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A REVISION OF THE TRIBE MACROSIPHINI OF JAPAN

(HOMOPTERA: APHIDIDAE, APHIDINAE)*

By MASAHISA MIYAZAKI
Entomological Institute, Faculty of Agriculture
Hokkaido University, Sapporo

Introduction

The Macrosiphini constitute a large group of aphids, being represented by more than 1000 described species in the world. This group is considered to be of rather recent origin and it seems that explosive evolution is in progress in this group even at present. The species are highly divergent in both morphology and biology. Insofar as their habits are known, the species of this tribe live on vast kinds of dicotyledons and monocotyledons. Furthermore, some species are found on conifers, ferns and mosses. So far as the primary hosts are concerned, however, it is known that the main body of this tribe is primarily associated with Rosaceae.

From the economic point of view, the Macrosiphini are of great importance, including many serious pests of economic plants. They interfere with the growth of host plants by the removal of sap and, in addition, often cause serious damages by transmitting various plant-viruses. For instance, *Myzus persicae* (Sulzer) and *Acyrthosiphon solani* (Kaltenbach) are counted among the worst pests of various kinds of growing crops and garden-plants, disseminating about 100 and 35 different sorts of plant virus diseases respectively.

The taxonomic studies on the Macrosiphini of Japan have been made mainly by Takahashi, Matsumura, Hori, Shinji and Moritsu. Since 1964, I have made a taxonomic study on aphids and the main purpose of the present paper is to review and arrange the members of the tribe Macrosiphini occurring in Japan according to the recent taxonomic knowledge. In this paper will be given 240 species, of which 26 are new to science and 13 new to Japan. Furthermore, 3 new genera are described. All the types of the new species described herein are deposited in the collection of the Entomological Institute, Hokkaido University.

Before going further, I wish to express my cordial thanks to Prof. C. Watanabe of the Hokkaido University for his continuous kind guidance and encouragement in the course of the study. I am especially obliged to Dr. D. Hille Ris Lambers of Bennekom, Netherlands, and Dr. V. F. Eastop of the British Museum for the valuable specimens for comparison and literature and for their helpful opinions. Many thanks are also due to Dr. M. Moritsu of the Yamaguchi University, Dr. M. Sorin of the Kogakukan University, Dr. W. H. Paik of the Seoul National University and Dr. C. C. Tao of the Taiwan Agricultural Research Institute for their kind help in various ways.

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Systematics

Family **Aphididae**

Subfamily **Aphidinae**

Tribe **Macrosiphini**

The Aphidinae are divided into 2 tribes, Macrosiphini and Aphidini. The Macrosiphini are distinguished from the Aphidini in having the 1st and 2nd abdominal spiracles situated closely to each other and by the 1st and 7th abdominal segments wanting marginal tubercles; if the marginal tubercles are present on the 1st abdominal segment, then they are placed much dorsally to the spiracles.

In the course of the present study have been known to occur in Japan 74 genera, which may be distinguished by the following key.

Key to the genera I*

1 Siphunculus reticulated at apex. . . . . Key II
– Siphunculus not reticulated at apex. 2
2(1) Cauda broadly round or semicircular. . . . . Key III
– Cauda conical, tongue-shaped or pentagonal. 3
3(2) Prothorax with 4 setae dorso-mesially. . . . . Key IV
– Prothorax with 2 setae dorso-mesially or with many dorsal setae arranged irregularly. . . 4
4(3) Antennal tubercles undeveloped, if developed then median tubercle of head conspicuous, about as high as antennal tubercles. . . . . Key V
– Antennal tubercles developed, though very low in some genera; median tubercle of head, if any, lower than antennal tubercles. 5
5(4) Antenna without secondary rhinaria on 3rd segment. . . . . Key VI
– Antenna with secondary rhinaria on 3rd segment. 6
6(5) Head always scabrous at least ventrally; antennal tubercles gibbous or protruding inward at inner apex. . . . . Key VII
– Head smooth or scabrous; antennal tubercles diverging or parallel, rarely slightly converging at inner sides. . . . . Key VIII

Key to the genera II

1 Head granulated; antennal tubercles converging at inner sides. On *Polygonum*. . . . . 40. *Myzosiphum* Tao
– Head smooth or spinulated; antennal tubercles not converging at inner sides. 2
2(1) Siphunculus swollen. 3
– Siphunculus cylindrical. 4
3(2) Spiracular sclerites of thorax strongly produced, with opening very large and round. Siphunculus slender, paler than cauda basally. On *Aconitum* & *Delphinium*. . . . . 8. *Delphiniobium* Mordvilko
– Spiracular sclerites of thorax not strongly produced, with opening of normal size. Siphunculus stout, barrel-shaped or strongly attenuated apically, wholly black as well as cauda. On

* In this paper, keys are based on the apterous viviparous females unless otherwise stated.

Staphylea & *Hemerocallis*. . . . . 9. *Indomegoura* Hille Ris Lambers

4(2) Head densely spinulous over dorsum and venter. Antenna without secondary rhinaria. Cauda shortly triangular, with a constriction at middle. On ferns. . . . . 21. *Macromyzus* Takahashi

– Head very sparsely spinulous or smooth at least dorsally. Antenna with secondary rhinaria. Cauda elongate. 5

5(4) First tarsal chaetotaxy 3 : 3 : 3. 6

– First tarsal chaetotaxy 4 : 4 : 4 or 5 : 5 : 5. 10

6(5) Head spinulated dorsally and ventrally; median tubercle as high as antennal tubercle; front shallowly W-shaped. Antenna with only 1 rhinarium on 3rd segment. Abdomen with scleroites at base of dorsal setae. On *Limonium*. . . . . 7. *Staticobium* Mordvilko

– Head smooth at least dorsally; median tubercle, if any, much lower than antennal tubercle; front weakly concave or U-shaped. Antenna usually with many rhinaria on 3rd segment. Abdomen with or without scleroites at base of dorsal setae. 7

7(6) Siphunculus reticulated at least on apical 1/3, usually as long as or shorter than cauda. Antesiphuncular sclerite almost always developed; postsiphuncular sclerite usually absent, if present smaller than antesiphuncular sclerite. On Compositae (*Artemisia*, *Aster* and their relatives). . . . . 3. *Macrosiphoniella* del Guercio

– Siphunculus reticulated on less than apical 1/3, always distinctly longer than cauda. Antesiphuncular sclerite present or absent, if present smaller than postsiphuncular sclerite which is almost always developed. 8

8(7) Abdomen with tergum membranous, with scleroites at base of dorsal setae. On Compositae. . . . . 5. *Dactynotus* Rafinesque (part., see II, 11)

– Abdomen with tergum membranous or uniformly sclerotized, without scleroites. 9

9(8) Head spinulous ventrally; antennal tubercle very high. Abdominal tergum sclerotized and pigmented. On *Sorbaria* & *Corylus*. . . . . 2. *Unisitobion* Takahashi

– Head smooth; antennal tubercle high or low, if high then abdominal tergum always pale and membranous. On various plants. . . . . 1. *Macrosiphum* Passerini

10(5) First segment of all tarsi with 2 sense pegs and 2 lateral setae. Abdomen with marginal sclerites well developed on 2nd–6th segments, without scleroites at bese of dorsal setae. On *Codonopsis*. . . . . 6. *Meguroleucon*, gen. n.

– First segment of all tarsi with 1 sense peg and 4 lateral setae. Abdomen with marginal sclerites developed only on 5th and 6th segments or with scleroites at base of dorsal setae. 11

11(10) Body with many irregularly arranged setae very long and flagellate. Siphunculus with many long setae. Head with antennal tubercles low; front weakly concave. . . . . 4. *Macrotrichaphis*, gen. n.

– Body with sparse, more or less regularly arranged setae moderately long and stiff. Siphunculus without setae. Head with antennal tubercles well developed; front U-shaped. On Compositae & Campanulaceae. . . . . 5. *Dactynotus* Rafinesque (part., see II, 8)

Key to tha genera III

1 Antenna with rhinaria on 3rd segment. 2

– Antenna without rhinaria on 3rd segment. 3

2(1) Abdomen with a large central sclerite. Siphunculus black, imbricated. Tarsi shorter than ultimate rostral segment. In alate viviparous female antenna with secondary rhinaria on 3rd and 4th segments; abdomen with a large central sclerite fused with marginal sclerites. On *Rhamnus* & *Polygonum*. . . . . 69. *Macchiatiella* del Guercio

– Abdomen without any sclerotization. Siphunculus fuscous, striated with faint transverse wrinkles. Tarsi longer than ultimate rostral segment. In alate viviparous female antenna with secondary rhinaria confined to 3rd segment; abdomen only with small sclerites me-

sially. On *Lonicera*. . . . . 68. *Amphicercidus* Oestrund

3(1) Ultimate rostral segment acute, concave marginally. Siphunculus without flange. In alate viviparous female abdomen without sclerites dorsally. On *Artemisia*. . . . . 66. *Cryptosiphum* Buckton

– Ultimate rostral segment not acute, straight or convex marginally. Siphunculus with flange. In alate viviparous female abdomen with developed sclerites dorsally. 4

4(3) Siphunculus smooth, with a clear-cut annular incision below flange. Tergum uniformly sclerotized, with sparse stiff setae. Abdominal spiracles round. In alate viviparous female antenna with flat-facetted rhinaria on 3rd and 4th segments; abdomen with a large central patch extending on 2nd–6th segments. On *Prunus* and various genera of Compositae. . . . . 67. *Brachycaudus* van der Goot

– Siphunculus imbricated, usually without annular incision below flange. Tergum membranous, if sclerotic then with many setae stiff and very long. Abdominal spiracles reniform. In alate viviparous female antenna with strongly protuberant secondary rhinaria on 3rd and 4th or on 3rd–5th segments; abdomen with transverse bands or a large patch. 5

5(4) First tarsal chaetotaxy 4 : 4 : 2. In alate viviparous female, abdomen with a large central sclerite. On *Sorbus*. . . . . 71. *Sorbaphis* Shaposhnikov

– First tarsal chaetotaxy 3 : 3 : 2. In alate viviparous female, abdomen with transverse bands. On *Pyrus*, *Artemisia* & *Ranunculus*. . . . . 70. *Sappaphis* Matsumura

Key to the genera IV

1 Prothorax with 4 setae arranged in a transverse line posteriorly. 2

– Prothorax with 2 pairs of mesial setae arranged in anterior and posterior pairs. 3

2(1) Dorsal setae of body pointed. Head and abdominal disc spinulous. Siphunculus rather short, tapering, with transvers rows of spinules. On *Trifolium*. . . . . 73. *Nearctaphis* Shaposhnikov

– Dorsal setae of body funnel-shaped. Head and abdominal disc not spinulous. Siphunculus elongate, cylindrical or swollen apically, imbricated. On *Artemisia* & *Chrysanthemum*. . . . . 59. *Coloradoa* Wilson

3(1) Dorsal setae of body long, stout and capitate at least on head and posterior part of abdomen. 4

– Dorsal setae of body pointed, sometimes minute and blunt but not capitate. 6

4(3) Head smooth. Ultimate rostral segment stiletto-shaped. Abdominal tergum membranous. On *Elaeagnus* and various genera of Compositae & Polygonaceae. . . . . 23. *Capitophorus* van der Goot

– Head scabrous. Ultimate rostral segment not stiletto-shaped. Abdominal tergum often sclerotized and sculptured. 5

5(4) Antennal tubercle with a finger-like projection. Abdominal tergum sclerotic, with irregularly shaped papillae. Larva with hind tibia not spinulated. On *Cannabis*. . . . . 34. *Diphorodon* Börner

– Antennal tubercle without a finger-like projection. Abdominal tergum membranous or sclerotic, sometimes papillated. Larva with hind tibia densely spinulated. On *Clethra* & *Rubus*. . . . . 28. *Matsumuraja* Schumacher

6(3) Antennal tubercle high, with a long finger-like projection. Spiracles of 1st–5th abdominal segments minute, those of 6th and 7th large. Cauda roundly diamond-shaped apically, cylindrical basally. In alate viviparous female antenna with primary rhinaria surrounded by very large accessory sensoria. On Ericaceae & Polygonaceae. . . . . 30. *Akkaia* Takahashi

– Antennal tubercle low or not developed at all, without any finger-like projection. Spiracles of abdomen normal. Cauda not diamond-shaped apically. In alate viviparous female antenna with primary rhinaria normal. 7

7(6) Head with front strongly produced forward into a ledge or bearing 3 projections, with a low swelling between antennal socket and eye. Larva with hind tibia densely spinulated. On Ericaceae & Cyperaceae. . . . . 29. *Vesiculaphis* del Guercio

– Head with front not produced into a ledge and not bearing projections, without a swelling between antennal socket and eye. Larva with hind tibia smooth or sparsely spinulated. . 8

8(7) Abdomen with marginal tubercles on first 5 segments; tergum membranous, with many scleroites. Cauda pentagonal. Siphunculus tapering, at most 3 times as long as wide at base. On various plants. . . . . 72. *Dysaphis* Börner (part., see V, 6)

– Abdomen without marginal tubercles on 1st segment, with or without them on the 2nd–5th; tergum sclerotized or membranous, without scleroites except in certain species of *Elatobium*. Cauda conical or tongue-shaped. Siphunculus cylindrical, tapering or swollen apically, more than 3 times as long as wide at base. 9

9(8) Head with sparse spinules ventrally. Abdomen with 8th segment bearing a low mesial tubercle and 4 setae. On *Polygonum*. . . . . 55. *Tricaudatus* Narzikulov

– Head without spinules ventrally. Abdomen with 8th segment bearing a mesial tubercle or not, if tubercle present then only 2 setae on the segment. 10

10(9) Head with antennal tubercles undeveloped; front roundly convex. Abdomen with 8th segment bearing 2 setae and a mesial tubercle variable from a very long process to an indistinct swelling. On Salicaceae, Araliaceae & Umbelliferae. . . . . 57. *Cavariella* del Guercio

– Head with antennal tubercles more or less developed; front U- or W-shaped. Abdomen with 8th segment bearing 4 or more setae, wanting a mesial tubercle. 11

11(10) Siphunculus cylindrical. On *Abies, Picea, Salix, Trochodendron, Rhododendron* and a plant of Umbelliferae. . . . . 56. *Elatobium* Mordvilko

– Siphunculus strongly swollen. On *Berberis*. . . . . 54. *Liosomaphis* Walker

Key to the genera V

1 First tarsal chaetotaxy 5 : 5 : 5. 2

– First tarsal chaetotaxy 3 : 3 : 3 or 3 : 3 : 2. 4

2(1) Siphunculus much shorter than cauda. Abdominal tergum smooth. Ultimate rostral segment shorter than hind tarsus. In alate viviparous female 3rd antennal segment longer than 4th–6th segments together, with many bulging rhinaria. On *Rosa & Thalictrum*. . . . . 27. *Longicaudus* van der Goot

– Siphunculus much longer than cauda. Abdominal tergum papillated. Ultimate rostral segment as long as or longer than hind tarsus. In alate viviparous female 3rd antennal segment much shorter than 4th–6th segments together, with fewer (less than 20), flat-facetted rhinaria. 3

3(2) Abdomen with minute spatulate setae. Head with median tubercle developed into a rectangular process. On *Potentilla*. . . . . 25. *Myzaphis* van der Goot

– Abdomen with long capitate setae. Head with median tubercle round or widely rectangular. On *Rosa*. . . . . 26. *Chaetosiphon* Mordvilko (part., see VI, 4)

4(1) Head with 3 projections on front. Antenna 4- or 5-segmented; 1st segment strongly angulated at inner apex; processus terminalis at most a little longer than basal part of 6th segment. Siphunculus spoon-shaped, without flange. On *Salix*. . . . . 58. *Aspidophorodon* Verma

– Head without projections on front. Antenna 6-segmented; 1st segment not angulated at inner apex; processus terminalis much longer than basal part of 6th segment. Siphunculus variously shaped, with a distinct flange, if lacking flange then shortly truncated conical, often bending inwards. 5

5(4) Siphunculus distinctly longer than cauda. 6

– Siphunculus shorter than cauda. 8

6(5) Abdomen with marginal tubercles on first 5 segments. Cauda angulate at apex, as long as or a little longer than wide. On various plants. . . 72. *Dysaphis* Börner (part., see IV, 8)
– Abdomen without marginal tubercles on 1st segment, with or without them on the 2nd–5th. Cauda blunt at apex, distinctly longer than wide. 7
7(6) Abdominal tergum sclerotized and papillated. Head very shallowly W-shaped at front. Siphunculus pale. Ultimate rostral segment longer than 2nd segment of hind tarsus. On *Artemisia*. . . . . 60. *Micraphis* Takahashi
– Abdominal tergum membranous and smooth. Head conspicuously W-shaped at front. Siphunculus dark. Ultimate rostral segment shorter than 2nd segment of hind tarsus. On Cruciferae. . . . . 62. *Lipaphis* Mordvilko
8(5) Siphunculus without a distinct flange, not longer than wide, if longer then bent inwards. On *Impatiens*, *Leersia* and various genera of Umbelliferae. . . 63. *Semiaphis* van der Goot
– Siphunculus with a distinct flange, much longer than wide, not bent inwards. 9
9(8) Abdomen with sclerotic transverse bands dorsally, which are sometimes divided into small sclerites. Cauda shortly conical, only a little longer than wide. On Cruciferae. . . . . 61. *Brevicoryne* van der Goot
– Abdomen without sclerotic bands and sclerites. Cauda elongate, round at apex. . . . 10
10(9) In alate viviparous female abdomen without a central patch. On *Chenopodium*. . . . . 64. *Hayhurstia* del Guercio
– In alate viviparous female abdomen with a central patch. On *Colydaris*. . . . . 65. *Longicaudinus* Hille Ris Lambers

Key to the genera VI

1 In alate viviparous female tarsi with 1st segment bearing 2 sense pegs and 2 lateral setae; primary rhinaria of 5th and 6th segments very large, without cilia. (Apterous viviparous females unknown). On *Deutzia*. . . . . 74. *Nippodysaphis* Hille Ris Lambers
– In alate viviparous female tarsi with 1st segment bearing 0 or 1 sense peg and 2–4 lateral setae, if 2 sense pegs present then primary rhinaria on 5th and 6th antennal segments small, with cilia. 2
2(1) Tarsi reduced, without claws; first tarsal chaetotaxy 1 : 0 : 0. On *Viburnum* & *Pteridium*. . . . . 52. *Shinjia* Takahashi
– Tarsi normal, with a pair of claws; first tarsal chaetotaxy otherwise. 3
3(2) First tarsal chaetotaxy 5 : 5 : 5. 4
– First tarsal chaetotaxy otherwise. 5
4(3) Dorsal setae of body not capitate; antennal setae very long. Abdominal tergum smooth. Mesosternal furca with a broad stem. On *Clynopodium* . . . 19. *Chaitomyzus* Takahashi
– Dorsal setae of body capitate; antennal setae short. Abdominal tergum papillated. Mesosternal furca sessile. On *Fragaria*. . . . . 26. *Chaetosiphon* Mordvilko (part., see V, 3)
5(3) Body with numerous setae long, thin and flagellate. First segment of all tarsi with only 2 setae much removed toward base of the segment. On *Illicium*. . . . . 53. *Polytrichaphis*, gen. n.
– Body with sparse setae, if many setae present then the setae are stiff and not flagellate. First segment of all tarsi with 3–5 setae, if only 2 setae present then the setae are situated near apex of the segment. 6
6(5) Siphunculus with some setae. 7
– Siphunculus without setae. 8
7(6) Abdominal disc areolated with spinules, with pointed setae as long as or longer than half width of 3rd antennal segment. Siphunculus rather thick-set, 3.0–5.5 times as long as wide at middle, often weakly curved in a reversed S-shape. In alate viviparous female abdomen usually with sclerotic bands. On *Prunus* & *Artemisia*. . . . . 31. *Tuberocephalus* Shinji (part., see VI, 10)

- Abdominal disc corrugated or finely craped, not areolated, with setae blunt and minute. Siphunculus slender, nearly straight, at least 6 times as long as wide at middle. In alate viviparous female abdomen without mesial sclerites. On *Lonicera* & *Polygonum*. . . . . 43. *Trichosiphonaphis* Takahashi

8(6) Siphunculus narrowest at middle, without flange. On *Stachyurus* & *Conandron*. . . . . 32. *Jacksonia* Theobald

- Siphunculus various in shape, with flange; if wanting flange then tapering. 9

9(8) Antennal tubercle with a finger-like projection much longer than wide. Antenna with 1st segment strongly protruding at inner apex. 10

- Antennal tubercle rounded or with a projection at most as long as wide. Antenna with 1st segment not protruding at inner apex. 11

10(9) Eye without a distinct triommatidion. Antenna 4- or 5-segmented. In alate viviparous female antenna with secondary rhinaria on 3rd-5th segments; abdomen usually with sclerotic bands. On *Artemisia*. . . . . 31. *Tuberocephalus* Shinji (part., see VI, 7)

- Eye with a distinct triommatidion. Antenna 6-segmented. In alate viviparous female antenna with secondary rhinaria on 3rd and 4th segments; abdomen with a large sclerite on abdominal disc. On *Humulus*. . . . . 33. *Phorodon* Passerini (part., see VI, 19)

11(9) First segment of all tarsi with 2 sense pegs and 2 lateral setae. On *Weigela*. . . . . 41. *Micromyzus* van der Goot (part., see VII, 3)

- First segment of all tarsi with 0 or 1 sense peg and 2 lateral setae. 12

12(11) Abdomen with dorsal setae longer than middle width of 3rd antennal segment. 13

- Abdomen with dorsal setae shorter than middle width of 3rd antennal segment. 16

13(12) Siphunculus short, at most about 5 times as long as wide at middle. Antenna much shorter than body. Abdominal tergum with scleroites at base of setae or uniformly sclerotized. First tarsal chaetotaxy 3 : 3 : 2. On *Impatiens* & *Clynopodium*. . . . 18. *Eumyzus* Shinji

- Siphunculus long, over 7 times as long as wide at middle. Antenna about as long as or longer than body. Abdominal tergum membranous or sclerotized, without scleroites at base of setae. First tarsal chaetotaxy 3 : 3 : 3. 14

14(13) Antenna much longer than body; 3rd segment with setae shorter than middle width of the segment. Larva with spinules on hind tibia. On ferns & *Digitaria*. . . . . 20. *Micromyzodium* Kanakaraj David

- Antenna about as long as body; 3rd segment with setae about as long as or longer than middle width of the segment. Larva without spinules on hind tibia. 15

15(14) Cauda elongately conical. Siphunculus not dilated apically. In alate viviparous female abdomen with mesial sclerites not consolidated. On *Perilla*. . . . 17. *Eomyzus* Takahashi

- Cauda shortly conical or shortly tongue-shaped. Siphunculus slightly dilated apically. In alate viviparous female abdomen with a large central sclerite. On *Impatiens* & *Laportea*. . . . . 16. *Hydronaphis* Shinji (part., see VIII, 10)

16(12) Siphunculus cylindrical, puffed subapically, densely spinulous. Dorsal setae of body short, stout, dilated toward tip. In alate viviparous female fore wing with radial sector joined to media. On *Musa* and various other genera of plants. . . . . 42. *Pentalonia* Coquerel

- Siphunculus cylindrical, tapering or gradually swollen, imbricated. Dorsal setae of body rather thin, pointed or inverted bottle-shaped, often minute. In alate viviparous female fore wing with radial sector not joined to media. 17

17(16) Head spinulated. Siphunculus stout, swollen at middle, about 4.5 times as long as wide at middle. Alate viviparous female with transverse bands on abdomen. On *Lonicera*. . . . . 49. *Neorhopalomyzus* Tao

- Head granulated or spinulated. Siphunculus cylindrical or swollen, if swollen then alate viviparous female with a central patch on abdomen. 18

18(17) Antennal tubercles roundly diverging at inner sides, each with a forwardly protruding tubercle at inner apex. Cauda without conspicuous constriction at extreme base. . . . 19

- Antennal tubercles diverging, parallel or converging at inner sides, without a projection

at inner apex, if a projection present then cauda constricted at extreme base. . . . 20

19 (18) Alate viviparous female without sclerites on abdominal disc. On Rosaceae (Pomoidea), Labiatae & Compositae. . . . . 35. *Ovatus* van der Goot

– Alate viviparous female with a developed sclerite on abdominal disc. On *Prunus*. . . . . 33. *Phorodon* Passerini (part., see VI, 10)

20 (18) Antennal tubercles parallel or slightly diverging at inner sides, not gibbous. Abdominal tergum pigmented. On *Microstegium* & *Digitaria*. . . . . 39. *Kaochiaoja* Tao

– Antennal tubercles gibbous, often conspicuously converging at inner sides, rarely roundly diverging. Abdominal tergum pale or pigmented. 21

21 (20) In alate viviparous female, wings with veins strongly bordered with black. On *Allium* & *Abelia*. . . . . 37. *Neotoxoptera* Theobald

– In alate viviparous female, wings with veins not or only faintly bordered with black. On various plants. . . . . 36. *Myzus* Passerini

Key to the genera VII

1 Antennal tubercles low, gibbous, not converging at inner sides. Head smooth or corrugated dorsally, sparsely spinulous ventrally. On *Rhus, Juncus* & *Carex*. . . . . 44. *Juncomyzus* Hille Ris Lambers

– Antennal tubercles developed, converging at inner sides. Head densely spinulous or granulous. 2

2 (1) Siphunculus cylindrical. 3

– Siphunculus swollen. 4

3 (2) Mesosternal furca with a stem. Abdominal tergum ornamented. Larva with hind tibia spinulous. On various plants. . . . . 38. *Neomyzus* van der Goot

– Mesosternal furca sessile. Abdominal tergum pale. Larva with hind tibia smooth. On ferns. . . . . 41. *Micromyzus* van der Goot (part., see VI, 11)

4 (2) Antenna with secondary rhinaria distributed beyond basal half of 3rd segment and sometimes also on 4th. Abdominal tergum sclerotic and pigmented. Siphunculus black, sometimes pale at middle. On *Astilbe* & *Chrysosplenium*. . . . . 45. *Taiwanomyzus* Tao

– Antenna with secondary rhinaria confined to basal half of 3rd segment. Abdominal tergum membranous or sclerotized, not pigmented. Siphunculus pale, at most fuscous at apex. . . 5

5 (4) Rhinaria on 3rd antennal segment protuberant, not fringed. On *Heracleum* & *Potentilla*. . . . . 48. *Paramyzus* Börner

– Rhinaria on 3rd antennal segment not protuberant, fringed. 6

6 (5) Abdomen with tergum sclerotized and corrugated. Head granulated. On ferns. . . . . 46. *Utamphorophora* Knowlton

– Abdomen with tergum membranous, smooth or finely wrinkled. Head spinulated. On *Cryptotaenia* & *Anemone*. . . . . 47. *Galiaphis* Ossiannilsson

Key to the genera VIII

1 Siphunculus swollen. 2

– Siphunculus cylindrical. 7

2 (1) Spiracles round. 3

– Spiracles reniform. 4

3 (2) Dorsal setae of body long and capitate. Cauda short, at most about 1.5 times as long as wide. Antenna with secondary rhinaria bunching on basal half of 3rd segment, without them on 4th. On *Ribes* & *Lamium*. . . . . 24. *Cryptomyzus* Oestrund

– Dorsal setae of body short, not capitate. Cauda elongate, at least about twice as long as wide. Antenna with secondary rhinaria scattered along whole length of 3rd segment, often also with some on 4th. On *Ribes* and various genera of Compositae (*Sonchus* and its relatives). . . . . 50. *Hyperomyzus* Börner

4(2) Abdomen with developed antesiphuncular sclerites. Head quite smooth. On Leguminosae. . . . . 11. *Megoura* Buckton
- Abdomen without developed antesiphuncular sclerites. Head smooth or scabrous. . . . 5
5(4) Siphunculus slender, only slightly swollen. Head spinulated dorsally and ventrally. In alate viviparous female antenna with secondary rhinaria only on 3rd segment. On various plants. . . . . 13. *Acyrthosiphon* Mordvilko (part., see VIII, 11)
- Siphunculus stout, conspicuously swollen. Head at least smooth dorsally, if scabrous dorsally then antenna of alate viviparous female bears secondary rhinaria on 3rd and 4th segments. 6
6(5) Head without median tubercle; frontal sinus deeply U-shaped (nearly as deep as length of 2nd antennal segment). Mesosternal furca with a stem as long as or longer than wide. Siphunculus swollen gently. In alate viviparous female abdomen without central sclerites; antenna with secondary rhinaria only on 3rd segment. On *Rubus*, *Filipendula* & ferns. . . . . 10. *Amphorophora* Buckton
- Head with median tubercle often well developed; frontal sinus widely U-shaped or W-shaped. Mesosternal furca sessile or shortly stemmed. Siphunculus often abruptly swollen. In alate viviparous female abdomen with a large central sclerite; antenna often with secondary rhinaria on 4th and 5th segments as well as on the 3rd. On *Deutzia*, *Hydrangea*, *Weigela*, *Tilia* & *Adenocaulon*. . . . . 51. *Rhopalosiphoninus* Baker
7(1) Dorsal setae of body numerous in number, funnel-shaped apically. Ultimate rostral segment acute, concave laterally, with basal 2 setae much longer than others. On *Artemisia*. . . . . 22. *Pleotrichophorus* Börner
- Dorsal setae of body sparse, not funnel-shaped apically. Ultimate rostral segment obtuse, straight or convex laterally, with basal 2 setae not much longer than others. 8
8(7) Abdominal tergum uniformly sclerotized and pigmented. Head smooth. On *Smilax* & *Impatiens*. . . . . 14. *Impatientinum* Mordvilko
- Abdominal tergum membranous or sclerotized, not pigmented, if sclerotized and pigmented then head scabrous. 9
9(8) Dorsal setae of body distinctly longer than width of 3rd antennal segment. 10
- Dorsal setae of body shorter than width of 3rd antennal segment. 11
10(9) Abdominal tergum reticulated with spinules anteriorly. Antenna with 3rd segment bearing a few (1–3) rhinaria near base. On *Impatiens*. . . 16. *Hydronaphis* Shinji (part., see VI, 15)
- Abdominal tergum smooth anteriorly. Antenna with 3rd segment bearing more (1–14) rhinaria often distributed on its whole length. On *Gelanium*, *Plectranthus* & *Mentha*. . . . . 15. *Cryptaphis* Hille Ris Lambers
11(9) Abdominal tergum membranous, reticulated. Siphunculus tapering, short, less than 1.5 times as long as cauda. Mesosternal furca sessile. On *Photinia*, *Cinnamomum* and various other genera of plants. . . . . 12. *Sinomegoura* Takahashi
- Abdominal tergum membranous or sclerotized, not reticulated. Siphunculus cylindrical or tapering, over 1.5 times as long as cauda. Mesosternal furca usually with a stem. On various plants. . . . . 13. *Acyrthosiphon* Mordvilko (part., see VIII, 5)

1. Genus ***Macrosiphum*** Passerini

Siphonophora Koch, 1855: 150 (nec *Siphonophora* Brandt, 1837) [type-species: *Aphis rosae* Linné, 1758].

Macrosiphum Passerini, 1860: 27 [type-species: *Aphis rosae* Linné, 1758].

Sitobion Mordvilko, 1914: 65 [type-species: *Aphis avenae* Fabricius, 1775].

This genus is widely distributed over the world, feeding on various kinds of plants. In Japan about 50 species have hitherto been described in this genus. However, the greater part of them should be transferred to various other genera. In the present

study 9 species have been known to occur in Japan.

A detailed synonymy of the genus is given by Hille Ris Lambers (1939).

Key to the species

1 Abdominal tergum membranous and pale. Antennal tubercle high. Median tubercle of head undeveloped. 2

– Abdominal tergum sclerotized, often pigmented. Antennal tubercle low. Median tubercle of head often conspicuous. 5

2(1) Antenna with basal part of 6th segment as long as or longer than 1st and 2nd segments together. On *Cornus*. . . . . 4. *M. cornifoliae* Shinji

– Antenna with basal part of 6th segment distinctly shorter than 1st and 2nd segments together. 3

3(2) Siphunculus wholly black. Antenna with 3rd segment bearing more than 20 rhinaria distributed on basal 4/5 or more of the segment. On *Rosa* . . . . 1. *M. mordvilkoi* Miyazaki

– Siphunculus pale basally. Antenna with 3rd segment bearing less than 20 rhinaria confined to basal half. 4

4(3) Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus. Siphunculus black, pale at extreme base, distinctly attenuated at reticulated area, over 1/3 as long as body. On *Clematis*. . . . . 2. *M. clematifoliae* Shinji

– Ultimate rostral segment about as long as 2nd segment of hind tarsus. Siphunculus pale, often dusky apically, scarcely or weakly attenuated at reticulated area, less than 1/3 as long as body. On various plants. . . . . 3. *M. euphorbiae* (Thomas)

5(1) Femora densely spinulated on apical 3/4 or more. Antenna imbricated on 1st and 3rd segments. Dorsal setae of body minute, those on cephalic disc being about 1/4 as long as middle width of 3rd antennal segment. On *Rosa*, *Rubus*, *Digitaria* & *Microstegium*. . . . . 9. *M. rubiphila* Takahashi

– Femora at most spinulated on apical half. Antenna smooth on 1st and 3rd segments. Dorsal setae of body long, those on cephalic disc much longer than 1/4 of middle width of 3rd antennal segment. 6

6(5) Antennal tubercle without a mid-ventral seta. In apterous viviparous female antenna with 1–5 rhinaria on 3rd segment, in alate viviparous female with less than 15 rhinaria arranged in a line. 7

– Antennal tubercle with a mid-ventral seta. In apterous viviparous female antenna with 4–10 rhinaria on 3rd segment, in alate viviparous female about 35–55 rhinaria arranged irregulary. 8

7(6) Antenna with 3rd segment bearing setae at most as long as half middle width of the segment. Siphunculus less than 1/3 of body length. Abdominal tergum pale or pigmented. On various plants. . . . . 5. *M. akebiae* Shinji

– Antenna with 3rd segment bearing setae as long as or longer than half middle width of the segment. Siphunculus about 1/3 as long as body. Abdominal tergum pigmented. On *Smilax*. . . . . 6. *M. smilacifoliae* Takahashi

8(6) Primary rhinarium of 5th antennal segment large, nearly occupying whole breadth of the segment. Abdominal tergum usually pigmented. Ultimate rostral segment 1.4–1.6 times as long as wide. On *Eccoilopus*. . . . . 7. *M. yasumatsui* Moritsu

– Primary rhinarium of 5th antennal segment distinctly smaller in diameter than width of the segment. Abdominal tergum usually not pigmented (pigmented in summer form). Ultimate rostral segment 1.7–2.1 times as long as wide. On *Rosa*. . . . . 8. *M. ibarae* Matsumura

1. ***Macrosiphum mordvilkoi*** Miyazaki

Macrosiphum rosae orientale Mordvilko, 1919: 451 (nec *Macrosiphum orientale* van der Goot,

1912).

Macrosiphum mordvilkoi Miyazaki, 1968 b : 277.

Specimens examined*: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo, Obihiro, Kunneppu, Kitami-mombetsu & Kita-moshiri. Honshû—Utsunomiya.

Host plants: All the specimens examined were collected from *Rosa rugosa*.

Distribution: Japan; Korea; Siberia (Primorskaya).

2. ***Macrosiphum clematifoliae*** Shinji

Macrosiphum clematifoliae Shinji, 1924 : 361.
Macrosiphum sp., Takahashi, 1924 : 19.
Macrosiphum clematidis Takahashi, 1927 : 2. **Syn. n.**
Macrosiphum clematidis: Takahashi, 1964 : 355; Tao, 1963 : 195.
Macrocaudus clematii Shinji, 1941 : 792. **Syn. n.**

This species is readily distinguished from any other congeneric species of Japan by the long siphunculus which are pale just basally.

Fundatrix. Differs from the apterous viviparous female in the following points:— Head with setae about 20–35 μ in length, 1/3–3/5 of middle width of 3rd antennal segment. Antenna 1.2 times as long as body; 3rd segment with about 6 rhinaria, with setae about as long as half middle width of the segment; processus terminalis 3 times as long as basal part of 6th; 3rd–6th as 100 : 66 : 70 : 20+65 in length. Mesosternal furca sessile. Ultimate rostral segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Siphunculus about 1/3 of body length, 1.7–2.0 times as long as cauda, not attenuated at apex where only a few rows of hexagonal cells are present.

Measurements in mm.** Body 2.8; antennal segments (1st–6th): 0.20, 0.11, 1.03, 0.58, 0.68, 0.23+0.65; ultimate rostral segment 0.16; hind femur 1.21; hind tibia 2.27; hind tarsus (2nd segment) 0.13; siphunculus 0.95 (reticulated area 0.05); cauda 0.40; longest dorsal seta 0.035 on head, 0.018 on abdominal disc, 0.040 on 8th abdominal segment.

Specimens examined: Fundatrices, Okutsu, Okayama Pref., 22-iv-66, ex *Clematis apiifolia*; Kumamoto, 18-iv-65, ex *C. apiifolia*. Many apterous viviparous females were collected at the following localities:— Honshû—Morioka, Iwate Pref.; Kawatabi, Miyagi Pref. Shikoku—Ichiu-mura, Tokushima Pref. (R. Takahashi leg.). Kyûshû—Takachiho, Miyazaki Pref.

Host plants: All the specimens examined were collected from *Clematis* spp. (including *C. apiifolia*).

Distribution: Japan; Taiwan.

Judging from the original descriptions, *Macrosiphum clematifoliae* Shinji, *Macrosiphum clematidis* Takahashi and *Macrocaudus clematii* Shinji agree well with each other except for the antennal rhinariation of the alate viviparous females. I am much inclined to the opinion that *clematidis* Takahashi and *clematii* Shinji should be suppressed as synonyms of *clematifoliae* Shinji.

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* The specimens are collected by the author unless otherwise stated.

** The measurements are given for one specimen. In this paper the body is measured by the length from the front to the end of the body excluding the cauda.

3. ***Macrosiphum euphorbiae*** (Thomas)

Siphonophora euphorbiae Thomas, 1878: 6.

Macrosiphum euphorbiae: Hille Ris Lambers, 1939: 84; Cottier, 1953: 208; Eastop, 1958: 46; Takahashi, 1964: 354.

Macrosiphum sobae Shinji, 1922: 787. **Syn. n.**

Macrosiphum sobae: Shinji, 1941: 883.

Specimens examined: Many apterous and some alate viviparous females were collected from the following localities:— Honshû—Kuriyagawa, Iwate Pref. (ex *Solanum tuberosum*, T. Oku leg.); Yokohama (ex *Tulipa gesneriana*); Tsumagoi, Gumma Pref. (ex *Solanum tuberosum*, K. Shibata leg.); Kamikôchi, Nagano Pref. (ex *Geum calthifolium*).

Host plants: Polyphagous.

Distribution: Cosmopolitan.

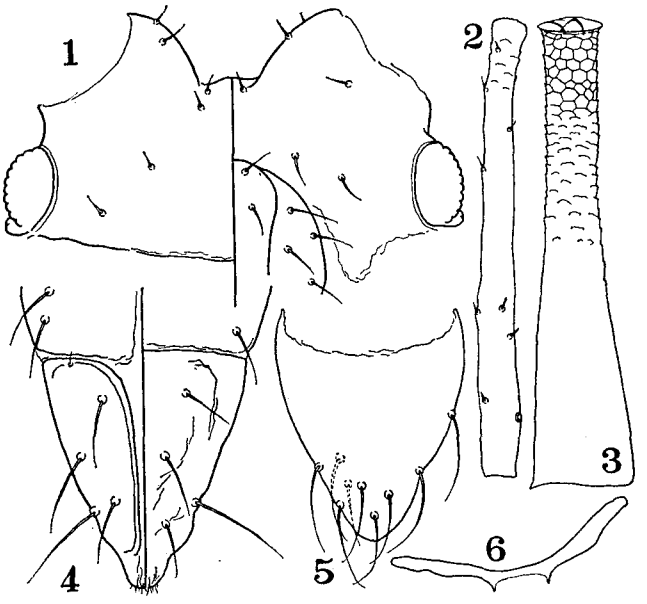

Fig. 1. *Macrosiphum cornifoliae* Shinji. Oviparous female:— 1, Head; 2, antenna (3rd segment); 3, siphunculus; 4, ultimate rostral segment; 5, cauda; 6, mesosternal furca.

4. ***Macrosiphum cornifoliae*** Shinji

Macrosiphum cornifoliae Shinji, 1924: 362.

Macrosiphum cornifoliae: Shinji, 1927: 63, 1941: 827 & 1944: 520.

This species is characterized by the mesosternal furca which is sessile, by the 6th antennal segment with the basal part long, by the rostrum with a short, obtuse ultimate segment, by the shortly tongue-shaped cauda, etc. On the basis of the present specimens, a redescription of the oviparous female is given below:—

Oviparous female. In cleared and mounted specimens body pale, without any ornamentation. Antenna pale; 3rd–5th segments at apex and 6th around primary

rhinarium black; processus terminalis fuscous. Siphunculus and cauda pale. Body 2.6–2.9 mm. in length.

Head with dorsal setae about 1/3–1/2 as long as middle width of 3rd antennal segment. Antennal tubercles developed, diverging at inner sides, each with 2 setae apically and sometimes a seta ventrally. Antenna 1.2–1.3 times as long as body; 3rd segment smooth, a little longer than 4th, with or without a rhinarium, with some setae about equal in length to those on dorsum of head; 4th imbricated, not longer than 5th; basal part of 6th longer than 1st and 2nd segments together; processus terminalis 3.0–3.5 times as long as basal part of 6th; 3rd–6th as 67 : 62 : 66 : 35+110 in length. Rostrum reaching middle coxa; ultimate segment obtuse, sligthtly longer than wide, as long as 2nd segment of hind tarsus, with 6–9 secondary setae. Tibiae with setae shorter than half width of middle tibia; hind tibia imbricated at apex, swollen, with numerous pseudosensoria; first tarsal chaetotaxy 3 : 3 : 3. Mesosternal furca sessile. Abdomen membranous, without sclerites and marginal tubercles; abdominal disc with setae about 3/5 as long as middle width of 3rd antennal segment; 8th segment with 5 or 6 setae 1.3–2.0 times as long as middle width of 3rd antennal segment. Siphunculus stout, gradually tapering toward apex, reticulated on apical 1/5–1/3, weakly imbricated basally, about 3.5–4.0 times as long as cauda, with a distinct flange. Cauda shortly tongue-shaped, with about 10 setae.

Measurements in mm. Body 2.9; antennal segments (1st–6th): 0.19, 0.10, 0.62, 0.60 0.63, 0.32+1.10; ultimate rostral segment 0.11: hind femur 1.02; hind tibia 1.95; hind tarsus (2nd segment) 0.11; siphunculus 0.75 (reticulated area 0.23); cauda 0.20; longest dorsal seta of head 0.015, that on 8th abdominal segment 0.075.

Specimens examined: Some oviparous females, Mashiko, Tochigi Pref., 18-xi-66, ex *Cornus kousa*, T. Tanaka leg.

Host plants: *Cornus kousa; Coruns brachypoda* (after Shinji, 1924).

Distribution: Japan; Korea.

By the courtesy of Dr. W. H. Paik, I have had the opportunity to examine an apterous viviparous female of the species from Korea (Suwon, 21-v-68, W. H. Paik leg.). It much resembles the oviparous female, only slightly differing as follows:— Antenna with 1 or 2 rhinaria on 3rd segment; basal part of 6th segment as long as 1st and 2nd together; length of 3rd–6th as 86 : 76 : 76 : 31+121. Ultimate segment of rostrum 0.9 as long as 2nd segment of hind tarsus, with 5 setae. Hind tibia slender, with setae slightly shorter than middle width of the tibia. Siphunculus darkened toward apex.

5. ***Macrosiphum akebiae*** Shinji

Macrosiphum akebiae Shinji, 1935b: 243.
Macrosiphum akebiae: Shinji, 1939b: 1 & 1941: 822.
Macrosiphum (Sitobion) avenae akebiae: Takahashi, 1964: 358; Paik, 1965: 78 [*Sitobion*].
Macrosiphum granarium: Hori, 1929: 62; Shinji, 1941: 851; Moritsu, 1944: 5.
Macrosiphum hagicola: Shinji, 1941: 855.

This species is variable in colouration and body size. In the specimens examined the body is green, yellowish green or orange-red, with the abdominal tergum pale or pigmented in various degree. Body is 2.0–3.5 mm. in length, larger specimens being found more frequently in spring generations than in the autumnal.

Specimens examined: Many fundatrices collected at Nagasaki (ex *Stellaria aqua-*

tica) and Sasebo, Nagasaki Pref. (ex *Platanus acerifolia*). An oviparous female from Ôsaka (ex *Akebia quinata*, M. Sorin leg.). A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Triticum aestivum*). Honshû—Morioka, Iwate Pref. (ex *Trifolium pratense*); Niigata (ex *Festuca rubra* var. *rubra* & *Tulipa gesneriana*); Tôkyô (ex *Triticum aestivum*, *Akebia quinata* & *Gladiolus gandavensis*, R. Takahashi leg.); Tashiro, Gumma Pref. (ex *Trifolium pratense*, R. Takahashi leg.); Ôsaka (ex *Agropyron ciliare* var. *minus*, R. Takahashi leg.). Kyûshû—Fukuoka (ex *Ranunculus japonicus*); Ômuta (ex *Akebia quinata* & *Rubus parvifolius*); Kumamoto (ex *Poa acroleuca*); Koniya, Amami-ôshima Isl. (ex *Ischaemum aristatum*).

Host plants: Polyphagous. It has been reported that this aphid is monoecious on wheat (Hori, 1929) or heteroecious, migrating from *Akebia* to various kinds of plants, mainly gramineous (Moritsu, 1944 and Takahashi, 1964). It should be noted here that in the course of the present investigation many fundatrices have been collected from *Stellaria aquatica* and *Platanus acerifolius*. This evidence suggests that the aphid may produce hibernating eggs on various kinds of plants.

Distribution: Japan; Korea.

6. ***Macrosiphum smilacifoliae*** Takahashi

Macrosiphum smilacifoliae Takahashi, 1921 b: 12.
Macrosiphum (*Sitobion*) *smilacifoliae*: Takahashi, 1964: 358; Tao, 1963: 192 [*Sitobion*].

According to the literature this aphid is green in life, with a deeply pigmented tergum. The specimens examined collected at Sasebo are, however, orange-red in colour and the pigmentation of the tergum is much reduced in some specimens.

Specimens examined: Some fundatrices and apterous viviparous females collected at the following localities:— Honshû—Iwami, Tottori Pref. (M. Sorin leg.). Kyûshû—Sasebo, Nagasaki Pref.

Host plants: All the specimens examined were collected from *Smilax china*.

Distribution: Japan; China; Taiwan.

7. ***Macrosiphum yasumatsui*** Moritsu

Macrosiphum yasumatsui Moritsu, 1958 a: 82.
Macrosiphum (*Sitobion*) *yasumatsui*: Takahashi, 1964: 356.

The present specimens slightly differ from diagnoses given by Moritsu (1958) and Takahashi (1964) in the following points:—

Apterous viviparous female. Abdominal tergum usually pigmented on 1st–7th segments, the pigmentation being much reduced in some specimens. Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus, with 6–8 secondary setae. Antenna with 2nd segment bearing 4 setae. Siphunculus 1.5–1.9 times as long as cauda, reticulated on apical 1/5–1/4.

Alate viviparous female. Antenna with 42–54 rhinaria on 3rd segment.

Specimens examined: Some apterous and alate viviparous females, Moroyama, Saitama Pref., 15-x-66, from a grass.

Host plants: A grass; *Eccoilopus cotulifer* (after Moritsu, 1958).

Distribution: Japan.

8. ***Macrosiphum ibarae*** Matsumura

Macrosiphum ibarae Matsumura, 1917: 397.

Macrosiphum ibarae: Takahashi, 1930a: 320 & 1964: 357 [*Macrosiphum* (*Sitobion*)]; Shinji, 1935c: 247 & 1941: 1166; Paik, 1965: 77 [*Sitobion*].

Macrosiphum rosae ibarae: Moritsu, 1946b: 5; Tao, 1963: 195.

Macrosiphum rosae: Hori, 1929: 72; Shinji, 1941: 876.

Macrosiphum sumatrensis Mason, 1927: 88.

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo, Mt. Apoi, Kitami-mombetsu & Abashiri. Honshû—Narugo, Miyagi Pref.; Tsumagoi, Gumma Pref. (R. Takahashi leg.); Utsunomiya; Tôkyô; Ôsaka; Shimonoseki, Yamaguchi Pref. Kyûshû—Nagasaki; Yatsushiro, Kumamoto Pref.; Ibusuki, Kagoshima Pref.; Nishi-nakama, Amami-ôshima Isl.

Host plants: *Rosa multiflora* and cultivated roses.

Distribution: Japan; Sakhalin; Korea; China; Taiwan; Sumatra; Malaya; Philippines

9. ***Macrosiphum rubiphila*** Takahashi

Macrosiphum (*Sitobion*) *rubiphila* Takahashi, 1964: 355.

In the course of the present study the alienicola of this species has been found from grasses for the first time. As a supplement to the original description the following aspects may be added:—

Apterous fundatrigenia. Body in life green; head often brownish. Antenna and siphunculus wholly black. Cauda pale. Legs pale brown; femora and tibiae at apex and tarsi black. Body roundly oval, 2.5–2.9 mm. in length.

Antenna 1.0–1.3 times as long as body; 3rd segment with 5–9 rhinaria basally; processus terminalis about 5.0–6.5 times as long as basal part of 6th segment. Ultimate rostral segment obtuse, about twice as long as wide, as long as or slightly shorter than 2nd segment of hind tarsus, with 6 secondary setae. Clypeus with 3 or 4 setae anteriorly; mandibular lamina with 3–5 setae. Siphunculus 12–14 times as long as wide at middle, about 2.5–3.0 times as long as cauda, reticulated on apical 1/9 or less. Cauda elongate, blunt at apex, attenuated at basal 1/3, with 8–13 setae. Abdominal tergum sclerotic and weakly pigmented, sometimes membranous on anterior segments; 2nd–5th segments with or without marginal tubercles; 7th and 8th segments usually with mesial tubercles.

Measurements in mm. Body 2.6; antennal segments (1st–6th): 0.15, 0.09, 0,78, 0.59, 0.47, 0.14+0.94; ultimate rostral segment 0.13; hind femur 1.05; hind tibia 1.89; hind tarsus (2nd segment) 0.14; siphunculus 0.92 (reticulated area 0.06); cauda 0.33; dorsal setae about 0.012 on head, 0.009 on abdominal disc, 0.020 on 8th abdominal segment.

Apterous alienicola. Differs from the apterous fundatrigenia as follows:— Body 1.5–2.4 mm. in length. Head with frontal sinus very shallow; antennal tubercle sometimes sparsely spinulated ventrally. Antenna 1.2–1.5 times as long as body; 3rd segment with 1–7 rhinaria; processus terminalis 6–7 times as long as basal part of 6th segment. Rostrum passing hind coxa, sometimes extending to 2nd abdominal segment; ultimate segment 1.0–1.4 times as long as 2nd segment of hind tarsus, usually about as long as basal part of 6th antennal segment. Siphunculus 10–12 times as long as wide at middle, about 2.0–2.5 times as long as cauda, reticulated on apical 1/10 or less. Abdomen without mesial and marginal tubercles; 2nd–4th tergites membranous,

with some sclerites surrounding intersegmental areolations; 5th–8th tergites sclerotic and pigmented.

Measurements in mm. Body 2.4; antennal segments (1st–6th): 0.14, 0.10, 0.70, 0.55, 0.47, 0.15+0.95; ultimate rostral segment 0.13; hind femur 0.88; hind tibia 1.60; hind tarsus (2nd segment) 0.12; siphunculus 0.68 (reticulated area 0.08); cauda 0.27; dorsal setae about 0.010 on head, 0.009 on abdominal disc, 0.022 on 8th abdominal segment.

Alate alienicola. Differs from the apterous alienicola as follows:—Body about 2.5 mm. in length, green in life; head and thorax yellowish brown. Antenna 1.3–1.4 times as long as body; 3rd segment with 22–33 rhinaria along whole length, with setae

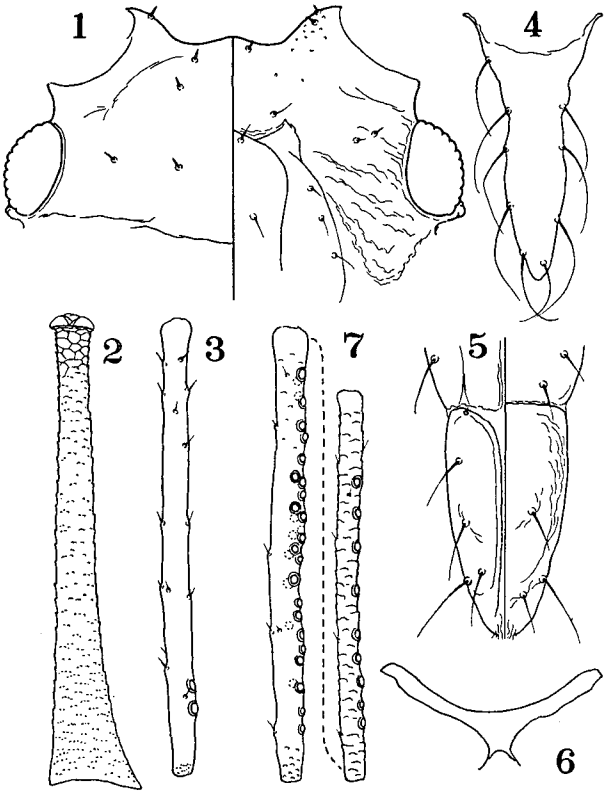

Fig. 2. *Macrosiphum rubiphila* Takahashi. Apterous alienicola:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, cauda; 5, ultimate rostral segment; 6, mesosternal furca. Alate alienicola:— 7, antenna (3rd & 4th segments).

about 1/3 as long as middle width of the segment; 4th with 8–14 rhinaria; processus terminalis 8–9 times as long as basal part of 6th. Wings of normal venation. Siphunculus 11–12 times as long as wide at middle, about 3 times as long as cauda, reticulated on apical 1/5. Cauda with 10–13 setae. Abdomen with 2nd–4th segments bearing developed marginal sclerites.

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.12, 0.09, 0.74, 0.67, 0.54, 0.12+1.12; ultimate rostral segment 0.12; hind femur 0.88; hind tibia 1.78; hind

tarsus (2nd segment) 0.12; siphunculus 0.65 (reticulated area 0.13); cauda 0.23; dorsal setae about 0.015 on head and abdomen, 0.028 on 8th abdominal segment.

Specimens examined: Many apterous fundatrigeniae, Shigisan, Ôsaka Pref., 21-v-61, ex *Rubus* sp., R. Takahashi leg. (holotype); Ikezuki, Miyagi Pref., 25-v-66, ex *Rosa multiflora*,; Sugadaira, Nagano Pref., 29-vi-65, ex *Rosa multiflora*, T. Tanaka leg.; Mt. Hikosan, Fukuoka Pref., 25-v-65, ex *Rosa multiflora*. Many apterous and alate alienicolae, Kawatabi, Miyagi Pref., 23-viii-67, ex *Digitaria adscendens*; Nikkô, Tochigi Pref., 6-x-67, ex *Microstegium vimineum*. Some fundatrices, Ôsaka, 25-iii-56, ex *Rubus* sp., M. Sorin leg.; Kyôto, 16-iv-65, H. Takada leg.

Host plants: Primary hosts—*Rosa multiflora* (infested on young shoots) & *Rubus* sp. Secondary hosts—*Microstegium vimineum* & *Digitaria adscendens* (infested especially on nodes).

Distribution: Japan.

This species differs sharply from any other congeneric ones in the alate viviparous female which has secondary rhinaria on the 3rd and 4th antennal segments. It is also characteristic of this species that the femora are spinulated extensively and also that the dorsal setae of body are minute.

2. Genus ***Unisitobion*** Takahashi

Unisitobion Takahashi, 1961 b: 104 [type-species: *Macrosiphum sorbi* Matsumura, 1918].

This genus is represented by 2 species, *U. sorbi* (Matsumura) and *U. corylicola* (Shinji), both occurring in Japan. The genus is closely related to *Macrosiphum* Passerini, from which it may be differentiated by the combination of the following characters:—Head spinulated ventrally; abdominal tergum sclerotized and pigmented; antennal tubercles high.

Key to the species

1 Tarsi spinulously imbricated on 1st segment. Tibiae pale, with base and apex black, imbricated apically. Abdominal tergum pigmented marginally and mesially. Ultimate rostral segment about as long as 2nd segment of hind tarsus. On *Sorbaria*. . . . . 1. *U. sorbi* (Matsumura)

– Tarsi smooth on 1st segment. Tibiae wholly black, smooth apically. Abdominal tergum wholly and uniformly pigmented. Ultimate rostral segment 1.3–1.9 times as long as 2nd segment of hind tarsus. On *Corylus*. . . . . 2. *U. corylicola* (Shinji)

1. ***Unisitobion sorbi*** (Matsumura)

Macrosiphum sorbi Matsumura, 1918: 4.
Unisitobion sorbi: Takahashi, 1961 b: 104.

As a supplement to the original description, the following accounts may be added:—

Alate viviparous female. Body in life pale yellow to pale green, 2.8–3.0 mm. in length; head dark brown; thorax pale brown. Legs dusky; femora at apex, tibiae at apex and tarsi black. Antenna dusky, with flagellum black apically. Siphunculus black, pale at extreme base. Cauda pale.

Head smooth dorsally, sparsely spinulous ventrally. Antenna with 18–23 flat rhinaria on 3rd segment. Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus, with 4–6 secondary setae. Wings of normal venation. Abdomen with

tergum pale and membranous; 2nd–5th segments with marginal sclerites often bearing a tubercle; ante- and postsiphuncular sclerites well developed; 8th segment sometimes with mesial tubercles. Siphunculus roughly imbricated, cylindrical, dilated at base, attenuated and reticulated on apical 1/7–1/6, about 15 times as long as wide at middle. Cauda conical, with constrictions, about 1/3 as long as siphunculus, with 7 setae.

Measurements in mm. Body 2.9; antennal segments (1st–6th): 0.19, 0.10, 1.21, 0.98, 0.90, 0.29+?; ultimate rostral segment 0.11; hind femur 1.44; hind tibia 2.90; hind tarsus (2nd segment) 0.13; siphunculus 0.97 (reticulated area 0.16); cauda 0.32; longest dorsal seta 0.023 on head, 0.015 on abdominal disc, 0.038 on 8th abdominal segment.

Fundatrix. Body in life pale yellowish green, with 3 longitudinal deep green stripes (with black stripes in apterous viviparous female), 2.9–3.3 mm. in length. Siphunculus black, pale at extreme base.

Head with dorsal setae at most about 1/4 as long as middle width of 3rd antennal segment; antennal tubercle strongly diverging. Antenna shorter than body; 3rd segment with 2–6 rhinaria; processus terminalis about twice as long as basal part of 6th. Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus. Legs with sparse short setae, those on tibiae being much shorter than middle width of hind tibia. Mesosternal furca sessile. Abdomen with tergum membranous, without any ornamentation.

Measurements in mm. Body 2.9; antennal segments (1st–6th): 0.17, 0.10, 0.84, 0.44, 0.43, 0.20+0.39; ultimate rostral segment 0.11; hind femur 1.14; hind tibia 2.10; hind tarsus (2nd segment) 0.12; siphunculus 0.88 (reticulated area 0.08); cauda 0.24; dorsal setae about 0.007 on head and abdominal disc, 0.018 on 8th abdominal segment.

Alate male. Differs from alate viviparous female as follows:—Body in life brown, greenish around siphunculus; head and thorax black; nymph also brown (larvae and nymphs of viviparous forms are pale yellowish green). Body 2.5–2.7 mm. in length. Antenna with about 50–60 secondary rhinaria on 3rd segment, 14–20 on 5th, none on 4th. Abdomen with narrow sclerotic bands surrounding intersegmental areolations of 2nd–5th segments; setae on abdominal disc pointed, 3/4 as long as middle width of 3rd antennal segment. Siphunculus about 12 times as long as wide at middle, hardly attenuated at reticulated area. Cauda shortly conical, about 1.3 times as long as wide, 1/4 as long as siphunculus.

Oviparous female. Slightly differs from the apterous viviparous female as follows:—Body in life dull yellow to green mottled with deep green, or brownish, about 2.6 mm. in length. Abdominal tergum membranous, without any ornamentation. Hind tibia swollen, with numerous pseudosensoria.

Specimens examined: Some alate viviparous females, Sapporo, 1-vi-67. Many fundatrices, Sapporo, 7-v-68 & 16-v-67. Some oviparous females and alate males, Sapporo, 26-x-67. Many apterous viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo, Lake Tôya & Nukabira.

Host plants: All the specimens examined were collected from *Sorbaria sorbifolia* var. *stellipila*.

Distribution: Japan.

2. ***Unisitobion corylicola*** (Shinji), comb. nov.
Macrosiphum colylicola Shinji, 1930b: 27.
Macrosiphum corylicola: Shinji, 1941: 831.

On the basis of the present specimens, a redescription is given as follows:—

Apterous viviparous female. Body in life dull yellow to yellowish green, often dark brown dorsally. Antenna and siphunculus black. Legs black; femora pale brown basally; tibiae pale brown basally in some specimens. Cauda fuscous. Body oblong, 2.5–3.1 mm. in length.

Head usually smooth on dorsum, spinulated on posterior half of venter, with setae 0.7–1.5 times as long as middle width of 3rd antennal segment. Antennal tubercles well developed, diverging at inner sides, each with 2 or 3 setae apically and 1 or 2 setae mid-ventrally. Median tubercle not developed. Antenna long, 1.4–1.5 times as long as body; 3rd segment smooth except at extreme base, with 3–9 rhinaria basally, with setae about as long as middle width of the segment; 4th imbricated, as long as or a little longer than 5th; processus terminalis 6.0–6.5 times as long as basal part of 6th; 3rd–6th as 110 : 85 : 85 : 20+120 in length. Rostrum reaching or just passing hind coxa; ultimate segment 1.3–1.9 times as long as 2nd segment of hind tarsus, with 10–13 secondary setae. Tibiae smooth, with setae about as long as middle width of hind tibia. First segment of all tarsi smooth, with 3 setae. Abdomen with tergum sclerotic and often deeply pigmented; 2nd–5th segments each with marginal tubercles and 7–9 setae besides marginal setae; 7th with a pair of mesial tubercles; 8th with a pair of mesial tubercles and 7–9 setae 0.5–1.0 as long as middle width of 3rd antennal segment; spiracular sclerites tuberculate. Siphunculus cylindrical, broadened at base, reticulated and attenuated at apical 1/9–1/6, weakly imbricated, 11–12 times as long as wide at middle, 2.2–2.8 times as long as cauda. Cauda conical, blunt at apex, about twice as long as wide, with 7–9 setae.

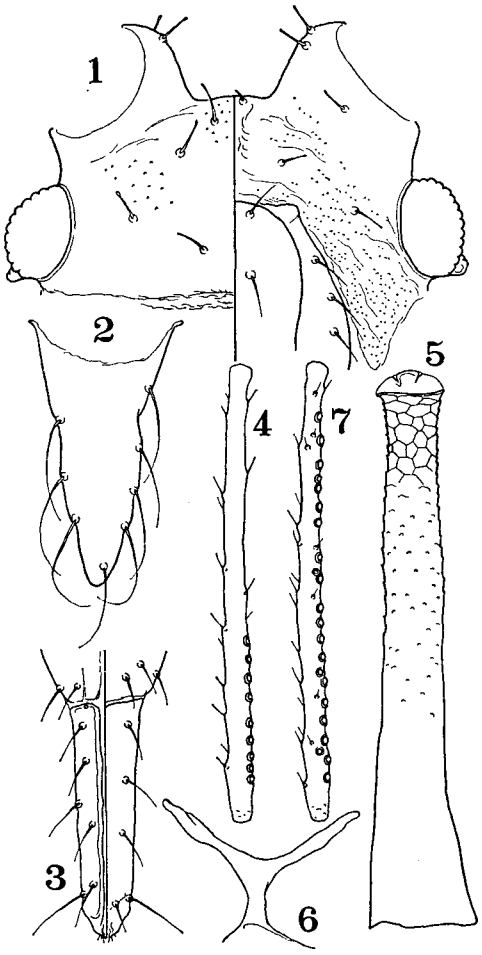

Fig. 3. *Unisitobion corylicola* (Shinji). Apterous viviparous female:—1, head; 2, cauda; 3, ultimate rostral segment; 4, antenna (3rd segment); 5, siphunculus; 6, mesosternal furca. Alate viviparous female:—7, antenna (3rd segment).

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.18, 0.11, 0.85, 0.74, 0.68, 0.17+1.12; ultimate rostral segment 0.19; hind femur 1.19; hind tibia 2.37; hind tarsus (2nd segment) 0.11; siphunculus 0.67 (reticulated area 0.09); cauda 0.30; longest dorsal seta of head 0.065, that on 8th abdominal segment 0.040.

Alate viviparous female. Differs from the apterous viviparous female as follows:—Body greenish; head and thorax brown. Antenna 1.6 times as long as body; 3rd segment with 14–23 rhinaria in a line. Wings of normal venation. Abdomen membranous, with well developed marginal sclerites on 2nd–6th segments.

Measurements in mm. Body 2.8; antennal segments (1st–6th): 0.19, 0.12, 0.99, 0.90, 0.89, 0.21+1.33; ultimate rostral segment 0.19; hind femur 1.27; hind tibia 2.60; hind tarsus (2nd segment) 0.13; siphunculus 0.81 (reticulated area 0.11); cauda 0.29; longest dorsal seta of head 0.055, that on 8th abdominal segment 0.060.

Specimens examined: Some apterous and alate viviparous females, Sapporo, Hokkaidô, 8-vi-65 & 19-vii-65, ex *Corylus sieboldiana* var. *brevirostris*; Sapporo, 22-viii-69, ex *Corylus sieboldiana*; Sapporo, 15-vi-65, ex *Carpinus laxiflora*.

Host plants: *Corylus sieboldiana*, *C. sieboldiana* var. *brevirostris* & *Carpinus laxiflora*; *Corylus heterophylla* var. *thunbergii* (after Shinji, 1941).

Distribution: Japan.

3. Genus ***Macrosiphoniella*** del Guercio

Macrosiphoniella del Guercio, 1911a: 331 [type-species: *Siphonophora atra* Ferrari, 1872].

Pyrethromyzus Börner, 1950: 15 [type-species: *Macrosiphum sanborni* Gillette, 1908].

Phalangomyzus Börner, 1939: 83 [type-species: *Siphonophora oblonga* Mordvilko, 1901; described as a subgenus of the genus *Macrosiphoniella*].

Asterobium Hille Ris Lambers, 1938: 19 [type-species: *Aphis asteris* Walker, 1849; described as a subgenus of the genus *Macrosiphoniella*].

Sinosiphoniella Tao, 1963: 200 [type-species: *Macrosiphoniella kuwayamai* Takahashi, 1941]. **Syn. n.**

It is known that the members of this genus constitute a well defined natural group associated with plants of Compositae (especially of Anthemideae and Asteroideae). This genus is closely related to *Dactynotus* Rafinesque but may be differentiated therefrom by the combination of the following characters:—First tarsal chaetotaxy 3 : 3 : 3; ultimate rostral segment usually acute, with secondary setae distinctly longer than the primary ones; antesiphuncular sclerites well developed, postsiphuncular sclerites being often absent; siphunculus reticulated on apical 1/3 or more.

In this paper 12 species are given as inhabitants of Japan, of which one is new to science.

Key to the species

1 Abdominal disc with numerous, irregularly arranged setae; head with 15 or more setae dorsally. 2

– Abdominal disc with sparse setae arranged in transverse rows; head with 4 pairs of setae dorsally. 5

2(1) Postsiphuncular sclerite large. Antenna smooth on 3rd segment. Tibiae pale except at base and apex. 3

– Postsiphuncular sclerite small or absent. Antenna imbricated on 3rd segment. Tibiae wholly black. 4

3(2) Siphunculus with some setae. . . . . 12. *M. chaetosiphon* Takahashi et Moritsu

– Siphunculus without setae. . . . . 11. *M. hikosanensis* Moritsu

4(2) Abdomen with sclerotic bands which may be much reduced in some specimens. Cauda with more than 20 setae. Siphunculus at most about as long as cauda. . . . . 9. *M. yomogicola* (Matsumura)

– Abdomen without sclerotic bands. Cauda at most with 15 setae. Siphunculus longer than

cauda. . . . . 10. *M. kuwayamai* Takahashi

5(1) Cauda pale or slightly fuscous, not dilated at base, without constriction. Siphunculus pale at base. 6

– Cauda black, dilated at base, with a constriction at basal 1/3. Siphunculus entirely black. . . 7

6(5) Primary rhinarium of 5th antennal segment ciliated. Cauda with 20–30 setae. Mandibular lamina with 5–8 setae. . . . . 7. *M. oblonga* (Mordvilko)

– Primary rhinarium of 5th antennal segment not ciliated. Cauda with 7–15 setae. Mandibular lamina with 2 or 3 setae. . . . . 8. *M. grandicauda* Takahashi et Moritsu

7(5) Antenna with 3rd segment bearing more than 10 rhinaria distributed beyond basal half of the segment. In alate viviparous female, 4th antennal segment with 0–10 rhinaria. . . . 8

– Antenna with 3rd segment bearing at most 15 rhinaria confined to basal half of the segment. In alate viviparous female, 4th antennal segment without rhinaria. 9

8(7) Dorsal scleroites well developed on abdominal disc. Ultimate rostral segment blunt, shorter than 2nd segment of hind tarsus. Antenna entirely black; 3rd segment with 20–40 small rhinaria; primary rhinarium of 5th flat, ciliated. Siphunculus 10–12 times as long as wide at apex. Tibiae wholly black. . . . . 5. *M. yomenae* (Shinji)

– Dorsal scleroites small or absent on abdominal disc. Ultimate rostral segment acute, longer than 2nd segment of hind tarsus. Antenna pale on 3rd segment; 3rd segment with about 10–30 rather large, protuberant rhinaria; primary rhinarium of 5th protuberant, not ciliated. Siphunculus 4–6 times as long as wide at apex. Tibiae pale basally. . . . . 6. *M. sanborni* (Gillette)

9(7) Abdominal disc with black scleroites. Primary rhinarium of 5th antennal segment cilialess, its longer axis being as long as or longer than middle width of the segment. . . . . 4. *M. formosartemisiae* Takahashi

– Abdominal disc without scleroites, if any they are not or hardly pigmented. Primary rhinarium of 5th antennal segment ciliated, its longer axis being at most as long as middle width of the segment. 10

10(9) Antenna pale on 3rd segment. Tibiae pale at middle. Cauda with 10–13 setae. . . . . 3. *M. pseudoartemisiae* Shinji

– Antenna and tibiae entirely black. Cauda with more than 14 setae. 11

11(10) Femora black except at extreme base. Abdomen with 8th segment bearing 7–9 setae; abdominal disc without scleroites. . . . . 1. *M. yomogifoliae* (Shinji)

– Femora pale basally. Abdomen with 8th segment bearing 4–7 setae; abdominal disc with some pale scleroites. . . . . 2. *M. hokkaidensis*, sp. n.

1. ***Macrosiphoniella yomogifoliae*** (Shinji)

Macrosiphum yomogifoliae Shinji, 1922: 788.

Macrosiphoniella yomogifoliae: Takahashi, 1931: 61; Shinji, 1933a: 214 & 1941: 810; Moritsu, 1949b: 58; Tao, 1963: 201; Takahashi et Moritsu, 1963: 5; Paik, 1965: 90.

Macrosiphum tanacetarium: Takahashi, 1921b: 17 & 1923: 78.

Oviparous female. Closely resembles apterous viviparous female except in following aspects:—Body pale green, with a shade of orange-red anteriorly. Rostrum reaching 1st abdominal segment; ultimate segment 0.9 as long as 2nd segment of hind tarsus. Hind tibia swollen on basal 2/3, bearing numerous pseudosensoria. Abdomen with 8th segment bearing 19 setae. Genital plate with about 35 setae, of which 20 are arranged along hind margin of the plate. Cauda elongately tongue-shaped, 3.3 times as long as wide at middle, slightly constricted at basal 1/3 and at extreme base, with 37 setae.

Specimens examined: An oviparous female, Sapporo, Hokkaidô, 17-x-64, ex *Chrysanthemum nipponicum*. A lot of apterous and alate viviparous females collected

at the following localities:— Hakkaidô—Sapporo (ex *Artemisia montana* & *Chrysanthemum nipponicum*); Nibushi & Lake Utoro (ex *Artemisia montana*). Honshû—Morioka, Iwate Pref. (ex *Artemisia princeps*); Inawashiro, Fukushima Pref. (ex *Artemisia princeps*); Tôkyô (ex *Chrysanthemum nipponicum*); Ogose, Saitama Pref. (ex *Artemisia princeps*); Hirayu, Gifu Pref. (ex *Artemisia* sp.); Ôsaka (ex *Artemisia* sp., R. Takahashi leg.). Shikoku—Ichiu-mura, Tokushima Pref. (ex *Artemisia* sp.). Kyûshû—Nase, Amami-ôshima Isl. (ex *Artemisia* sp.).

Host plants: *Artemisia* spp. (including *A. princeps* & *A. montana*) & *Chrysanthemum nipponicum*. Tao (1963) gives *Artemisia indica* & *Chrysanthemum morifolium* as hosts in China.

Distribution: Japan; Korea; China; Taiwan; Malaya.

This species is closely related to *M. artemisiae* (Boyer) from Europe, from which it may be differentiated by the following points:—(1) Ultimate rostral segment 0.99–1.29 times as long as 2nd segment of hind tarsus (0.88–0.95 as long as that segment in *artemisiae*). (2) Scleroites of abdominal disc absent, if any very small (often present, pale in colour, 20–55 μ in diameter). (3) Third antennal segment entirely black, sometimes pale at extreme base (pale basad). (4) Rostrum reaching 2nd abdominal segment (reaching 1st abdominal segment). (5) Genital plate with 2–6, mostly 3 or 4 setae anteriorly, 8–13, mostly 10 or 11 setae along hind margin (2, sometimes 3 setae anteriorly, 7–11, mostly 9 setae along hind margin).

2. ***Macrosiphoniella hokkaidensis***, sp. n.

Apterous viviparous female. Body in life yellowish green, without wax powder; head reddish brown. Eye orange-red. Antenna, siphunculus and cauda black. Legs black; femora pale basally. Body oval, 1.8–2.6 mm. in length.

Head with 4 pairs of dorsal setae 1.8–2.1 times as long as middle width of 3rd antennal segment. Antennal tubercles developed, strongly diverging at inner sides, each with 2 or 3 setae apically and a seta mid-ventrally. Antenna slightly longer than body; 3rd segment weakly imbricated, with 5–14 irregularly arranged rhinaria on basal half, with setae 1.0–1.5 times as long as middle width of the segment; processus terminalis 2.3–2.7 times as long as basal part of 6th segment; 3rd–6th segments as 69 : 56 : 43 : 20+50 in length. Clypeus with 4 or 5 setae anteriorly; mandibular lamina with 5–10 setae. Rostrum passing hind coxa; ultimate segment acute, 4–5 times as long as wide, 1.1–1.3 times as long as 2nd segment of hind tarsus, with 6 long secondary setae. Hind tarsus with 2nd segment bearing 1 or 2 secondary setae dorsally and 4 or 5 ventrally. First tarsal chaetotaxy 3 : 3 : 3. Abdomen pale, membranous, with developed antesiphuncular sclerites, with some pale scleroites at base of dorsal setae, without marginal tubercles; 2nd–4th segments each with 7–12 setae besides marginal ones; 6th with 6 or 7 setae between siphunculi; 8th with 4–7 setae, of which the longest one is 1.6–2.4 times as long as middle breadth of 3rd antennal segment. Genital plate elliptic, with 10–14 setae along hind margin, 2 or 4 setae anteriorly and 0–2 setae on middle area. Siphunculus stout, tapering or nearly cylindrical, reticulated on apical 1/2–3/5, weakly imbricated basally, 4–7 times as long as wide at middle, 0.8–1.2 times as long as cauda, with a distinct flange. Cauda distinctly constricted at basal 1/3, 2.5–3.0 times as long as wide, with 14–25 setae.

Measurements in mm. Body 2.4; antennal segments (1st–6th): 0.13, 0.10, 0.73, 0.56,

0.43, 0.21+0.53; ultimate rostral segment 0.19; hind femur 0.93; hind tibia 1.65; hind tarsus (2nd segment) 0.16; siphunculus 0.50 (reticulated area 0.27); cauda 0.44; longest dorsal seta on head 0.090, that on 8th abdominal segment 0.080.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Body about 2.1 mm. in length, yellowish green in life; head and thorax dark brown. Legs black; fore femur pale basally; middle and hind femora pale at extreme base. Antenna 1.3 times as long as body; 3rd segment with 25–36 rhinaria. Abdomen with 2nd–5th segments bearing well developed marginal sclerites.

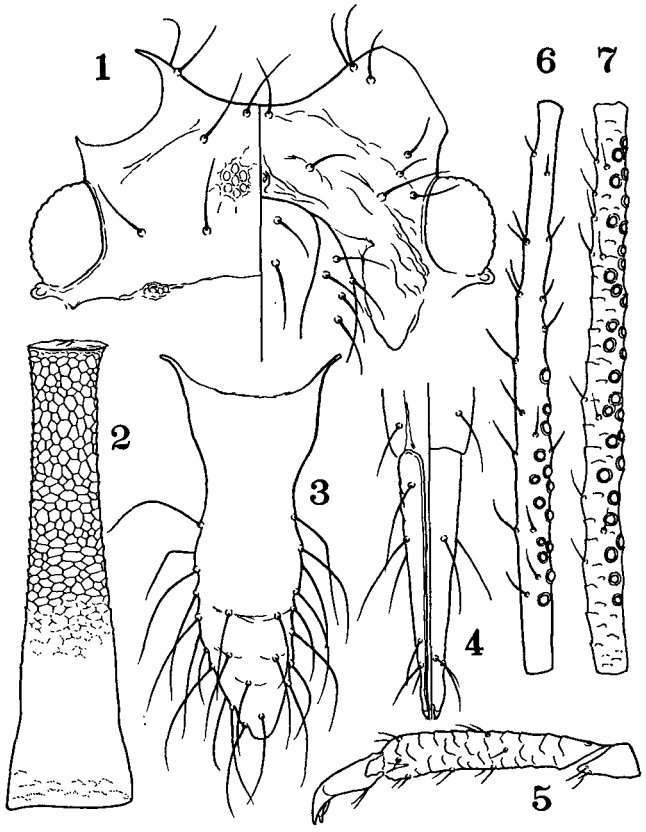

Fig. 4. *Macrosiphoniella hokkaidensis*, sp. n. Apterous viviparous female:— 1, head; 2, siphunculus; 3, cauda; 4, ultimate rostral segment; 5, hind tarsus; 6, antenna (3rd segment). Alate viviparous female:—7, antenna (3rd segment).

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.12, 0.09, 0.73, 0.60, 0.44, 0.20+0.54; ultimate rostral segment 0.19; siphunculus 0.42 (reticulated area 0.26); hind femur 0.86; hind tibia 1.70; hind tarsus (2nd segment) 0.15; longest dorsal seta on head 0.070, that on 8th abdominal segment 0.095.

Specimens examined: Syntypes—20 apterous and 4 alate viviparous females, Sapporo, Hokkaidô, 24-vii-65 (no. 1364) & 13-ix-65 (no. 1392). Many apterous viviparous

females were also collected at the following localities in Hokkaidô:—Jôzankei (5-vii-64), Obihiro (15-vii-66) & Abashiri (23-vii-66).

Host plants: All the specimens examined were collected from *Artemisia montana*. They infested young shoots of the host.

Distribution: Japan.

On account of the pale scleroites of the abdomen, etc., this species comes near *M. pseudoartemisiae* Shinji, from which it is readily distinguished by the following aspects:—(1) Antenna and tibiae wholly black (pale basally in *pseudoartemisiae*). (2) Cauda with 14-25 setae (10-13 setae). (3) Siphunculus stouter. (4) Antenna with 5-14 rhinaria on 3rd segment (2-7 rhinaria). (5) Mandibular lamina with 5-10 setae (3-5 setae). This species also resembles *M. yomogifoliae* (Shinji), but differs therefrom in the following points in addition to the characters given in the key:—(1) Body in life yellowish green with head reddish brown, without wax powder (in *yomogifoliae* body deep green with dark head, usually covered with wax powder). (2) Antesiphuncular sclerite developed (usually narrowly crescent, divided or sometimes effaced).

3. ***Macrosiphoniella pseudoartemisiae*** Shinji

Macrosiphoniella pseudoartemisiae Shinji, 1933a: 216.

Macrosiphoniella pseudoartemisiae: Shinji, 1941: 799; Moritsu, 1949b: 59; Tao, 1963: 201; Paik, 1965: 91.

Specimens examined: Many apterous and alate viviparous females collected at the following localities:—Honshû—Nikkô, Tochigi Pref. (ex *Artemisia princeps*); Wakayama (ex *Artemisia* sp., R. Takahashi leg.); Ôsaka (ex *Artemisia* sp., R. Takahashi leg.). Kyûshû—Nagasakibana, Kagoshima Pref. (ex *Artemisia princeps*).

Host plants: *Artemisia* spp. (including *A. princeps*).

Distribution: Japan; Korea; China; India.

4. ***Macrosiphoniella formosartemisiae*** Takahashi

Macrosiphoniella formosartemisiae Takahashi, 1921b: 15.

Macrosiphoniella formosartemisiae: Okamoto et Takahashi, 1927: 131; Moritsu, 1949b: 60; Tao, 1963: 202; Takahashi et Moritsu, 1963: 4 & 6; Paik, 1965: 89.

Macrosiphoniella japonica Shinji, 1942: 322.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:—Honshû—Mt. Tanzawa, Kanagawa Pref. (ex *Artemisia japonica*, R. Takahashi leg.); Mt. Kongô, Ôsaka Pref. (ex *Artemisia* sp., R. Takahashi leg.). Kyûshû—Lake Shidaka, Ôita Pref. (ex *Artemisia japonica*).

Host plants: *Artemisia japonica* & *Artemisia* sp.

Distribution: Japan; Korea; China; Taiwan.

5. ***Macrosiphoniella yomenae*** (Shinji)

Macrosiphum yomenae Shinji, 1922: 788.

Macrosiphoniella yomenae: Shinji, 1941: 817; Moritsu, 1949b: 57; Tao, 1963: 202; Takahashi et Moritsu, 1963: 4 & 6; Paik, 1965: 88.

Macrosiphum yomenafoliae Shinji, 1922: 788.

Macrosiphum moriokae Shinji, 1924: 362.

Macrosiphum moriokae: Shinji, 1933a: 214.

Macrosiphum astericola Okamoto et Takahashi, 1927: 132.

Specimens examined: Many apterous and alate viviparous females have been ex-

amined, their localities being as follows:— Hokkaidô—Sapporo (ex *Aster ageratoides* var. *ovatus*). Honshû—Kawatabi, Miyagi Pref. (ex *Kalimeris yomena*); Ôizawa, Yamagata Pref. (ex *Kalimeris yomena*); Bandai-kôgen, Fukushima Pref. (ex *Aster* sp.); Mashiko, Tochigi Pref. (ex *Aster* sp.); Mt. Iwawaki, Ôsaka Pref. (ex *Aster* sp., R. Takahashi leg.); Taiji, Wakayama Pref. (ex *Aster* sp.). Kyûshû—Dazaifu, Fukuoka Pref. (ex *Kalimeris yomena*); Miyazaki (ex *Kalimeris yomena*).

Host plants: *Kalimeris yomena, Aster ageratoides* var. *ovatus* & *Aster* sp.

Distribution: Japan; Korea; China.

This species is characterized by the rostrum with the ultimate segment obtuse and by the antenna bearing numerous bulging rhinaria on the 3rd segment. In these respects, the species comes near *M. linariae* (Koch) from Europe, from which it may be distinguished by the following characters:—(1) Abdomen with dorsal setae more numerous in number; mesial setae duplicated. (2) Siphunculus reticulated at most at apical 2/5. (3) In alate viviparous female, antenna with 4th segment often bearing some rhinaria. (4) Body dark green in life.

6. ***Macrosiphoniella sanborni*** (Gillette)

Macrosiphum sanborni Gillette, 1908: 65.
Macrosiphum sanborni: Palmer, 1952: 323.
Macrosiphoniella sanborni: van der Goot, 1917: 36; Hori, 1929: 75; Shinji, 1933a: 213 & 1941: 804; Hille Ris Lambers, 1938: 30; Moritsu, 1949b: 56; Cottier, 1953: 204; Takahashi et Moritsu, 1963: 4 & 5.
Macrosiphoniella (*Pyrethromyzus*) *sanborni*: Eastop, 1958: 44 & 1966: 456.
Pyrethromyzus sanborni: Börner, 1950: 15; Tao, 1963: 200; Paik, 1965: 86.
Macrosiphum nishigaharae Essig et Kuwana, 1918: 50.

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo, Mt. Apoi, Obihiro, Kushiro & Kitami-mombetsu. Honshû—Kawatabi, Miyagi Pref.; Mashiko & Nikkô, Tochigi Pref.; Tôkyô; Kyôto (H. Takada leg.); Ôsaka (R. Takahashi leg.); Shimonoseki, Yamaguchi Pref. Shikoku—Ichiu-mura, Tokushima Pref. (R. Takahashi leg.). Kyûshû—Dazaifu, Fukuoka Pref.; Nagasaki; Miyakonojô, Miyazaki Pref.; Kagoshima; Yuwan, Amami-ôshima Isl.

Host plants: This aphid is commonly found on the cultivated chrysanthemum. The present specimens were collected from *Chrysanthemum morifolium, C. japonense, C. ornatum, Kalimeris yomena* and *Artemisia princeps.*

Distribution: Cosmopolitan.

7. ***Macrosiphoniella oblonga*** (Mordvilko)

Siphonophora oblonga Mordvilko, 1901: 343.
Macrosiphoniella oblonga: Hille Ris Lambers, 1938: 25.
Macrosiphoniella oblonga hidaensis Takahashi et Moritsu, 1963: 7. **Syn. n.**
Macrosiphum lineatum: van der Goot, 1915: 74; Theobald, 1926: 114.
Macrosiphoniella yomogicola: Takahashi, 1939a: 114.

Specimens examined: A lot of apterous and some alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Artemisia montana*). Honshû—Koiwai, Iwate Pref. (ex *Artemisia princeps*); Inawashiro, Fukushima Pref. (ex *Artemisia princeps*); Mt. Norikura, Gifu Pref. (ex *Artemisia princeps,*

R. Takahashi leg., syntypes of *M. oblonga hidaensis* Takahashi et Moritsu). Kyûshû—Nesebu, Amami-ôshima Isl. (ex *Artemisia princeps*).

Host plants: *Artemisia princeps* & *A. montana* (in Japan). *A. campestris* (in Russia, after Mordvilko, 1929); *A. noxa* & *Chrysanthemum indicum* (in Europe, after Hille Ris Lambers, 1938); *C. frutescens* (in Holland, after van der Goot, 1915). This aphid is found on the underside of older leaves of the hosts.

Distribution: Japan; Europe.

Takahashi et Moritsu (1963) distinguished the Japanese form from the European one by the 3rd antennal segment which is shorter than the 4th in the Japanese form. The length of the antennal segments is, however, rather variable in this species. Having compared the present specimens from Japan with European material of *M. oblonga*, I could not find any special differences between them.

This species is closely related to *M. grandicauda* Takahashi et Moritsu, and yet it may be distinguished from the latter by the following characters in addition to those given in the key:—(1) Femora scabrous on apical 2/3 or more (almost smooth, at most scabrous near apex in *grandicauda*). (2) Antesiphuncular sclerite small, often divided (well developed). (3) Hind tarsus with 2nd segment bearing 12–15 secondary setae (5–8 secondary setae). (4) Abdomen with 8th segment bearing 6–11 setae (4–6 setae).

8. ***Macrosiphoniella grandicauda*** Takahashi et Moritsu

Macrosiphoniella grandicauda Takahashi et Moritsu, 1963: 9.
Macrosiphoniella yomogicola: Moritsu, 1949b: 56.
Dactynotus macrocaudus Tao, 1964b: 231. **Syn. n.**

Specimens examined: A lot of apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Abashiri (ex *Artemisia montana*) & Kitami (ex *Artemisia montana*). Honshû—Nikkô, Tochigi Pref. (ex *Artemisia princeps*); Ôsaka (ex *Petasites japonicus*, M. Sorin leg. & ex *Artemisia princeps*, R. Takahashi leg., syntypes of *M. grandicauda* Takahashi et Moritsu); Ôsaka (ex *Arctium lappa*, R. Takahashi leg.).

Host plants: *Artemisia princeps*, *A. montana*, *Artemsia* sp., *Arctium lappa* & *Petasites japonicus*. Especially, older leaves are infested.

Distribution: Japan.

Having read the original description of *Dactynotus macrocaudus* Tao, I have been convinced that it should be suppressed as a synonym of *Macrosiphoniella grandicauda* Takahashi et Moritsu.

9. ***Macrosiphoniella yomogicola*** (Matsumura)

Macrosiphum yomogicola Matsumura, 1917: 401.
Macrosiphoniella yomogicola: Paik, 1965: 88; Takahashi et Moritsu, 1963: 2 & 5.
Macrosiphoniella yomogi: Shinji, 1933a; 214.
Macrosiphoniella fulvicola Shinji, 1933a: 215.
Macrosiphoniella fulvicola: Shinji, 1941: 796; Moritsu, 1949b: 53; Tao, 1963: 201.
Macrosiphum parvum Shinji, 1922: 788. **Syn. n.**
Macrosiphoniella parva: Shinji, 1941: 803; Moritsu, 1949b: 59.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo, Mt. Muine, Mt. Eniwa, Tôya, Mt. Apoi, Kushiro, Wassamu & Sarobetsu. Honshû—Sukayu, Aomori Pref.; Morioka, Iwate

Pref.; Shirabu-takayu (H. Higuchi leg.), Ôizawa & Zaô, Yamagata Pref.; Niigata; Okinajima, Fukushima Pref.; Mashiko, Tochigi Pref.; Tôkyô; Mt. Yatsugatake, Nagano Pref.; Hirayu, Gifu Pref.; Ôsaka (R. Takahashi leg.); Kumano & Toba, Mie Pref.; Tadono, Wakayama Pref. (R. Takahashi leg.). Shikoku—Shiragayama, Tokushima Pref. (S. Takagi leg.).

Host plants: All the specimens examined were collected from *Artemisia* spp. (including *princeps, montana, indica* & *schmidtiana*) and *Chrysanthemum morifolium*. Paik (1965) gives *Artemisia japonica* & *Ixeris dentata* as hosts in Korea.

Distribution: Japan; Korea; China.

Unlike other members of *Macrosiphoniella*, this species is frequently visited by ants, often being conceiled under the earth shelters provided by ants.

10. ***Macrosiphoniella kuwayamai*** Takahashi

Macrosiphoniella kuwayamai Takahashi, 1941: 8.
Macrosiphoniella kuwayamai: Moritsu, 1949b: 55; Takahashi et Moritsu, 1963: 2 & 5.
Sinosiphoniella kuwayamai: Tao, 1963: 200; Paik, 1965: 85.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Tsumagoi, Gumma Pref. (R. Takahashi leg.); Shirahama, Wakayama Pref. (R. Takahashi leg.). Shikoku—Ichiu-mura, Tokushima Pref. (R. Takahashi leg.). Kyûshû—Mt. Hikosan, Fukuoka Pref.; Lake Shidaka, Ôita Pref.; Takachiho, Miyazaki Pref.

Host plants: All the specimens examined were collected from *Artemisia princeps*.

Distribution: Japan; Korea; China.

11. ***Macrosiphoniella hikosanensis*** Moritsu

Macrosiphoniella hikosanensis Moritsu, 1949b: 55.
Macrosiphoniella hikosanensis: Takahashi et Moritsu, 1963: 2 & 5; Paik, 1965: 86.

Alate viviparous female. Body dark reddish brown in life; head and thorax black. Antenna yellowish brown; basal 2 segments, 3rd at apex, 4th at apical half, 5th and 6th dark. Femora black, pale at extreme base; tibiae yellowish brown, black at both ends; tarsi black. Body 2.4–2.8 mm. in length.

Head with 11–14 setae dorsally; antennal tubercles high, diverging at inner sides. Antenna with 3rd segment smooth, bearing 23–32 rhinaria on outer surface of the segment; primary rhinaria of 5th and 6th protuberant, without cilia. Clypeus with 2 pairs of setae anteriorly; mandibular lamina with 5–8 setae. Rostrum reaching hind coxa; ultimate segment 0.9–1.0 as long as 2nd segment of hind tarsus, with 3 pairs of secondary setae. Femora and tibiae smooth; first tarsal chaetotaxy 3 : 3 : 3. Abdomen with numerous, irregularly arranged setae dorsally, with many scleroites scattered on anterior 7 segments; marginal sclerites developed on 2nd–6th segments, those on 5th being the largest; 8th segment with 12–18 setae on a sclerotic band. Setae on body, antenna and femora pointed, rather uniform in length, about 2.5 times as long as middle width of 3rd antennal segment. Siphunculus about 3 times as long as wide at base, reticulated on apical 1/2–2/3, imbricated basally. Cauda conical, blunt apically, longer than siphunculus, with about 20 setae.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.19, 0.11, 0.96, 0.92, 0.60, 0.18+1.24; ultimate rostral segment 0.16; hind femur 1.15; hind tibia 2.10; hind tarsus (2nd segment) 0.18; siphunculus 0.24 (reticulated area 0.13); cauda 0.28; longest

seta on head 0.115.

Specimens examined: Some alate viviparous females, Sapporo, Hokkaidô, 26-vii-65, ex *Artemisia montana*; Nibushi, Hokkaidô, 22-vii-66, ex *Artemisia montana*. A lot of apterous viviparous females collected at the following localities:— Hokkaidô—Sapporo & Nibushi (ex *Artemisia montana*). Honshû—Kuriyagawa, Iwate Pref. (ex *Artemisia princeps*); Nikkô, Tochigi Pref. (ex *Artemisia princeps*); Mt. Takao, Tôkyô Distr. (ex *Artemisia princeps*, R. Takahashi leg.). Kyûshû—Ambô, Yaku Isl. (ex *Artemisia princeps*, H. Takada leg.).

Host plants: *Artemisia princeps* & *A. montana*. This aphid infests the underside of older leaves of the host.

Distribution: Japan; Korea.

12. ***Macrosiphoniella chaetosiphon*** Takahashi et Moritsu

Macrosiphoniella chaetosiphon Takahashi et Moritsu, 1963: 6.

Specimens examined: Some apterous and an alate viviparous females collected at Kawachi-nagano & Kobuka, Ôsaka Pref. (ex *Artemisia princeps*, R. Takahashi leg., syntypes of *M. chaetosiphon* Takahashi et Moritsu).

Host plants: *Artemisia princeps*.

Distribution: Japan.

4. Genus ***Macrotrichaphis***, gen. n.

Type-species: *Macrotrichaphis yatsugatakensis*, sp. n.

The new genus is essentially characterized by the combination of the following characters:—

Body densely setose, the setae being very long and flagellate. Antennal tubercles low, strongly diverging at inner sides. Antenna long; 3rd segment with rhinaria in apterous viviparous female. Siphunculus elongate, cylindrical, reticulated at apex, with many setae. Abdomen membranous, with ante- and postsiphuncular sclerites well developed, without scleroites on anterior segments. First tarsal chaetotaxy 5 : 5 : 5.

In general faces the new genus is closely allied to *Macrosiphoniella*, and yet it differs from the latter by the first tarsal chaetotaxy being 5 : 5 : 5. It is also related to *Dactynotus* in the first tarsal chaetotaxy, but is distinguished therefrom by the setose body and siphunculus.

The genus is represented by a single species.

1. ***Macrotrichaphis yatsugatakensis***, sp. n.

Apterous viviparous female. In cleared and mounted specimens body pale with head and prothorax brown. Antenna dark brown; 3rd and 4th segments often paler. Legs yellowish brown; femora at apex, tibiae at both ends, and tarsi blackish. Siphunculus black. Cauda pale.

Body oval, 1.9–2.3 mm. in length, with numerous, irregularly arranged setae which are flagellate and at least about twice as long as middle width of 3rd antennal segment. Head with antennal tubercles low and strongly diverging at inner sides; frons weakly concave. Antenna 1.2–1.4 times as long as body; flagellum moderately imbricated; 1st segment a little angulated mesially, with about 20–30 setae; 3rd with 11–24 rhinaria on basal 2/3–3/4, with many flagellate setae about twice as long as middle width of

the segment; processus terminalis 8–9 times as long as basal part of 6th; 3rd–6th as 70 : 45 : 43 : 12+103 in length. Clypeus with 10–16 setae anteriorly; mandibular lamina with 15–21 setae. Rostrum reaching 4th abdominal segment; ultimate segment obtuse, convex laterally, about 3 times as long as wide, 1.2–1.5 times as long as 2nd segment

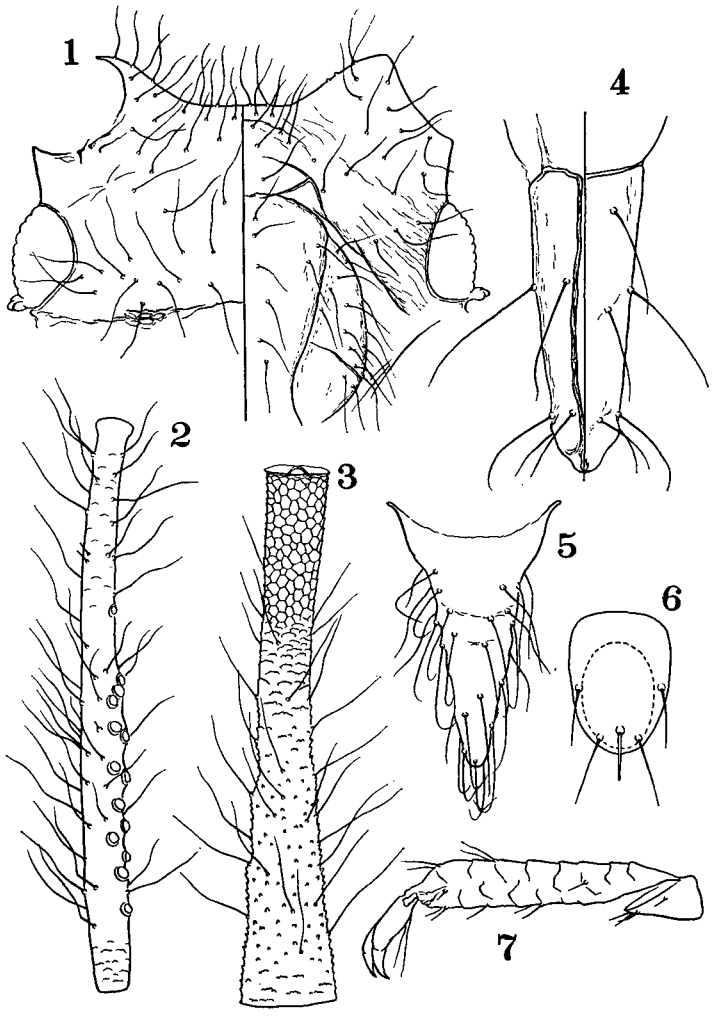

Fig. 5. *Macrotrichaphis yatsugatakensis*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (3rd segment); 3, siphunculus; 4, ultimate rostral segment; 5, cauda; 6, 1st segment of hind tarsus (ventral view); 7, hind tarsus.

of hind tarsus, with 6–8 secondary setae. Legs with coxae spinulously imbricated; femora entirely smooth, with setae about as long as middle width of hind femur; tibiae smooth, with setae 2.0–3.0 times as long as middle width of hind tibia; 1st segment of all tarsi with 5, someties 4 setae (1 sense peg and 3 or 4 lateral setae).

Mesosternal furca with a stem as long as or longer than wide. Abdomen with tergum membranous, without marginal sclerites and intersegmental areolations; ante- and postsiphuncular sclerites well developed, the latter being spinulated; anterior 6 segments without scleroites; 7th usually with scleroites at base of setae; 8th with a sclerotic band, with 16–23 setae. Genital plate semi-circular or oval, with about 50–60 setae. Siphunculus cylindrical apically, slightly dilated near base, reticulated on apical 1/5–1/3, strongly scabrous basally, 9–11 times as long as wide at middle, with many long, flagellate setae mostly on basal non-reticulated area, with a distinct flange. Cauda rather narrowly conical, slightly swollen at base, about 2/5 as long as siphunculus, with 25–30 setae.

Measurements in mm. Body 2.2; antennal segments (1st–6th): 0.17, 0.10, 0.67, 0.43, 0.40, 0.11+0.95; ultimate rostral segment 0.19; hind femur 0.92; hind tibia 1.62; hind tarsus (2nd segment) 0.14; siphunculus 0.65 (reticulated area 0.21); cauda 0.26; longest dorsal seta on head 0.09, that on 8th abdominal segment 0.10.

Specimens examined: Syntypes—10 apterous viviparous females, Mt. Yatsugatake, Yamanashi Pref., 30-vii-67, H. Higuchi leg., no. a 274.

Host plants: Unknown.

Distribution: Japan.

5. Genus ***Dactynotus*** Rafinesque

Dactynotus Rafinesque, 1818: 15 [type-species: *Aphis hieracium-paniculatum* Rafinesque, 1818, designated by Börner (1930)].

Uroleucon Mordvilko, 1914: 64 [type-species: *Aphis sonchi* Linné, 1767, designated by Börner (1930); described as a subgenus of the genus *Macrosiphum* Passerini].

Uromelan Mordvilko, 1914: 64 [type-species: *Aphis jaceae* Linné, 1758, designated by Hille Ris Lambers (1939); described as a subgenus of the genus *Macrosiphum* Passerini].

A detailed synonymy of the genus is given by Hille Ris Lambers (1939).

Key to the species

1 Cauda pale. 2
– Cauda black. 7
2(1) Ultimate rostral segment shorter than 2nd segment of hind tarsus. Abdominal disc with small scleroites which are often effaced, with setae at most 1.6 times as long as middle width of 3rd antennal segment. On *Sonchus* & *Picris*. . . . . 1. *D. sonchi* (Linné)
– Ultimate rostral segment as long as or longer than 2nd segment of hind tarsus. Abdominal disc with distinct scleroites, if the scleroites are indistinct then the dorsal setae are more than twice as long as middle width of 3rd antennal segment. 3
3(2) Antenna with 3rd segment more than 1.5 times as long as 4th and 5th segments together. On *Lactuca* & *Sonchus*. . . . . 6. *D. formosanus* (Takahashi)
– Antenna with 3rd segment at most a little longer than 4th and 5th segments together. . . 4
4(3) Siphunculus nearly twice as long as cauda. Body green in life. On *Aster*. . . . . 4. *D. monticola* (Takahashi)
– Siphunculus 1.1–1.6 times as long as cauda. Body red to dark brown in life. 5
5(4) Ultimate rostral segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Antesiphuncular sclerite absent, postsiphuncular sclerite rather weak. Antenna with 3rd segment bearing less than 30 rhinaria. On *Aster* & *Lactuca*. . . . . 2. *D. fuchuensis* (Shinji)
– Ultimate rostral segment more than 1.4 times as long as 2nd segment of hind tarsus. Ante- and postsiphuncular sclerites well developed. Antenna with 3rd segment bearing more than

30 rhinaria. 6

6(5) Cauda with more than 30 setae. Antenna with 3rd segment shorter than 4th and 5th together. Ultimate rostral segment more than 1.7 times as long as 2nd segment of hind tarsus. On *Saussurea*. . . . . 3. *D. saussureae* Takahashi

– Cauda with less than 20 setae. Antenna with 3rd segment as long as or a little longer than 4th and 5th together. Ultimate rostral segment 1.4–1.6 times as long as 2nd segment of hind tarsus. On *Picris* & *Lactuca*. . . . . 5. *D. picridis* (Fabricius)

7(1) Abdomen without postsiphuncular sclerites. Cauda short, less than twice as long as wide at base. Siphunculus at least 2.2 times as long as cauda. On *Taraxacum*. . . . . 13. *D. taraxaci* (Kaltenbach)

– Abdomen with developed postsiphuncular sclerites. Cauda elongate. Siphunculus at most 2.1 times as long as cauda. 8

8(7) Cauda with 40 or more setae. Siphunculus smooth, only reticulated on apical 1/5. Tibiae wholly black. On *Cirsium*. . . . . 9. *D. giganteus* (Matsumura)

– Cauda at most with 35 setae. Siphunculus imbricated or spinulated, reticulated on more than apical 1/5. Tibiae pale at middle. 9

9(8) Primary rhinarium of 5th antennal segment small and flat, if protuberant then not larger than secondary rhinaria. 11

– Primary rhinarium of 5th antennal segment strongly protuberant and much larger than secondary rhinaria. 10

10(9) Siphunculus less than 1.3 times as long as cauda, reticulated on apical 1/3–2/5. Ultimate rostral segment not longer than basal part of 6th antennal segment. On *Solidago* & *Aster*. . . . . 10. *D. amamianus* (Takahashi)

– Siphunculus more than 1.3 times as long as cauda, reticulated on apical 1/5–1/3. Ultimate rostral segment not shorter than basal part of 6th antennal segment. On *Solidago* & *Aster*. . . . . 11. *D. lactucicola* (Strand)

11(9) Siphunculus 1.0–1.2 times as long as cauda. Abdomen with 2nd–4th tergites each bearing 12–20 setae excluding marginal ones. Ultimate rostral segment 1.1 times as long as 2nd segment of hind tarsus. On *Adenophora*. . . . . 12. *D. adenophorae* (Matsumura)

– Siphunculus at least 1.4 times as long as cauda. Abdomen with 2nd–4th tergites each bearing 6–12 setae excluding marginal ones. Ultimate rostral segment 1.1–1.7 times as long as 2nd segment of hind tarsus. 12

12(11) Antenna with 3rd segment more than 1.3 times as long as siphunculus. Abdomen with 6th tergite bearing 2 setae between siphunculi. On *Campanula*. . . . . 14. *D. neocampanulae* Takahashi

– Antenna with 3rd segment at most 1.1 times as long as siphunculus. Abdomen with 6th tergite bearing 3–5 setae between siphunculi. 13

13(12) Cauda usually with more than 20 setae. Siphunculus less than 1.8 times as long as cauda. Antenna with 3rd segment bearing rhinaria on its basal 1/2–7/9. On *Breea* & *Cirsium* . . . . . 8. *D. cephalonopli* Takahashi

– Cauda with less than 20 setae. Siphunculus more than 1.8 times as long as cauda. Antenna with 3rd segment bearing rhinaria on its basal 3/4 to whole length. On *Arctium*, *Atractylodes* & *Carthamus*. . . . . 7. *D. gobonis* (Matsumura)

1. ***Dactynotus sonchi*** (Linné)

Aphis sonchi Linné, 1767: 735.

Macrosiphum sonchi: van der Goot, 1915: 92; Theobald, 1926: 86.

Dactynotus sonchi: Hille Ris Lambers, 1939: 37; Eastop, 1958: 36 & 1966: 440; Miyazaki, 1966: 39.

Macrosiphum sonchicola Matsumura, 1917: 396. **Syn. n.**

Macrosiphum lactucicola: Shinji, 1941: 871.

Dactynotus picridiphaga Takahashi, 1962: 76.

Specimens examined: A lot of apterous and some alate viviparous females have been collected at the following localities in Hokkaidô:—Sapporo (ex *Sonchus brachyotis*); Kunneppu (ex *Sonchus brachyotis*); Asahikawa (ex *Picris hieracioides* var. *glabrescens*, M. Inouye leg., holotype of *Dactynotus picridiphaga* Takahashi).

Host plants: *Sonchus brachyotis* & *Picris hieracioides* var. *glabrescens* (in Japan). *Sonchus, Lactuca* & *Cichorium* (in Europe, after Hille Ris Lambers, 1939); *Mulgedium* (in Australia, after Eastop, 1966); *Geropogon* & *Aster* (in Middle East, after Bodenheimer et Swirsky); *Centaurea, Serratula, Chrysanthemum, Lapsana* & *Carduus* (in England, after Theobald, 1926).

Distribution: Cosmopolitan.

Having read the original description of *Macrosiphum sonchicola* Matsumura, I have come to the conclusion that *sonchicola* may be, in reality, a synonym of *Dactynotus sonchi* (L.), being described on the basis of immature specimens.

2. ***Dactynotus fuchuensis*** (Shinji)

Macrosiphum fuchuensis Shinji, 1942 b: 260.
Macrosiphum fuchuensis: Moritsu, 1958 a: 83.
Dactynotus fuchuensis: Takahashi, 1962: 75.

Specimens examined: Many apterous viviparous females collected at Utsunomiya, Tochigi Pref. (ex *Aster scaber*).

Host plants: *Aster scaber*; *Lactuca raddeana* (after Moritsu, 1958).

Distribution: Japan.

3. ***Dactynotus saussureae*** Takahashi

Dactynotus saussureae Takahashi, 1962: 78.

Specimens examined: Some apterous viviparous females collected at Karuizawa, Nagano Pref. (ex *Saussurea* sp., R. Takahashi leg., syntypes of *D. saussureae* Takahashi).

Host plants: *Saussurea* sp.

Distribution: Japan.

4. ***Dactynotus monticola*** (Takahashi)

Macrosiphum monticolum Takahashi, 1935: 502.
Dactynotus monticola: Takahashi, 1962: 74; Tao, 1963: 196.

Specimens examined: Many apterous and alate viviparous females, collected at the following localities:— Honshû—Shiobara, Tochigi Pref. (T. Tanaka leg.); Karuizawa, Nagano Pref. (R. Takahashi leg.); Kobuka & Mt. Iwawaki, Ôsaka Pref. (R. Takahashi leg.); Nachi, Wakayama Pref. Shikoku—Shôdo-shima Isl., Kagawa Pref.; Ichiu-mura, Tokushima Pref. (R. Takahashi leg.).

Host plants: All the specimens examined were collected from *Aster ageratoides* var. *semiamplexicaulis*.

Distribution: Japan; China; Taiwan.

5. ***Dactynotus picridis*** (Fabricius)

Aphis picridis Fabricius, 1775: 737.
Macrosiphum picridis: van der Goot, 1915: 82 (partim).
Dactynotus picridis: Hille Ris Lambers, 1939: 33; Takahashi, 1962: 74.

Specimens examined: A lot of apterous and alate viviparous females have been

examined, their localities being as follows:— Hokkaidô—Mt. Muine & Mt. Apoi (ex *Picris hieracioides* var. *glabrescens*); Shari (ex *Hieracium umbellatum*, H. Torikura leg.). Honshû—Zaô, Yamagata Pref. (ex *Picris hieracioides* var. *glabrescens*); Hirayu, Gifu Pref. (ex *Picris hieracioides* var. *glabrescens*); Chihaya, Ôsaka Pref. (ex *Lactuca* sp., R. Takahashi leg.). Kyûshû—Mt. Hikosan, Fukuoka Pref. (ex *Picris hieracioides* var. *glabrescens*); Kijima-kôgen, Ôita Pref. (ex *Picris hieracioides* var. *glabrescens*).

Host plants: *Picris hieracioides* var. *glabrescens, Hieracium umbellatum* & *Lactuca* sp.

Distribution: Japan; Europe; Middle East.

6. ***Dactynotus formosanus*** (Takahashi)

Macrosiphum formosanum Takahashi, 1921 b: 6.
Macrosiphum formosanum: Shinji, 1941: 835.
Dactynotus formosanus: Takahashi, 1962: 74; Tao, 1963: 196; Paik, 1965: 82.
Macrosiphum sonchi: Shinji, 1927: 71.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:—Hokkaidô—Sopporo (ex *Sonchus oleraceus*) & Asahikawa (ex *Youngia japonica*). Honshû—Morioka, Iwate Pref. (ex *Sonchus* sp.); Kawatabi, Miyagi Pref. (ex *Lactuca* sp.); Inashiki, Ibaragi Pref. (ex *Lactuca scariola* var. *sativa*, K. Sekiguchi leg.); Tôkyô; Nagano (ex *Sonchus* sp., R. Takahashi leg.); Ôsaka (ex *Sonchus* sp., R. Takahashi leg.). Kyûshû—Kumamoto (ex *Youngia japonica*); Kagoshima (ex *Youngia japonica*); Koshuku, Amami-ôshima Isl. (ex *Youngia japonica*).

Host plants: *Sonchus oleraceus, Sonchus* spp., *Youngia japonica, Lactuca scariola* var. *sativa* & *Lactuca* sp.

Distribution: Japan; Korea; China; Taiwan.

7. ***Dactynotus gobonis*** (Matsumura)

Macrosiphum gobonis Matsumura, 1917: 395.
Macrosiphum gobonis: Hori, 1929: 59 (partim); Shinji, 1927: 66 & 1941: 844 (partim).
Dactynotus (Uromelan) gobonis: Takahashi, 1962: 76 (partim).
Uromelan gobonis: Tao, 1963: 199 (partim); Paik, 1965: 84 (partim).

On the basis of the present specimens, a brief redescription is given below:—

Apterous viviparous female. Body, cauda and siphunculus black. Antenna wholly black; 3rd segment pale at base in some specimens. Legs brown; femora on distal part, tibiae at both ends, and tarsi black. Body 2.3–3.6 mm. in length.

Dorsal setae of head blunt, often spatulated at tip, 1.3–1.5 times as long as middle width of 3rd antennal segment. Antennal tubercles high, diverging at inner sides. Antenna 1.0–1.3 times as long as body; 3rd segment smooth, with 31–64 rhinaria on basal 3/4 to whole length; 3rd–6th as 38 : 22 : 19 : 6+37 in length. Rostrum just passing hind coxa, sometimes reaching 3rd abdominal segment; ultimate segment 1.1–1.4 times as long as 2nd segment of hind tarsus. Tibiae with setae shorter than middle width of hind tibia. First tarsal chaetotaxy 5 : 5 : 5 or 5 : 5 : 4. Abdomen with developed scleroites, the marginal ones being often fused with each other, without marginal tubercles; postsiphuncular sclerite well developed; 2nd–4th segments each with 6–11 setae besides marginal ones; 6th with 3 or 4 setae between siphunculi; 8th with 4 or 5 setae. Siphunculus imbricated, reticulated on apical 1/5–3/10, 9–12 times as long as wide at middle, 1.8–2.1 times as long as cauda. Cauda elongate, conical,

often with a weak constriction near base, with 11–18 setae.

Measurements in mm. Body 2.8; antennal segments (1st–6th): 0.18, 0.10, 1.04, 0.58, 0.48, 0.15+0.95; ultimate rostral segment 0.19; hind femur 1.05; hind tibia 2.04; hind tarsus (2nd segment) 0.14; siphunculus 0.94 (reticulated area 0.24); cauda 0.51; longest dorsal seta on head 0.08, that on 8th abdominal segment 0.08.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Body 2.5–3.3 mm. in length. Antenna with 3rd segment bearing 60–80 rhinaria on its whole length. Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus. Abdomen with developed marginal sclerites; postsiphuncular sclerite well developed; antesiphuncular sclerite small. Siphunculus reticulated at apical 1/4–1/3, 11–14 times as long as wide at middle, 2.2–2.4 times as long as cauda which bears 11–16 setae.

Measurements in mm. Body 2.8; antennal segments (1st–6th): 0.17, 0.10, 1.04, 0.62, 0.49, 0.16+1.00; ultimate rostral segment 0.19; hind femur 1.10; hind tibia 2.25; hind tarsus (2nd segment) 0.15; siphunculus 0.99 (reticulated area 0.32); cauda 0.44: longest dorsal seta on head 0.06, that on 8th abdominal segment 0.07.

Specimens examined: Many apterous and alate viviparous females, Sapporo, Hokkaidô, 20-vii-65 & 14-ix-65, ex *Arctium lappa*, 24-ix-65, ex *Carthamus tinctorius* & 27-vi-68, ex *Atractylodes japonica*; Niigata, 8-vi-56, ex *Arctium lappa*, K. Shibata leg.; Ôsaka, 20-v-54, ex *Arctium lappa*, R. Takahashi leg.

Host plants: *Arctium lappa, Carthamus tinctorius* & *Atractylodes japonica.*

Distribution: Japan; Korea; China; Taiwan.

Cirsium and *Breea* have been recorded as host plants of this species. However, all the examined specimens collected from *Cirsium* and *Breea* are not referred to the present species but to *D. cephalonopli* Takahashi.

8. ***Dactynotus cephalonopli*** Takahashi.

Dactynotus (Uromelan) cephalonopli Takahashi, 1962: 80.
Macrosiphum ambrosiae: Takahashi, 1923: 12.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Breea setosa*, S. Takagi leg., syntypes of *D. cephalonopli* Takahashi); Noboribetsu (ex *Cirsium* sp.); Sarobetsu, Kitami & Yukomambetsu (ex *Cirsium kamtschaticum*). Honshû—Mt. Gassan, Yamagata Pref. (ex *Cirsium* sp., K. Kusigemati leg.); Kaigake, Niigata Pref. (ex *Cirsium* sp., H. Higuchi leg.); Kawatabi, Miyagi Pref. (ex *Cirsium* sp.); Bandai-kôgen, Fukushima Pref. (ex *Cirsium* sp.); Nikkô, Tochigi Pref. (ex *Cirsium* sp.); Lake Kamakita, Saitama Pref. (ex *Cirsium* sp.); Taiji, Wakayama Pref. (ex *Cirsium* sp.). Kyûshû—Takachiho, Miyazaki Pref. (ex *Cirsium japonicum*).

Host plants: *Breea setosa, Cirsium japonicum, C. kamtschaticum* & *Cirsium* spp.

Distribution: Japan; Taiwan.

9. ***Dactynotus giganteus*** (Matsumura)

Macrosiphum giganteum Matsumura, 1918: 2.
Macrosiphum gigantea: Shinji, 1941: 841.
Dactynotus (Uromelan) giganteus: Takahashi, 1962: 75.
Uromelan giganteus: Paik, 1965: 83.

As a supplement to the original description, the following characters may be

added:—

Apterous viviparous female. Body, antenna, siphunculus and cauda black. Legs black; femora pale at base. Body 4.0–4.3 mm. in length.

Dorsal setae of head pointed or blunt, 1.6–2.0 times as long as middle width of 3rd antennal segment. Antenna 1.1–1.2 times as long as body; 3rd segment with 22–66 rhinaria on basal 3/7–3/5, with setae nearly as long as middle width of the segment; 3rd–6th segments as 52 : 40 : 30 : 8+45 in length. Rostrum just passing or reaching far beyond hind coxa; ultimate segment 1.4–1.7 times as long as hind tarsus, with 3 or 4 pairs of secondary setae. Hind tibia with setae nearly as long as or longer than middle width of hind tibia. First segment of all tarsi with 5 or 4 setae. Abdomen with dorsal scleroites and postsiphuncular sclerites well developed, without marginal tubercles; 2nd–4th segments each with 9–12 setae besides marginal ones; 6th with 3–5 setae between siphunculi; 8th with 10–16 setae. Siphunculus smooth, reticulated on apical 1/7–1/5, 13–16 times as long as wide at middle. Cauda 1/2–2/3 as long as siphunculus, with about 40–60 setae.

Measurements in mm. Body 4.3; antennal segments (1st–6th): 0.23, 0.15, 1.40, 1.05, 0.79, 0.22+1.16; ultimate rostral segment 0.28 ; hind femur 1.88; hind tibia 3.73; hind tarsus (2nd segment) 0.19; siphunculus 1.45 (reticulated area 0.22); cauda 0.94, longest dorsal seta on head 0.11, that on 8th abdominal segment 0.11.

Alate viviparous female. Slightly differs from the apterous viviparous female as follows:—

Antenna 1.1–1.3 times as long as body; 3rd segment with 50–85 rhinaria. Abdomen with developed marginal sclerites on 2nd–4th, 6th and 7th segments. Siphunculus 11–15 times as long as wide at middle, 1.8–2.0 times as long as cauda.

Measurements in mm. Body 4.4; antennal segments (1st–6th): 0.21, 0.14, 1.36, 1.15, 0.85, 0.21+1.20; ultimate rostral segment 0.29; hind femur 1.72; hind tibia 3.35; hind tarsus (2nd segment) 0.19; siphunculus 1.48 (reticulated area 0.28); cauda 0.73; longest dorsal seta on head 0.09, that on 8th abdominal segment 0.10.

Specimens examined: Many apterous and alate viviparous females, Sapporo, Hokkaidô, 24-vi-64, 8-vii-65 & 10-ix-62, ex *Cirsium kamtschaticum*; Yukomambetsu, Hokkaidô, 8-vii-62, ex *Cirsium kamtschaticum*; Aizankei, Hokkaidô, 25-vii-57, ex *Cirsium* sp., S. Takagi leg.; Lake Shikaribetsu, Hokkaidô, 14-vii-66, ex *Cirsium kamtschaticum*; Mt. Takao Tôkyô Distr., 20-vii-57, ex *Cirsium* sp., R. Takahashi leg.; Kamikôchi, Nagano Pref., 26-viii-67, ex *Cirsium* sp.; Ichiu-mura, Tokushima Pref., 20-viii-58, ex *Cirsium* sp., R. Takahashi leg.

Host plants: *Cirsium* spp. (including *C. kamtschaticum*).

Distribution: Japan; Korea.

10. ***Dactynotus amamianus*** (Takahashi)

Macrosiphum amamianum Takahashi, 1930a: 318.
Dactynotus (Uromelan) amamianus: Takahashi, 1962: 76.
Macrosiphum rudbeckiae: Essig et Kuwana, 1918: 52 (partim).

Specimens examined: Many apterous and alate viviparous females collected at the following localities:— Hokkaidô—Mt. Apoi & Tenninkyô (ex *Solidago virga-aurea* var. *gigantea*). Honshû—Sukayu, Aomori Pref. (ex *Solidago virga-aurea* var. *asiatica*); Nikkô, Tochigi Pref.; Takayama, Gifu Pref. (ex *Solidago virga-aurea* var. *asiatica*, R.

Takahashi leg.); Mt. Iwawaki, Ôsaka Pref. (R. Takahashi leg.). Kyûshû—Kirishima, Kagoshima Pref. (ex *Aster* sp., R. Takahashi leg.); Nase, Amami-ôshima Isl. (R. Takahashi leg.).

Host plants: *Solidago virga-aurea* var. *asiatica*, *S. virga-aurea* var. *gigantea* & *Aster* sp.

Distribution: Japan.

11. ***Dactynotus lactucicola*** (Strand)

Macrosiphum sp., Takahashi, 1925: 11.
Macrosiphum lactucicola Strand, 1929: 22.
Dactynotus (*Uromelan*) *lactucicola*: Takahashi, 1962: 76.
Uromelan lactucicola: Tao, 1963: 199.
Macrosiphum nipponica Shinji, 1942b: 258. **Syn. n.**

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Lake Utonai & Mt. Eniwa (ex *Solidago virga-aurea* var. *gigantea*). Honshû—Kawatabi, Miyagi Pref. (ex *Aster* sp.); Utsukushigahara, Nagano Pref. (ex *Solidago virga-aurea* var. *asiatica*, R. Takahashi leg.).

Host plants: *Solidago virga-aurea* var. *asiatica*, *S. virga-aurea* var. *gigantea* & *Aster* sp.

Distribution: Japan; China; Taiwan.

12. ***Dactynotus adenophorae*** (Matsumura), comb. n.

Macrosiphum adenophorae Matsumura, 1918: 3.
Dactynotus triphyllae Miyazaki, 1966: 37. **Syn. n.**

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities in Hokkaidô:—Obihiro (H. Higuchi leg.) & Sapporo (syntypes of *Dactynotus triphyllae* Miyazaki); Mt. Apoi; Irika (Shakotan).

Host plants: All the specimens examined were collected from *Adenophora triphylla* var. *japonica*.

Distribution: Japan.

The specimens examined disagree with the original description of *Macrosiphum adenophorae* Matsumura in the siphunculus not much longer than the cauda and in the antenna of the alate viviparous female bearing more numerous (about 80–110) rhinaria on the 3rd segment. Notwithstanding these differences, I prefer to adopt the name *adenophorae* Matsumura for the present species which occurs commonly on *Adenophora triphylla* (=*A. verticillata*) in Hokkaidô.

13. ***Dactynotus taraxaci*** (Kaltenbach)

Aphis taraxaci Kaltenbach, 1843: 30.
Macrosiphum taraxaci: Theobald, 1926: 97; Palmer, 1952: 326.
Dactynotus (*Uromelan*) *taraxaci*: Hille Ris Lambers, 1939: 64.
Dactynotus taraxaci: Miyazaki, 1966: 38.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities in Hokkaidô:—Sapporo & Kunneppu (ex *Taraxacum officinale*); Lake Notoro & Toyotomi (ex *Taraxacum* sp.).

Host plants: *Taraxacum* spp. (inculuding *T. offlicinale*).

Distribution: Japan; Europe; North America.

14. ***Dactynotus neocampanulae*** Takahashi

Dactynotus (*Uromelan*) *neocampanulae* Takahashi, 1962: 79.

Specimens examined: Some apterous and alate viviparous females collected at the following localities:— Honshû—Mt. Iwawaki, Ôsaka Pref. (ex *Campanula punctata*, R. Takahashi leg., syntypes of *D. neocampanulae* Takahashi); Mt. Nijô (ex *Platycodon grandiflorum*, R. Takahashi leg.) & Taishi (ex *Campanula* sp., R. Takahashi leg.), Ôsaka Pref.

Host plants: *Campanula punctata*, *Campanula* sp. &. *Platycodon grandiflorum*.

Distribution: Japan.

Species of *Dactynotus* not included in the key

15. ***Dactynotus kikioensis*** (Shinji)

Macrosiphum kikioensis Shinji, 1942b: 261.

Dactynotus kikioensis: Takahashi, 1962: 73.

Host plants: *Platycodon grandiflorum* (after Shinji, 1942) & *Campanula* sp. (after Takahashi, 1962).

Distribution: Japan.

As I have seen no representatives of this species, it is excluded from the key. According to the diagnosis given by Takahashi (1962), this species is distinguished from any other congeneric ones known from Japan by the very short ultimate rostral segment with only a pair of secondary setae.

6. Genus ***Meguroleucon***, gen. n.

Type-species: *Meguroleucon codonopsicola*, sp. n.

The new genus may be defined as follows:—

Siphunculus subcylindrical, reticulated at apex, longer than cauda which is pale. Abdomen membranous, with marginal and siphuncular sclerites well developed, without scleroites and marginal tubercles. First segment of all tarsi with 4 setae (2 sense pegs and 2 lateral setae). Head quite smooth, with 4 pairs of dorsal setae; antennal tubercles high, diverging at inner sides; median tubercle not developed. Antenna long, with secondary rhinaria confined to 3rd segment in both of apterous and alate viviparous females.

The new genus is closely allied to *Eomacrosiphon* Hille Ris Lambers, 1958, in the abdominal sclerotization, and yet it is readily distinguished from the latter by the first tarsal segment of all legs with 2 sense pegs and 2 lateral setae. The new genus may be distinguished from any other related genera by the first tarsal chaetotaxy and by the unique sclerotization of the abdomen.

The genus is represented by a single species.

1. ***Meguroleucon codonopsicola***, sp. n.

Apterous viviparous female. Body in life pale yellowish green with a milky tint; head brown. Antenna and siphunculus black. Cauda pale. Legs pale; femora at apex, tibiae at basal 1/3 and at apex, and tarsi black. Body oval, 2.2–2.6 mm. in length.

Head quite smooth, with 4 pairs of rigid setae dorsally, which are at most a little longer than half middle width of 3rd antennal segment; antennal tubercles high,

diverging at inner sides, each with 2 setae apically and 1 or 2 setae mid-ventrally. Antenna as long as or longer than body; 3rd segment smooth or weakly imbricated, nearly as long as 4th and 5th together, with 8–18 rather small rhinaria on basal 1/2–2/3, with setae shorter than half middle width of the segment; 4th and following segments imbricated; primary rhinaria of 5th and 6th ciliated; processus terminalis 2.7–2.9 times as long as basal part of 6th; 3rd–6th as 84 : 47 : 36 : 17+46 in length. Clypeus with 4 setae anteriorly; mandibular lamina with 1–3 setae. Rostrum reaching between middle and hind coxae or attaining hind coxa; ultimate segment blunt, convex laterally,

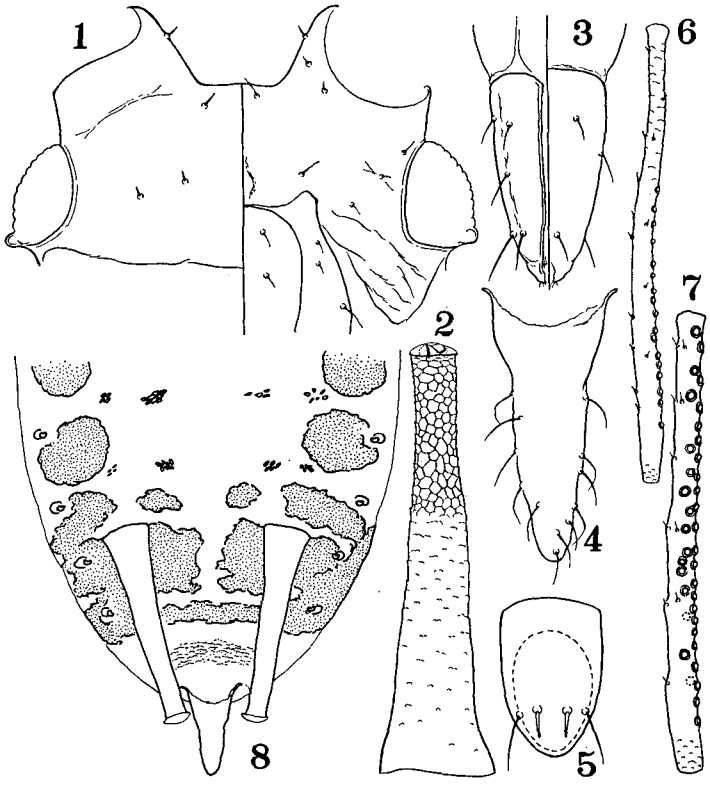

Fig. 6. *Meguroleucon codonopsicola*, sp. n. Apterous viviparous female:— 1, head; 2, siphunculus; 3, ultimate rostral segment; 4, cauda; 5, 1st segment of hind tarsus (ventral view); 6, antenna (3rd segment). Alate viviparous female:— 7, antenna (3rd segment); 8, pattern of sclerites of abdomen.

about twice as long as broad, 0.7–0.8 as long as 2nd segment of hind tarsus, with 5–7 secondary setae. Prothorax with a pair of mesial setae, without marginal tubercles. Femora spinulously imbricated apically, with setae 1/4–3/8 as long as middle width of hind femur. Tibiae smooth, with setae about as long as middle width of hing tibia. First segment of all tarsi with 4 setae (2 sense pegs and 2 lateral setae). Mesosternal furca with a stem about as long as wide at base. Abdomen membranous, without scleroites and marginal tubercles; marginal sclerites developed on 2nd–4th segments;

antesiphuncular sclerite developed, usually divided into 2 pieces; postsiphuncular sclerite very large, sometimes fused with antesiphuncular sclerite; 7th segment often with a narrow sclerotic band which is often fused with postsiphuncular sclerites; all these sclerites quite smooth; 2nd–4th segments each with 4–6 blunt setae between marginal sclerites, the longest seta being 1/4–1/3 as long as middle width of 3rd antennal segment, with blackish intersegmental areolations; 8th segment sclerotic, imbricated, with 4–6 setae about 2/3 as long as middle width of 3rd antennal segment. Genital plate oval, with 9–12 setae along hind margin, a pair of setae anteriorly and 0–8 setae on middle area. Siphunculus cylindrical or tapering, reticulated on apical 1/4–3/10, nearly smooth at base, the remaining part being moderately imbricated, 7–8 times as long as wide at middle, a little longer than 6th antennal segment, with a distinct flange. Cauda elongately conical, blunt at apex, weakly constricted at basal 1/3, 5/9–5/8 as long as siphunculus, with 8–12 setae.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.13, 0.10, 0.74, 0.44, 0.33, 0.15+0.43; ultimate rostral segment 0.11; hind femur 1.02; hind tibia 1.73; hind tarsus (2nd segment) 0.15; siphunculus 0.63 (reticulated area 0.17); cauda 0.40; dorsal setae of head 0.018–0.028, those on 8th abdominal segment 0.030–0.035.

Alate viviparous female. Slightly differs from the apterous viviparous female as follows:—

Body 2.3–2.9 mm. in length; colouration same as in apterous viviparous female except for head and thorax which are black. Antenna 1.1–1.2 times as long as body; 3rd segment shorter than 4th and 5th together, with 37–44 rhinaria along whole length of the segment; processus terminalis about 3.0–3.5 times as long as basal part of 6th; 3rd–6th segments as 80 : 53 : 44 : 19+61 in length. Ultimate rostral segment about 0.7 as long as 2nd segment of hind tarsus. Wings of normal venation; veins and pterostigma pale brown in cleared specimens. Abdomen with marginal sclerites larger than in apterous form; ante- and postsiphuncular sclerites and marginal sclerites of 7th segment fused together. Siphunculus reticulated on apical 1/3–2/5, 8 times as long as wide at middle, shorter than 6th antennal segment. Cauda with 11–14 setae.

Measurements in mm. Body 2.6; antennal segments (1st–6th): 0.15, 0.10, 0.96, 0.65, 0.47, 0.21+0.64; ultimate rostral segment 0.12; hind femur 1.06; hind tibia 1.96; hind tarsus (2nd segment) 0.18; siphunculus 0.73 (reticulated area 0.25); cauda 0.39; dorsal setae of head 0.020–0.028, those on 8th abdominal segment 0.043 or less.

Specimens examined: Syntypes—14 apterous and 3 alate viviparous females, Yukomambetsu, Hokkaidô, 29–vii–67, ex *Codonopsis lanceolata*, no. 2214.

Host plants: *Codonopsis lanceolata*. This aphid infests stalks of the host without causing any deformation.

Distribution: Japan.

7. Genus ***Staticobium*** Mordvilko

Staticobium Mordvilko, 1914: 66 [type-species: *Staticobium otolepidis* Nevsky, 1928, designated by Börner, 1930].

1. ***Staticobium loochooense*** (Takahashi), comb. n.

Aulacorthum loochooense Takahashi, 1939b: 115.
Staticobium loochooense Sorin, 1967: 14. **Syn. n.**

Specimens examined: Some apterous viviparous females collected at Yonakuni Isl. (ex *Limonium wrightii*, K. Iha leg., syntypes of *Staticobium loochooense* Sorin).

Host plants: *Limonium wrightii*.

Distribution: Japan (Ryukyu).

Having examined syntypes of *Staticobium loochooense* Sorin, 1967, I have come to the conclusion that *loochooense* Sorin should be suppressed as a snyonym of *loochooense* Takahashi, 1939.

8. Genus ***Delphiniobium*** Mordvilko

Delphiniobium Mordvilko, 1914: 65 [type-species: (*Rhopalosiphum aconiti* van der Goot, 1912)=*Myzus junackianum* Karsch, 1887].

This genus is represented by 4 species, *D. junackianum* (Karsch), *C. lycoctoni* Börner and *D. carpatica* Mamontova-Solucha from Europe, and *D. bogdouli* Szelegiewicz from Mongolia. In the course of the present study a new species has been found from Japan.

1. ***Delphiniobium yezoense***, sp. n.

Apterous viviparous female. Body green or bluish green in life. Antenna pale; 3rd-5th segments at apex and 6th black; 3rd on rhinariated area fuscous. Legs pale; femora subapically, tibiae apically and tarsi wholly black. Siphunculus pale, black apically. Cauda black. Body 2.9–3.5 mm. in length.

Head with dorsal setae stiff and often spatulated, the longer setae being about as long as or shorter than middle width of 3rd antennal segment; antennal tubercles diverging at inner sides, each with 1 or 2 apical and 1, rarely 2 mid-ventral setae; median tubercle produced. Antenna about as long as or longer than body; 3rd segment smooth, about as long as 4th and 5th together, with 10–25 strongly bulging rhinaria on basal half, and with setae at most 3/4 as long as middle width of the segment; 4th smooth or weakly imbricated apically; processus terminalis 7.0–9.5 times as long as basal part of 6th; 3rd–6th segments as 110 : 55 : 50 : 13+107 in length. Clypeus with a pair of setae anteriorly; mandibular lamina with 3, rarely 4 setae. Rostrum reaching hind coxa; ultimate segment obtuse, 1.1–1.3 times as long as 2nd segment of hind tarsus, with 7–10 secondary setae. Thoracic spiracles placed at bottom of a crater on a large protuberance, the opening of the crater being large and round. Mesosternal furca with a stem not longer that wide. Femora smooth, with setae 1/3–1/2 as long as middle width of hind femur. Tibiae smooth, with setae distinctly longer than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3. Abdomen membranous, without sclerites and marginal tubercles, with pale intersegmental areolations; spiracles placed on tuberculate spiracular plates; 2nd–4th segments each with 5–8 setae in addition to marginal ones, the mesial setae being at most 4/5 as long as middle width of 3rd antennal segment; 8th with 4 setae 1.1–1.7 times as long as middle width of 3rd antennal segment. Genital plate round, with 12–16 setae along hind margin and 2–4 (mostly 4) setae anteriorly. Siphunculus smooth, slightly swollen, reticulated on apical 1/7–1/5, 11–13 times as long as wide at reticulated area, with a developed flange. Cauda elongate, not constricted, 2/3 as long as siphunculus, with 7 or 8 setae.

Measurements in mm. Body 3.1; antennal segments (1st–6th): 0.15, 0.11, 1.05, 0.54, 0.49, 0.13+1.08; ultimate rostral segment 0.20; hind femur 1.38; hind tibia 2.42; hind

tarsus (2nd segment) 0.16; siphunculus 0.70 (reticulated area 0.12); cauda 0.51; longest seta 0.040 on head, 0.028 on abdominal disc and 0.052 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Body 3.0–3.6 mm. in length, bluish green in life; head and thorax fuscous, with a brownish tinge. Antenna black; 3rd segment pale at base, a little shorter than 4th and 5th together, with 40–65 rhinaria along whole length; processus terminalis about 10 times as long as basal part of 6th. Abdomen with small, weakly pigmented marginal sclerites and fuscous intersegmental areolations on 2nd–5th segments. Siphunculus black except at base, 1.6–1.7 times as long as cauda.

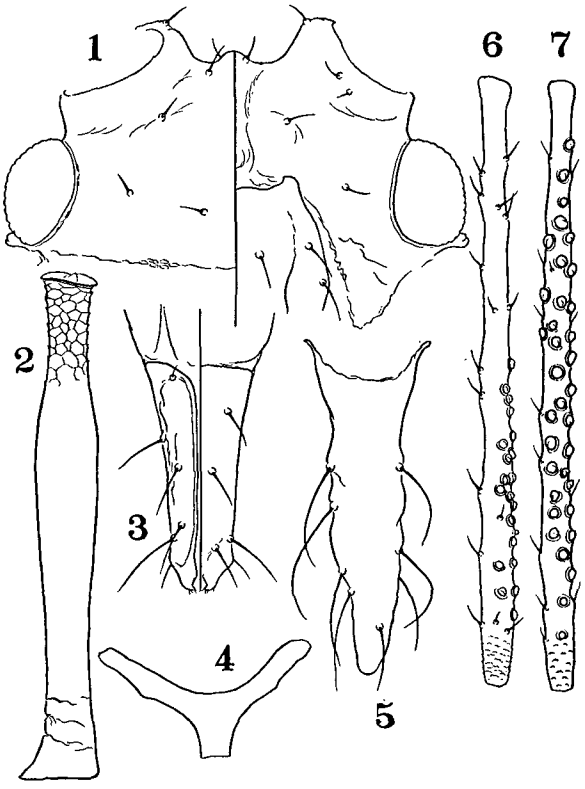

Fig. 7. *Delphiniobium yezoense*, sp. n. Apterous viviparous female:—
1, head; 2, siphunculus; 3, ultimate rostral segment;
4, mesosternal furca; 5, cauda; 6, antenna (3rd segment).
Alate viviparous female:— 7, antenna (3rd segment).

Measurements in mm. Body 3.0; antennal segments (1st–6th): 0.14, 0.09, 1.07, 0.58, 0.57, 0.13+1.28; ultimate rostral segment 0.18; hind femur 1.32; hind tibia 2.53; hind tarsus (2nd segment) 0.16; siphunculus 0.73 (reticulated area 0.12); cauda 0.44; longest seta 0.030 on head, 0.032 on abdominal disc and 0.052 on 8th abdominal segment.

Alate male. Slightly differs from the alate viviparous female as follows:—

Body dark brown in life, 2.4–2.5 mm. in length. Siphunculus often wholly black.

Antenna with 39–45 rhinaria on 3rd segment, 2–7 rhinaria on 4th and 1–5 secondary rhinaria on 5th. Clypeus usually without setae anteriorly. Abdomen with marginal sclerites and intersegmental areolations a little more developed than in alate viviparous female, often with scleroites at base of dorsal setae; dorsal setae on abdominal disc 6/7 as long as middle width of 3rd antennal segment. Siphunculus slenderer, with apical reticulation ridged. Cauda smaller, about half length of siphunculus.

Oviparous female. Slightly differs from the apterous viviparous female as follows:—

Antenna with 11–18 rhinaria on 3rd segment. Hind tibia fuscous, swollen basally, with numerous pseudosensoria. Siphunculus more strongly pigmented and thinner than in apterous viviparous female. Genital plate with 22–24 setae along hind margin, 4 setae anteriorly and 7–14 additional ones on central area. Abdomen with 8th segment bearing 6–8 setae.

Specimens examined: Syntypes—18 apterous and 14 alate viviparous females, Sapporo, Hokkaidô, 12-vi-68 (no. 2452), 15-vi-65 (no. 1300), 18-vi-66 (nos. 1674 & 1679), 22-vi-67 (nos. 2173 & 2175), 10-vii-65 (no. 1332), 15-vii-64 (no. 434) & 8-ix-65 (no. 1384); 4 alate males and 7 oviparous females, Sapporo, 2-x-65 (no. 1406) & 21-x-65 (no. 1414). Some apterous and alate viviparous females have also been collected at Tôro (16-vii-66) and Nibushi (22-vii-66), Hokkaidô.

Host plants: All the specimens examined were collected from *Aconitum* spp. (including *A. chinense*, *A. kitadakense*, *A. yesoense* & *A. sachalinense*). This aphid infests the young shoots or flower stems of the host plants.

Distribution: Japan.

The new species closely resembles *D. bogdouli* Szelegiewicz. In comparison with the holotype (an alate viviparous female) of *bogdouli*, the alate viviparous female of the present species differs in the following points:—(1) Clypeus with 2 setae anteriorly (with 4 setae in *bogdouli*). (2) Antenna wholly black except at base of 3rd segment (pale on 4th and 5th segments basally). Furthermore, according to the original description, the body of *bogdouli* is shining brown in life, while it is green or bluish green in the present species. From *D. lycoctoni* Börner the new species may be differentiated as follows:—(1) Clypeus with 2 setae anteriorly (with 4 setae in *lycoctoni*). (2) Abdominal disc with setae at most about 35 μ in length (up to 45 μ). (3) Cauda tapering, without distinct constrictions near base. (4) Siphunculus 11–13 times as long as wide at reticulated area (about 9 times so).

9. Genus ***Indomegoura*** Hille Ris Lambers

Indomegoura Hille Ris Lambers in MacGillivray, 1958: 25 [type-species: *Rhopalosiphum indicum* van der Goot, 1916].

Omeimegoura Tao, 1963: 184 [type-species: *Omeimegoura nigrotibiae* Tao, 1963]. **Syn. n.**

The genus *Omeimegoura* Tao is erected for *O. nigrotibiae* Tao, being separated from *Indomegoura* mainly by the absence of the rhinaria on the 3rd antennal segment and by the shortly conical cauda in the apterous viviparous female. In the course of the present study, however, I have come to the opinion that *Omeimegoura* should be suppressed as a synonym of *Indomegoura*.

This genus is represented by the following 2 species distributed in South-East Asia. So far as their habits are known, the species are associated with *Staphylea*.

Key to the species

1 Cauda elongate, much longer than wide. Antenna with 1–12 rhinaria on 3rd segment. Ultimate rostral segment 0.7–0.9 as long as 2nd segment of hind tarsus. Siphunculus cylindrical at base, strongly attenuated at apical reticulated area. . . . . 1. *I. indica* (van der Goot)

– Cauda triangular, about as long as wide. Antenna usually without rhinaria on 3rd segment. Ultimate rostral segment 0.9–1.0 as long as 2nd segment of hind tarsus. Siphunculus elongately barrel-shaped. . . . . 2. *I. nigrotibiae* (Tao)

1. ***Indomegoura indica*** (van der Goot)

Rhopalosiphum indicum van der Goot, 1916: 1.
Rhopalosiphum indicum: van der Goot, 1917 a: 176; Essig et Kuwana, 1918: 55.
Amphorophora indica: Takahashi, 1923: 87 & 1924: 107; Shinji, 1941: 737.
Indomegoura indica: Hille Ris Lambers in MacGillivray, 1958: 25; Tao, 1963: 184; Paik, 1965: 71.
Rhopalosiphum miniatum Matsumura, 1918: 12.
Rhopalosiphum hemerocallidis Matsumura, 1918: 12.
Nectarosiphon mitsubautsugi Shinji, 1923: 308.
Amphorophora essigwanai Mason, 1925: 29.

Fundatrix. Body orange-red in life, powdery, globular, 4.8–4.9 mm. in length. Antenna, legs, siphunculus and cauda black.

Antennal tubercles low, strongly diverging at inner sides, imbricated ventrally. Antenna 5-segmented, a little longer than half body length; 3rd segment imbricated, with 0–2 rhinaria, with setae shorter than basal width of the segment; processus terminalis about twice as long as basal part of 5th; 3rd–5th segments as 57 : 20 : 7+14 in length. Rostrum passing middle coxa; ultimate segment 0.7–0.8 as long as 2nd segment of hind tarsus, with 4 secondary setae. Mesosternal furca sessile. Abdominal tergum membranous, finely craped, showing indistinct areolations; dorsal setae on abdominal disc pointed, shorter than basal diameter of 3rd antennal segment; 8th abdominal segment with 7–11 setae. Siphunculus cylindrical, attenuated at apex, sometimes elongately barrel-shaped, 3.0–3.5 times as long as wide at base, smooth, with a few rows of oblong hexagonal cells at apex. Cauda shortly tongue-shaped, 1/2–3/5 as long as siphunculus, at most 1.3 times as long as wide at base, with about 13 setae.

Measurements in mm. Body 4.8; antennal segments (1st–5th): 0.17, 0.13, 1.43, 0.47, 0.17+0.34; ultimate rostral segment 0.18; hind femur 1.40; hind tibia 2.40; hind tarsus (2nd segment) 0.23; siphunculus 0.60; cauda 0.33; dorsal setae of head about 0.035, those on abdominal disc about 0.030–0.040.

Oviparous female. Differs from the fundatrix as follows:—

Antennal tubercles usually well developed, diverging at inner sides. Antenna 6-segmented, slightly shorter than body; 3rd segment smooth, without rhinaria; processus terminalis 4.0–4.5 times as long as basal part of 6th. Mesosternal furca with a short broad base. Femora imbricated at apex; hind tibia swollen, with numerous pseudosensoria; middle and fore tibiae also with a few pseudosensoria in some specimens. Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus. Siphunculus 4.0–4.5 times as long as wide at base, reticulated at apical 1/8–1/6. Cauda bluntly conical or tongue-shaped, about 2/5 as long as siphunculus, with 10–12 setae.

Measurements in mm. Body 3.3; antennal segments (1st–6th): 0.14, 0.11, 0.92, 0.54, 0.46, 0.16+0.64; ultimate rostral segment 0.17; hind femur 1.21; hind tibia 1.98;

hind tarsus (2nd segment) 0.19; siphunculus 0.65; cauda 0.27; dorsal setae on head and abdominal disc 0.032–0.051, those on 7th abdominal segment 0.49–0.70.

Alate male. Antenna 1.2–1.3 times as long as body; 3rd segment rather smooth, with numerous rhinaria; 4th weakly imbricated, with 28–46 rhinaria on outer surface; 5th with 13–22 secondary rhinaria; processus terminalis 5–6 times as long as basal part of 6th. Ultimate rostral segment 0.9 as long as 2nd segment of hind tarsus. Abdomen with marginal and intersegmental sclerites well developed; setae on abdominal disc as long as or slightly longer than basal width of 3rd antennal segment. Siphunculus gently swollen at middle, 4.5–5.5 times as long as wide at middle, reticulated at apical 1/6–1/5. Cauda conical, pointed at apex, about half as long as siphunculus, with 11–15 setae.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.11, 0.10, 0.90, 0.69, 0.55, 0.17+0.92; ultimate rostral segment 0.15; hind femur 1.13; hind tibia 2.10; hind tarsus (2nd segment) 0.16; siphunculus 0.37; cauda 0.19; longest dorsal seta 0.030 on head, 0.042 on abdominal disc, 0.065 on 8th abdominal segment.

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 13-v-64 & 16-v-67, ex *Staphylea bumalda*. Some oviparous females and males, Sapporo, 2-x-65, ex *Staphylea bumalda*. Many apterous and alate viviparous females collected at the following localities:—Sapporo (ex *Staphylea bumalda* & *Hemerocallis middendorffii*); Teshikaga, Hokkaidô (ex *Hemerocallis middendorffii*, S. Matsumura leg., syntypes of *Rhopalosiphum hemerocallidis* Matsumura). Some larvae, Sapporo (ex *Staphylea bumalda*, S. Matsumura leg., syntypes of *Rhopalosiphum miniatum* Matsumura).

Host plants: Primary hosts—*Staphylea bumalda*; *Euscaphis japonica* (after Essig et Kuwana, 1918). Secondary hosts—*Hemerocallis* spp. (including *H. middendorffii*).

Distribution: Japan; Korea; China; Taiwan; India.

Having examined syntypes of *Rhopalosiphum miniatum* Matsumura and *Rhopalosiphum hemerocallidis* Matsumura, I have been convinced that *miniatum* and *hemerocallidis* should be suppressed as synonyms of *Indomegoura indica* (van der Goot), as Takahashi (1924) already pointed out.

2. ***Indomegoura nigrotibiae*** (Tao), comb. n.

Omeimegoura nigrotibiae Tao, 1963: 184.

This species is new to Japan. The present specimens agree well with the original description of *nigrotibiae*. On the basis of the present material, a brief redescription is given below:—

Apterous viviparous female. In cleared specimens, body slightly dusky; head dark brown. Antenna dark brown; 3rd segment pale at extreme base. Legs dark brown; femora paler at extreme base. Siphunculus dark brown. Cauda pale or dusky. Body roundly oval, 2.2–2.5 mm. in length.

Dorsal setae of head pointed, a little shorter than middle width of 3rd antennal segment. Antennal tubercle low, rounded at inner apex, sparsely imbricated ventrally, with a seta apically and a seta mid-ventrally. Frons weakly concave. Antenna a little longer than body; 3rd segment smooth, usually without rhinaria (with a rhinarium in some specimens), with setae about 3/4 as long as middle width of the segment; processus terminalis 4–5 times as long as basal part of 6th; 3rd–6th segments as 58 : 37 : 34 : 15+68 in length. Rostrum reaching hind coxa; ultimate segment blunt, 0.9–1.0

as long as 2nd segment of hind tarsus, with 4 secondary setae. Femora smooth or sparsely scabrous. Tibiae smooth, with setae nearly as long as middle width of hind tibia. First segment of all tarsi with 2 or 3 setae. Abdomen with tergum reticulated, without marginal tubercles and sclerites; 2nd–4th segments each with about 10–15 setae besides marginal ones; 8th with 6 or 7 setae 1.5 times as long as middle width of 3rd antennal segment. Siphunculus elongately barrel-shaped, about 5 times as long as wide at base, 2.5–3.0 times as long as cauda, sparsely spinulated at middle, with some rows of transverse hexagonal cells at apex. Cauda bluntly triangular, about as long as wide, with 12 setae.

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.10, 0.09, 0.57, 0.36, 0.35, 0.15+0.65; ultimate rostral segment 0.16; hind femur 0.88; hind tibia 1.56; hind tarsus (2nd segment) 0.18; siphunculus 0.50 (reticulated area 0.07); cauda 0.18; longest dorsal seta 0.030 on head, 0.043 on abdominal disc, 0.050 on 8th abdominal segment.

Specimens examined: Some apterous viviparous females, Mt. Takao, Tôkyô Distr., 24-vii-59, ex *Staphylea bumalda*, R. Takahashi leg.

Host plants: *Staphylea bumalda*.

Distribution: Japan; Taiwan.

10. Genus ***Amphorophora*** Buckton

Amphorophora Buckton, 1876: 187 [type-species: *Amphorophora ampullata* Buckton, 1876].
Eunectarosiphon del Guercio, 1913: 188 [type-species: *Aphis rubi* Kaltenbach, 1843].
Rhopalosiphum van der Goot, 1913: 146, nec Koch, 1854 [type-species: *Amphorophora ampullata* Buckton, 1876].

In the course of the present study 4 species have been known to occur in Japan, of which one is new to science.

Key to the species

1 Antenna, tibiae and siphunculus almost wholly black. Cauda elongate, about 2.5 times as long as wide. Ultimate rostral segment with about 20 secondary setae. On *Rubus*. . . . . 3. *A. amurensis* (Mordvilko)
– Antenna, tibiae and siphunculus pale basally. Cauda thick, at most about twice as long as wide. Ultimate rostral segment with 4–8 setae. 2
2(1) Antenna with 1–5 rhinaria on 3rd segment. Ultimate rostral segment smooth. Cauda with 7–10 setae. On *Filipendula*. . . . . 4. *A. filipendulae*, sp. n.
– Antenna with 10 or more rhinaria on 3rd segment. Ultimate rostral segment more or less scabrous. Cauda with about 15–25 setae. 3
3(2) Femora scabrous on apical 1/3. Siphunculus slender, with basal cylindrical portion more than 3 times as long as smallest width of the portion. Antenna with 10–17 rhinaria on 3rd segment. On *Athyrium* & *Lastrea*. . . . . 1. *A. ampullata* Buckton
– Femora scabrous on apical 2/3 or more. Siphunculus stout, with basal cylindrical portion less than 3 times as long as smallest width of the portion. Antenna with 19–27 rhinaria on 3rd segment. On *Lastrea*. . . . . 2. *A. scabripes* Miyazaki

1. ***Amphorophora ampullata*** Buckton

Amphorophora ampullata Buckton, 1876: 187.
Amphorophora ampullata: Hille Ris Lambers, 1949: 231; Hille Ris Lambers et Basu, 1966: 15; Miyazaki, 1968c: 14.
Rhopalosiphum ampullata: van der Goot, 1915: 142.

Megoura dryopteridis Matsumura, 1918: 13.
Amphorophora dryopteridis: Moritsu, 1948: 83.
Amphorophora shidae Shinji, 1933b: 348
Amphorophora shidae: Shinji, 1914: 765.

Specimens examined: Many apterous viviparous females, some alate viviparous females and oviparous females have been collected at Sapporo, Hokkaidô.

Host plants: *Athyrium yokoscense, A. pycnosorum* & *Lastrea quelpaertensis.* In the literature are recorded various kinds of ferns as hosts (see Miyazaki, 1968).

Distribution: Japan; Korea; Europe.

2. ***Amphorophora scabripes*** Miyazaki

Amphorophora scabripes Miyazaki, 1968c: 17.

Specimens examined: Some apterous and alate viviparous females collected at Oirase, Aomori Pref. & Sôbestu, Hokkaidô (syntypes of *A. scabripes* Miyazaki).

Host plants: All the specimens examined were collected from *Lastrea quelpaertensis.*

Distribution: Japan.

3. ***Amphorophora amurensis*** (Mordvilko)

Acyrthosiphon rubi amurensis Mordvilko, 1919: 267.
Amphorophora rubiphaga Takahashi, 1961: 109. **Syn. n.**

Specimens examined: A lot of apterous and alate viviparous females have been collected at the following localities in Hokkaidô:—Sapporo (ex *Rubus* sp., R. Takahashi leg., syntypes of *A. rubiphaga* Takahashi); Sapporo, Nibushi & Kitami-mombetsu (ex *Rubus idaeus* var. *aculeatissimus*).

Host plants: *Rubus idaeus* var. *aculeatissimus* & *Rubus* sp.

Distribution: Japan; Siberia (Primorskaja).

The Japanese form is slightly different from the original description of *amurensis* in the following points:—(1) Cauda with 7–17 (in most cases over 9) setae in all (with 4, sometimes 3 setae on each side in *amurensis*). (2) Head with median tubercle hardly developed in most specimens (median tubercle distinctly protruding). (3) Siphunculus sometimes hardly or not swollen at all just below flange.

4. ***Amphorophora filipendulae***, sp. n.

Apterous viviparous female. Body green or yellowish green in life. Antenna black; basal 2 segments wholly and 3rd segment at extreme base pale; 3rd and 4th segments pale basally in some specimens. Legs pale brown; femora at apex, tibiae at both ends and tarsi black. Siphunculus black except at base. Cauda pale. Body spindle-shaped, 2.5–3.8 mm. in length.

Head spinulated ventrally, with dorsal setae pointed, 1.2–1.5 times as long as middle width of 3rd antennal segment. Antennal tubercles large, parallel at inner sides, each with 1 or 2 setae apically and 1 seta mid-ventrally. Antenna 1.0–1.2 times as long as body; 1st segment scabrous, with 4–7 setae; 3rd segment smooth, with 1–5 rhinaria near base, with setae at most about half as long as width of the segment; processus terminalis 5–6 times as long as basal part of 6th; 3rd–6th segments as 31 : 21 : 17 : 6+36 in length. Rostrum reaching hind coxa; ultimate segment about as long as 2nd segment of hind tarsus, with 4–6, rarely 8 secondary setae. Clypeus

with 2 pairs of setae anteriorly; mandibular lamina with 2–4 setae. Femora imbricated apically, with setae at most half as long as width of hind femur. Tibiae with setae longer than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3. Mesosternal furca with a long stem which is narrowest at base. Abdominal tergum sclerotic, pale, sometimes evenly brownish, wrinkled, with pale intersegmental areolations; 2nd–4th segments each with 6–9 short blunt setae in addition to marginal ones, with or without marginal tubercles; 6th segment with 5–7 setae between siphunculi; 8th with 4–6 pointed setae, of which longer ones are at most about 1.3 times as long as middle

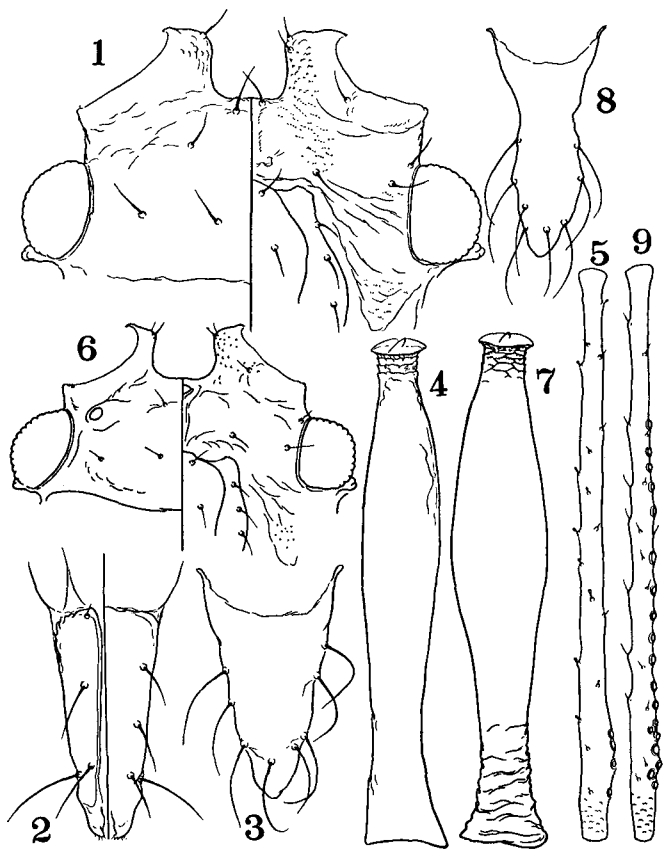

Fig. 8. *Amphorophora filipendulae*, sp. n. Apterous viviparous female:— 1, head; 2, ultimate rostral segment; 3, cauda; 4, siphunculus; 5, antenna (3rd segment). Alate viviparous female:— 6, head; 7, siphunculus; 8, cauda; 9, antenna (3rd segment).

width of 3rd antennal segment. Siphunculus smooth, corrugated below well developed flange, cylindrical on basal 1/3, swollen apically, 9–11 times as long as wide at base, as long as or a little shorter than 3rd antennal segment. Cauda elongately tongue-shaped, 1/4–1/3 as long as siphunculus, with 7–10 setae. Genital plate round, with 8–14 setae along hind margin and a pair of long ones anteriorly.

Measurements in mm. Body 3.3; antennal segments (1st–6th): 0.18, 0.10, 0.88,

0.58, 0.48, 0.18+1.08; ultimate rostral segment 0.16; hind femur 1.50; hind tibia 2.85; hind tarsus (2nd segment) 0.16; siphunculus 0.85; cauda 0.34; longest dorsal seta 0.060 on head, 0.015 on abdominal disc, 0.050 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Body green; head and thorax fuscous with a brownish tinge. Antenna black; 3rd segment pale at extreme base. Legs dark; tibiae often wholly black. Body 3.5–4.2 mm. in length.

Antenna with 3rd segment bearing 18–34 rhinaria on basal 2/3–3/4. Abdomen membranous, with rather small, faintly pigmented marginal sclerites on 2nd–5th segments.

Measurements in mm. Body 4.2; antennal segments (1st–6th): 0.20, 0.13, 1.25, 1.00, 0.75, 0.23+1.35; ultimate rostral segment 0.19; hind femur 1.70; hind tibia 3.45; hind tarsus (2nd segment) 0.18; siphunculus 0.44; cauda 0.18; longest dorsal seta 0.058 on head, 0.025 on abdominal disc, 0.060 on 8th abdominal segment.

Fundatrix. Differs from the apterous viviparous female as follows:—

Body strongly swelling, often almost globate, 4.3–4.9 mm. in length. Antenna 0.7–0.8 as long as body; 3rd segment with 1–3 rhinaria near base; processus terminalis 2–3 times as long as basal part of 6th; length of 3rd–6th segments as 40 : 28 : 18 : 9+21. Mesosternal furca with base much broader than long. Abdomen membranous, with dorsal setae shorter than in apterous viviparous female. Siphunculus stout, about 6–9 times as long as wide at base, about 2.3 times as long as cauda.

Measurements in mm. Body 4.3; antennal segments (1st–6th): 0.18, 0.13, 0.98, 0.68, 0.40, 0.19+0.53; ultimate rostral segment 0.18; hind femur 1.65; hind tibia 2.77; hind tarsus 0.17; siphunculus 0.90; cauda 0.40; longest dorsal seta 0.045 on head, 0.025 on abdominal disc, 0.068 on 8th abdominal segment.

Specimens examined: Syntypes—4 apterous and 4 alate viviparous females, Sapporo, Hokkaidô, 22-vi-67, no. 2174; 4 fundatrices, Sapporo (Misumai), 26-v-67, no. 2117. Many apterous and alate viviparous females have also been collected at the following localities in Hokkaidô:—Mt. Shirai (23-vi-68), Mt. Soranuma (18-vi-63) & Sôbetsu (7-vii-67).

Host plants: All the specimens examined were collected from *Filipendula kamtschatica*. They infested the underside of young leaves or young shoots of the host.

Distrbution: Japan.

The new species is related to *A. gei* (Börner) from Europe. Judging from the redescription of *gei* given by Hille Ris Lambers (1949), however, the present species may be distinguished therefrom by the following aspects:—(1) Ultimate rostral segment as long as 2nd segment of hind tarsus (1.3 times so in *gei*), with 4–6 secondary setae (8–10 secondary setae). (2) Antennal tubercle with 2 or 3 setae in all (5–8 setae).

11. Genus ***Megoura*** Buckton

Megoura Buckton, 1876: 188 [type-species: *Megoura viciae* Buckton, 1876].

Drepaniella del Guercio, 1913: 188 [type-species: (*Aphis viciae* Kaltenbach, 1843, nec Fabricius, 1781)=*Megoura viciae* Buckton, 1876].

The members of this genus are associated with Leguminosae. In the course of the present study 3 species have been known to occur in Japan, of which one is new to science.

Key to the species

1 Antenna with about 15-50 protruding rhinaria on 3rd segment. Cauda and tibiae black. On *Vicia* & *Lathyrus*. . . . . 1. *M. japonica* (Matsumura)

– Antenna with 1-15 flat rhinaria on 3rd segment. Cauda pale. Tibiae pale at middle and base. 2

2(1) Head with dorsal setae as long as or longer than middle width of 3rd antennal segment. Antennal tubercle rather low; frontal sinus 2/5-1/4 as deep as wide. On *Lespedeza*. . . . . 2. *M. lespedezae* (Essig et Kuwana)

– Head with dorsal setae 1/4-1/3 as long as middle width of 3rd antennal segment. Antennal tubercle high; frontal sinus 1/2 as deep as wide. On *Lespedeza*. . . . . *M. brevipilosa*, sp. n.

1. ***Megoura japonica*** (Matsumura)

Rhopalosiphum viciae var. *japonicum* Matsumura, 1918: 10.
Megoura viciae japonica: Moritsu, 1948: 84; Tao, 1963: 183.
Megoura japonica: Okamoto et Takahashi, 1927: 133.
Megoura viciae coreana Moritsu, 1948: 84.
Megoura viciae coreana: Paik, 1965: 72.
Megoura viciae crassicauda Mordvilko, 1919: 327.
Megoura crassicauda: Hille Ris Lambers, 1965a: 195.
Nectarosiphum moriokae Shinji, 1923: 308.
Amphorophora lathyri Shinji, 1924: 365.
Megoura lathyri: Shinji, 1941: 897.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Vicia unijuga* & *Lathyrus japonicus*); Obihiro (ex *Vicia unijuga*). Honshû—Hachijô Isl. (I. Fujiyama leg.); Ôsaka (ex *Vicia faba*, R. Takahashi leg.). Shikoku—Shôdo-shima Isl., Kagawa Pref. (ex *Lathyrus japonicus*). Kyûshû—Fukuoka (ex *Vicia angustifolia* var. *segetalis*); Beppu, Ôita Pref.

Host Plants: *Vicia unijuga*, *V. angustifolia* var. *segetalis*, *V. faba* & *Lathyrus japonicus*; *Vicia cracca* & *Lathyrus davidii* (after Moritsu, 1948).

Distribution: Japan; Siberia (Primorskaja); Korea; China; Taiwan.

The present specimens differ from the original description of *japonica* Matsumura by the black cauda and the black head. However, I prefer to follow Moritsu (1948) and Okamoto et Takahashi (1927) in adopting the name *japonica* Matsumura for the present species which is commonly found on *Vicia unijuga* in Sapporo.

2. ***Megoura lespedezae*** (Essig et Kuwana)

Rhopalosiphum lespedezae Essig et Kuwana, 1918: 57.
Myzus lespedezae: Shinji, 1927: 59.
Amphorophora lespedezae: Shinji, 1941: 744; Tao, 1963: 184; Paik, 1965: 73.

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo & Kunneppu (ex *Lespedeza bicolor*). Honshû—Okinajima, Fukushima Pref. (ex *Lespedeza* sp.); Mt. Takao, Tôkyô Distr. (ex *Lespedeza* sp., R. Takahashi leg.); Takayama, Gifu Pref. (ex *Lespedeza* sp., R. Takahashi leg.); Ôsaka (ex *Lespedeza* sp., R. Takahashi leg.); Mt. Rokkô, Hyôgo Pref. (ex *Lespedeza* sp., R. Takahashi leg.); Kashikojima, Mie Pref. (ex *Lespedeza bicolor*). Shikoku—Ichiu-mura, Tokushima Pref. (ex *Lespedeza* sp., R. Takahashi leg.). Kyûshû— Yatsushiro, Kumamoto Pref. (ex *Lespedeza bicolor*); Miyakonojô, Miyazaki Pref. (ex *Lespedeza cyrtobotrya*).

Host plants: *Lespedeza* spp. (including *L. bicolor* & *L. cyrtobotrya*).
Distribution: Japan; Korea; China; Taiwan.

3. ***Megoura brevipilosa*** sp. n.

Apterous viviparous female. In cleared specimens body pale; head and marginal sclerites on 2nd–5th abdominal segments pale brown. Antenna dark brown; 3rd segment pale at extreme base; 4th and following segments paler. Legs dark brown; femora on basal half and tibiae at base and at middle pale. Siphunculus dark brown. Cauda pale. Body oval, 2.4–2.8 mm. in length.

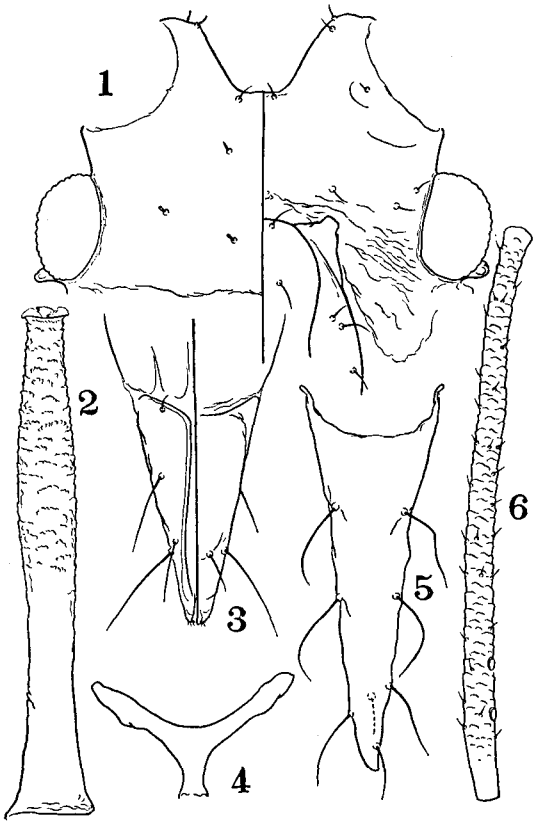

Fig. 9. *Megoura brovipilosa*, sp. n. Apterous viviparous female:—1, head; 2, siphunculus; 3, ultimate rostral segment; 4, mesosternal furca; 5, cauda; 6, antenna (3rd segment).

Head with dorsal setae very short and blunt, the longest seta being at most about 1/3 as long as middle width of 3rd antennal segment; antennal tubercles well developed, diverging at inner sides, each with 2 or 3 setae apically and 1 or 2 setae midventrally; frontal sinus about half as deep as wide. Clypeus with 4 setae anteriorly; mandibular lamina with 2 or 3 setae. Rostrum just attaining hind coxa; ultimate segment tapering, 0.8–0.9 as long as 2nd segment of hind tarsus, with 2 secondary setae. Antenna 1.7–1.8 times as long as body; 3rd segment imbricated, with 2 or 3 flat rhinaria near base, with setae shorter than half middle width of the segment; processus terminalis 4.5–5.0 times as long as basal part of 6th; 3rd–6th segments as 100 : 93 : 68 : 26+121 in length. Femora imbricated apically; tibiae with setae a little longer than middle width of hind tibia; 1st segment of all tarsi with 3 setae. Abdomen membranous; 2nd–4th segments each with 8–10 minute setae between marginal sclerites, with marginal tubercles; 8th segment with 4 or 5 setae a little shorter than middle width of 3rd antennal segment. Genital plate round, with 11–14 setae along hind margin and 2–4 setae anteriorly. Siphunculus weakly imbricated, gently swollen at middle, about 9 times as long as wide, 1.3 times as long as cauda. Cauda elongately conical, about 3 times as long as wide, without a distinct constriction, with 7 or 8 setae.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.22, 0.11, 1.04,

1.00, 0.74, 0.26+1.22; ultimate rostral segment 0.12; hind femur 1.43; hind tibia 2.65; hind tarsus (2nd segment) 0.14; siphunculus 0.84; cauda 0.64; dorsal setae 0.013–0.018 on head, about 0.010 on abdominal disc and 0.038–0.043 on 8th abdominal segment.

Specimens examined: Syntypes—3 apterous viviparous females, Sendai, Miyagi Pref., 8-x-64, ex *Lespedeza* sp., H. Takada leg.

Host plants: *Lespedeza* sp.

Distribution: Japan.

This species is related to *M. lespedezae* (Essig et Kuwana) in the antennal and caudal characters, and yet it is readily distinguished from the latter by the high antennal tubercle and by the very short body setae. From *M. japonica* (Matsumura) it differs by the pale cauda, by the short body setae and by the much fewer, flat rhinaria on the 3rd antennal segment.

12. Genus ***Sinomegoura*** Takahashi

Sinomegoura Takahashi, 1960a: 228 [type-species: *Acyrthosiphon photiniae* Takahashi, 1936].

This genus is distributed in South-East Asia, being represented by 4 species, *S. photiniae* (Takahashi), *S. citricola* (van der Goot), *S. rhododendri* (Takahashi) and *S. pyri* Ghosh et Raychaudhuri. In Japan following 2 species are known to occur.

Key to the species

1 Head scabrous on whole surface of venter. Ultimate rostral segment longer than basal part of 6th antennal segment. Siphunculus about 1.2–1.3 times as long as cauda. Cauda pale or fuscous, with 10–18 setae. Body brown or green. On *Photinia* & *Raphiolepis*. . . . . 1. *S. photiniae* (Takahashi)

– Head scabrous only on under surface of antennal tubercle. Ultimate rostral segment shorter than basal part of 6th antennal segment. Siphunculus at most 1.1 times as long as cauda. Cauda black, with 17–24 setae. Body dark brown. On *Cinnamomum*, *Citrus*, *Musa* and various other genera of plants. . . . . 2. *S. citricola* (van der Goot)

1. ***Sinomegoura photiniae*** (Takahashi)

Acyrthosiphon photiniae Takahashi, 1936: 600.
Sinomegoura photiniae: Takahashi, 1960a: 229; Tao, 1963; 183.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Tôkyô (ex *Photinia glabra*); Ôsaka (ex *Photinia glabra*, R. Takahashi leg.); Takarazuka, Hyôgo Pref. (ex *Raphiolepis umbellata*). Kyûshû—Fukuoka (ex *Photinia glabra*); Miyazaki.

Host plants: *Photinia glabra* & *Raphiolepis umbellata*.

Distribution: Japan; China.

2. ***Sinomegoura citricola*** (van der Goot)

Macrosiphoniella citricola van der Goot, 1917b: 34.
Macrosiphoniella citricola: Takahashi, 1923: 76.
Megoura citricola: Takahashi, 1929: 252; Shinji, 1941: 895; Moritsu, 1948: 85.
Sinomegoura citricola: Takahashi, 1960a: 228; Tao, 1963: 183; Eastop, 1966: 476.
Megoura jacobsoni Mason, 1927: 88.
Tuberosiphum camphorae Shinji, 1922: 789.

Specimens examined: A lot of apterous and alate viviparous females collected at

the following localities:— Honshû—Tôkyô (ex *Pieris japonica*); Nara (ex *Cinnamomum camphora*); Ôsaka (ex *Citrus* sp., R. Takahashi leg.); Hiroshima (ex *Lagerstroemia indica*). Kyûshû—Fukuoka; Nagasaki (ex *Cinnamomum camphora*); Saga (ex *Cinnamomum camphora*); Ômuta, Fukuoka Pref. (ex *Cinnamomum camphora, Eurya japonica* & *Viburnum awabuki*); Kumamoto (ex *Cinnamomum camphora*); Miyazaki (ex *Musa basjoo*); Kagoshima (ex *Cinnamomum japonicum, Viburnum awabuki* & *Buxus liukiuensis*).

Host plants: *Cinnamomum camphora, C. japonicum, Eurya japonica, Viburnum awabuki, Pieris japonica, Buxus liukiuensis, Musa basjoo* & *Lagerstroemia indica*; *Cinnamomum burniarius, C. zeylanicum, Litsea* sp., *Citrus aurantium, Murraya exotica, Ficus obscura, Lasianthus* sp., *Trachycarpus fortunei, Acrohychia pedunculata* & *Eugenia densiflora* (in Japan, after Moritsu, 1948); *Camellia japonica, Canarium album, Bauhinia variegata* & *Bridelia ovata* (in China, after Tao, 1968); *Mangifera indica* & *Sarcocephalus bartlingii* (in Australia, after Eastop, 1966); *Gardenia florida* (in Sumatra, after Mason, 1927).

Distribution: Japan; China; Taiwan; India; Nepal; Philippines; Singapore; Java; Sumatra; New Guinea; Australia.

13. Genus ***Acyrthosiphon*** Mordvilko

Acyrthosiphon Mordvilko, 1914: 75 [type-species: (*Aphis pisi* Kaltenbach, 1843)=*Aphis pisum* Harris, 1776].

Macchiatielle del Guercio, 1917: 210, nec del Guercio, 1909 [type-species: (*Macchiatiella trifolii* del Guercio, 1917)=*Aphis pisum* Harris, 1776].

Microtarsus Börner, 1939: 83, nec Eyton, 1839 [type-species: *Siphonophora cyparissiae* Koch, 1855].

Microlophium Mordvilko, 1914: 198 [type-species: (*Aphis urticae* Schrank, 1801, nec Linné, 1758)=*Macrosiphum evansi* Theobald, 1923; described as a subgenus of the genus *Acyrthosiphon*].

Aulacorthum Mordvilko, 1914: 68 [type-species: (*Aphis pelargonii* sensu Mordvilko, 1914, nec Kaltenbach, 1843)=*Aphis solani* Kaltenbach, 1843].

Neomacrosiphum van der Goot, 1915: VII [type-species: (*Aphis pelargonii* sensu van der Goot, 1915, nec Kaltenbach, 1843)=*Aphis solani* Kaltenbach, 1843].

Perillaphis Takahashi, 1965b: 101 [type-species: *Macrosiphum perillae* Shinji, 1924; described as a subgenus of the genus *Aulacorthum*].

Rhodobium Hille Ris Lambers, 1947: 300 [type-species: (*Macrosiphum rosaefolium* Theobald, 1915)=*Myzus porosus* Sanderson, 1901].

Sumoia Tao, 1963: 176 [type-species: *Macrosiphum taiwanum* Takahashi, 1923]. **Syn. n.**

Pseudomegoura Shinji, 1929b: 112 [type-species: (*Macrosiphum nishikigi* Shinji, 1928)=*Rhopalosiphum magnoliae* Essig et Kuwana, 1918]. **Syn. n.**

This genus is here understood after Eastop (1966). In this sense *Sumoia* Tao and *Pseudomegoura* Shinji, as well as *Aulacorthum* Mordvilko, *Microlophium* Mordvilko and *Rhodobium* Hille Ris Lambers, may be suppressed as synonyms of this genus. In this paper will be given 25 species occurring in Japan, of which 3 are new to science and 2 new to Japan.

Key to the species

1 Head smooth, at most with sparse spinules on antennal tubercles ventrally or on posteriormost area of ventrum. 2

– Head densely spinulated or granulated at least on whole surface of ventrum. 6

2(1) Tibiae strongly imbricated at apex. Antenna with basal 2 segments densely and strongly imbricated. On *Urtica*. . . . . 5. *A. carnosus* (Buckton)
– Tibiae smooth or with a few weak imbrications at apex. Antenna with basal 2 segments smooth or sparsely and weakly imbricated. 3
3(2) Ultimate rostral segment with 4–6 secondary setae. Antenna with 3rd segment imbricated. 4
– Ultimate rostral segment with 8–10 secondary setae. Antenna with 3rd segment smooth. 5
4(3) Frontal sinus of head deeply V-shaped. Siphunculus black except at extreme base, tapering on basal half, 1.3–1.7 times as long as cauda, usually at most about as stout as 3rd antennal segment at middle. Cauda mostly 3.0–4.0 times as long as wide, with 9–15 setae. On *Pisum, Vicia, Medicago & Trifolium*. . . . . 1. *A. pisum* (Harris)
– Forntal sinus of head shallowly U-shaped. Siphunculus pale, fuscous at apex, nearly cylindrical, dilated at base, distinctly stouter than 3rd antennal segment at middle. Cauda 2.0–3.0 times as long as wide, with 7 or 8 setae. On *Medicago & Trifolium* . . . . . 2. *A. kondoi* Shinji et Kondo
5(3) Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus. Abdomen with tergum sclerotic and wrinkled, with dorsal setae 9–12 μ in length. On *Geum*. . . . . 3. *A. shinanonus*, sp. n.
– Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus. Abdomen with tergum weakly sclerotized and rather smooth, with dorsal setae 30–35 μ in length. On *Rubus*. . . . . 4. *A. rubiformosanus* (Takahashi)
6(1) Head with a conspicuous median tubercle. 7
– Head without a conspicuous median tubercle. 8
7(6) Abdomen with pale tergum. Cauda slender, more than twice as long as wide. On *Rosa*. . . . . 23. *A. porosus* (Sanderson)
– Abdomen with evenly pigmented tergum. Cauda rather thick, less than twice as long as wide. On *Leucothoe & Vaccinium*. . . . . 24. *A. vaccinii* (Hille Ris Lambers)
8(6) Antennal tubercles gibbous, converging at inner sides. Head with dorsal setae minute and inverted bottle-shaped. In larva hind tibia spinulous. On *Glechoma*. . . . . 25. *A. glechomae* (Takahashi)
– Antennal tubercles not gibbous, a little converging, parallel or diverging at inner sides. Head with dorsal setae long and pointed at least anteriorly. In larva hind tibia smooth. 9
9(8) Abdominal tergum membranous, with sclerotic markings. 10
– Abdominal tergum membranous or evenly sclerotized, without sclerotic markings. . . . 11
10(9) Head and siphunculus black. Abdomen with a large sclerotic patch at middle, with developed marginal sclerites on first 6 segments and with broad sclerotic bands on 7th and 8th. On *Convallaria*. . . . . 21. *A. watanabei*, sp. n.
– Head and siphunculus pale. Abdomen with a broad transverse band anteriorly and large postsiphuncular sclerites. On *Codonopsis*. . . . . 22. *A. codonopsis*, sp. n.
11(9) Abdominal tergum not pigmented. 12
– Abdominal tergum pigmented wholly or marginally. 22
12(11) Siphunculus usually slightly swollen, or rather stout with mesial side gently convex. . . 13
– Siphunculus sub-cylindrical, not swollen. 15
13(12) Siphunculus black. Abdomen with small but distinct antesiphuncular sclerites. Body pink or orange-red in life. On *Paederia*. . . . . 14. *A. nipponicus* (Essig et Kuwana)
– Siphunculus usually pale, dark at apex. Abdomen without antesiphuncular sclerites. . . 14
14(13) Cauda fuscous to black. Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus. Body yellowish green to green or orange-red in life. On *Sambucus* and various other plants. . . . . 19. *A. magnoliae* (Essig et Kuwana)
– Cauda pale. Ultimate rostral segment 0.8–1.1 times as long as 2nd segment of hind

tarsus. Body white to yellow in life. On *Cercidiphyllum*. . . . . 20. *A. cercidiphylli* (Matsumura)

15(12) Antenna with 17-29 rhinaria on 3rd segment, the rhinariated area being fuscous. Body white or yellow in life. On *Aster*. . . . . 13. *A. asteris* (Takahashi)

– Antenna with less than 15 rhinaria on 3rd segment, pale or entirely black. 16

16(15) Siphunculus black, at most pale at extreme base, if pale then ultimate rostral segment not longer than 2nd segment of hind tarsus. 17

– Siphunculus pale at least on basal half. Ultimate rostral segment usually longer than 2nd segment of hind tarsus. 19

17(16) Ultimate rostral segment 0.9-1.0 as long as 2nd segment of hind tarsus. Siphunculus about 9-10 times as long as wide at middle. Cauda shortly conical, 1/3-2/5 as long as siphunculus. Body in life white to dull yellow, with reddish brown area around siphunculus. (Fundatrix green). On *Parabenzoin* and *Lindera*. . . . 11. *A. muradachi* (Shinji)

– Ultimate rostral segment 1.0-1.5 times as long as 2nd segment of hind tarsus. Siphunculus 11-17 times as long as wide at middle. Cauda elongate, 3/5-2/3 as long as siphunculus. 18

18(17) Antenna with 3rd segment smooth, bearing 1-4 rhinaria. Siphunculus 11-14 times as long as wide at middle. Body at most about 2.5 mm. in length, dull yellowish green, mottled with dark green and black in life. On *Ligustrum*. . . 10. *A. ibotum* (Essig et Kuwana)

– Antenna with 3rd segment more or less imbricated, bearing 4-8 rhinaria. Siphunculus 15-17 times as long as wide at middle. Body about 3.0 mm. or more in length, yellow, green or orange-yellow in life. On *Cirsium*. . . . 7. *A. vandenboshi* (Hille Ris Lambers)

19(16) Antenna with flagellum black. Tibiae black, often slightly paler at middle when cleared. Body in life white to pale yellow, sometimes with a greenish shade, with a deep yellow or brownish area around siphunculus. (Fundatrix yellowish green to green). On *Syringa*. . . . . 9. *A. syringae* (Matsumura)

– Antenna with flagellum pale basally. Tibiae pale, black at tip. 20

20(19) Cauda shortly conical, about 1/3 as long as siphunculus. Mesosternal furca sessile or with a stem much wider than long. Body in life white to pale yellow, sometimes with a greenish shade, with a brown area around siphunculus. On *Lindera*. . . . . 12. *A. linderae* (Shinji)

– Cauda elongate. Mesosternal furca with a stem as long as or longer than wide. . . . 21

21(20) Head nearly smooth dorsally. Antenna with 3rd segment bearing 1-3 rhinaria. Body 3.0-3.8 mm. in length, yellow or green in life. On *Cirsium*. . . . . 6. *A. cirsicola* (Takahashi)

– Head scabrous dorsally, with a smooth area postero-mesially. Body 1.5-2.5 mm. in length, whitish to dull yellow or green in life. On various plants. . . . . 8. *A. solani* (Kaltenbach) (part., see 25)

22(11) Abdomen with 2nd-4th segments each bearing 2-4 dorsal setae in addition to marginal ones. 23

– Abdomen with 2nd-4th segments each bearing 6-10 dorsal setae in addition to marginal ones. 24

23(22) Antenna with 3rd segment imbricated. Cauda dark, 1.3-1.5 times as long as wide. Ultimate rostral segment 1.3-1.4 times as long as 2nd segment of hind tarsus, with 6 secondary setae. Dorsal setae of head pointed, 2.0-2.8 times as long as middle width of 3rd antennal segment. On *Phytolacca*. . . . . 17. *A. phytolaccae* (Miyazaki)

– Antenna with 3rd segment smooth. Cauda pale, 2.0-2.4 times as long as wide. Ultimate rostral segment 1.1-1.3 times as long as 2nd segment of hind tarsus, with 9-12 secondary setae. Dorsal setae of head blunt, 1.5-1.8 times as long as middle width of 3rd antennal segment. On *Nepeta*. . . . . 16. *A. nepetifolii* (Miyazaki)

24(22) Dorsal setae of body very stout, those on cephalic disc being 2.3-2.8 times as long as middle width of 3rd antennal segment. Ultimate rostral segment 1.6 times as long as

2nd segment of hind tarsus. Body yellowish brown to orange-red in life. On *Perilla*. . . . . 18. *A. perillae* (Shinji)

– Dorsal setae of body thin, those on cephalic disc being at most twice as long as middle width of 3rd antennal segment. Ultimate rostral segment 1.0–1.4 times as long as 2nd segment of hind tarsus. 25

25 (24) Antenna with 3rd segment bearing setae 0.7–1.1 times as long as middle width of the segment. Femora black on apical 1/2–2/3. Cauda black. Body dark green to nearly black in life. On *Paederia*. . . . . 15. *A. esakii* (Takahashi)

– Antenna with 3rd segment bearing setae at most half as long as middle width of the segment. Femora usually pale, black at tip. Cauda pale or fuscous. Body in life dull yellowish green, with tergum dark marginally or wholly. On various plants. . . . . 8. *A. solani* (Kaltenbach) (part., see 21)

1. ***Acyrthosiphon pisum*** (Harris)

Aphis pisum Harris, 1776: 66.

Acyrthosiphon pisum: Hille Ris Lambers, 1947: 247; Eastop, 1958: 20 & 1966: 425; Tao, 1963: 190; Paik, 1965: 74.

Acyrthosiphon pisi brevicaudatus Takahashi, 1965c: 20. **Syn. n.**

Aphis pisi Kaltenbach, 1843: 23.

Macrosiphum pisi: Hori, 1929: 70; Palmer, 1952: 320.

Acyrthosiphum pisi: Shinji, 1941: 721.

Specimens examined: Many apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Lathyrus japonicus* & *Medicago sativa*); Ebetsu (ex *Trifolium pratense*). Honshû—Ôsaka (ex *Pisum* sp. & *Trifolium repens*, R. Takahashi leg.) & Tsumagoi, Gumma Pref. (K. Shibata leg.) (syntypes of *Acyrthosiphon pisi brevicaudatus* Takahashi); Ôsaka (ex *Vicia angustifolia* var. *segetalis*, M. Sorin leg.); Shimonoseki, Yamaguchi Pref. (ex *Vicia angustifolia* var. *segetalis*).

Host plants: *Vicia angustifolia* var. *segetalis*, *Medicago sativa*, *Trifolium pratense*, *T. repens*, *Lathyrus japonicus* & *Pisum* sp. In the literature are recorded as hosts various plants of the Leguminosae including such genera as *Astragalus*, *Cicer*, *Crotalaria*, *Cytisus*, *Glycine*, *Lathyrus*, *Lens*, *Lotus*, *Medicago*, *Melilotus*, *Onobrychis*, *Ononis*, *Phaseolus*, *Pisum*, *Robinia*, *Trifolium*, *Trigonella*, *Vicia*, and *Vigna*.

Distribution: Cosmopolitan.

2. ***Acyrthosiphon kondoi*** Shinji et Kondo

Acyrthosiphon kondoi Shinji et Kondo, 1938: 65.

Acyrthosiphon kondoi: Takahashi, 1965c: 19.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Trifolium pratense* & *Medicago sativa*); Ebetsu (ex *Trifolium pratense*); Obihiro (ex *Trifolium pratense*); Kushiro (ex *Trifolium* sp.); Kitami-mombetsu (ex *Trifolium pratense*); Toyotomi (ex *Trifolium pratense*). Honshû—Koiwai, Iwate Pref. (ex *Trifolium pratense*); Chiba (ex *Medicago sativa*, S. Sekiguchi leg.).

Host plants: *Medicago sativa*, *Trifolium pratense*, *T. repens* & *Trifolium* sp.

Distribution: Japan; Manchuria.

3. ***Acyrthosiphon shinanonus***, sp. n.

Apterous viviparous female. Body green in life. Antenna yellowish brown; 5th

and 6th segments black. Legs yellowish brown; femora at apex, tibiae at both ends and tarsi black. Siphunculus fuscous. Cauda green. Body spindle-shaped, 2.5–3.1 mm. in length.

Head with dorsal setae 1/2–4/5 as long as middle width of 3rd antennal segment. Antennal tubercles developed, slightly diverging at inner sides, often slightly imbricated, each bearing 2 or 3 setae apically and a seta mid-ventrally. Antenna 1.2 times as long as body; 1st segment smooth, with 6–8 setae; 3rd segment smooth, with 2–13 rhinaria in a line, with setae at most about half as long as middle width of the segment; processus terminalis 4–5 times as long as basal part of 6th; 3rd–6th segments as 88 : 65 : 53 : 17+81 in length. Clypeus with 4, rarely 6 setae anteriorly; mandibular lamina with 2–6 setae. Rostrum reaching between middle and hind coxae; ultimate segment 0.8–0.9 as long as 2nd segment of hind tarsus, with 6–10 secondary setae. Prothorax usually with marginal tubercles. Mesosternal furca with a long slender stem. Femora imbricated on apical 1/3–1/2, with setae about 1/3 as long as middle width of hind femur. Tibiae smooth, with setae about as long as middle width of hind tibia. Tarsi with 2nd segment bearing 9–12 secondary setae; first tarsal chaetotaxy 3 : 3 : 3. Abdomen with tergum sclerotic and wrinkled, with inconspicuous marginal tubercles on 2nd–5th segments; 2nd–4th segments each with 6–8 minute setae besides marginal ones, the longer setae being about 1/4 as long as middle width of 3rd antennal segment; 8th segment with 5–7 setae about as long as or a little longer than middle width of 3rd antennal segment. Genital plate round, with 12–18 setae along hind margin and 2 setae anteriorly. Siphunculus cylindrical, slightly dilated toward base, weakly imbricated, 14–16 times as long as wide at middle, as long as or shorter than 3rd antennal segment, with a distinct flange. Cauda stout, blunt at apex, 2.0–2.5 times as long as wide, 2/5–1/2 as long as siphunculus, with 8–11 setae.

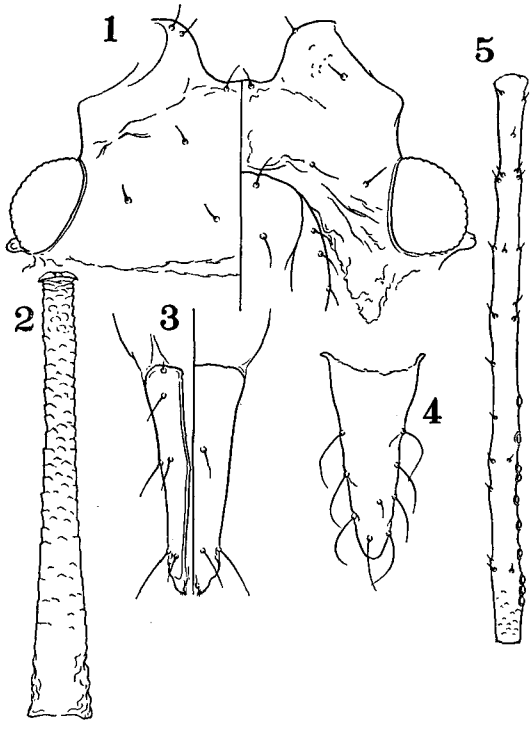

Fig. 10. *Acyrthosiphon shinanonus*, sp. n. Apterous viviparous female:—1, head; 2, siphunculus; 3, ultimate rostral segment; 4, cauda; 5, antenna (3rd segment).

Measurements in mm. Body 2.9; antennal segments (1st–6th): 0.14, 0.09, 0.96 0.68, 0.54, 0.18+0.85; ultimate rostral segment 0.14; hind femur 1.30; hind tibia 2.35; hind tarsus (2nd segment) 0.17; siphunculus 0.80; cauda 0.39; dorsal setae 0.020–0.040 on head, about 0.010 on abdominal disc, up to 0.045 on 8th abdominal segment.

Specimens examined: Syntypes—6 apterous viviparous females, Kamikôchi, Nagano Pref., 28-viii-67, ex *Geum calthaefolium* var. *nipponicum*, H. Higuchi leg., no. a 405.

Host plants: *Geum calthaefolium* var. *nipponicum*.

Distribution: Japan.

This species closely resembles *A. rubiformosanus* (Takahashi), but it may be distinguished from the latter by the shorter ultimate rostral segment, by the shorter body setae and by the sclerotic, wrinkled tergum.

4. ***Acyrthosiphon rubiformosanus*** (Takahashi)

Macrosiphum rosae (?): Takahashi, 1923: 13.
Macrosiphum rubiformosanum Takahashi, 1927: 3.
Macrosiphum rubiformosanum: Tao, 1963: 193.
Acyrthosiphon (*Microlophium*) *rubiformosanus*: Takahashi, 1965c: 21.

Specimens examined: Some apterous and alate viviparous females collected at Chihaya & Kawachi-nagano, Ôsaka Pref. (ex *Rubus* sp., R. Takahashi leg.) and Atetsu, Amami-ôshima Isl. (ex *Rubus rosaefolius* var. *maximowiczii*).

Host plants: *Rubus rosaefolius* var. *maximowiczii* & *Rubus* sp.

Distribution: Japan; Taiwan.

5. ***Acyrthosiphon carnosus*** (Buckton)

Siphonophora carnosa Buckton, 1876: 144.
Microlophium carnosum: Hille Ris Lambers, 1949: 205.

This species is new to Japan. The Japanese form may be slightly different from the European one in the apterous viviparous female which sometimes has a mesial brown stripe on the abdomen.

Specimens examined: Many apterous and alate viviparous females, Sapporo, Hokkaidô, 8-vi-64 & 22-viii-67; Sôbetsu, Hokkaidô, 7-vii-67.

Host plants: All the specimens examined were collected from *Urtica platyphylla*.

Distribution: Japan; Northern Asia; Europe; N. America.

6. ***Acyrthosiphon cirsicola*** (Takahashi)

Macrosiphum cirsicola Takahashi, 1923: 10.
Aulacorthum cirsicola: Takahashi, 1965b: 113 (partim).
Acyrthosiphum circifoliae Shinji, 1935d: 251.
Acyrthosiphum circifoliae: Shinji, 1941: 1156.

Fundatrix. Body yellowish green in life. Antenna pale; 3rd-5th segments at apex and 6th black. Legs pale; femora at apex, tibiae at apex and tarsi black. Siphunculus pale, fuscous at apex. Cauda yellowish. Body roundly oval, 3.0-3.5 mm. in length.

Antenna 6-segmented, 1.2-1.3 times as long as body; 3rd segment with 2-6 small rhinaria and with very short setae; processus terminalis 3.2-3.6 times as long as basal part of 6th, much shorter than 3rd. Rostrum reaching hind coxa; ultimate segment obtuse, 1.2-1.3 times as long as 2nd segment of hind tarsus, with 4-6 secondary setae. Mesosternal furca sessile. Hind tibia about 4/5 as long as body. Abdominal tergum sclerotic, wrinkled, in cleared and mounted specimens often pigmented around siphunculi; dorsal setae of anterior abdominal segments minute, those on 8th segment slightly longer than middle width of 3rd antennal segment. Siphunculus cylindrical,

broadened at base, imbricated, 13–17 times as long as wide at middle. Cauda bluntly conical, 2/5–1/2 as long as siphunculus, with 7 setae.

Measurements in mm. Body 3.1; antennal segments (1st–6th): 0.19, 0.09, 1.12, 0.75, 0.68, 0.22+0.80; ultimate rostral segment 0.17; hind femur 1.42; hind tibia 2.50; hind tarsus (2nd segment) 0.13; siphunculus 0.80; cauda 0.34; dorsal setae 0.018–0.035 on head, about 0.010 on abdominal disc, at most 0.043 on 8th abdominal segment.

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 2-vi-68, ex *Cirsium kamtschaticum*. Many apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo, Lake Shikotsu, Mt. Apoi & Teshikaga (ex *Cirsium kamtschaticum*). Honshû—Mt. Gassan, Yamagata Pref. (ex *Cirsium* sp., K. Kusigemati leg.); Mt. Iwawaki, Ôsaka Pref. (ex *Cirsium* sp., R. Takahashi leg.); Taisha, Shimane Pref. (ex *Cirsium* sp.).

Host plants: *Cirsium* spp. (including *C. kamtschaticum*).

Distribution: Japan; Taiwan.

7. ***Acyrthosiphon vandenboshi*** (Hille Ris Lambers), comb. n.

Aulacorthum vandenboshi Hille Ris Lambers, 1967: 132.
Aulacorthum cirsicola: Takahashi, 1965b: 113 (partim).

Specimens examined: Some apterous viviparous females collected at the following localities:— Honshû—Mt. Kongô, Ôsaka Pref. (ex *Cirsium* sp., van den Bosh leg., paratype of *Aulacorthum vandenboshi* Hille Ris Lambers); Mt. Iwawaki, Ôsaka Pref. (ex *Cirsium* sp., R. Takahashi leg.); Nachi, Wakayama Pref. (ex *Cirsium* sp.); Shimonoseki, Yamaguchi Pref. (ex *Cirsium* sp.). Kyûshû—Beppu, Ôita Pref. (ex *Cirsium* sp.); Hyûga, Miyazaki Pref. (ex *Cirsium japonicum*).

Host plants: *Cirsium* spp. (including *C. japonicum*).

Distribution: Japan.

8. ***Acyrthosiphon solani*** (Kaltenbach)

Aphis solani Kaltenbach, 1843: 15.
Aulacorthum solani: Hille Ris Lambers, 1949: 182; Cottier, 1953: 246; Tao, 1963: 179; Takahashi, 1965b: 113.
Myzus solani: Palmer, 1952: 342.
Acyrthosiphon (*Aulacorthum*) *solani*: Eastop, 1966: 426.
Macrosiphum hagicola Matsumura, 1917: 396. **Syn. n.**
Macrosiphum hagicola: Paik, 1965: 80.
Macrosiphum primulana Matsumura, 1917: 400. **Syn. n.**
Myzus primulana: Hori, 1929: 103; Shinji, 1941: 975.
Macrosiphum senecionis Matsumura, 1917: 401. **Syn. n.**
Macrosiphum hagi Essig et Kuwana, 1918: 44.
Macrosiphum matsumuraeanum Hori, 1926: 52.
Macrosiphum matsumuraeanum: Hori, 1929: 66.
Illinoia kerriae Shinji, 1930e: 137. **Syn. n.**
Acyrthosiphum kerriae: Shinji, 1941: 709.
Aulacorthum kerriae: Takahashi, 1965b: 111.
Myzus chelidonii: Shinji, 1941: 910 & 1944: 524.
Aulacorthum smilacis Takahashi, 1965b: 107. **Syn. n.**

Specimens examined: Some apterous viviparous females collected at Takayama, Gifu Pref. (ex *Smilax oldhami*, R. Takahashi leg., syntypes of *Aulacorthum smilacis* Takahashi) and an alate viviparous female collected at Tôkyô (ex *Lespedeza bicolor*,

I. Kuwana leg., holotype of *Macrosiphum hagi* Essig et Kuwana). In addition, numerous specimens have been examined, their localities being as follows:— Hokkaidô—Sapporo, Chitose, Kunneppu, Obihiro, Kushiro & Abashiri. Honshû—Oirase, Aomori Pref.; Morioka, Iwate Pref.; Ikezuki, Miyagi Pref.; Niigata; Inawashiro, Fukushima Pref.; Kamikôchi, Nagano Pref.; Utsunomiya, Tochigi Pref.; Tôkyô; Ogose, Saitama Pref.; Kyôto; Ôsaka; Wakayama; Himeji, Hyôgo Pref.; Tottori; Taisha, Shimane Pref,; Sandankyô, Hiroshima Pref.; Shimonoseki, Yamaguchi Pref. Shikoku—Shôdoshima Isl., Kagawa Pref.; Kôchi. Kyûshû—Fukuoka; Saga; Nagasaki; Kumamoto; Miyazaki; Kagoshima; Nase & Yuwan, Amami-ôshima Isl.

Host plants: Polyphagous. The present specimens were collected from plant species belonging to the following genera:—*Amelanchier, Aralia, Arctium, Artemisia, Astilbe, Boehmeria, Cacalia, Carpesium, Centaurea, Cercis, Chrysanthemum, Cirsium, Corydalis, Cryptotaenia, Cucumis, Dahlia, Erigeron, Eupatorium, Filipendula, Hosta, Kalimeris, Kerria, Lagerstroemia, Lamium, Lespedeza, Lilium, Melastoma, Mentha, Petasites, Philadelphus, Polygonatum, Primula, Prunus, Ranunculus, Rubus, Rumex, Semiaquilegia, Senecio, Solanum, Stellaria, Taraxacum, Thalictrum, Trifolium, Tulipa, Urtica, Veratrum, Veronica, Viburnum, & Weigela.*

Distribution: Cosmopolitan.

In this species the tergum is very variable in pigmentation. In the apterous viviparous female the tergum is quite pale, evenly smoky, dark marginally or black entirely. Having examined syntypes of *Aulacorthum smilacis* Takahashi and the original description of *Illinoia kerriae* Shinji, both of the species being with a pigmented tergum in the apterous viviparous females, I have been convinced that these species should be suppressed as synonyms of *Acyrthosiphon solani* (Kaltenbach).

The diagnoses given in the original descriptions of *Macrosiphum hagicola* Matsumura, *M. primulana* Matsumura and *M. senecionis* Matsumura agree well with *Acyrthosiphon solani* (Kaltenbach) except that the apterous viviparous females are devoid of rhinaria on the 3rd antennal segment. I am much inclined to the opinion that all these names should apply to a single species, since in this species the rhinaria of the apterous viviparous female can be easily overlooked when specimens are not in goot conditions.

9. ***Acyrthosiphon syringae*** (Matsumura), comb. n.

Macrosiphum syringae Matsumura, 1918: 4.
Aulacorthum syringae Takahashi, 1965b: 106. **Syn. n.**

Fundatrix. Similar to the apterous viviparous female, but body in life yellowish green to green, often reddish brown around siphunculi; antenna 1.1–1.2 times as long as body, with processus terminalis about 2.4 times as long as basal part of 6th segment; mesosternal furca sessile, broadly based; tarsi of all legs with 1st segment bearing 2 or 3 setae.

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 26-v-67, ex *Syringa reticulata*. Many apterous and alate viviparous females collected at Sapporo (ex *Syringa reticulata*, R. Takahashi leg., syntypes of *Aulacorthum syringae* Takahashi); Sapporo (ex *Syringa vulgaris, S. reticulata & S. emodi*).

Host plants: *Syringa vulgaris, S. reticulata & S. emodi.*

Distribution: Japan.

Takahashi (1965) separated *syringae* Takahashi, 1965, from *syringae* Matsumura, 1918, on account of the antennae, tibiae and siphunculi of the former being wholly black. In the specimens examined, however, the tibiae are sometimes pale at middle especially in the cleared and mounted specimens, and the siphunculus is usually pale on basal half. So, I am much inclined to the opinion that *syringae* Takahashi should be suppressed as a synonym of *syringae* Matsumura.

10. ***Acyrthosiphon ibotum*** (Essig et Kuwana), comb. n.

Macrosiphum ibotum Essig et Kuwana, 1918: 46.
Macrosiphum ibotum: Shinji, 1941: 858.
Aulacorthum ibotum: Takahashi, 1965b: 113.
Macrosiphum ligustrumae Shinji, 1927: 69.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Ligustrum obtusifolium*); Urakawa (ex *Ligustrum obtusifolium*). Honshû—Tôkyô (ex *Ligustrum* sp., R. Takahashi leg.); Moroyama, Saitama Pref. (ex *Ligustrum* sp.); Yamanouchi, Hyôgo Pref. (ex *Ligustrum ibota*).

Host plants: *Ligustrum* spp. (including *L. obtusifolium* & *L. ibota*).
Distribution: Japan.

11. ***Acyrthosiphon muradachi*** (Shinji), comb. n.

Macrosiphum muradachi Shinji, 1928a: 154.
Myzus muradachi: Shinji, 1941: 949.
Aulacorthum muradachi: Takahashi, 1965b: 110.
Aulacorthum brevicaudum Moritsu, 1958a: 84. **Syn. n.**

Fundatrix. Body in life green, dark reddish brown around siphunculi, roundly oval, about 2.3 mm. in length. Antenna pale yellowish brown; 3rd–5th segments at apex and 1st, 2nd and 6th segments wholly black. Legs pale yellowish brown; femora at apical half, tibiae at both ends and tarsi black. Siphunculus black. Cauda pale.

Head spinulous except on dorsum postero-mesially; antennal tubercles high, diverging at inner sides; front convex; dorsal setae very short and blunt, about 1/4 as long as middle width of 3rd antennal segment. Antenna 0.8–0.9 as long as body, imbricated throughout; 3rd segment with 0–2 rhinaria, with setae at most 1/4 as long as middle width of the segment; processus terminalis 2.3–2.6 times as long as basal part of 6th. Rostrum passing middle coxa; ultimate segment obtuse, 0.8 as long as 2nd segment of hind tarsus, with 2 pairs of secondary setae. Mesosternal furca sessile. First tarsal chaetotaxy 3 : 3 : 3. Abdominal tergum moderately sclerotized, with developed intersegmental areolations; dorsal setae on anterior segments minute and blunt; 8th segment with 4 or 5 setae at most about 2/3 as long as middle width of 3rd antennal segment. Siphunculus cylindrical, imbricated, 8 times as long as wide at middle. Cauda bluntly conical, with 7 setae.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.13, 0.10, 0.49, 0.34, 0.31, 0.14+0.32; ultimate rostral segment 0.11; hind femur 0.98; hind tibia 1.35; hind tarsus (2nd segment) 0.14; siphunculus 0.47; cauda 0.21; longest dorsal seta 0.013 on head, 0.010 on abdominal disc, 0.025 on 8th abdominal segment.

Specimens examined: Some fundatrices, Mt. Hikosan, Fukuoka Pref., 25-v-65, ex *Parabenzoin trilobum*. Many apterous and some alate viviparous females have been

collected at the following localities:— Honshû—Kaigake, Niigata Pref. (H. Higuchi leg.); Kyôto (ex *Lindera erythrocarpa*); Mt. Gozaisho, Mie Pref.; Kobuka, Ôsaka Pref. (ex *Lindera umbellata*, R. Takahashi leg.). Kyûshû—Mt. Hikosan, Fukuoka Pref. (T. Esaki and K. Yasumatsu leg., syntypes of *Aulacorthum brevicaudum* Moritsu); Mt. Hikosan (ex *Parabenzoin praecox* & *P. trilobum*).

Host plants: *Parabenzoin praecox*, *P. trilobum*, *Lindera umbellata* & *L. erythrocarpa*.

Distribution: Japan.

Having examined syntypes of *Aulacorthum brevicaudum* Moritsu, I have been convinced that *brevicaudum* should be suppressed as a synonym of *muradachi* Shinji.

12. ***Acyrthosiphon linderae*** (Shinji), comb. n.

Macrosiphum linderae Shinji, 1922: 787.
Myzus linderae: Shinji, 1941: 933.

On the basis of the present material a redescription may be given as follows:—

Apterous viviparous female. Body in life white or creamy, brownish around siphunculus. Eye dark reddish brown. Antenna pale; 3rd–5th segments black at apex and 6th fuscous. Legs pale; femora at apex, tibiae at both ends and tarsi black. Siphunculus pale, black at apex. Cauda pale. Body 2.0–2.2 mm. in length.

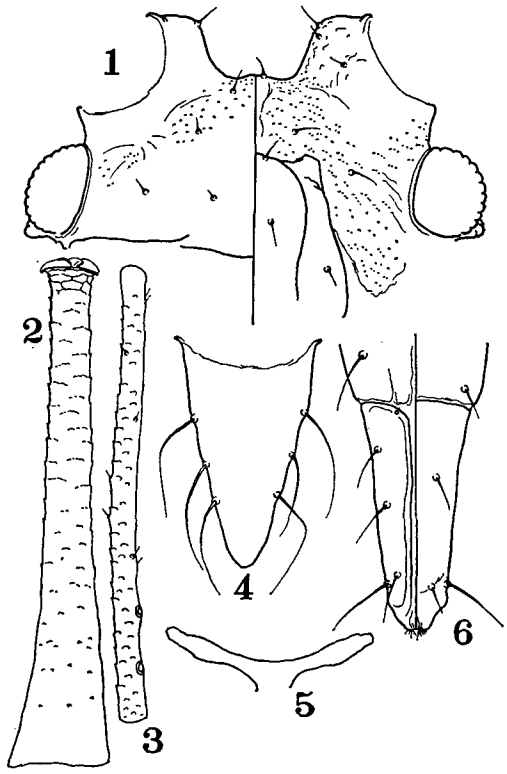

Fig. 11. *Acyrthosiphon linderae* (Shinji). Apterous viviparous female:—1, head; 2, siphunculus; 3, antenna (3rd segment); 4, cauda; 5, mesosternal furca; 6, ultimate rostral segment.

Head sparsely spinulated on dorsum anteriorly and laterally, evenly spinulous over venter; dorsal setae blunt, the posterior ones being 1/2–2/3 as long as middle width of 3rd antennal segment. Antennal tubercles high and diverging at inner sides, spinulated antero-ventrally, each bearing 1 or 2 setae anteriorly and a seta ventrally. Antenna 1.4–1.5 times as long as body; 3rd segment imbricated, with 2–6 rhinaria in a line, with setae 1/3–1/2 as long as middle width of the segment; processus terminalis nearly 5 times as long as basal part of 6th; 3rd–6th as 64 : 64 : 62 : 19+93 in length. Clypeus with 4 setae anteriorly; mandibular lamina smooth, with 1 or 2 setae. Rostrum reaching hind coxa; ultimate segment 1.2–1.4 times as long as 2nd segment of hind tarsus, with 5 or 6 setae. Femora spinulously imbricated apically, with setae at most about 1/3 as long as middle width

of hind femur. Tibiae with setae about as long as middle width of hind tibia. First segment of all tarsi with 3 setae; the 2nd with 5 or 6 secondary setae. Mesosternal furca sessile or with a stem much broader than long. Abdominal tergum rather weakly sclerotized, not pigmented, without marginal tubercles; 2nd–4th segments each with 4–6 minute setae besides marginal ones; 8th with 4, sometimes 5 setae, of which the longest one is 1.0–1.5 times as long as middle width of 3rd antennal segment. Genital plate round, with 9–11 setae along hind margin and 2 setae anteriorly. Siphunculus tapering, imbricated, 11–13 times as long as wide at middle, about 3 times as long as cauda, with a developed flange. Cauda shortly conical, less than twice as long as wide, with 6–8 setae.

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.13, 0.07, 0.60, 0.55, 0.55, 0.17+0.85; ultimate rostral segment 0.14; hind femur 0.95; hind tibia 1.75; hind tarsus (2nd segment) 0.11; siphunculus 0.60; cauda 0.20; dorsal setae 0.020–0.023 on head, 0.008 on abdominal disc, about 0.040 on 8th abdominal segment.

Fundatrix. Slightly differs from the apterous viviparous female as follows:—

Body pale green in life, 2.5 mm. in length. Head with setae about 1/3 as long as middle width of 3rd antennal segment. Antenna as long as or slightly longer than body; 3rd segment with 1–4 rhinaria; processus terminalis 2.7 times as long as basal part of 6th. Ultimate rostral segment 1.1–1.3 times as long as 2nd segment of hind tarsus. Mesosternal furca sessile. Tibiae with setae distinctly shorter than middle width of hind tibia.

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.15, 0.09, 0.65, 0.57, 0.55, 0.20+0.54; ultimate rostral segment 0.14; hind femur 0.88; hind tibia 1.55; hind tarsus (2nd segment) 0.11; siphunculus 0.70; cauda 0.22; longest dorsal seta 0.013 on head, 0.010 on abdominal disc and 0.028 on 8th abdominal segment.

Specimens examined: Some apterous viviparous females and a few fundatrices, Mt. Hikosan, Fukuoka Pref., 25-v-65, ex *Lindera sericea*.

Host plants: *Lindera sericea*. This aphid infests the underside of leaves of the host, curling the leaves loosely and causing reddish brown blotches.

Distribution: Japan.

This species is very closely related to *A. muradachi* (Shinji), from which it may be distinguished by the longer ultimate rostral segment and by the pale siphunculus.

13. ***Acyrthosiphon asteris*** (Takahashi), comb. n.

Aulacorthum asteris Takahashi, 1965b: 104.

Specimens examined: Some apterous and an alate viviparous females collected at Kuroyama, Ôsaka Pref. (ex *Kalimeris yomena*, M. Sorin leg., syntypes of the species).

Host plants: *Kalimeris yomena*.

Distribution: Japan.

14. ***Acyrthosiphon nipponicus*** (Essig et Kuwana)

Macrosiphum nipponicum Essig et Kuwana, 1918: 48.
Aulacorthum nipponicum: Takahashi, 1965b: 102.
Macrosiphum paederiae Takahashi, 1921b: 11.
Macrosiphum paederiae: Takahashi, 1923: 15 & 73.
Acyrthosiphon paederiae: Shinji, 1941: 706.

Specimens examined: A lot of apterous and alate viviparous females have been

examined, their localities being as follows:— Honshû—Kawatabi, Miyagi Pref. (ex *Paederia scandens* var. *mairei*); Tôkyô (ex *Paederia scandens* var. *mairei*, R. Takahashi leg.); Mt. Iwawaki, Ôsaka Pref. (R. Takahashi leg.). Kyûshû—Kagoshima & Sata, Kagoshima Pref. (ex *Paederia scandens* var. *mairei*); Nase, Uragami & Koshuku, Amami-ôshima Isl. (ex *Paederia scandens* var. *maritima*).

Host plants: *Paederia scandens* var. *mairei* & *P. scandens* var. *maritima*.

Distribution: Japan; Korea; China; Taiwan.

15. ***Acyrthosiphon esakii*** (Takahashi), comb. n.

Macrosiphum esakii Takahashi, 1924: 101.
Aulacorthum esakii: Takahashi, 1965b: 111.

Specimens examined: Some apterous viviparous females collected at the following localities:— Honshû—Hirao, Ôsaka Pref. (R. Takahashi leg.). Kyûshû—Nase & Akakina, Amami-ôshima Isl.

Host plants: All the specimens examined were collected from *Paederia scandens* var. *mairei*.

Distribution: Japan.

16. ***Acyrthosiphon nepetifolii*** (Miyazaki), comb. n.

Aulacorthum nepetifolii Miyazaki, 1968a: 125.

Specimens examined. Some apterous and alate viviparous females collected at Mt. Yûbari, Hokkaidô (ex *Nepeta subsessilis* var. *yezoensis*, syntypes of *Aulacorthum nepetifolii* Miyazaki).

Host plants: *Nepeta subsessilis* var. *yezoensis*.

Distribution: Japan.

17. ***Acyrthosiphon phytolaccae*** (Miyazaki), comb. n.

Aulacorthum phytolaccae Miyazaki, 1968a: 127.

Specimens examined: Some apterous viviparous females collected at Sendai, Miyagi Pref. (ex *Phytolacca esculenta*, H. Takada leg., syntypes of *Aulacorthum phytolaccae* Miyazaki).

Host plants: *Phytolacca esculenta*.

Distribution: Japan.

18. ***Acyrthosiphon perillae*** (Shinji)

Macrosiphum perillae Shinji, 1924: 363.
Acyrthosiphum perillae: Shinji, 1941: 716.
Aulacorthum (Perillaphis) perillae: Takahashi, 1965b: 99.
Macrosiphum perillae Takahashi, 1924: 25.
Aulacorthum perillae: Tao, 1963: 178.

Specimens examined: Some apterous and alate viviparous females collected at Hirao, Ôsaka Pref. (ex *Perilla frutescens*, R. Takahashi leg.).

Host plants: *Perilla frutescens*.

Distribution: Japan; Taiwan.

19. ***Acyrthosiphon magnoliae*** (Essig et Kuwana), comb. n.

Rhopalosiphum magnoliae Essig et Kuwana, 1918: 59.
Amphorophora magnoliae: Shinji, 1941: 755.

Aulacorthum magnoliae: Takahashi, 1965b: 109; Paik, 1965: 70.
Rhopalosiphum sambuci Matsumura, 1918: 9.
Rhopalosiphum sambucicola Takahashi, 1918: 372.
Macrosiphum nishikigi Shinji, 1928a: 154. **Syn. n.**
Pseudomegoura nishikigi: Shinji, 1929b: 112 & 1941: 1014.
Amphorophora malvicola Shinji, 1933b: 347. **Syn. n.**
Amphorophora malvicola: Shinji, 1941: 761.
Myzus magnolifoliae Shinji, 1941: 935. **Syn. n.**

Specimens examined: A lot of specimens have been examined, their localities being as follows:— Hokkaidô—Sapporo, Lake Shikotsu, Mt. Apoi, Obihiro, Kushiro, Nibushi, Kitami, Kitami-mombetsu, Toikambetsu & Toyotomi. Honshû—Lake Towada, Aomori Pref.; Morioka, Iwate Pref.; Kawatabi & Sendai, Miyagi Pref.; Niigata; Utsunomiya, Tochigi Pref.; Tôkyô; Moroyama, Saitama Pref.; Kyôto (R. Takahashi leg.); Ôdaigahara, Nara Pref. (R. Takahashi leg.); Ôsaka (R. Takahashi leg.); Himeji, Hyôgo Pref.; Sandankyô, Hiroshima Pref.; Izumo, Shimane Pref.; Shimonoseki, Yamaguchi Pref. Shikoku—Shôdo-shima Isl., Kagawa Pref.; Matsuyama, Ehime Pref. (R. Takahashi leg.). Kyûshû—Fukuoka & Hikosan, Fukuoka Pref.; Saga, Kumamoto & Yatsushiro, Kumamoto Pref.; Miyazaki & Miyakonojô, Miyazaki Pref.; Kagoshima & Sata, Kagoshima Pref.

Host plants: Polyphagous. The present specimens were collected from the following plants:—*Corylopsis pauciflora*, *Deutzia gracilis*, *Euonymus japonicus*, *E. sieboldianus*, *Iris japonica*, *Kerria japonica*, *Lagerstroemia indica*, *Lindera strychnifolia*, *Lycium chinense*, *Maesa japonica*, *Magnolia kobus*, *Malus halliana*, *Orixa japonica*, *Osmanthus auranticus* var. *thunbergii*, *Polygonatum falcatum*, *Poncirus trifoliata*, *Prunus yedoensis*, *Rorippa indica*, *Salix eriocarpa*, *Sambucus sieboldiana*, *Sepium japonicum* & *Stephanandra tanakae*.

Distribution: Japan; Korea.

In this species the antenna and tibiae are usually wholly black. In some cases, however, they are quite pale basally (e.g. in the apterous viviparous females collected at Ôdaigahara, Nara Pref., 18-viii-56, ex *Sambucus* sp., R. Takahashi leg.). *Rhopalosiphum sambuci* Matsumura, *Macrosiphum nishikigi* Shinji and *Amphorophora malvicola* Shinji are, judging from the descriptions, hardly separable from the pale form of *Acyrthosiphon magnoliae* (Essig et Kuwana). For the time being, I prefer to synonymize *sambuci*, *nishikigi* and *malvicola* with *magnoliae*. Having read the original description of *Myzus magnolifoliae* Shinji, I have been convinced that this should be suppressed as a synonym of *A. magnoliae* (E. et K.), too.

20. ***Acyrthosiphon cercidiphylli*** (Matsumura), comb. n.

Macrosiphum cercidiphylli Matsumura, 1918: 2.
Aulacorthum cercidiphylli: Takahashi, 1965b: 110.
Amphorophora katsurae Shinji, 1930g: 160.
Amphorophora katsurae: Shinji, 1941: 750.

Fundatrix. Body roundly oval, yellow in life, 2.5–2.7 mm. in length. Antenna pale; 3rd-5th segments apically and 6th black. Legs pale; femora apically, tibiae at both ends and tarsi black. Siphunculus pale, black at tip. Cauda pale.

Head smooth dorsally, evenly spinulous ventrally, with dorsal setae minute and blunt; antennal tubercles moderately developed, diverging at inner sides, each bearing

a swelling ventrally. Antenna about as long as body; 3rd segment weakly imbricated, with 0–2 rhinaria; processus terminalis twice as long as basal part of 6th. Rostrum passing middle coxa; ultimate segment 0.8–0.9 as long as 2nd segment of hind tarsus, with 2 pairs of secondary setae. Mesosternal furca sessile; basal part nearly as wide as length of arms. Femora imbricated on apical half, with very short setae; tibiae smooth, with setae much shorter than middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 3. Abdominal tergum membranous, pale; dorsal setae minute and blunt; 8th segment with 5 setae. Siphunculus weakly imbricated, slightly swollen or nearly cylindrical, about 9 times as long as wide at swollen portion, 2.5 times as long as cauda. Cauda tongue-shaped, a little longer than wide, with 5 or 6 setae.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.16, 0.09, 0.70, 0.53, 0.51, 0.26+0.55; ultimate rostral segment 0.14; hind femur 0.92; hind tibia 1.60; hind tarsus (2nd segment) 0.15; siphunculus 0.52; cauda 0.20; dorsal setae of head and abdominal disc 0.007–0.010, those of 8th abdominal segment up to 0.020.

Apterous viviparous female. The summer form differs from the spring form in the following points:—Body smaller, 1.1–1.2 mm. in length (1.8–2.1 mm. in spring form); antenna with 3rd segment often lacking rhinaria.

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 20-v-67. A lot of apterous and some alate viviparous females collected at the following localities:—Hokkaidô—Sapporo. Honshû—Oirase, Aomori Pref.; Hirayu, Gifu Pref. (R. Takahashi leg.).

Host plants: All the specimens examined were collected from *Cercidiphyllum japonicum*.

Distribuiton: Japan.

21. ***Acyrthosiphon watanabei***, sp. n.

Apterous viviparous female. Body in life yellow to orange-yellow in spring, creamy white in summer; head black; sclerites on thorax and abdomen shining black. Eye reddish brown. Antenna pale yellow; basal 2 segments wholly and 3rd–5th at apex black, 6th fuscous. Legs pale brownish yellow; femora at apex, tibiae at both ends and tarsi black. Siphunculus black. Cauda yellow. Body roundly oval, 2.6–3.2 mm. in length. Larva white to yellow, slightly covered with wax powder.

Head with fine spinules ventrally, some spinules also occurring dorsally; dorsal setae blunt, 0.8–1.2 times as long as middle width of 3rd antennal segment. Antennal tubercles large, diverging at inner sides, with 2 apical and 1 mid-ventral setae each. Antenna 1.1–1.2 times as long as body; 1st segment spinulated on outer side basally, with 7–9 setae; 3rd weakly or moderately imbricated, with 2–4 rhinaria near base, with setae at most half as long as middle width of the segment; processus terminalis 4.0–4.5 times as long as basal part of 6th; 3rd–6th segments as 80 : 69 : 52 : 18+74 in length. Mandibular lamina with 2 or 3 setae; clypeus with 2 pairs of setae anteriorly. Rostrum reaching middle coxa; ultimate segment obtuse, 1.5–2.0 times as long as wide, 0.8–0.9 as long as 2nd segment of hind tarsus, with 2–4 secondary setae. Femora smooth, often imbricated apically in hind leg. Tibiae with setae at most about as long as middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3. Abdominal tergum membranous, with black intersegmental areolations, without marginal tubercles, with well developed sclerites arranged as follows:—a large, irregularly perforated

central patch extending on 1st-3rd segments; marginal sclerites on first 6 segments; small mesial sclerites on 4th segment (these sclerites are effaced in some specimens); a broad transverse band on 7th segment. Abdomen with 2nd-4th segments each bearing 10-12 short setae besides marginal ones; 8th segment with 7-10 setae, of which the longer ones are about as long as or a little longer than middle width of 3rd an-

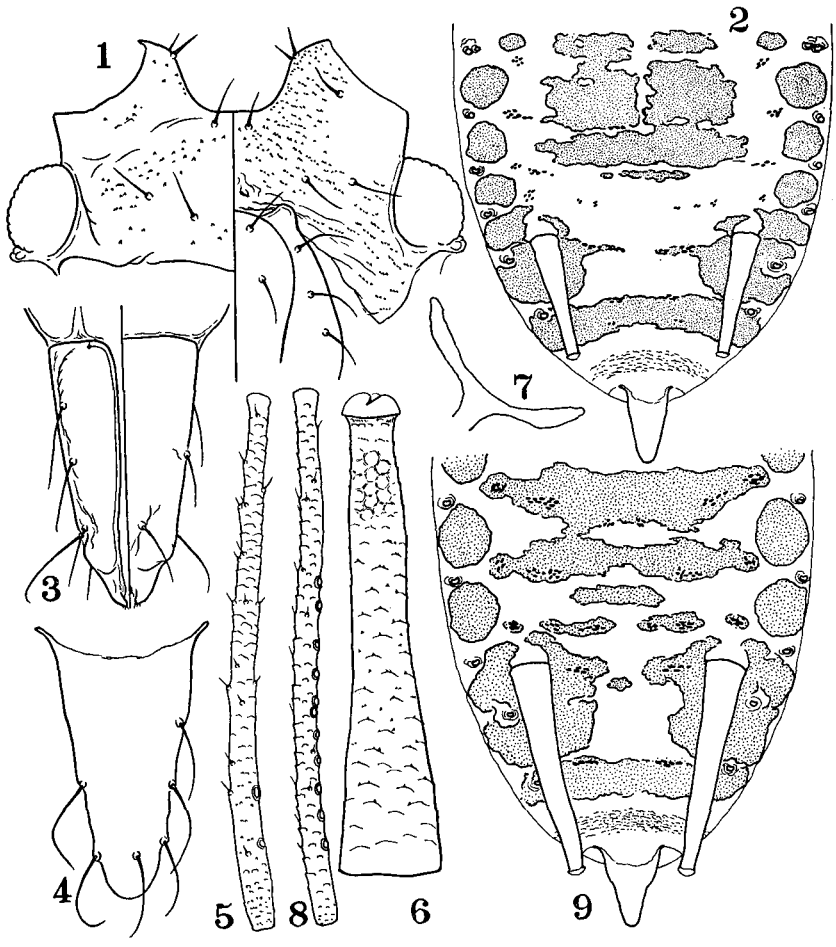

Fig. 12. *Acyrthosiphon watanabei*, sp. n. Apterous viviparous female:— 1, head; 2, pattern of sclerites of abdomen; 3, ultimate rostral segment; 4, cauda; 5, antenna (3rd segment); 6, siphunculus; 7, mesosternal furca. Alate viviparous female:— 8, antenna (3rd segment); 9, pattern of sclerites of abdomen.

tennal segment. Genital plate round, with a pair of setae anteriorly and 13-20 setae along hind margin. Siphunculus tapering, imbricated, about as long as head width across eyes, 8-9 times as long as wide at middle, the flange being rather narrow with puffed lid. Cauda conical, round at apex, about twice as long as wide, 1/2-3/5 as long as siphunculus, with 6 or 7 setae.

Measurements in mm. Body 3.0; antennal segments (1st–6th): 0.18, 0.11, 0.87, 0.76, 0.62, 0.20+0.77; ultimate rostral segment 0.13; hind femur 1.30; hind tibia 2.35; hind tarsus (2nd segment) 0.15; siphunculus 0.66; cauda 0.38; longest dorsal seta 0.048 on head, 0.018 on abdominal disc, 0.050 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Head and thorax black. Femora black, pale near base. Otherwise in colouration as in apterous viviparous female. Body 2.4–2.7 mm. in length.

Antenna 1.3–1.4 times as long as body; 3rd segment with 6–14 rhinaria arranged in a line on basal 2/3 or more of the segment; processus terminalis 4–5 times as long as basal part of 6th. Wings of normal venation. Abdomen with large intersegmental areolations, each of which is wrapped in a sclerite; postsiphuncular sclerite large, usually fused with antesiphuncular sclerite and often also with sclerotic band of 7th segment; 1st–4th segments each with a transverse band which is fused with neighbouring ones in various degree. Cauda about 1.5 times as long as wide, 3/7–1/2 as long as siphunculus.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.17, 0.10, 0.90, 0.73, 0.49, 0.19+0.89; ultimate rostral segment 0.12; hind femur 1.15; hind tibia 2.27; hind tarsus (2nd segment) 0.15; siphunculus 0.58; cauda 0.27; longest dorsal seta 0.040 on head, 0.025 on abdominal disc, 0.050 on 8th abdominal segment.

Specimens examined: Syntypes—18 apterous and 12 alate viviparous females, Sapporo, Hokkaidô, 12-vi-68 (nos. 2444 & 2461), 27-vi-68 (no. 2487) & 4-ix-68 (no. 2535), ex *Convallaria keiskei*.

Host plants: *Convallaria keiskei*. This aphid infests the underside of leaves, causing ethiolation around the infesting site.

Distribution: Japan.

This species is characterized by the peculiar pattern of the sclerotization in the apterous viviparous female.

22. ***Acyrthosiphon codonopsis***, sp. n.

Aulacorthum (*Neomyzus*) *taiwanum*: Takahashi, 1965b: 101.

This form is already described by Takahashi (1965) under the name of *Aulacorthum* (*Neomyzus*) *taiwanum* (Takahashi). Having examined those specimens used by Takahashi, I have come to the conclusion that this form should be, in reality, treated as a new species. It may be distinguished from *taiwanum* by the following points:—

Apterous viviparous female. Head smooth dorsally. Pro- and metathorax with a pair of sclerites. Abdomen without a sclerotic band posteriorly to postsiphuncular sclerites.

Detailed characters are given by Takahashi (1965).

Specimens examined: Syntypes—8 apterous viviparous females, Mt. Kôya, Wakayama Pref., 23-ix-60, ex *Codonopsis lanceolata*, R. Takahashi leg.

Host plants: *Codonopsis lanceolata*.

Distribution: Japan.

23. ***Acyrthosiphon porosus*** (Sanderson)

Myzus porosus Sanderson, 1901: 205.

Rhodobium porosum: Hille Ris Lambers, 1948: 285; Eastop, 1958: 63; Tao, 1963: 179; MacGillivray, 1963: 892; Takahashi, 1965c: 24.

Acyrthosiphon (Rhodobium) porosum: Eastop, 1966: 427.
Macrosiphum rosaefolium Theobald, 1915: 109.
Macrosiphum rosaefolium: Takahashi, 1925: 9.
Rhodobium rosaefolium: Hille Ris Lambers, 1947: 301; Eastop, 1961: 38.

Specimens examined: Some apterous viviparous females collected at Sapporo, Hokkaidô (ex *Rosa rugosa*) & Ôsaka (from a rose, R. Takahashi leg.).

Host plants: *Rosa rugosa* and cultivated roses. Strawberry (in North America, after MacGillivray, 1963); *Senecio confusus* (in Bermuda, after MacGillivray, 1959).

Distribution: Cosmopolitan.

24. ***Acyrthosiphon vaccinii*** (Hille Ris Lambers), comb. n.

Aulacorthum vaccinii Hille Ris Lambers, 1952: 53.

This species is new to Japan. Having compared the specimens examined with a syntype of *vaccinii* Hille Ris Lambers, I have been convinced that they should be identified with *vaccinii*. This species may be characterized by the following features of the apterous viviparous female:—Abdominal tergum black, strongly sclerotized; head with a prominent median tubercle; dorsal setae of body minute; antenna with processus terminalis only 3.0–3.5 times as long as basal part of 6th segment; siphunculus pale, dark at apex; body in life shining black dorsally, dull yellowish green ventrally, often with a brownish tint around siphunculi.

Specimens examined: Some apterous viviparous females, Sapporo, Hokkaidô; 1- & 10-vi-68, ex *Leucothoe grayana* var. *oblongifolia*; Sapporo, 15-ix-68, ex *Vaccinium japonicum*.

Host plants: *Leucothoe grayana* var. *oblongifolia* & *Vaccinium japonicum* (in Japan). *Vaccinium uliginosum* (in Europe, after Hille Ris Lambers, 1952).

Distribution: Japan; Europe.

25. ***Acyrthosiphon glechomae*** (Takahashi), comb. n.

Aulacorthum glechomae Takahashi, 1965b: 103.

Only the apterous viviparous female has been described. On the basis of the present material a brief description of the alate viviparous female is given below.

Alate viviparous female. Body pale yellow in life; head, thorax and sclerites on abdomen black. Antenna black. Legs pale brown; femora at apex, tibiae at apex and tarsi black. Siphunculus fuscous. Cauda pale. Body 1.7–1.8 mm. in length.

Head smooth dorsally, spinulous ventrally, with short pointed setae. Antenna imbricated throughout, 1.2 times as long as body; 3rd segment with 13–18 flat rhinaria more or less arranged in a line; processus terminalis 4.0–4.5 times as long as basal part of 6th; 3rd–6th as 44 : 36 : 32 : 15+63 in length. Mandibular lamina spinulous. Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus, with a pair of secondary setae. Femora scabrous; tibiae smooth, with setae shorter than middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 3. Wings of normal venation. Abdomen with marginal sclerites on 1st–6th segments, developed sclerites surrounding intersegmental areolations on 1st and 2nd, a large, irregularly perforated central sclerite extending on 3rd–5th, and sclerotic bands on 6th and 7th; 2nd–4th segments each with only 2 setae between marginal sclerites, without marginal tubercles; 8th tergite sclerotized, with 4 pointed setae, the longest one being at most 4/5 as long as middle width of 3rd antennal segment. Siphunculus strongly imbricated throughout,

narrowest at middle, dilated toward both ends, 9–11 times as long as wide at middle, with a large flange. Cauda about half length of siphunculus, with 5 setae.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.09, 0.07, 0.44, 0.39, 0.33, 0.15+0.61; ultimate rostral segment 0.11; hind femur 0.56; hind tibia 1.16; hind tarsus (2nd segment) 0.09; siphunculus 0.34; cauda 0.16; dorsal setae 0.018 on head, 0.015 on abdominal disc, 0.024 on 8th abdominal segment.

Specimens examined: Some apterous and alate viviparous females, Akiyoshidai, Yamaguchi Pref., 5-v-66. Apterous viviparous females collected at Mt. Iwawaki, Ôsaka Pref. (R. Takahashi leg., syntypes of *Aulacorthum glechomae* Takahashi).

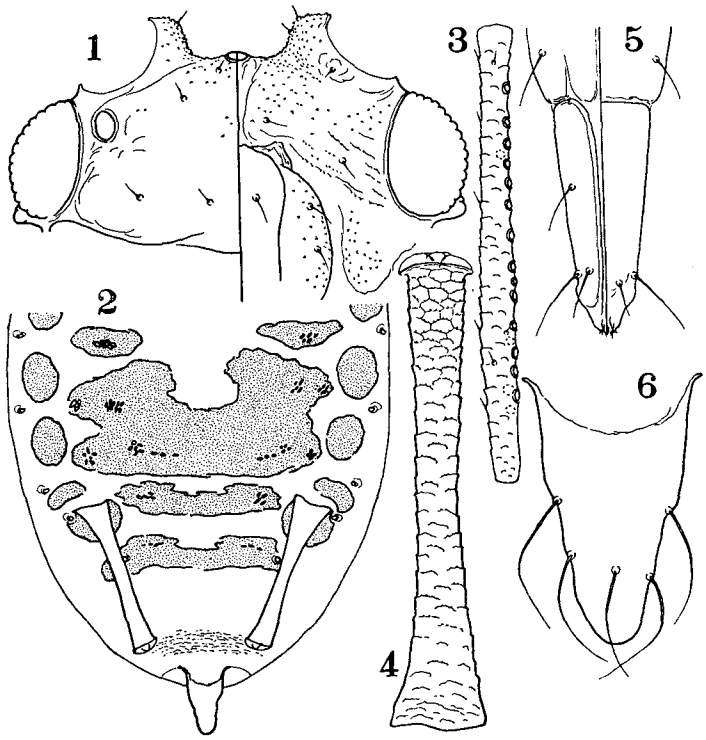

Fig. 13. *Acyrthosiphon glechomae* (Takahashi). Alate viviparous female:— 1, head; 2, pattern of sclerites of abdomen; 3, antenna (3rd segment); 4, siphunculus; 5, ultimate rostral segment; 6, cauda.

Host plants: All the specimens examined were collected from *Glechoma hederacea* var. *grandis*. This aphid is found rather solitarily on the under surface of leaves.

Distribution: Japan.

This species is an aberrant member of *Acyrthosiphon*, being characterized by the following points:—Head scabrous with minute granules, with minute dorsal setae and with gibbous antennal tubercles. Siphunculus cylindrical at middle, dilated at both ends. Larva with spinulous hind tibia.

14. Genus ***Impatientinum*** Mordvilko

Impatientinum Mordvilko, 1914: 72 [type-species: (*Impatientinum fuscum* Mordvilko, 1928) = *Aphis balsamines* Kaltenbach, 1862].

Tuberosiphum Shinji, 1922: 789 [type-species: *Tuberosiphum impatiens* Shinji, 1922].

This genus is distributed in the Palearctic region, being represented by 3 species, *I. balsamines* (Kaltenbach), *I. asiaticum* Nevsky and *I. impatiens* (Shinji). These species are associated with the Balsaminaceae. The following 2 species are known to occur in Japan.

Key to the species

1 Antenna with 6–15 rhinaria distributed beyond basal half of 3rd segment; 4th and 5th segments also with some secondary rhinaria. Siphunculus more or less calf-shaped, distinctly shorter than head width across eyes. Ultimate rostral segment 0.7–0.8 as long as 2nd segment of hind tarsus. . . . . 1. *I. balsamines* (Kaltenbach)

– Antenna with 3–11 rhinaria on basal half of 3rd segment; 4th and 5th segments without secondary rhinaria. Siphunculus usually tapering, as long as or longer than head width across eyes. Ultimate rostral segment 0.8–1.0 as long as 2nd segment of hind tarsus. . . . . 2. *I. impatiens* (Shinji)

1. ***Impatientinum balsamines*** (Kaltenbach)

Aphis balsamines Kaltenbach, 1862: 57.
Macrosiphoniella balsamines: Theobald, 1926: 168.
Impatientinum balsamines: Hille Ris Lambers, 1947: 305; Takahashi, 1965c: 24.
Impatientinum fuscum Mordvilko in Filipjev, 1928: 193.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hakkaidô—Sapporo, Kunneppu & Kitami-mombetsu. Honshû —Mt. Yahiko, Niigata Pref. (R. Takahashi leg.); Hirayu, Gifu Pref. (R. Takahashi leg.).

Host plants: All the specimens examined were collected from *Impatiens nolitangere*.

Distribution: Japan; Western Russia; Europe.

2. ***Impatientinum impatiens*** (Shinji)

Tuberosiphum impatiens Shinji, 1922: 789.
Macrosiphum impatiensae: Shinji, 1941: 864.
Impatientinum impatiens: Takahashi, 1965c: 23.
Impatientinum impatiensae: Paik, 1965: 76.
Macrosiphum smilaceti Takahashi, 1924: 101.
Macrosiphum smilaceti: Takahashi, 1937a: 6.
Acyrthosiphon smilaceti: Tao, 1963: 190.

Fundatrix. Closely resembles the apterous viviparous female but differs as follows:—

Antenna shorter than body; 3rd segment about as long as 4th and 5th together, with 1–3 rhinaria; 4th shorter than 5th; processus terminalis about 3 times as long as basal part of 6th. Antennal tubercles low, strongly diverging at inner sides. Abdominal tergum less strongly sclerotized, irregularly perforated mesially and marginally. Mesosternal furca sessile.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.14, 0.11, 0.78, 0.34, 0.46, 0.19+0.60; ultimate rostral segment 0.15; hind femur 1.05; hind tibia 1.75;

hind tarsus (2nd segment) 0.16; siphunculus 0.56; cauda 0.44; dorsal setae 0.022–0.030 on head, 0.013–0.025 on abdominal disc, up to 0.037 on 8th abdominal segment.

Apterous and alate viviparous females. In the specimens collected at Sapporo in September, the ground colour of body is yellowish green to bluish green; in other specimens examined, it is orange-red.

Specimens examined: Some fundatrices, Mt. Seppiko, Hyôgo Pref., 19-iv-66, ex *Smilax china*. A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Impatiens textori*). Honshû—Ikezuki (ex *Smilax china*) & Kawatabi (ex *Impatiens textori*), Miyagi Pref.; Okukinu, Tochigi Pref. (H. Higuchi leg.); Ogose, Saitama Pref. (ex *Impatiens textori*); Tsumagoi, Gumma Pref. (ex *Impatiens textori*, K. Shibata leg.); Toyama (ex *Impatiens textori*, S. Takagi leg.); Kawachi-nagano, Hirao & Mt. Iwawaki, Ôsaka Pref. (ex *Impatiens textori*, R. Takahashi leg.); Miyajima, Hiroshima Pref. (ex *Smilax china*). Kyûshû—Sasebo, Nagasaki Pref. (ex *Smilax china*); Miyazaki (ex *Smilax china*).

Host plants: *Smilax china* & *Impatiens textori*; *I. balsamina* (after Shinji, 1922). It seems that this aphid migrates from *Smilax* to *Impatiens*.

Distribution: Japan; Korea; Taiwan; India.

15. Genus ***Cryptaphis*** Hille Ris Lambers

Cryptaphis Hille Ris Lambers, 1947: 296 [type-species: (*Cryptaphis setiger* Hille Ris Lambers, 1947)=*Aphis poae* Hardy, 1850].

This genus comprises 3 species, *C. poae* (Hardy) from Europe, and *C. geranicola* (Shinji) and *C. menthae* Takahashi from Japan.

Key to the species

1 Antenna with 6–14 rhinaria on 3rd segment and 0–4 rhinaria on 4th; processus terminalis about 3.5–4.0 times as long as basal part of 6th segment. . . . . 1. *C. geranicola* (Shinji)

– Antenna with 0–7 rhinaria on 3rd segment, without rhinaria on 4th; processus terminalis about 4.5–5.0 times as long as basal part of 6th segment. . . . . 2. *C. menthae* Takahashi

1. ***Cryptaphis geranicola*** (Shinji)

Myzus geranicola Shinji, 1935 a: 234.
Myzus geranicola: Shinji, 1941: 1171.
Cryptaphis geranii Takahashi, 1961 b: 105. **Syn. n.**

Takahashi (1961) gives a detailed description of the apterous viviparous female. On the basis of the present specimens, descriptions of the fundatrix and alate viviparous female are given below.

Fundatrix. Closely resembles the apterous viviparous female, being distinguished therefrom by the following aspects:—

Antenna with 0–4 rhinaria on 3rd segment, without them on 4th; processus terminalis 2.7–3.6 times as long as basal part of 6th (3.6–4.2 times so in apterous viviparous female); 3rd–6th segments as 46 : 21 : 21 : 11+38 in length. Ultimate rostral segment 1.4–1.5 times as long as 2nd segment of hind tarsus (1.2–1.4 times so in apterous viviparous female). Mesosternal furca with arms widely detached and connected with each other by a chitinous band. Abdomen with 8th segment bearing 5–8 setae (4–6 in apterous viviparous female). Body yellowish brown, with tergum dark

brown to nearly black in life, 1.7–2.2 mm. in length. Larva yellow.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.09, 0.08, 0.42, 0.22, 0.20, 0.11+0.37; ultimate rostral segment 0.14; siphunculus 0.32; cauda 0.12; longest dorsal seta 0.10 on head, 0.13 on abdominal disc, 0.12 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Head sparsely spinulated ventrally, with dorsal setae at most 1.8 times as long as middle width of 3rd antennal segment. Antenna 1.1 times as long as body; 3rd segment with 16–29 bulging rhinaria and setae about as long as middle width of the segment; 4th with 3–7 rhinaria; processus terminalis about 4.5–5.5 times as long as basal part of 6th segment. Abdomen with dorsal setae at most about 2.0–3.0 times as long as middle width of 3rd antennal segment; 1st and 2nd segments each with a sclerotic band; marginal sclerites on 2nd segment usually free, those on 3rd and 4th partly fused with central patch which extends on 2nd–7th tergites; ante- and postsiphuncular sclerites completely fused with central patch.

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.11, 0.09, 0.77, 0.37, 0.27, 0.12+0.57; ultimate rostral segment 0.14; siphunculus 0.30; cauda 0.13; longest seta of head 0.06, that of abdomen 0.08.

Specimens examined: Some alate viviparous females, Sapporo, Hokkaidô, 12-vi-68, ex *Geranium erianthum*. Some fundatrices, Sapporo, 19-v-68 & 22-v-67, ex *Geranium erianthum*. A lot of apterous viviparous females have been collected at the following localities in Hokkaidô:—Sapporo (ex *Geranium* sp., R. Takahashi leg., syntypes of *Cryptaphis geranii* Takahashi; ex *Geranium erianthum* & *G. thunbergii*); Mt. Apoi (ex *Geranium erianthum*).

Host plants: *Geranium erianthum*, *G. thunbergii* & *Geranium* sp. This aphid infests the underside of leaves, causing heavy leaf-curlings.

Distribution: Japan.

Takahashi (1961) has separated *geranii* Takahashi, 1961, from *geranicola* Shinji, 1935, by the diverging antennal tubercles and by the presence of rhinaria on the 3rd and 4th antennal segments in the apterous viviparous female. In the present specimens, however, rhinaria are at times present while at times absent on the 4th antennal segment.

2. ***Cryptaphis menthae*** Takahashi

Cryptaphis menthae Takahashi, 1961 b: 107.

Takahashi (1961) gives detailed descriptions of the apterous and the alate viviparous females. The fundatrix slightly differs from the apterous viviparous female in the following points:—Mesosternal furca sessile, the basal part being as broad as or broader than length of arms. Antenna without secondary rhinaria, with processus terminalis 3.5–4.0 times as long as basal part of 6th segment; 3rd–6th segments as 53 : 30 : 25 : 12+48 in length. Ultimate rostral segment 1.3–1.5 times as long as 2nd segment of hind tarsus.

Specimens examined: Some fundatrices, Sandankyô, Hiroshima Pref., 1-v-66, ex *Plectranthus longitubus*; Taisha, Shimane Pref., 8-v-66, ex *Plectranthus inflexus*. Some apterous and alate viviparous females collected at Mt. Iwawaki, Ôsaka Pref. (ex *Mentha* sp., M. Sorin leg., syntypes of *C. menthae* Takahashi); Taisha (ex *Plectranthus inflexus*).

Host plants: *Plectranthus longitubus, P. inflexus* & *Mentha* sp. The infested leaves are crisped.

Distribution: Japan.

16. Genus ***Hydronaphis*** Shinji

Hydronaphis Shinji, 1922: 790 [type-species: *Hydronaphis impatiens* Shinji, 1922].

In general appearance this genus closely resembles *Cryptaphis* Hille Ris Lambers, from which it may be distinguished by the following features in addition to those given in the key:—Siphunculus weakly clavate; setae of body and antenna not spatulate at tip. This genus has been represented by a single species, *H. impatiens* Shinji. In the course of the present study a new species has been found from Japan.

Key to the species

1 Abdominal tergum reticulated with spinules. Antenna black, with 0–3 rhinaria on 3rd segment. Cauda black, shortly tongue-shaped, without constrictions. Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus, with 2 secondary setae. On *Impatiens*. . . . . 1. *H. impatiens* Shinji

– Abdominal tergum with sparse rows of spinules, which may partly form reticulations. Antenna pale basally, without rhinaria on 3rd segment. Cauda pale, shortly conical, blunt at tip, constricted at extreme base. Ultimate rostral segment 1.6 times as long as 2nd segment of hind tarsus, with 6 secondary setae. On *Laportea*. . . . . 2. *H. laporteae*, sp. n.

1. ***Hydronaphis impatiens*** Shinji

Hydronaphis impatiens Shinji, 1922: 790.
Hydronaphis impatiens: Takahashi, 1965c: 31.

Specimens examined: Some apterous and alate viviparous females collected at Mt. Takao, Tôkyô Distr. (ex *Impatiens noli-tangere*, R. Takahashi leg.); Lake Kamakita, Saitama Pref. (ex *Impatiens textori*).

Host plants: *Impatiens textori* & *I. noli-tangere*. This aphid infests roots and stalks of the host.

Distribution: Japan.

2. ***Hydronaphis laporteae***, sp. n.

Apterous viviparous female. Body dull yellow in life; tergum dark brown to nearly black. Antenna pale yellowish brown, dark apically. Legs pale yellowish brown; femora at apex, tibiae at apex and tarsi black. Siphunculus pale, black at tip. Cauda pale. Body roundly oval, 1.6–1.8 mm. in length.

Head densely spinulous over dorsum and venter; dorsal setae pointed, the longest one being about 1.4 times as long as middle width of 3rd antennal segment. Antennal tubercles diverging at inner sides, each with 1 or 2 setae apically and 1–3 setae ventrally; median tubercle not developed. Antenna about as long as body, imbricated throughout; 3rd segment without rhinaria, with setae nearly as long as or a little longer than middle width of the segment; primary rhinaria on 5th and 6th segments without distinct cilia; processus terminalis about 5 times as long as basal part of 6th; length of 3rd-6th segments as 47 : 27 : 20 : 9+46. Clypeus sparsely scabrous, gibbous, with 4 setae anteriorly; mandibular lamina scabrous, with 1 or 2 setae. Rostrum reaching middle part of abdomen; ultimate segment long, 1.6 times as long as 2nd

segment of hind tarsus, with 6 secondary setae. Femora scabrous apically, with setae slightly shorter than middle width of hind femur. Tibiae smooth, with setae 1.0–1.5 times as long as middle width of hind tibia. First segment of all tarsi with 3 setae (sense peg about as long as lateral setae); the 2nd segment with 1 or 2 secondary setae ventrally. Mesosternal furca sessile. Abdominal tergum uniformly sclerotized,

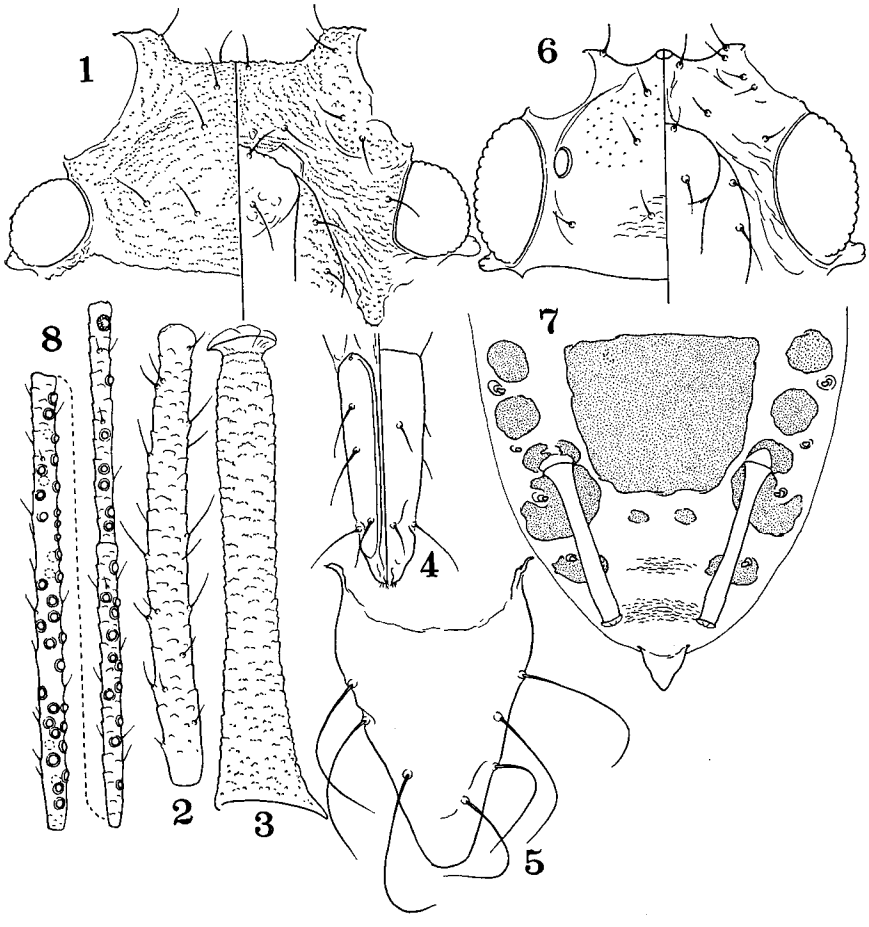

Fig. 14. *Hydronaphis laporteae*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (3rd segment); 3, siphunculus; 4, ultimate rostral segment; 5, cauda. Alate viviparous female:— 6, head; 7, pattern of sclerites of abdomen; 8, antenna (3rd–5th segments).

pigmented, with rather sparse spinules which may partly form reticulations, without marginal tubercles; 2nd–4th segments each with 11–14 long pointed setae including marginal ones; 8th with 3 or 4 setae 1.3–1.8 times as long as middle width of 3rd antennal segment. Genital plate round, with 10–14 setae along hind margin, a pair of setae anteriorly and 7–10 additional ones on central area. Siphunculus strongly im-

bricated, sub-cylindrical, broadened at base, slightly dilated near apex, abruptly constricted below large flange, 9–10 times as long as wide at middle. Cauda shortly conical, blunt at apex, constricted at extreme base, 1/4–1/3 as long as siphunculus, with 5–7 setae. Larva yellow in life, with hind tibia quite smooth.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.11, 0.08, 0.47, 0.31, 0.22, 0.09+0.49; ultimate rostral segment 0.13; hind femur 0.65; hind tibia 1.16; hind tarsus (2nd segment) 0.08; siphunculus 0.45; cauda 0.11; longest dorsal seta 0.055 on head and abdominal disc, 0.065 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—Head sparsely spinulous dorsally, smooth ventrally; dorsal setae at most about as long as middle width of 3rd antennal segment. Antennal tubercle small, gibbous at inner apex. Antenna 1.2–1.3 times as long as body; 1st and 2nd segments sparsely spinulated or smooth; 3rd imbricated, with 28–37 rhinaria on whole surface of the segment; 4th with 8–14 rhinaria; 5th with 2–6 secondary rhinaria; processus terminalis 5–6 times as long as basal part of 6th; length of 3rd–6th segments as 61 : 38 : 31 : 13+77. Rostrum reaching hind coxa; ultimate segment 1.6–1.8 times as long as 2nd segment of hind tarsus, with 5 or 6 secondary setae. Abdomen with a rectangular central sclerite extending on 3rd–5th segments, with developed marginal sclerites on 2nd–6th segments; 2nd–4th segments each with 7–11 setae between marginal sclerites, the setae being about as long as those on head. Siphunculus gradually dilated toward apex, broadened at base, constricted below flange. Cauda galeate. Genital plate transversely oval, with 10–13 setae along hind margin, 2 setae anteriorly and 11–18 additional ones centrally. Body 1.8–2.0 mm. in length.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.10, 0.08, 0.62, 0.42, 0.32, 0.15+0.75; ultimate rostral segment 0.13; hind femur 0.70; hind tibia 1.43; hind tarsus (2nd segment) 0.08; siphunculus 0.39; cauda 0.10; longest dorsal seta of head 0.030, that on 8th abdominal segment 0.060.

Specimens examined: Syntypes—7 apterous viviparous females, Sapporo, Hokkaidô, 8- & 20-ix-67, ex *Laportea bulbifera* (nos. 2282 & 2290); 10 alate viviparous females, Sapporo, 20-ix-67, ex *Laportea bulbifera* (no. 2286).

Host plants: *Laportea bulbifera*. This aphid infests the underside of leaves, without causing any deformation.

Distribution: Japan.

This species is readily distinguished from *Hydronaphis impatiens* Shinji by the following points in addition to those given in the key:—(1) Siphunculus pale, black at tip (wholly black in *impatiens*), 9–10 times as long as wide at middle (6–9 times so). (2) Mesosternal furca very broadly based (with a short but distinct stem). (3) Legs paler than in *impatiens*. (4) In alate viviparous female antenna longer and with more numerous rhinaria than in *impatiens*; abdomen with a smaller central sclerite, without sclerotic bands on 6th and 7th segments.

17. Genus ***Eomyzus*** Takahashi

Eomyzus Takahashi, 1960a: 227 [type-species: *Myzus nipponicus* Moritsu, 1949].

The genus is monobasic.

1. ***Eomyzus nipponicus*** (Moritsu)

Myzus nipponicus Moritsu, 1949a: 15.
Eomyzus nipponicus: Takahashi, 1960a: 228.

Specimens examined: Many apterous viviparous females collected at Tôkyô (ex *Perilla* sp., R. Takahashi leg.).

Host plants: *Perilla* sp.; *P. frutescens* var. *crispa* (after Moritsu, 1949). This aphid infests the root of the host.

Distribution: Japan.

18. Genus ***Eumyzus*** Shinji

Eumyzus Shinji, 1929b: 111 [type-species: *Aphis impatiensae* Shinji, 1924].

On account of long rigid setae on the body this genus comes near *Eomyzus*, differing therefrom by the short siphunculus, by the gibbous antennal tubercles and by the membranous abdominal tergum with many scleroites. The genus is distributed in the eastern part of Asia, being represented by following 3 species.

Key to the species

1 Abdominal tergum evenly sclerotized. Ultimate rostral segment 1.6–1.7 times as long as 2nd segment of hind tarsus, with 4 secondary setae. On *Clinopodium*. . . . . 3. *E. clinopodii* Takahashi

– Abdominal tergum membranous, with scleroites at base of setae. Ultimate rostral segment at most 1.5 times as long as 2nd segment of hind tarsus, with 0–2 secondary setae. On *Impatiens*. 2

2(1) Head smooth on greater part of the disc; antennal tubercles developed, gibbous at inner apex. Scleroites of abdomen large, tuberculate, each of which bears 1–4 setae. Ultimate rostral segment 1.3–1.5 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Body reddish in life. . . . . 1. *E. impatiensae* (Shinji)

– Head scabrous dorsally, often smooth on small area at middle; antennal tubercles rather small and strongly diverging at inner sides. Scleroites of abdomen small, flat, each of which bears a seta. Ultimate rostral segment about as long as 2nd segment of hind tarsus, without secondary setae. Body yellowish in life. . . . . 2. *E. gallicola* Takahashi

1. ***Eumyzus impatiensae*** (Shinji)

Aphis impatiensae Shinji, 1924: 355.
Myzus impatiensae: Monzen, 1929: 66; Shinji, 1941: 924 & 1944: 525.
Eumyzus impatiensae: Shinji, 1929b: 111; Paik, 1965: 60.

On the basis of the present specimens, a redescription is given below:—

Apterous viviparous female. Body pink, red or reddish brown in life. Antenna pale, black apically. Legs pale; tibiae at apex and tarsi black. Siphunculus and cauda black. Body fat, roundly oval, 1.8–2.0 mm. in length.

Head scabrous over venter and on dorsum anteriorly and laterally, with stiff, pointed setae about twice as long as middle width of 3rd antennal segment. Antennal tubercle developed, gibbous at inner apex, with 1–4 setae apically and 2–4 setae ventrally. Antenna 6-segmented, 5/9–2/3 as long as body; basal 2 segments scabrous; 3rd segment smooth or weakly imbricated, nearly as long as 4th and 5th together, with setae a little longer than half middle width of the segment, without rhinaria; 4th and following segments imbricated; 5th with primary rhinarium wanting cilia;

processus terminalis 3.0–3.5 times as long as basal part of 6th; 3rd–6th as 39 : 25 : 15 : 9+29 in length. Clypeus nearly smooth, with 2–4 setae anteriorly; mandibular lamina scabrous, with 3–5 setae. Rostrum passing middle coxa; ultimate segment 1.3–1.5 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Mesosternal furca sessile. Legs with short, sparse setae; 1st tarsal chaetotaxy 3 : 3 : 2 or 3 : 2 : 2. Abdomen with pointed setae 2.5–3.0 times as long as middle width of 3rd antennal segment and with large, slightly tuberculate scleroites at base of dorsal setae, some of the scleroites being fused together; 2nd–4th segments each with 8–12 setae besides marginal ones; 7th with 5–9 setae between spiracles; 8th with 4–6 setae. Siphunculus short, scabrous, tapering, 4–5 times as long as wide at middle, about twice as long as cauda, with a large flange. Cauda shortly tongue-shaped, about as long as wide, with 5 or 6 setae.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.08, 0.06, 0.29, 0.19, 0.13, 0.08+0.26; ultimate rostral segment 0.12; hind femur 0.46; hind tibia 0.73; hind tarsus (2nd segment) 0.09; siphunculus 0.20; cauda 0.10; dorsal setae 0.053 on head, 0.055 on abdominal disc and 0.070 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—Abdomen yellowish brown, sometimes with a greenish tinge. Head, thorax and antenna black. Legs pale; femora at apex, tibiae at apex and tarsi black. Body 1.7–2.2 mm. in length.

Head smooth dorsally, sparsely spinulous ventrally, with dorsal setae at most as long as middle width of 3rd antennal segment. Antenna 5/7–4/5 as long as body; 3rd segment with 20–28 rhinaria, with setae about 3/5 as long as middle width of the segment; 4th with 3–7 rhinaria; 5th usually without secondary rhinaria; processus terminalis 3.5–4.5 times as long as basal part of 6th; 3rd–6th as 45 : 27 : 20 : 11+41 in length. Rostrum with ultimate segment 1.4–1.6 times as long as 2nd segment of hind tarsus. Wings of normal venation. Abdomen with a central patch which is extending on 3rd–6th segments, irregularly perforated especially along mesial line; marginal sclerites on 2nd–6th segments; a broad sclerotic band on 7th; dorsal setae stiff and pointed, a little longer than middle width of 3rd antennal segment on anterior segments, nearly twice as long as that width on 8th segment. Siphunculus 3.5–4.5 times as long as wide at middle, 1.5–1.7 times as long as cauda.

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.08, 0.06, 0.43, 0.25, 0.19, 0.11+0.38; ultimate rostral segment 0.12; hind femur 0.57; hind tibia 1.08; hind tarsus (2nd segment) 0.08; siphunculus 0.17; cauda 0.11; longest dorsal seta 0.028 on head, 0.030 on abdominal disc, 0.048 on 8th abdominal segment.

Alate viviparous females collected at Mt. Hayachine differ from others in the following points:—Antenna with only 8–17 rhinaria on 3rd segment, 0–2 rhinaria on 4th; central sclerite of abdomen divided into scattered small sclerites.

Specimens examined: Many apterous and alate viviparous females, Mt. Hayachine, Iwate Pref., 28-viii-66, ex *Impatiens textori*, K. Kusigemati leg.; Lake Kamakita, Saitama Pref., 15-x-66, ex *Impatiens textori*; Mt. Takao, Tôkyô Distr., 31-vii-58, ex *Impatiens noli-tangere*, R. Takahashi leg.; Kobuka, Ôsaka Pref., 23-x-60, ex *Impatiens textori*, R. Takahashi leg.

Host plants: *Impatiens textori* & *I. noli-tangere*. The infested leaves of the host plants are deformed into bag-shaped pseudogalls.

Distribution: Japan; Korea.

2. ***Eumyzus gallicola*** Takahashi

Eumyzus gallicola Takahashi, 1963: 55.

Only the apterous viviparous female has been described. The alate viviparous female closely resembles that of *E. impatiensae* (Shinji), but differs therefrom in the following aspects:—

Antenna 3/4 as long as body; 3rd segment with 12–17 rhinaria and with setae at most about half as long as middle width of 3rd antennal segment; 4th with 1–5 rhinaria; 5th with 0–3 secondary rhinaria; processus terminalis 3.0–3.5 times as long as basal part of 6th; 3rd–6th as 42 : 26 : 18 : 10+35 in length. Clypeus with 1–3 setae anteriorly; mandibular lamina smooth, with 1 or 2 setae. Ultimate rostral segment about as long as 2nd segment of hind tarsus, with or without a secondary seta. First tarsal chaetotaxy 3 : 3 : 2. Abdomen with a large central sclerite perforated or sometimes divided into smaller sclerites, with marginal sclerites on 2nd–6th segments (those on 5th sometimes effaced), and with a sclerotic band on 7th; dorsal setae as long as middle width of 3rd antennal segment on abdominal disc, about 1.5 times so on 8th segment. Siphunculus imbricated or striated with spinules, cylindrical or tapering, 3–4 times as long as wide at middle, 1.5 times as long as cauda which bears 4–6 setae.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.07, 0.06, 0.37, 0.24, 0.20, 0.11+0.34; ultimate rostral segment 0.09; hind femur 0.55; hind tibia 0.93; hind tarsus (2nd segment) 0.09; siphunculus 0.17; cauda 0.11; longest dorsal seta 0.023 on head, 0.025 on abdominal disc, 0.040 on 8th abdominal segment.

Specimens examined: Some alate viviparous females, Lake Towada, Aomori Pref., 5-ix-64. Many apterous viviparous females have also been examined, their localities being as follows:— Hokkaidô—Sapporo. Honshû—Lake Towada & Sukayu, Aomori Pref.; Tokusawa, Nagano Pref. (H. Higuchi leg.); Hirayu, Gifu Pref. (R. Takahashi leg., syntypes of *E. gallicola* Takahashi).

Host plants: All the specimens examined were collected from *Impatiens nolitangere*. This aphid makes bag-shaped pseudogalls on leaves of the host.

Distribution: Japan.

3. ***Eumyzus clinopodii*** Takahashi

Eumyzus clinopodii Takahashi, 1965c: 24.

Specimens examined: Some apterous viviparous females collected in Mie Pref. (ex *Clinopodium gracile*, M. Sorin leg., syntypes of *E. clinopodii* Takahashi).

Host plants: *Clinopodium gracile*.

Distribution: Japan.

Among the members of *Eumyzus* this species is erratic in the evenly sclerotized tergum of the abdomen. What is more, the species infests *Clinopodium*, whereas the others live in the characteristic galls caused on *Impatiens*. For the time being I prefer to follow Takahashi (1965) in including this species in *Eumyzus* on the basis of the shape of the head, siphunculus, cauda and antenna.

19. Genus ***Chaitomyzus*** Takahashi

Chaitomyzus Takahashi, 1960a: 223 [type-species: *Chaitomyzus hirticornis* Takahashi, 1960].

On account of the scabrous head with developed antennal tubercles and the sclerotized tergum with long stiff setae, this genus comes near *Cryptaphis*, *Hydronaphis* and *Eomyzus*. It is, however, readily differentiated from the latter genera by the first tarsal chaetotaxy being 5 : 5 : 5. The following is the only representative of the genus.

1. ***Chaitomyzus hirticornis*** Takahashi

Chaitomyzus hirticornis Takahashi, 1960a : 223.

Specimens examined: Some apterous viviparous females collected at Mt. Kongô, Ôsaka pref. (ex *Clinopodium* sp. (?), M. Sorin leg., syntypes of *C. hirticornis* Takahashi).

Host plants: *Clinopodium* sp. (?)

Distribution: Japan.

20. Genus ***Micromyzodium*** Kanakaraj David

Micromyzodium Kanakaraj David, 1958: 175 [type-species: *Micromyzodium filicium* Kanakaraj David, 1958].

This genus has been represented by 2 species, *M. filicium* Kanakaraj David from India and *M. polypodii* Takahashi from Japan. On this occasion a new species is described.

Key to the species

1 Abdominal tergum membranous and pale; abdominal sternum with fine, often indistinct spinules. Femora with sparse spinules apically. Siphunculus at least pale at middle, weakly imbricated or sparsely spinulated. Ultimate rostral segment 2.3–2.5 times as long as 2nd segment of hind tarsus, with 6 secondary setae. On ferns. . . 1. *M. polypodii* Takahashi

– Abdominal tergum sclerotic and pigmented; abdominal sternum with dense spinules. Femora strongly scabrous along whole length. Siphunculus entirely black, scabrous. Ultimate rostral segment 1.5–1.7 times as long as 2nd segment of hind tarsus, with 2 secondary setae. On *Digitaria*. . . . . 2. *M. spinulosum*, sp. n.

1. ***Micromyzodium polypodii*** Takahashi

Micromyzodium polypodii Takahashi, 1963: 61.
Micromyzodium polypodii: Miyazaki, 1968c: 19.

Specimens examined: Many apterous and some alate viviparous females collected at Hirao (syntypes of *M. polypodii* Takahashi) & Mt. Kongô, Ôsaka Pref.; Mt. Takao & Mt. Mitake, Tôkyô Distr.; Mt. Tanzawa, Kanagawa Pref. All the specimens were collected from ferns by R. Takahashi.

Host plants: ferns.

Distribution: Japan.

2. ***Micromyzodium spinulosum***, sp. n.

Apterous viviparous female. Body shining black in life. Antenna yellowish brown; basal 2 segments, 3rd–5th at apex and 6th dark. Legs yellowish brown; femora at apex, tibiae at apex and tarsi black. Siphunculus black. Cauda pale. Body roundly oval, 1.1–1.5 mm. in length.

Head densely and strongly spinulous over dorsum and venter; setae blunt at tip, 1.3–2.0 times as long as middle width of 3rd antennal segment; antennal tubercles

high, diverging at inner sides, each with an apical seta, without setae ventrally; median tubercle not developed. Antenna 1.3–1.5 times as long as body; basal 2 segments spinulously imbricated; flagellum moderately imbricated; 3rd segment as long as or slightly longer than siphunculus, without rhinaria, with setae about half as long as middle width of the segment; processus terminalis about 4 times as long as basal part of 6th. Clypeus spinulous, with 4 setae anteriorly; mandibular lamina densely spinulous, with 2 or 3 setae. Rostrum just passing hind coxa; ultimate segment about 3 times as long as broad, 1.5–1.7 times as long as 2nd segment of hind tarsus, with 2 secondary setae, with ventral pair of primary setae much removed toward base. Femora densely spinulous along whole length, with dorsal and lateral setae short and stiff, with ventral setae thin, a little shorter than middle width of hind femur. Tibiae

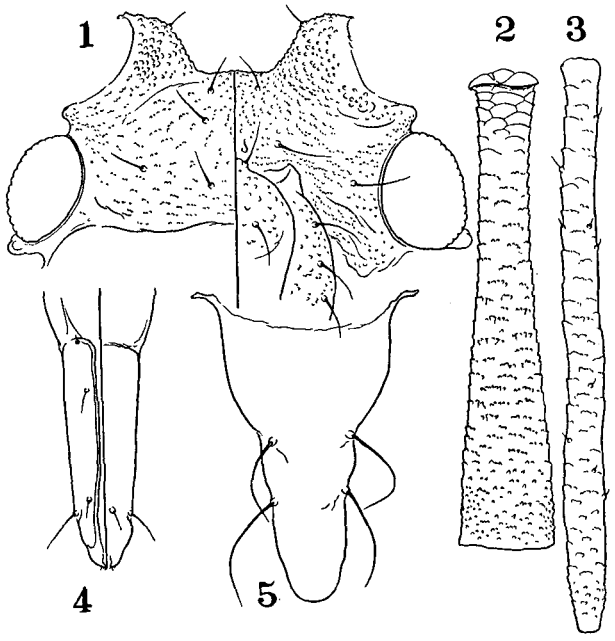

Fig. 15. *Micromyzodium spinulosum*, sp. n. Apterous viviparous female:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, ultimate rostral segment (right, dorsal surface; left, ventral surface); 5, cauda.

smooth, with sparse setae at most about as long as middle width of hind tibia. First segment of all legs with 3 setae; the 2nd segment with a dorsal and a ventral secondary setae. Mesosternal furca broadly and very shortly stemmed. Abdominal tergum evenly sclerotized, pigmented, smooth mesially and wrinkled marginally, without marginal tubercles; 2nd–4th tergites with mesial, pleural and marginal setae in single pairs, which are stout, often spatulate and about twice as long as middle width of 3rd antennal segment; 5th and 6th each with 2 setae between siphunculi; 8th with 2–4 (mostly 4) setae; abdominal sternum densely spinulated with fine spinules arranged in transverse rows. Genital plate round, spinulated, with 9–11 setae along hind margin and a pair of setae anteriorly. Siphunculus cylindrical, a little broadened basally, 7–8

times as long as wide at middle, 2.5–3.0 times as long as cauda, scabrously imbricated, with a few rows of transversely hexagonal cells at apex, with a well developed flange. Cauda conical, blunt at apex, attenuated near middle, with 4 setae. In larva hind tibia densely spinulous.

Measurements in mm. Body 1.1; antennal segments (1st–6th): 0.09, 0.07, 0.31, 0.23, 0.24, 0.13+0.48; ultimate rostral segment 0.12; hind femur 0.42; hind tibia 0.78; hind tarsus (2nd segment) 0.07; siphunculus 0.30; cauda 0.11; longest dorsal seta of head 0.038, that of abdomen 0.043.

Alate viviparous female. Slightly differs from the apterous viviparous female as follows:—

Head sparsely spinulous ventrally, smooth dorsally except on antennal tubercles, with setae at most as long as middle width of 3rd antennal segment. Antenna with 7–13 rhinaria on basal half of 3rd segment, with or without a rhinarium on 4th. Clypeus smooth anteriorly, scabrous posteriorly. Wings pale, with normal venation. Abdomen with a large central patch extending on 3rd–6th segments and fused with postsiphuncular sclerites, with marginal sclerites on 1st–5th segments and with transverse bands on 1st, 2nd and 7th segments. Body 1.3–1.4 mm. in length.

Measurements in mm. Body 1.4; antennal segments (1st–6th): 0.09, 0.06, 0.40, 0.35, 0.30, 0.15+0.50; ultimate rostral segment 0.12; hind femur 0.50; hind tibia 0.98; hind tarsus (2nd segment) 0.07; siphunculus 0.32; cauda 0.10; longest dorsal seta on head 0.014, that on abdomen 0.031.

Specimens examined: Syntypes—16 apterous and 2 alate viviparous females, Kawatabi, Miyagi Pref., 8-ix-67, ex *Digitaria adscendens*, no. 2246.

Host plants: *Digitaria adscendens*. This aphid infests the stalk of the host.

Distribution; Japan.

This species is characterized by the femora and abdominal sternum which are densely spinulous.

21. Genus ***Macromyzus*** Takahashi

Macromyzus Takahashi, 1960a: 225 [type-species: *Myzus woodwardiae* Takahashi, 1921].

This genus comprises 3 species, *M. woodwardiae* (Takahashi) and *M. polypodicola* (Takahashi) distributed in South-East Asia, and *M. indicus* Kanakaraj David from India. The former two are known as fern-feeders.

Key to the species

1 Thorax and abdomen with dark sclerites at base of dorsal setae. Head with dorsal setae more than 1.3 times as long as middle width of 3rd antennal segment. . . . . 1. *M. woodwardiae* (Takahashi)

– Thorax and abdomen without sclerites at base of dorsal setae. Head with dorsal setae at most about as long as middle width of 3rd antennal segment. . . . . 2. *M. polypodicola* (Takahashi)

1. ***Macromyzus woodwardiae*** (Takahashi)

Myzus woodwardiae Takahashi, 1921b: 20.
Myzus woodwardiae: Takahashi, 1923: 28 & 82 and 1931: 70.
Macrosiphum woodwardiae: Takahashi, 1925b: 3.
Macromyzus woodwardiae: Takahashi, 1960a: 225; Tao, 1963: 168; Miyazaki, 1968c: 19.
Myzus woodwardiae hinoi Moritsu, 1952: 26.

Specimens examined: A lot of apterous and some alate viviparous females have been examined, their localities being as follows:— Honshû—Bandai-kôgen, Fukushima Pref. (from a fern); Yokohama, Kanagawa Pref. (K. Sato leg.); Karasawa, Nagano Pref. (from a fern, H. Higuchi leg.); Hirao & Mt. Kongô, Ôsaka Pref. (from ferns, R. Takahashi leg.); Nachi, Wakayama Pref. (ex *Rumohra mutica*); Futaminoura, Mie Pref. (ex *Dryopteris monticola*); Mt. Daisen, Tottori Pref. (from a fern, H. Higuchi leg.).

Host plants: Various ferns including *Dryopteris monticola* & *Rumohra mutica*. In Taiwan *Woodwardia* & *Polystichum* are recorded as hosts (after Takahashi, 1921).

Distribution: Japan; Taiwan; India.

2. ***Macromyzus polypodicola*** (Takahashi)

Myzus polypodicola Takahashi, 1921b: 21.
Myzus polypodicola: Takahashi, 1923: 82, 1925a: 18 & 1931: 70.
Macrosiphum polypodicola: Takahashi, 1925b: 1.
Macromyzus polypodicola: Takahashi, 1963: 56; Tao, 1963: 168; Miyazaki, 1968c: 19.

Specimens examined: Many apterous and some alate viviparous females have been examined, their localities being as follows:— Honshû—Mt. Takao & Mt. Mitake, Tôkyô Distr.; Mt. Tanzawa, Kanagawa Pref.; Hirao & Mt. Kongô, Ôsaka Pref. All the specimens were collected from ferns by R. Takahashi.

Host plants: Ferns. *Dryopteris arida* & *Polystichum* sp. (in Taiwan, after Tao, 1963).

Distribution: Japan; Taiwan; Sumatra; India.

22. Genus ***Pleotrichophorus*** Börner

Pleotrichophorus Börner, 1930: 138 [type-species: *Aphis glandulosa* Kaltenbach, 1846; described as a subgenus of the genus *Capitophorus* van der Goot].

1. ***Pleotrichophorus glandulosus*** (Kaltenbach)

Aphis glandulosa Kaltenbach, 1846: 170.
Myzus glandulosus: van der Goot, 1915: 106.
Capitophorus (*Pleotrichophorus*) *glandulosus*: Börner, 1930: 138.
Pleotrichophorus glandulosus: Hille Ris Lambers, 1953: 126; Tao, 1963: 165 & 1966: 14; Paik, 1965: 58.
Myzus pilosus van der Goot, 1912: 68.
Capitophorus pilosus: Theobald, 1926: 246.
Capitophorus formosartemisiae: Shinji, 1941: 780.

Specimens examined: A lot of apterous and some alate viviparous females collected at the following localities:— Honshû—Inawashiro, Fukushima Pref. (ex *Artemisia princeps*); Ôsaka (ex *Artemisia* spp., R. Takahashi leg.); Wakayama & Tsubaki, Wakayama Pref. (ex *Artemisia* spp., R. Takahashi leg.). Shikoku—Shôdo-shima Isl., Kagawa Pref. (ex *Artemisia princeps*); Matsuyama, Ehime Pref. (ex *Artemisia* sp., H. Takada leg.). Kyûshû—Nagasaki (ex *Artemisia princeps*).

Host plants: *Artemisia* spp. (including *A. princeps*).

Distribution: Japan; Korea; China; Taiwan; Europe.

23. Genus ***Capitophorus*** van der Goot

Capitophorus van der Goot, 1913: 84 [type-species: *Aphis carduina* Walker, 1850].

Capitophorinus Börner, 1931: 129 [type-species: *Capitophorus similis* van der Goot, 1915; described as a subgenus of the genus *Capitophorus* van der Goot].

The members of this genus migrate from Elaeagnaceae to Polygonaceae or Compositae, some of them completing their life-cycles either on the primary or secondary hosts. In this study are recognized 6 species occurring in Japan, of which one is new to science.

Key to the species

1 Mesial setae on abdominal disc long and duplicated. 2
– Mesial setae on abdominal disc long or short, always simple. 3
2(1) Abdomen with pleural setae duplicated or triplicated and with marginal ones usually triplicated on anterior segments; mesial and pleural setae of each segment placed on a pale sclerotic band. Siphunculus cylindrical. Secondary host: *Artemisia*. . . . . 1. *C. formosartemisiae* (Takahashi)
– Abdomen with pleural setae simple and with marginal ones duplicated on anterior segments; mesial and pleural setae placed on pale round sclerites separately. Siphunculus slightly swollen apically. On *Polygonum*. . . . . 2. *C. eniwanus*, sp. n.
3(1) Prothorax with pleural and marginal setae much shorter than width of 3rd antennal segment. Siphunculus weakly swollen apically. Ultimate rostral segment 1.0–1.3 times as long as 2nd segment of hind tarsus. Secondary host: *Polygonum*. . . . . 3. *C. javanicus* Hille Ris Lambers
– Prothorax with pleural and marginal setae much longer than width of 3rd antennal segment. Siphunculus cylindrical. Ultimate rostral segment more than 1.4 times as long as 2nd segment of hind tarsus. 4
4(3) Abdomen with first 5 segments bearing minute setae; 6th segment with mesial setae in a single pair. Antenna with processus terminalis 5–6 times as long as basal part of 6th segment. Ultimate rostral segment with secondary setae shorter than half middle width of the segment. On *Cirsium*. . . . . 4. *C. montanus* Takahashi
– Abdomen with first 5 segments bearing long setae at least marginally; 6th segment with mesial setae duplicated. Antenna with processus terminalis usually more than 7 times as long as basal part of 6th segment. Ultimate rostral segment with secondary setae longer than half middle width of the segment. 5
5(4) Ultimate rostral segment not longer than basal part of 6th antennal segment. Abdomen with first 5 segments bearing marginal setae 2.0–2.8 times as long as middle width of 3rd antennal segment. On *Cirsium*. . . . . 5. *C. cirsiiphagus* Takahashi
– Ultimate rostral segment 1.2–1.5 times as long as basal part of 6th antennal segment. Abdomen with first 5 segments bearing marginal setae 1.1–2.0 times as long as middle width of 3rd antennal segment. Secondary hosts: *Cirsium*, *Breea*, *Hemistepta* & *Arctium*. . . . . 6. *C. elaeagni* (del Guercio)

1. ***Capitophorus formosartemisiae*** (Takahashi)

Myzus formosartemisiae Takahashi, 1921 b: 25.
Capitophorus formosartemisiae: Tao, 1963: 164 & 1966: 10; Takahashi, 1961 a: 2.

Specimens examined: A lot of apterous and some alate viviparous females have beem examined, their localities being as follows:— Hokkaidô—Sapporo & Wassamu (ex *Artemisia montana*). Honshû—Oirase, Aomori Pref. (ex *Artemisia princeps*); Koiwai, Iwate Pref. (ex *Artemisia princeps*); Tanzawa, Kanagawa Pref. (ex *Artemisia* sp., R. Takahashi leg.); Ôsaka (ex *Artemisia* sp., R. Takahashi leg.). Kyûshû—Beppu, Ôita Pref. (ex *Artemisia princeps*).

Host plants: *Artemisia* spp. (including *A. princeps* & *A. montana*).

Distribution: Japan; China; Taiwan.

2. ***Capitophorus eniwanus***, sp. n.

Apterous viviparous female. Body white or pale yellow in life. Eye black. Legs pale; tibiae at apex and tarsi black. Antenna, siphunculus and cauda pale. Body spindle-shaped, 2.0–2.1 mm. in length.

Head with dorsal setae about twice as long as middle width of 3rd antennal segment; antennal tubercle with an apical and a ventral setae. Antenna about as long as body; 1st segment with 2 or 3 long capitate setae at inner apex; 3rd segment imbricated, with thin, slightly capitate setae which are about 1/3 as long as middle width of the segment; processus terminalis 5.5–6.5 times as long as basal part of 6th; 3rd–6th segments as 43 : 30 : 28 : 13+73 in length. Clypeus with 4 setae anteriorly; mandibular lamina with 2–4 setae. Rostrum reaching hind coxa; ultimate segment slightly tapering, 2.9–3.4 times as long as wide, 1.5–1.7 times as long as 2nd segment of hind tarsus, much longer than basal part of 6th antennal segment, with 2 secondary setae which are longer than half middle width of the segment. Femora smooth or weakly imbricated apically; tibiae weakly imbricated at apex, with dorsal and lateral setae rather thin and mostly capitate, with ventral setae pointed, these setae being at most nearly as long as middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 3. Dorsal setae of body long and capitate, their arrangement being as follows:—mesonotum with single pairs of antero-mesial, postero-mesial, pleural and marginal setae; metanotum and first 5 abdominal segments with mesial setae duplicated or sometimes simple unilaterally, placed on pale round sclerites, with pleural setae in single pairs, and with marginal setae simple or duplicated; 6th abdominal segment with mesial setae duplicated or simple, usually without pleural setae; 7th with mesial setae duplicated or triplicated, without pleural setae, the marginal ones being thin and short; 8th with 4 or 5 long capitate setae on a pale, slightly tuberculate sclerite and with 2 or 3 shorter ones. Abdomen sometimes with small inconspicuous marginal tubercles on 2nd–4th segments. Genital plate with 6 or 7 setae along hind margin and a pair of setae anteriorly. Siphunculus faintly imbricated, swollen at apex, 17–19 times as long as wide at middle, 2.2–2.4 times as

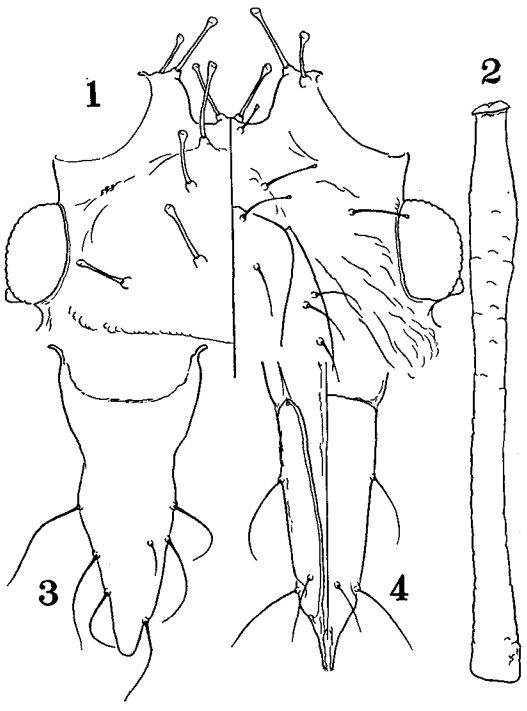

Fig. 16. *Capitophorus eniwanus*, sp. n. Apterous viviparous female:—
1, head; 2, siphunculus; 3, cauda; 4, ultimate rostral segment.

long as cauda, with a distinct flange. Cauda elongately conical, constricted at basal 1/3, about twice as long as wide, with 9 or 10 setae.

Measurements in mm. Body 2.0; antennal segments (1st-6th): 0.09, 0.06, 0.43, 0.30, 0.27, 0.12+0.78; ultimate rostral segment 0.17; hind femur 0.56; hind tibia 1.08; hind tarsus (2nd segment) 0.10; siphunculus 0.56; cauda 0.25; dorsal setae 0.033-0.070 on head, 0.040-0.060 on abdominal disc, 0.035-0.065 on 8th abdominal segment.

Specimens examined: Syntypes—4 apterous viviparous females, Mt. Eniwa, Hokkaidô, 1-vii-66, ex *Polygonum weirichii*, no. 1712.

Host plants: *Polygonum weirichii.*

Distribution: Japan.

This species resembles *C. horni* Börner from Europe in the dorsal chaetotaxy. Judging from the redescription of *C. horni* given by Hille Ris Lambers (1953), however, the present species is distinguished therefrom by the following points:—(1) Siphunculus swollen at apex (about cylindrical in *horni*). (2) Ultimate rostral segment 1.5-1.7 times as long as 2nd segment of hind tarsus (1.2-1.5 times so). (3) Abdomen with mesial setae duplicated or simple on 6th segment (triplicated); setae on 8th segment at most twice as long as middle width of 3rd antennal segment (3 times so). (4) Antenna with 1st segment bearing setae at most about as long as middle width of 3rd antennal segment (twice as long as that width).

3 ***Capitophorus javanicus*** Hille Ris Lambers

Capitophorus hippophaes javanicus Hille Ris Lambers, 1953: 156.
Capitophorus hippophaes javanicus: Takahashi, 1961a: 2; Paik, 1965: 57; Eastop, 1966: 434.
Capitophorus hippophaes var. *javanicus*: Tao, 1963: 164.
Capitophorus hippophaes: Shinji, 1941: 786 & 1944: 516; Tao, 1966: 12.

The specimens collected at Bifuka, Inawashiro and Ôizawa differ from others in the following points:—Mesial setae of 6th abdominal segment long like those of 7th and 8th abdominal segments (minute in other specimens). Longest seta on 1st antennal segment 15-23 μ in length (8-15, mostly about 10 μ). Siphunculus long and slender, 18-24 times as long as wide at middle, sometimes hardly swollen apically (13-19 times so).

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Polygonum longisetum*); Bifuka (ex *Polygonum* sp.). Honshû—Sukayu, Aomori Pref. (ex *Polygonum* sp.); Ôizawa, Yamagata Pref. (ex *Polygonum tinctorium*); Kawatabi, Miyagi Pref. (ex *Polygonum longisetum*); Ogose, Saitama Pref. (ex *Polygonum* sp.); Ôsaka (ex *Elaeagnus* sp. & *Polygonum* spp., R. Takahashi leg.); Gôkei, Okayama Pref. (ex *Elaeagnus* sp.). Kyûshû—Fukuoka (ex *Elaeagnus umbellata*); Kijima-kôgen, Ôita Pref. (ex *Elaeagnus umbellata*); Hyûga & Miyakonojô, Miyazaki Pref. (ex *Polygonum persicaria*); Kagoshima (ex *Polygonum senticosum*) & Nagasakibana (ex *Polygonum persicaria*), Kagoshima Pref.

Host plants: Primary hosts—*Elaeagnus* spp. (including *E. umbellata*). Secondary hosts—*Polygonum* spp. (including *P. persicaria, P. senticosum, P. longisetum* & *P. tinctorium*).

Distribution: Japan; Korea; China; India; Taiwan; Java; Australia; New Zealand.

This species very closely resembles *C. hippophaes* (Walker) from Europe and N. America, but differs in the absence of pleural setae on the 6th abdominal segment.

4. ***Capitophorus montanus*** Takahashi

Capitophorus sp., Takahashi, 1924: 34.
Capitophorus montanus Takahashi, 1931: 77.
Capitophorus montanus: Takahashi, 1961a: 2; Tao, 1963: 165 & 1966: 13.

Specimens examined: Some apterous viviparous females collected at Ichiu-mura, Tokushima Pref. (R. Takahashi leg.) and Takachiho, Miyazaki Pref. (ex *Cirsium japonicum*).

Host plants: *Cirsium japonicum*.
Distribution: Japan; Taiwan.

5. ***Capitophorus cirsiiphagus*** Takahashi

Capitophorus cirsiiphagus Takahashi, 1961a: 3.
Capitophorus cirsiiphagus: Paik, 1965: 56.

The specimens examined from Nikkô, Lake Kamakita and Takachiho slightly differ from the original description of *cirsiiphagus* in that the mesial setae of the 1st–5th abdominal segments are minute (in some specimens only a few of the mentioned setae are as long as the marginal ones).

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Nikkô, Tochigi Pref. (ex *Cirsium* sp., H. Higuchi leg.); Lake Kamakita, Saitama Pref. (ex *Cirsium* sp.); Chihaya (ex *Cirsium* sp., M. Sorin leg., syntypes of *C. cirsiiphagus* Takahashi), Mt. Iwawaki (ex *Cirsium* sp., R. Takahashi leg.) & Makiosan (ex *Cirsium* sp., M. Sorin leg.), Ôsaka Pref.; Nachi, Wakayama Pref. (ex *Cirsium* sp., R. Takahashi leg.). Kyûshû—Takachiho, Miyazaki Pref. (ex *Cirsium japonicum*).

Host plants: *Cirsium* spp. (including *C. japonicum*). Paik (1965) gives *Aster tataricus* var. *hortensis* as a host in Korea.
Distribution: Japan; Korea.

6. ***Capitophorus elaeagni*** (del Guercio)

Myzus elaeagni del Guercio, 1894: 189.
Capitophorus elaeagni: Hille Ris Lambers, 1953: 144; Cottier, 1953: 227; Eastop, 1958: 28 & 1966: 432; Takahashi, 1961a: 2; Tao, 1963: 165 & 1966: 9; Paik, 1965: 55.
Capitophorus elaeagni van der Goot, 1913: 84 & 145.
Myzus braggii Gillette, 1908: 17.
Capitophorus braggii: van der Goot, 1915: 119; Takahashi, 1924: 33; Hori, 1929: 82; Gillette et Palmer, 1934: 146; Shinji, 1941: 777; Palmer, 1952: 251.
Capitophorus arclifolii Shinji, 1924: 359.

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Breea setosa, Cirsium kamtschaticum* & *C. aomorense*). Honshû—Kawatabi, Miyagi Pref. (ex *Elaeagnus* sp.); Niigata (ex *Arctium lappa*, K. Shibata leg.); Utsunomiya, Tochigi Pref. (ex *Arctium lappa*, T. Tanaka leg.); Ôsaka (ex *Elaeagnus* sp., R. Takahashi leg.); Iwami, Tottori Pref. (ex *Cirsium* sp., M. Sorin leg.). Kyûshû—Fukuoka (ex *Elaeagnus umbellata*); Takachiho, Miyazaki Pref. (ex *Elaeagnus pungens* & *Cirsium japonicum*); Kagoshima (ex *Elaeagnus umbellata*); Manya, Amami-ôshima Isl. (ex *Hemistepta lyrata*).

Host plants: Primary hosts—*Elaeagnus* spp. (including *E. umbellata* & *E. pungens*). Secondary hosts—*Cirsium* spp. (including *C. japonicum, C. kamtschaticum* & *C. aomo-*

rense), *Breea setosa*, *Hemistepta lyrata* & *Arctium lappa*. It is known that this aphid infests *Elaeagnus* and *Hippophae* as primary hosts and the tubuliflorous Compositae such as *Cirsium*, *Carduus*, *Lappa* and *Cynara* as secondary hosts (in Europe, after Hille Ris Lambers, 1953).

Distribution: Cosmopolitan.

24. Genus ***Cryptomyzus*** Oestrund

Myzus van der Goot, 1913: 145, nec Passerini, 1860 [type-species: *Aphis ribis* Linné, 1758].
Cryptomyzus Oestrund, 1922: 139 [type-species: *Aphis ribis* Linné, 1758].

The species of this genus take Ribesiaceae as primary hosts and Labiatae as secondary hosts, some species being monoecious on the latter. In Japan has been known one species, *C. ribis* (L.), to occur on *Ribes* spp. In this paper another species, *C. taoi* Hille Ris Lambers, is added to the fauna of Japan for the first time.

Key to the Species

1 Antenna with 0–3 rhinaria confined to 3rd segment; setae on 3rd segment distinctly shorter than basal width of the segment. Ultimate rostral segment with 5–8 secondary setae. Siphunculus 2.5–2.8 times as long as cauda. Abdomen usually with pleural setae in single pairs on first 5 segments. On *Ribes*. . . . . 1. *C. ribis* (Linné)

– Antenna with 5–19 rhinaria on 3rd segment, sometimes with a few rhinaria also on 4th and 5th; setae on 3rd segment as long as or longer than basal width of the segment. Ultimate rostral segment with 9–13 secondary setae. Siphunculus 4.3–4.7 times as long as cauda. Abdomen usually with pleural setae duplicated or triplicated on first 5 segments. On *Lamium*. . . . . 2. *C. taoi* Hille Ris Lambers

1. ***Cryptomyzus ribis*** (Linné)

Aphis ribis Linné, 1758: 451.
Myzus ribis: Buckton, 1876: 180; van der Goot, 1915: 110.
Rhopalosiphum ribis: Matsumura, 1918: 13.
Capitophorus ribis: Theobald, 1926: 229; Hori, 1929: 85; Palmer, 1952: 268.
Cryptomyzus ribis: Hille Ris Lambers, 1953: 108.

Specimens examined: Some apterous viviparous females collected at Sarobetsu, Hokkaidô (ex *Ribes* sp., H. Torikura leg.).

Host plants: *Ribes* sp.; *Ribes grossularia* & *R. sativum* (after Hori, 1929). It is known in Europe that the species migrates between *Ribes* spp. and *Stachys* spp. (after Hille Ris Lambers, 1953).

Distribution: Japan; Europe; North America.

2. ***Cryptomyzus taoi*** Hille Ris Lambers

Capitophorus ribis: Tseng et Tao, 1936: 151.
Cryptomyzus taoi Hille Ris Lambers, 1965a: 199.
Cryptomyzus taoi Hille Ris Lambers, nom. nud., Tao, 1963: 165.

This species has hitherto been known only from China. The present material from Japan agree well with the original description of *C. taoi*.

Specimens examined: Some apterous viviparous females, Shimonoseki, Yamaguchi Pref., 7-v-66, ex *Lamium album* var. *barbatum*.

Host plants: *Lamium album* var. *barbatum* (in Japan). *Marrubium supinum* (in China, after Hille Ris Lambers, 1965).

Distribution: Japan; China.

25. Genus ***Myzaphis*** van der Goot

Myzaphis van der Goot, 1913: 96 [type-species: *Aphis rosarum* Kaltenbach, 1843].
Francoa del Guercio, 1917: 197 [type-species: (*Francoa elegans* del Guercio, 1917)=*Aphis rosarum* Kaltenbach, 1843].

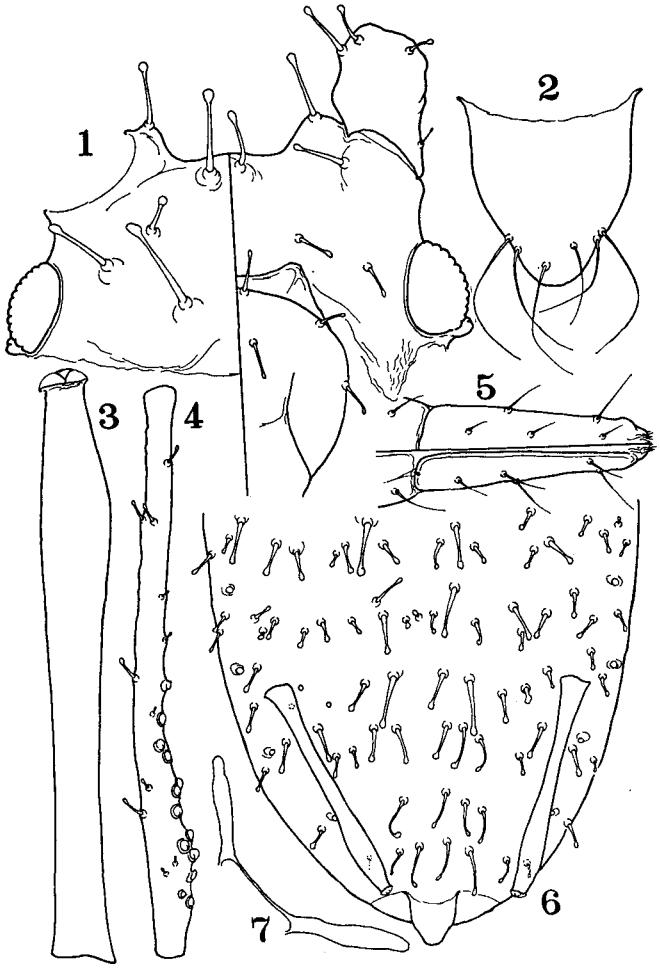

Fig. 17. *Cryptomyzus taoi* Hille Ris Lambers. Apterous viviparous female:—
1, head; 2, cauda; 3, siphunculus; 4, antenna (3rd segment);
5, ultimate rostral segment; 6, abdomen; 7, mesosternal furca.

The members of this small genus are associated with *Rosa* and *Potentilla*. In the course of the present study a species has been found from Japan for the first time.

1. ***Myzaphis rosarum*** (Kaltenbach)

Aphis rosarum Kaltenbach, 1843: 101.

Myzaphis rosarum: van der Goot, 1913: 96; Cottier, 1953: 141; Jacob, 1946: 110; Heinze, 1960: 801; Tao, 1963: 164 & 1966: 7; Richards, 1963: 682.

Francoa elegans del Guercio, 1917: 197.

The Japanese form slightly differs from the European one by the long cephalic setae, the length of which is as follows:—25–35 μ by anterior discal setae, and by setae on median and antennal tubercles, 13–20 μ by middle discal setae, and 9–10 μ by posterior discal setae.

Specimens examined: Some apterous viviparous females, Sapporo, Hokkaidô, 21-vi-68, ex *Potentilla fruticosa*.

Host plants: *Potentilla fruticosa*.

Distribution: Japan; China; Europe; North America; New Zealand.

On account of the long cephalic setae, the Japanese form resembles *M. bucktoni* Jacob from England, but may be differentiated therefrom by the median tubercle of the head bearing only 2 setae, by the abdomen wanting brown markings and by the siphunculus gently swollen apically.

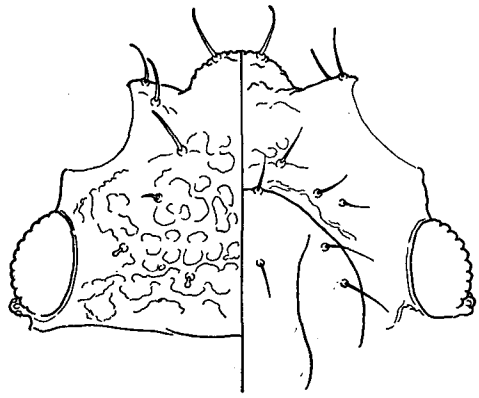

Fig. 18. *Myzaphis rosarum* (Kaltenbach). Head of apterous viviparous female

26. Genus ***Chaetosiphon*** Mordvilko

Chaetosiphon Mordvilko, 1914: 71 [type-species: *Capitophorus chaetosiphon* Nevsky, 1928, designated by Nevsky, 1929].

Pentatrichopus Börner, 1930: 140 [type-species: *Aphis tetrarhoda* Walker, 1849].

The members of this genus live on the plants of Rosaceae. In this paper are given 3 species, of which one is new to Japan.

Key to the species

1 Head with a rectangular median tubercle higher than antennal tubercles, with ventral setae not capitate. Antenna with processus terminalis at most about twice as long as basal part of 6th segment. . . . . 3. *C. coreanus* (Paik)

– Head with a rather inconspicuous median tubercle much lower than antennal tubercles, with ventral setae strongly capitate. Antenna with processus terminalis about 4 times as long as basal part of 6th segment. 2

2(1) Abdomen without pleural setae, with mesial and marginal setae often very short. . . . . 1. *C. minor* (Forbes)

– Abdomen with pleural setae, with mesial and marginal setae always long. . . . . 2. *C. fragaefolii* (Cockerell)

1. ***Chaetosiphon minor*** (Forbes)

Siphonophora minor Forbes, 1884: 101.

Capitophorus minor: Hottes et Frison, 1931: 284; Gillette et Palmer, 1934: 152; Moritsu, 1945: 9; Palmer, 1952: 263.

Pentatrichopus minor: Schaefers, 1960: 790.

Chaetosiphon minor: Richards, 1963: 692.

Capitophorus fragariae Shinji, 1924: 358.

Capitophorus fragarifoliae Shinji, 1941: 783.

Specimens examined: Some apterous viviparous females collected at Utsunomiya, Tochigi Pref. (ex *Fragaria ananassa*, T. Tanaka leg.).

Host plants: *Fragaria ananassa*. Richards (1963) gives *Rosa nitida* as well as *Fragaria* spp. as a host plant in Canada.

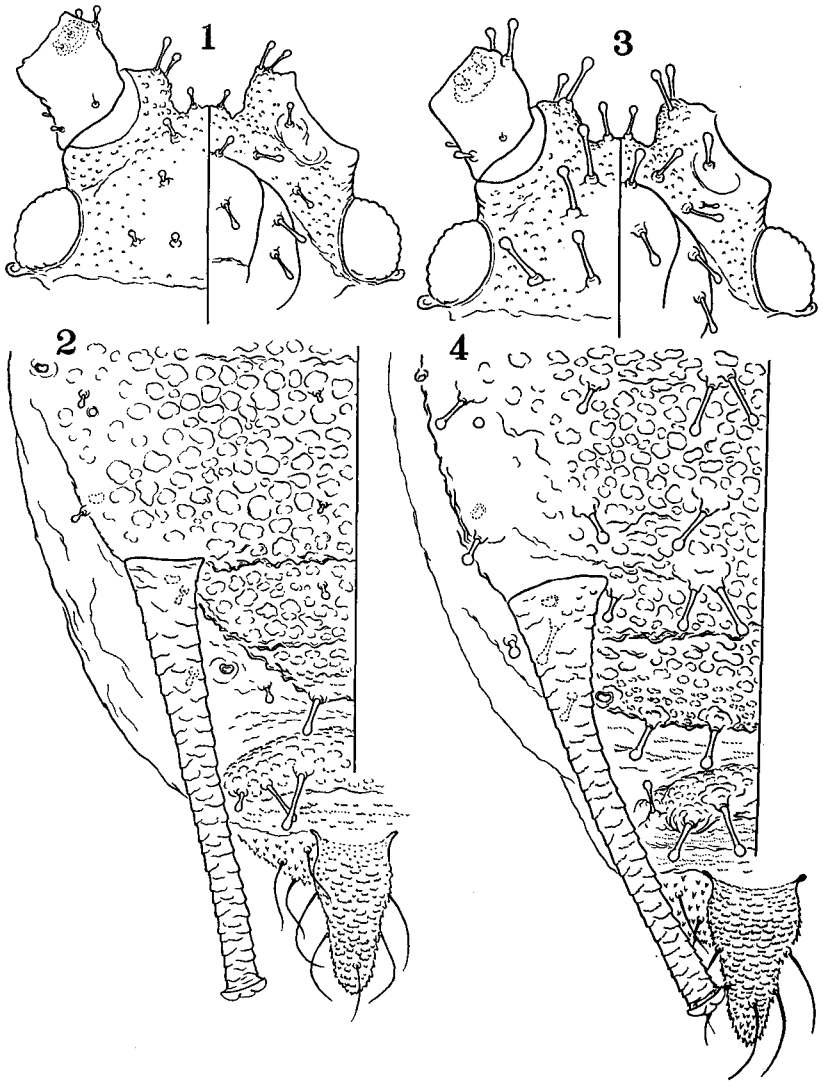

Fig. 19. *Chaetosiphon minor* (Forbes) (1 & 2) and *C. fragaefolii* (Cockerell) (3 & 4). Apterous viviparous female:— 1 & 3, head; 2 & 4, abdomen.

Distribution: Japan; North America.

2. ***Chaetosiphon fragaefolii*** (Cockerell)

Myzus fragaefolii Cockerell, 1901: 101.
Capitophorus fragaefolii: Palmer, 1952: 256.

Chaetosiphon (Pentatrichopus) fragaefolii: Hille Ris Lambers, 1953: 66.
Pentatrichopus fragaefolii: Schaefers, 1960: 783.
Chaetosiphon fragaefolii: Eastop, 1958: 31; Richards, 1963: 694.
Capitophorus fragariae Theobald, 1912: 223.
Pentatrichopus fragariae: Cottier, 1953: 131.

This species is new to Japan. It very closely resembles *C. minor* (Forbes), and yet it may be distinguished from the latter by the arrangement and length of the dorsal setae of the body as shown in the key and Fig. 19.

Specimens examined: An apterous viviparous female, Nikkô, Tochigi Pref., 13-ix-66, ex *Fragaria ananassa*, T. Tanaka leg.

Host plants: *Fragaria ananassa*. Furthermore, Richards (1963) gives *Rosa* spp. and *Potentilla anserina* as hosts in Canada.

Distribution: Cosmopolitan.

3. ***Chaetosiphon coreanus*** (Paik)

Pentatrichopus coreanus Paik, 1965: 126.
Chaetosiphon coreanus: Miyazaki, 1968b: 280.

Specimens examined: A lot of specimens including fundatrices, apterous & alate viviparous females and oviparous females collected at the following localities in Hokkaidô—Sapporo, Obihiro & Kunneppu.

Host plants: All the specimens examined were collected from *Rosa rugosa*. Furthermore, Paik (1965) records *Rosa polyantha* var. *genuina* as a host in Korea.

Distribution: Japan; Korea.

This species is characterized by the undeveloped antennal tubercles which are much lower than the produced median tubercle of the head. In this respect the species is alike the members of *Myzaphis*, but the abdomen always bears pleural setae which are long as well as mesial and marginal ones.

27. Genus ***Longicaudus*** van der Goot

Longicaudus van der Goot, 1913: 105 [type-species: *Aphis trirhoda* Walker, 1849].
Yezosiphum Matsumura, 1918: 7 [type-species: (*Yezosiphum thalictri* Matsumura, 1918)= *Aphis trirhoda* Walker, 1849].

1. ***Longicaudus trirhodus*** (Walker)

Aphis trirhoda Walker, 1849a: 45.
Hyalopterus trirhoda: Buckton, 1879: 114.
Semiaphis trirhodus: van der Goot, 1915: 272.
Longicaudus trirhodus: Theobald, 1927: 35; Heinze, 1960: 799; Doncaster, 1961: 138; Richards, 1963: 681; Tao, 1964a: 143.
Pergandeida trirhodus: Shinji, 1941: 651 & 1944: 498; Tao, 1962: 102; Paik, 1965: 109.
Longicaudus trirhodus japonicus Hille Ris Lambers, 1965a: 196. **Syn. n.**
Yezosiphum thalictri Matsumura, 1918: 7.
Aphis thalictrii Essig et Kuwana, 1918: 78.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Thalictrum aquilegifolium*). Honshû—Taishi (ex *Thalictrum* sp., R. Takahashi leg.) & Mt. Nijôsan (ex *Thalictrum minus* var. *hypoleucum*, M. Sorin leg.), Ôsaka Pref.; Wakayama (ex *Thalictrum minus* var. *hypoleucum*, R. Takahashi leg.). Shikoku—Kôchi (H. Takada leg.). Kyûshû—Nagasaki

(from cultivated rose). Many fundatrices collected at Sapporo (ex *Rosa rugosa*) and Nagasaki (from cultivated rose).

Host plants: Primary hosts—*Rosa rugosa* and cultivated roses. Secondary hosts—*Thalictrum* spp. (including *T. aquilegifolium* & *T. minus* var. *hypoleucum*). In Europe *Aquilegia* sp. is also recorded as a host (after Doncaster, 1961).

Distribution: Japan; Korea; China; Taiwan; Europe; North America.

Hille Ris Lambers (1965) has pointed out that the Japanese form of *trirhodus* Walker is different from the European one by the antenna with a rather long processus terminalis and by the abdomen of the alate viviparous female bearing disconnected bands dorsally. In the specimens examined, however, the alate viviparous female has on the abdominal disc a rectangular patch, though it is often irregularly perforated. The processus terminalis of the antenna is rather long also in the present specimens, i.e. 1.4–1.7 times as long as the basal part of the 6th antennal segment in the apterous viviparous female, 1.4–2.1 times so in the alate viviparous female.

28. Genus ***Matsumuraja*** Schumacher

Acanthaphis Matsumura, 1918: 15, nec del Guercio, 1900 [type-species: *Acanthaphis rubi* Matsumura, 1918].

Matsumuraja Schumacher, 1921: 186 [type-species: *Acanthaphis rubi* Matsumura, 1918].

Neophorodon Takahashi, 1922: 204 [type-species: (*Neophorodon rubi* Takahashi, 1922, nec *Acanthaphis rubi* Matsumura, 1918)=*Matsumuraja rubifoliae* Takahashi, 1931].

Of the genus about 10 species have been described from South-East Asia. The species are associated with *Rubus*; only one species, *M. rubifoliae* Takahashi, is known to migrate between *Clethra* and *Rubus*. In the course of the present study have been known to occur in Japan 7 species, of which one is new to science.

Key to the species

1 Abdomen with 2 rows of long mesial processes, of which the longer ones are as long as 4th antennal segment. . . . . 1. *M. rubi* (Matsumura)

– Abdomen with or without mesial processes, if any they are much shorter than 4th antennal segment. 2

2(1) First antennal segment strongly angulated at inner apex, without a finger-like projection. . . . . 3. *M. sorini* Takahashi

– First antennal segment with a more or less distinct finger-like projection. 3

3(2) Abdomen with 1st–5th segments bearing long mesial setae. 4

– Abdomen with 1st–5th segments bearing minute mesial setae. 6

4(3) Antenna 5-segmented, pale, 4/5 as long as body. First antennal segment with a projection shorter than half length of the segment. Siphunculus thin, cylindrical, strongly broadened at base. . . . . 2. *M. rubea* Sorin

– Antenna 6-segmented, if 5-segmented then black apically and shorter than 4/5 of body length. First antennal segment with a projection longer than half length of the segment. Siphunculus subcylindrical or swollen. 5

5(4) Abdomen with 2nd–4th segments each bearing 8–11 setae. Antenna with 3rd segment bearing setae longer than middle width of the segment. Hind tibia without sound pegs. . . . . 4. *M. taisetsusana*, sp. n.

– Abdomen with 2nd–4th segments each bearing 4–6 setae. Antenna with 3rd segment bearing setae shorter than middle width of the segment. Hind tibia with sound pegs. . . . . 5. *M. rubifoliae* Takahashi (part., see 7)

6(3) Antenna pale or faintly pigmented on 3rd–5th segments apically. Abdomen with 6th segment usually bearing minute setae. . . . . 7. *M. nuditerga* Hille Ris Lambers
– Antenna usually heavily pigmented on 3rd–5th segments apically. Abdomen with 6th segment usually bearing long setae. 7
7(6) Marginal setae of anterior abdominal segments as long as or longer than width of 3rd antennal segment. Antenna often 5-segmented; 1st segment with a finger-like projection usually shorter than the segment. . . . . 5. *M. rubifoliae* Takahashi (part., see 5)
– Marginal setae of anterior abdominal segments shorter than width of 3rd antennal segment. Antenna 6-segmented; 1st segment with a finger-like projection usually longer than the segment. . . . . 6. *M. rubiphila* Takahashi

1. ***Matsumuraja rubi*** (Matsumura)

Acanthaphis rubi Matsumura, 1918: 16.
Matsumuraja rubi: Schumacher, 1921: 186; Takahashi et Sorin, 1965: 56.
Matsumuraja ribi: Shinji, 1941: 888.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Sôbetsu (ex *Rubus idaeus* var. *aculeatissimus*). Honshû—Mt. Kongô, Ôsaka Pref. (ex *Rubus* sp., M. Sorin leg.); Mt. Rokkô, Hyôgo Pref. (ex *Rubus* spp., R. Takahashi leg.).

Host plants: *Rubus* spp. (including *R. idaeus* var. *aculeatissimus*).
Distribution: Japan.

2. ***Matsumuraja rubea*** Sorin

Matsumuraja rubea Sorin in Takahashi et Sorin, 1965: 56.

Specimens examined: No representatives of the species have been available to the present study.

Host plants: *Rubus* sp. (after Takahashi et Sorin, 1965).
Distribution: Japan.

3. ***Matsumuraja sorini*** Takahashi

Matsumuraja sorini Takahashi in Takahashi et Sorin, 1965: 52.

Specimens examined: Some apterous viviparous females collected at Oda, Mie Pref. (ex *Rubus peltatus*, M. Sorin leg., syntypes of *M. sorini* Takahashi).

Host plants: *Rubus peltatus*.
Distribution: Japan.

4. ***Matsumuraja taisetsusana***, sp. n.

Apterous viviparous female. Body pale yellow in life. Eye blackish brown. Antenna pale; 3rd–5th segments at apex and 6th dusky. Legs pale; tibiae at apex and tarsi dark. Siphunculus pale, dusky apically. Cauda pale. Body 1.6–1.9 mm. in length.

Head with strong spinules on dorsum marginally and over venter, with long capitate setae dorsally, the longest seta being 1.8–2.8 times as long as middle width of 3rd antennal segment. Antennal tubercle high, with 2 apical and 2 or 3 mid-ventral setae. Antenna 6-, rarely 5-segmented, 1/2–3/5 as long as body, smooth on first 4 or 5 segments; finger-like projection of 1st segment 4/7–5/7 as long as the segment, rectangular at apex, with 3 long capitate setae; 3rd segment with long capitate setae, of which the longest one is 1.0–2.0 times as long as middle width of the segment; processus terminalis about 2–3 times as long as basal part of 6th; length of

3rd–6th as 24 : 16 : 17 : 10+29. Mandibular lamina smooth, with 1–3, mostly 2 setae. Rostrum just passing middle coxa or nearly attaining hind coxa; ultimate segment about 3 times as long as wide, 1.1–1.3 times as long as 2nd segment of hind tarsus, with 2 secondary setae, with ventral pair of primary setae much removed based. Femora with dorsal setae spatulate, and with ventral ones pointed, the longest seta being 1/2–2/3 as long as middle width of hind femur. Hind tibia with dorso-basal setae stout and capitate, 1.0–1.5 times as long as middle width of the tibia, and with apical setae pointed, mostly shorter than basal ones. Tarsi with 2nd segment bearing 2

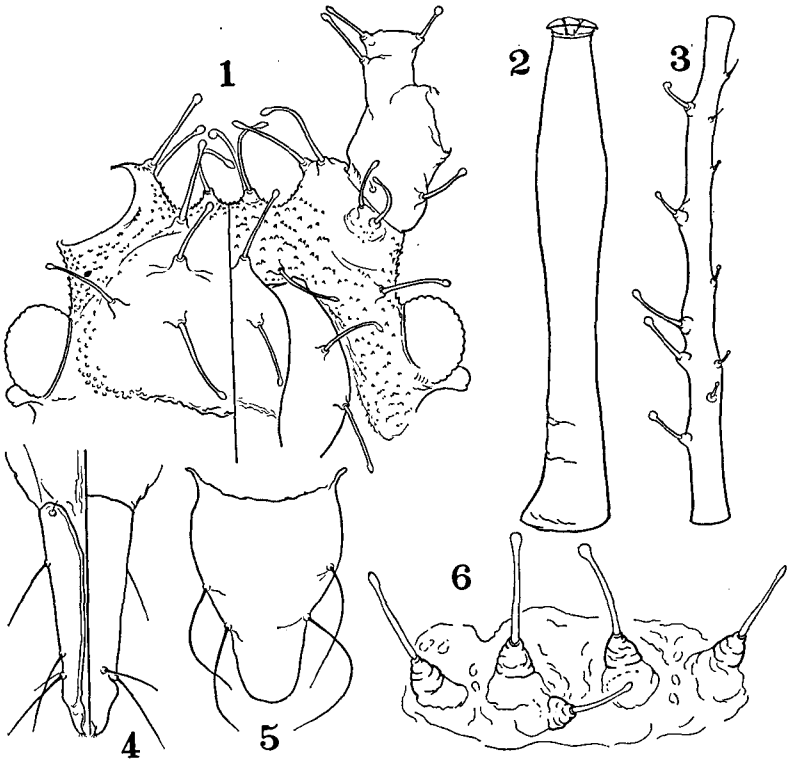

Fig. 20. *Matsumuraja taisetsusana*, sp. n. Apterous viviparous female:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, ultimate rostral segment (right, dorsal surface; left, ventral surface); 5, cauda; 6, dorsal setae of abdomen (mesial group of 3rd abdominal tergite).

dorsal and 2 ventral secondary setae; first tarsal chaetotaxy 3 : 3 : 2, rarely 3 : 3 : 3. Abdominal tergum papillated, with long capitate setae growing from small tubercles on pale, somewhat protuberant sclerites, without marginal tubercles; anterior 4 segments each with 8–11 (mostly 9 or 10) setae, of which the longest one is 2.0–3.5 times as long as middle width of 3rd antennal segment; 5th with 7 or 8 setae; 6th with 6 or 7 setae between siphunculi; 7th with 6, rarely 8 setae; 8th with 6–9 setae. Genital plate with 6–10 setae along hind margin and 3 or 4 setae anteriorly. Siphunculus swollen, smooth or weakly imbricated basally, 9–12 times as long as its smallest width, about 3.0–3.5

times as long as cauda. Cauda constricted at extreme base, with 4 setae.

Measurements in mm. Body 1.9; antennal segments (1st-6th): 0.08, 0.06, 0.27, 0.17, 0.20, 0.09+0.25; ultimate rostral segment 0.11; hind femur 0.54; hind tibia 0.91; hind tarsus (2nd segment) 0.09; siphunculus 0.39; cauda 0.12; longest dorsal seta on head 0.055, that on abdominal disc 0.060.

Specimens examined: Syntypes—11 apterous viviparous females, Mt. Taisetsu (Yukomambetsu), Hokkaidô, 30-vii-67, ex *Rubus idaeus* var. *aculeatissimus*, no. 2218. Some apterous viviparous females have also been collected at Kamikôchi, Nagano Pref. (26-viii-67, H. Higuchi leg.).

Host plants: *Rubus idaeus* var. *aculeatissimus*.

Distribution: Japan.

The new species is related to *M. rubea* Sorin in the setal pattern on the abdomen, but differs therefrom by the antenna usually 6-segmented, by the 1st antennal segment bearing a much longer projection, by the smooth, swollen siphunculus and by the 6th abdominal segment bearing more (6 or 7) setae.

5. ***Matsumuraja rubifoliae*** Takahashi

Neophorodon rubi Takahashi, 1922: 204, nec *Acanthaphis rubi* Matsumura, 1918.
Neophorodon rubi: Takahashi, 1923: 17 & 84 and 1924: 35 & 105.
Matsumuraja rubifoliae Takahashi, 1931: 78.
Matsumuraja rubifoliae: Moritsu, 1957: 634; Takahashi, 1959: 55; Tao, 1963: 163 & 1966: 5; Takahashi et Sorin, 1965: 53.

Specimens examined: A lot of apterous and some alate viviparous females collected at the following localities:— Honshû—Tôkyô (ex *Rubus* spp., R. Takahashi leg.); Moroyama, Saitama Pref. (ex *Rubus hirsutus*); Amanosan (ex *Rubus hirsutus*, R. Takahashi leg.), Mt. Kongô (ex *Rubus* sp., R. Takahashi leg.) & Chihaya (ex *Rubus* sp., R. Takahashi leg.), Ôsaka Pref.; Iwakuni, Yamaguchi Pref. (ex *Rubus hirsutus*). Kyûshû—Takasakiyama, Ôita Pref. (ex *Rubus hirsutus*); Atetsu, Amami-ôshima Isl. (ex *Rubus rosaefolius* var. *maximowiczii*). Some fundatrices collected at Amanosan, Ôsaka Pref. (ex *Clethra barbinervis*, R. Takahashi leg.) and Mt. Rokkô, Hyôgo Pref. (ex *Clethra barbinervis*, M. Sorin leg.).

Host plants: Primary hosts—*Clethra barbinervis*. Secondary hosts—*Rubus* spp. (including *R. hirsutus*, *R. palmatus* & *R. rosaefolius* var. *maximowiczii*.)

Distribution: Japan; China; Taiwan.

6. ***Matsumuraja rubiphila*** Takahashi

Matsumuraja rubiphila Takahashi in Takahashi et Sorin, 1965: 55.

Specimens examined: Many apterous and some alate viviparous females have been examined, their localities being as follows:— Honshû—Mikuni, Niigata Pref. (H. Higuchi leg.); Suganuma, Tochigi Pref. (H. Higuchi leg.); Mt. Takao, Tôkyô Distr. (ex *Rubus* sp., R. Takahashi leg.); Mt. Ômine (ex *Rubus palmatus*, M. Sorin leg.), Amanosan (ex *Rubus* sp., R. Takahashi leg.) & Yokoyama-mura (ex *Rubus* sp., M. Sorin leg.), Ôsaka Pref.

Host plants: *Rubus* spp. (including *R. palmatus*).

Distribution: Japan.

7. ***Matsumuraja nuditerga*** Hille Ris Lambers

Matsumuraja nuditerga Hille Ris Lambers, 1965a: 201.
Matsumuraja rubifoliae Takahashi, form: Takahashi et Sorin, 1965: 53.

Specimens examined: Some apterous viviparous females collected at the following localities:— Honshû—Chihaya (ex *Rubus* sp., M. Sorin leg.) & Kobuka (ex *Rubus palmatus*, M. Sorin leg.), Ôsaka Pref.; Mt. Maya, Hyôgo Pref. (ex *Rubus* sp., M. Sorin leg.).

Host plants: *Rubus* spp. (including *R. palmatus*).
Distribution: Japan.

29. Genus ***Vesiculaphis*** del Guercio

Vesiculaphis del Guercio, 1911b: 463 [type-species: *Toxoptera caricis* Fullaway, 1910].
Trilobaphis Theobald, 1922: 137 [type-species: (*Trilobaphis caricis* Theobald, 1922, nec *Toxoptera caricis* Fullaway, 1910)= *Vesiculaphis theobaldi* Takahashi, 1930].

This genus consists of 7 described species, 6 from South-East Asia and 1 from Europe. So far as the biology is known, the species of this genus take Ericaceae (*Rhododendron* & *Pieris*) as primary hosts and Cyperaceae (*Carex* & *Cyperus*) as secondary hosts. In Japan are known to occur 3 species, of which one is described here as a new species.

Key to the species

Apterous alienicolae

1 Front of head strongly produced forward into a ledge, extending out beyond apex of 1st antennal segment; median projection hardly developed. Antenna with 1st segment not produced at inner apex. . . . . 1. *V. caricis* (Fullaway)
– Front of head not produced, much lower than apex of 1st antennal segment; rectangular median projection well developed. Antenna with 1st segment produced at inner apex. . . . . 2. *V. cephalata*, sp. n.

Alate fundatrigeniae

1 Antenna with 3rd segment usually smooth, bearing about 30–45 rhinaria. Abdomen without dorsal bands on anterior segments; 8th tergite protuberant postero-mesially. Fore wing with media once branched. . . . . 1. *V. caricis* (Fullaway)
– Antenna with 3rd segment distinctly imbricated, bearing about 20–25 rhinaria. Abdomen with dorsal bands on 3rd–5th segments; 8th tergite hardly protuberant postero-mesially. Fore wing with media twice branched. . . . . 3. *V. kongoensis* Takahashi

1. ***Vesiculaphis caricis*** (Fullaway)

Toxoptera caricis Fullaway, 1910: 32.
Vesiculaphis caricis: del Guercio, 1911b: 464; Takahashi, 1921b: 30; Shinji, 1941: 695; Tao, 1962: 100 & 1964a: 128.
Toxoptera rhododendroni Uye, 1923: 3.
Toxoptera shichito Uye, 1923: 3.

Fundatrix. Body in life yellowish green with a brownish tinge, or dark reddish brown. Eye, siphunculus and cauda black. Antenna and legs pale, black apically. Body hemispheric, 1.6–2.0 mm. in length.

Head corrugated dorsally, spinulated ventrally, tuberculate before eyes; front

straight to very shallowly W-shaped, a little produced forward, not surpassing apex of 1st antennal segment. Antenna 5- or 6-segmented, 1/3–2/5 of body length; 1st segment imbricated with spinules, roundly angulated at inner apex, the joint to 2nd segment slanting; 3rd nearly smooth, with a few minute setae; processus terminalis as long as or slightly shorter than basal part of terminal segment; length of 3rd and following segments as 18 : 8 : 8 : 9+8 by 6-segmented antenna, 21 : 9 : 9+8 by 5-segmented antenna. Clypeus with a few spinules and 3–5 setae anteriorly; mandibular lamina spinulous, with 1 or sometimes 2 setae. Rostrum reaching middle coxa; ulti-

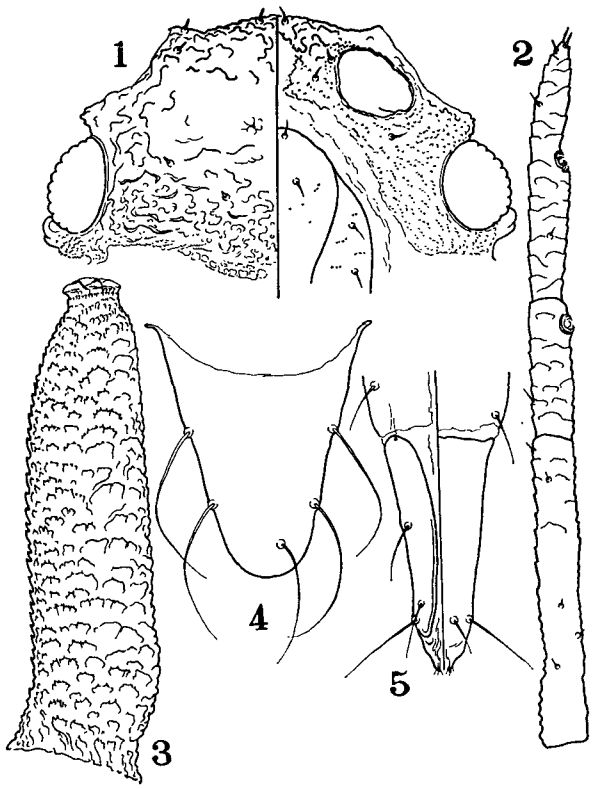

Fig. 21. *Vesiculaphis caricis* (Fullaway). Fundatrix :— 1, head; 2, antenna (3rd–5th segments); 3, siphunculus; 4, cauda; 5, ultimate rostral segment.

mate segment 1.5–1.7 times as long as 2nd segment of hind tarsus, with 2–4 secondary setae. Tibiae scabrously imbricated at apex, with dorsal setae minute and blunt, with ventral setae pointed and much shorter than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 2. Abdominal tergum sclerotic, coarse with ridged wrinkles or imbrications, with minute setae; distance between 6th and 7th spiracles distinctly shorter than that between 5th and 6th; 8th tergite free, roundly triangular, with about 8 setae, the posterior angle weakly protruding. Siphunculus stout, usually bent inward, constricted at extreme base, strongly attenuated at apex, smooth or wrinkled dorso-basally,

heavily imbricated ventrally, the imbrications being large on outer side and fine on inner side, 3–4 times as long as wide at middle, 2.5–3.0 times as long as cauda, with a small but distinct flange. Cauda conical or attenuated at middle, blunt at apex, with 5–7 setae.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.06, 0.05, 0.17, 0.08, 0.09, 0.09+0.08; ultimate rostral segment 0.12; siphunculus 0.37; cauda 0.12; dorsal setae on head about 0.006, that on 8th abdominal segment about 0.014.

Specimens examined: A lot of fundatrices, Tôkyô, 6-iv-67; Kyôto, 28-iv-66, H. Takada leg.; Ôsaka, 14-iv-65, R. Takahashi leg.; Okutsu, Okayama Pref., 22-iv-66; Fukuoka, 16-iv-65. Some alate viviparous females collected at Tôkyô and Miyakonojô & Udo, Miyazaki Pref.

Host plants: All the specimens examined were collected from *Rhododendron* spp. Takahashi (1921) gives *Cyperus rotundus* as a host in Taiwan.

Distribution: Japan; Taiwan; Hawaii.

2. ***Vesiculaphis cephalata***, sp. n.

Apterous viviparous female. Body dull yellow in life. Eye black. Antenna pale. Legs pale; tarsi slightly dusky. Siphunculus slightly dusky. Cauda pale. Body flat, elongately oval, 2.0–2.3 mm. in length.

Head granulated over dorsum and on venter antero-mesially and postero-laterally, without spinules ventrally; front not ledged, with 3 projections, of which the lateral ones are finger-like, with 1 or 2 setae apically, and the median one is nearly rectangular, with 3 or 4 setae; dorsal setae minute, 4 or 5 in number, arranged posteriorly, the anterior discal setae being effaced; ventral setae long and pointed, the longest one being longer than middle width of 3rd antennal segment; lateral tubercle before eye conspicuous. Antenna 6- sometimes 5-segmented, about 1/3 as long as body; 1st segment smooth, strongly produced at inner apex, with 5–7 short pointed setae, the joint to 2nd segment slanting; 3rd smooth, with setae 1/4–1/3 as long as middle width of the segment; processus terminalis 1.0–1.1 times as long as basal part of terminal segment; length of 3rd and following segments as 20 : 12 : 10 : 9+9 by 6-segmented antenna, 29 : 10 : 8+9 in 5-segmented antenna. Clypeus smooth, with 4 slender setae anteriorly; mandibular lamina smooth, with 1 or 2 setae. Rostrum short, reaching between fore and middle coxae; ultimate segment obtuse, about 1.5 times as long as wide, as long as 2nd segment of hind tarsus, with 0–2 secondary setae. Legs short and stout; femora smooth; tibiae with a few spinules at apex, with pointed setae 2/3 as long as middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 2. In larva hind tibia densely spinulous. Mesosternal furca sessile, with arms separated from each other. Prothorax wholly and meso- and metathorax laterally sclerotized and granulated; the remaining part of thorax and anterior part of abdomen less sclerotized, smooth or wrinkled. Abdomen with minute dorsal setae, without marginal tubercles; 2nd–5th tergites each with 4–7 setae in addition to marginal ones; 5th sternite with spinulated area mesially to spiracles; 6th segment with spiracles closely placed to those of 7th, with 2 dorsal setae between siphunculi; 8th tergite sclerotic, semicircular, defined from foregoing tergites which are consolidated, scabrous along margin, with 4 setae. Siphunculus weakly curved in an S-shape, stout, cylindrical, strongly attenuated toward apex on apical 1/3, smooth dorsally, strongly scabrous ventrally, 5–6 times as long as wide at middle, a little shorter than head width across eyes, with a distinct flange.

Cauda about 1/3 as long as siphunculus, with 4 setae.

Measurements in mm. Body 2.0; antennal segments (1st–6th): 0.09, 0.06, 0.19, 0.10, 0.09, 0.08+0.09; ultimate rostral segment 0.08; hind femur 0.39; hind tibia 0.59; hind tarsus (2nd segment) 0.08; siphunculus 0.47; cauda 0.14; longest dorsal seta on head 0.006, that on 8th abdominal segment 0.018.

Specimens examined: Syntypes—18 apterous viviparous females, Sapporo, Hokkaidô, 27-vi-68 (no. 2496), 21-vii-68 (no. 2517) & 4-viii-68 (no. 2524).

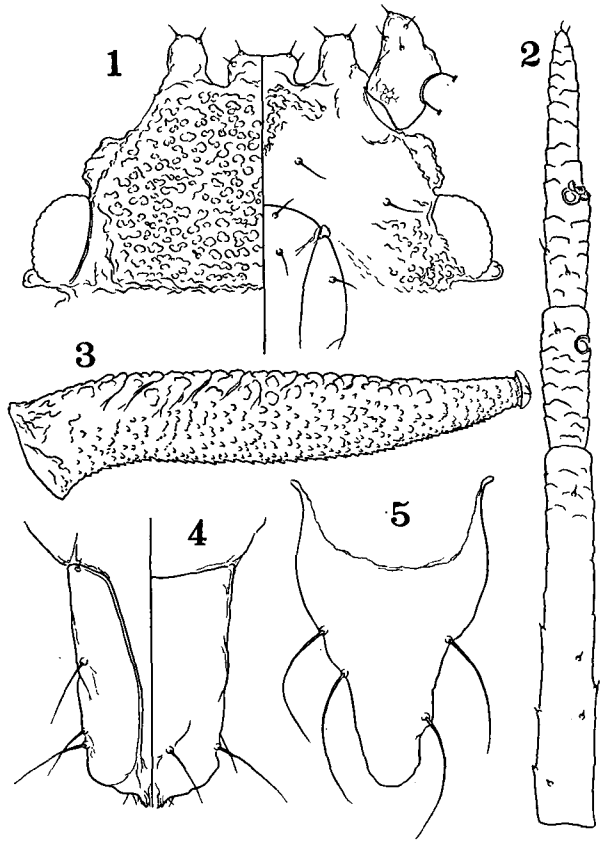

Fig. 22. *Vesiculaphis cephalata*, sp. n. Apterous viviparous female:—
1, head; 2, antenna (3rd–5th segments); 3, siphunculus;
4, ultimate rostral segment; 5, cauda.

Host plants: All the specimens examined were collected from *Carex* sp.

Distribution: Japan.

This species is closely related to *V. theobaldi* Takahashi from Europe, and yet it may be distinguished from the latter by the following characters:—(1) Head without spinules ventrally (with distinct spinules in *theobaldi*). (2) Ultimate rostral segment about as long as 2nd segment of hind tarsus (a little longer than that segment). (3) Antenna with 1st segment more strongly produced at inner apex than in *theobaldi*. From *V. congoensis* Takahashi this species may be differentiated by the alatoid nymph,

of which the head lacks spinules ventrally (densely spinulous ventrally in *congoensis*).

3. ***Vesiculaphis congoensis*** Takahashi

Vesiculaphis congoensis Takahashi, 1965c: 47.

Specimens examined: Some alate viviparous females collected at Mt. Kongô, Ôsaka Pref. (ex *Rhododendron* sp., R. Takahashi leg., syntypes of *V. congoensis* Takahashi).

Host plants: *Rhododendron* sp.

Distribution: Japan.

30. Genus ***Akkaia*** Takahashi

Akkaia Takahashi, 1919: 439 [type-species: *Akkaia polygoni* Takahashi, 1919].

This is a peculiar genus closely related to *Vesiculaphis* del Guercio, from which it differs by the shape of the antennal tubercles, cauda and spiracles. The genus consists of 4 species described from South-East Asia. So far as their habits are known, the species of this genus migrate from Ericaceae to Polygonaceae.

Key to the species

1 Head papillated dorsally except on anterior marginal area; antennal tubercle with a projection nearly reaching apex of 1st antennal segment. Siphunculus nearly as long as head width across eyes, tapering and slightly bent outward on apical half, with a small flange. . . . . 1. *A. polygoni* Takahashi

– Head weakly papillated dorsally on posterior half only; antennal tubercle with a projection only reaching mid-length of 1st antennal segment. Siphunculus shorter than head width across eyes, more abruptly attenuated on apical 1/3, not or hardly bent outward, with a developed flange. . . . . 2. *A. odaiensis* Takahashi

1. ***Akkaia polygoni*** Takahashi

Akkaia polygoni Takahashi, 1919: 440.

Akkaia polygoni: Takahashi, 1923: 58 & 1961c: 13; Shinji, 1941: 724; Tao, 1963: 166 & 1966: 17.

Phorodon enkianthai Shinji, 1923: 306.

Cavariella enkianthae Shinji, 1924: 356.

Siphonoeoryne polygoni Shinji, 1922: 793. **Syn. n.**

Fundatrix. Body in life reddish brown, yellowish brown or dull yellowish green. Antenna yellowish brown, dark apically. Legs yellowish brown; tibiae at apex and tarsi black. Siphunculus and cauda dark brown.

Head strongly corrugated over dorsum and venter, with minute setae; antennal tubercle low, only slightly protuberant at inner apex. Antenna scabrous, 4- or 5-segmented, 1/4–2/7 as long as body; 1st segment without a projection at inner apex; processus terminalis as long as or shorter than basal part of terminal segment. Rostrum reaching middle coxa; ultimate segment about as long as 2nd segment of hind tarsus, slightly concave laterally, with 2 secondary setae. Hind tibia scabrous apically, conspicuously gibbous at apex dorsally, with short, sparse setae at most 3/5 as long as middle width of hind tibia. First tarsal chaetotaxy 3 : 2 : 2. Abdominal tergum wrinkled, pale on anterior segments, pigmented on 5th–7th segments, with a few minute setae; spiracles on anterior segments not reduced, those on 1st and 2nd

segments being placed with some distance from each other; 7th tergite with a pair of setae, without a distinct protuberance; 8th with a median tubercle broadly conical, bearing 2 setae at apex. Siphunculus straight, stout, heavily imbricated, slightly tapering toward apex, attenuated at tip, about 5 times as long as wide at middle, about 2.5 times as long as cauda, with a small flange. Cauda more or less alike in shape to that of apterous viviparous female, sometimes tongue-shaped, with 5–7 setae.

Measurements in mm. Body 2.5; antennal segments (1st–5th): 0.09, 0.06, 0.29, 0.10, 0.09+0.07; ultimate rostral segment 0.11; hind femur 0.52; hind tibia 0.88; hind tarsus (2nd segment) 0.11; siphunculus 0.48; cauda 0.18; dorsal setae on head and on abdominal disc about 0.005, those on 8th abdominal segment 0.011.

Larva of fundatrigenia green in life, with hind tibia densely spinulous. In alate fundatrigenia antenna with fewer rhinaria than in alate gynopara (26–35 secondary rhinaria on 3rd segment, 12–16 on 4th and 0–2 on 5th).

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 16-v-67 & 1-vi-68, ex *Enkianthus campanulatus*. A lot of apterous and some alate viviparous females have also been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Enkianthus campanulatus*, *Pieris japonica* & *Polygonum thunbergii*). Honshû—Ôizawa, Yamagata Pref. (ex *Polygonum thunbergii*); Kawatabi, Miyagi Pref. (ex *Polygonum thunbergii*); Toyama (ex *Enkianthus* sp., S. Takagi leg.); Kuroyama, Saitama Pref. (ex *Polygonum thunbergii*); Tôkyô (ex *Polygonum thunbergii* & *Enkianthus* sp., R. Takahashi leg.); Hirayu, Gifu Pref. (ex *Polygonum* sp., R. Takahashi leg.); Ôsaka (ex *Polygonum thunbergii*, R. Takahashi leg.). Kyûshû—Sata, Kagoshima Pref. (ex *Polygonum thunbergii*).

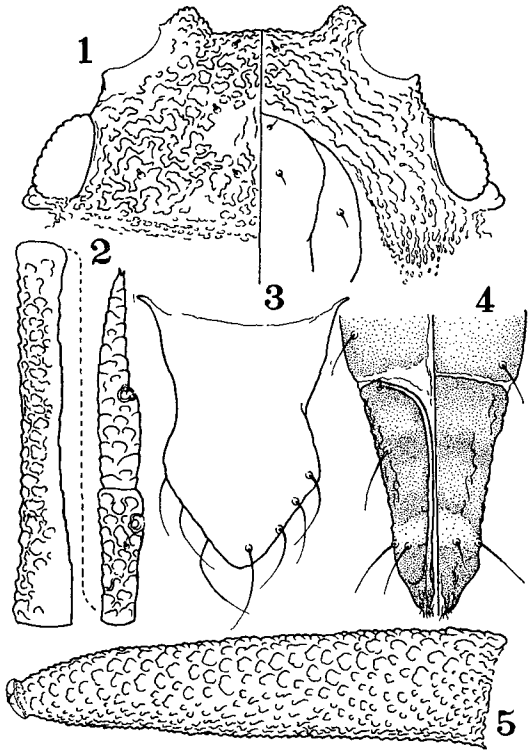

Fig. 23. *Akkaia polygoni* Takahashi. Fundatrix:— 1, head; 2, antenna (3rd–5th segments); 3, cauda; 4, ultimate rostral segment; 5, siphunculus.

Host plants: Primary hosts—*Enkianthus* spp. (including *E. campanulatus*) & *Pieris japonica*. Secondary hosts—*Polygonum* spp. (including *P. thunbergii*).

Distribution: Japan; China.

The original description of *Siphonoeoryne polygoni* Shinji agrees enough with the present specimens of *Akkaia polygoni* Takahashi except that the 4th antennal segment is shorter than the 5th (in the alate viviparous female).

2. ***Akkaia odaiensis*** Takahashi

Akkaia odaiensis Takahashi, 1961c: 11.

Specimens examined: Some apterous viviparous females collected at Ôdaigahara, Nara Pref. (ex *Polygonum thunbergii*, M. Sorin leg., syntypes of *A. odaiensis* Takahashi).

Host plants: *Polygonum thunbergii*.

Distribution: Japan.

Species of *Akkaia* not included in the key

3. ***Akkaia taiwana*** Takahashi

Akkaia taiwana Takahashi, 1933: 297.
Akkaia taiwana: Takahashi, 1961c: 14; Tao, 1963: 166 & 1966: 17.
Akkaia kagoshimana Suenaga, 1934: 11.

Host plants: *Polygonum thunbergii* (after Suenaga, 1934).

Distribution: Japan; China; Taiwan.

As I have seen no representatives of this species, it is excluded from the key. Judging from the original description, this species may be distinguished from *A. polygoni* Takahashi and *A. odaiensis* Takahashi by the following characters of the apterous viviparous female:—(1) Siphunculus black, gradually and slightly tapering, not distinctly attenuated apically. (2) Antennal tubercle with a straight projection. (3) Abdomen with 7th and 8th tergites wanting tubercles. (4) Antenna with processus terminalis about twice as long as basal part of terminal segment.

31. Genus ***Tuberocephalus*** Shinji

Tuberocephalus Shinji, 1929a: 39 [type-species: *Tuberocephalus artemisiae* Shinji, 1929].

Tuberocephalus Shinji, 1930a: 189 [type-species: (*Tuberocephalus artemisiae* Shinji, 1930)= *T. artemisiae* Shinji, 1929].

Trichosiphoniella Shinji, 1929a: 46 [type-species: (*Aphis spinosula* Essig et Kuwana, 1918)= *Myzus sakurae* Matsumura, 1917]. **Syn. n.**

Trichosiphoniella Shinji, 1930a: 188 [type-species: (*Aphis spinosula* Essig et Kuwana, 1918)= *Myzus sakurae* Matsumura, 1917].

This is a small genus distributed in South-East Asia. The species of the genus live on *Prunus* as primary hosts and *Artemisia* as secondary hosts. It has been known that in this genus the fundatrices and fundatrigeniae are morphologically quite different from the alienicolae, i.e. the fundatrices and apterous fundatrigeniae are fat, *Myzus*-like in general appearance, whereas the apterous alienicolae are flat and slender, their heads bearing *Phorodon*-like tubercles. In the course of the present study has been found a form, of which the apterous alienicola is *Myzus*-like.

Key to the species

Fundatrices

1 Antenna 4-segmented, with processus terminalis shorter than basal part of terminal segment. Siphunculus slender, often rather atrophied, with an indistinct flange. Head very small as compared with body; antennal tubercle low, often hardly developed; eye composed of about 10 facets. Abdomen pale, membranous, very faintly areolated with fine spinules. . . . . 2. *T. sasakii* (Matsumura)

– Antenna 5-segmented, with processus terminalis 1.5 times as long as basal part of terminal segment. Siphunculus stout, with a distinct flange. Head of normal size; antennal tubercles distinct; eye composed of many facets. Abdomen pale, sometimes with small brown scle-

rites, conspicuously areolated or striated with spinules especially on ventral surface. . . . . 3. *T. sakurae* (Matsumura)

Apterous fundatrigeniae

1 Abdominal tergum pigmented. Head with dorsal setae 30–50 μ in length. Body pale green or dark green in life. On cherry. . . . . 3. *T. sakurae* (Matsumura)
– Abdominal tergum quite pale. Head with dorsal setae 15–30 μ in length. Body dull yellow, reddish yellow or dark brown in life. 2
2(1) Tibiae smooth except at apex of hind tibia. Siphunculus more than 3 times as long as wide at base. Mesosternal furca with a broad base. On cherry. . . . . 4. *T. higansakurae* (Monzen)
– Tibiae scabrous along whole length. Siphunculus less than 3 times as long as wide at base. Mesosternal furca with arms separated from each other (sometimes connected by a chitinous band). On peach. . . . . 5. *T. momonis* (Matsumura)

Apterous alienicolae

1 Body fat and round, dark in colour; tergum areolated. Antennal tubercle and 1st antennal segment without finger-like projections. Siphunculus with some setae. On roots of *Artemisia*. . . . . 6. *T.* sp.
– Body flat and slender, pale in colour; tergum wrinkled or papillated. Antennal tubercle and 1st antennal segment each with a finger-like projection. Siphunculus without setae. On leaves of *Artemisia*. 2
2(1) Antenna 5- sometimes 4-segmented, about 2/7–3/8 of body length; processus terminalis 1.3–1.8 times as long as basal part of terminal segment. Projection on antennal tubercle reaching tip of that on 1st antennal segment. Body papillated dorsally. Prothorax without lateral projections. . . . . 1. *T. artemisiae* Shinji
– Antenna 6- or 5-segmented, 5/8–3/4 of body length; processus terminalis 2.2–2.7 times as long as basal part of terminal segment. Projection on antennal tubercle not reaching tip of that on 1st antennal segment. Body wrinkled dorsally. Prothorax with a projection on each side. . . . . 2. *T. sasakii* (Matsumura)

1. ***Tuberocephalus artemisiae*** Shinji

Tuberocephalus artemisiae Shinji, 1929a: 40.
Tuberocephalus artemisiae Shinji, 1930a: 190.

On the basis of the present specimens a redescription is given below:—

Apterous alienicola. Body pale yellow to dull yellow in life. Antenna, legs, siphunculus and cauda pale. Body rather flat, elongate, 1.1–1.5 mm. in length.

Head corrugated dorsally, spinulous ventrally; antennal tubercle with a mid-ventral seta, with a long finger-like projection reaching or often exceeding tip of projection on 1st antennal segment; discal setae minute and blunt, frontal ones as long as or longer than middle width of 3rd antennal segment. Eye small, without a distinct triommatidion. Antenna 5- sometimes 4-segmented, about 2/7–3/8 of body length, imbricated throughout, without secondary rhinaria; 1st segment produced into a finger-like projection at inner apex; primary rhinaria cilia-less; processus terminalis 1.3–1.8 times as long as basal part of terminal segment. Clypeus smooth, with 4 setae anteriorly; mandibular lamina smooth, with a seta. Rostrum reaching between fore and middle coxae; ultimate segment concave laterally, 1.3–1.5 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Prothorax papillated dorsally, not produced laterally, with a pair of mesial setae. Mesosternal furca sessile; with arms

widely separated from each other. Legs short; femora with a few imbrications and sparse setae; tibiae smooth, with sparse, pointed setae (hind tibia with rigid long blunt setae dorso-apically); first tarsal chaetotaxy usually 2 : 2 : 2. In larva hind tibia with many spinules on apical half. Abdominal tergum sclerotic, papillated; first 7 segments and metanotum fused together; 1st–5th segments each with a pair of mesial and a

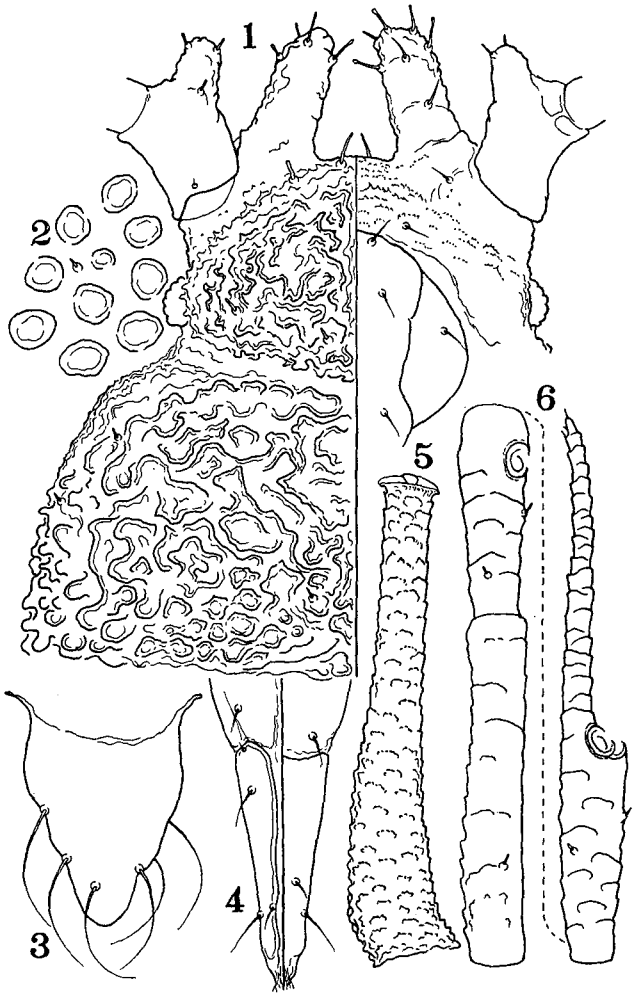

Fig. 24. *Tuberocephalus artemisiae* Shinji. Apterous alienicola:—
1, head and prothorax; 2, sculpture of abdominal tergum; 3, cauda; 4, ultimate rostral segment; 5, siphunculus; 6, antenna (3rd–5th segments).

pair of marginal setae, these setae being minute and blunt; 7th a little produced posteriorly, with 4 setae; 8th imbricated, with 2 setae as long as or longer than middle width of 3rd antennal segment. Siphunculus cylindrical, a little dilated basally, weakly bent inward, strongly imbricated, 7–9 times as long as wide at middle, about as long

as head width across eyes, with a developed flange. Cauda elongately pentagonal, 1/3–2/5 as long as siphunculus, with 6 setae.

Measurements in mm. Body 1.4; antennal segments (1st–5th): 0.06, 0.04, 0.13, 0.06, 0.07+0.13; projection on antennal tubercle 0.07; ultimate rostral segment 0.08; hind femur 0.22; hind tibia 0.38; hind tarsus (2nd segment) 0.06; siphunculus 0.27; cauda 0.09; dorsal setae 0.010–0.030 on head, 0.008 on abdominal disc, 0.025 on 8th abdominal segment.

Alate viviparous female (immigrant). Differs from the apterous viviparous female as follows:—

Head smooth, with short pointed setae; median tubercle distinct; antennal tubercle produced apically into a projection which is about as long as wide, bearing 5–7 setae. Antenna 6-segmented, 4/7–3/5 of body length; 1st segment conspicuously angulated or slightly protruded at inner apex; 3rd about as long as 4th and 5th together, with 22–37 flat rhinaria, with some minute setae; 4th with 7–10 rhinaria; 5th with 2–5 secondary rhinaria; 6th with 0–2 secondary rhinaria, with processus terminalis 1.7–1.8 times as long as basal part of the segment. Ultimate rostral segment tapering, 1.4–1.5 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Wings of normal venation. First tarsal chaetotaxy 3 : 3 : 2. Abdomen membranous; 2nd–4th segments with round marginal sclerites and developed intersegmental areolations, without mesial sclerites, with 2 or 3 short setae between marginal sclerites; 8th with 2 or 3 setae as long as or shorter than middle width of 3rd antennal segment. Siphunculus cylindrical, slightly dilated basally, imbricated with denticles, 6–8 times as long as wide at middle, without setae. Cauda pentagonal, not constricted at base, with 6 setae.

Measurements in mm. Body 1.5; antennal segments (1st–6th): 0.06, 0.05, 0.27, 0.14, 0.11, 0.09+0.16; ultimate rostral segment 0.09; hind femur 0.32; hind tibia 0.62; hind tarsus (2nd segment) 0.07; siphunculus 0.21; cauda ?; dorsal setae 0.010 on head, 0.009 on abdominal disc, 0.023 on 8th abdominal segment.

Alate male. Slightly differs from the alate viviparous female as follows:—

Antenna with more numerous secondary rhinaria, the number being 49–70 on 3rd segment, 24–33 on 4th, 17–27 on 5th, 6–8 on basal part of 6th; processus terminalis 1.1–1.5 times as long as basal part of 6th. Ultimate rostral segment 1.2–1.3 times as long as 2nd segment of hind tarsus. Abdomen with irregularly shaped central sclerites besides marginal ones.

Specimens examined: A lot of apterous alienicolae, Sapporo, Hokkaidô, 27-ix-64, ex *Artemisia montana*; Kawatabi, Miyagi Pref., 4-ix-66, ex *Artemisia princeps*. Some alate viviparous females (immigrants) and alate males, Wassamu, Hokkaidô, 27-ix-64, ex *Artemisia montana*.

Host plants: *Artemisia montana* & *A. princeps*. The aphid infests the underside of leaves, sometimes curling them up. The infested plants often become sooty on account of the black mold.

Distribution: Japan.

2. ***Tuberocephalus sasakii*** (Matsumura), comb. n.

Myzus sasakii Matsumura, 1917: 404.

Myzus sasakii: Monzen, 1929: 57; Moritsu, 1947: 44; Takahashi, 1965a: 45.

Trichosiphoniella sasakii: Hille Ris Lambers, 1965a: 197.

Specimens examined: Many fundatrices, emigrants and apterous alienicolae have been examined, their localities being as follows:— Hokkaidô—Odaitô, Lake Tôya & Hakodate (ex *Prunus* spp.). Honshû—Sukayu & Lake Towada, Aomori Pref. (ex *Artemisia princeps*); Ikezuki, Miyagi Pref. (ex *Prunus* sp.); Yokohama, Kanagawa Pref. (ex *Artemisia princeps*); Ôsaka (ex *Prunus donarium*, R. Takahashi leg.). Kyûshû—Yakushima Isl. (ex *Artemisia princeps*, H. Takada leg.).

Host plants: Primary hosts—*Prunus* spp. (cherry trees). Secondary hosts—*Artemisia princeps*. The fundatrix forms a bag-like gall on leaves of the cherry. The alienicolae live on the underside of leaves of *Artemisia* without causing any deformation.

Distribution: Japan.

3. ***Tuberocephalus sakurae*** (Matsumura), comb. n.

Myzus sakurae Matsumura, 1917: 403.
Myzus sakurae: Hori, 1929: 105.
Myzus momonis: Moritsu, 1947: 39.
Trichosiphoniella momonis: Paik, 1965: 61.
Myzus sasakii (?): Takahashi, 1924: 103.
Aphis spinosula Essig et Kuwana, 1918: 77.
Trichosiphoniella spinosula: Shinji, 1929a: 47 & 1930a: 188.
Trichosiphoniella spinulosa: Hille Ris Lambers, 1965a: 199.

On the basis of syntypes of *Myzus sakurae* Matsumura, a redescription is given below:—

Apterous fundatrigenia. Head densely spinulous over dorsum and venter; setae pointed and rather long, the longest dorsal one being 1.0–1.5 times as long as middle width of 3rd antennal segment (30–45 μ in length); front convex; antennal tubercles developed, roundly diverging at inner sides, each bearing 1–3 setae apically and 1–3 setae ventrally. Eye large, with a conspicuous ocular tubercle. Antenna 6-segmented, scabrous, 3/5 of body length; 3rd segment about as long as 4th and 5th together, with setae as long as or a little shorter than middle width of the segment (22–30 μ in length); processus terminalis 2.4–2.9 times as long as basal part of terminal segment. Clypeus with some spinules and 4 setae anteriorly; mandibular lamina spinulous, with 1–3 setae. Rostrum passing middle coxa; ultimate segment 1.3–1.5 times as long as 2nd segment of hind tarsus, usually with 2 secondary setae. Thoracic and abdominal terga pigmented, conspicuously reticulated with spinules. Mesosternal furca sessile. Femora spinulous, with pointed setae more than half as long as middle width of hind femora; tibiae smooth or sparsely spinulous, with setae mostly shorter than middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 2. In larva hind tibia with many spinules except at base. Abdomen without marginal tubercles; 2nd–4th segments each with 8–16, mostly 10–12 pointed setae, the longest seta being about 45 μ in length; 8th with 4 or 5 setae which are 40–50 μ in length. Siphunculus heavily pigmented, gradually tapering or rather abruptly attenuated apically, straight or slightly bent inward, strongly imbricated, 3.5–4.0 times as long as wide at middle, with a developed flange, with 5–10 setae, of which the longer ones are 30–40 μ in length. Cauda dusky to dark brown, nearly half as long as siphunculus with 5 or 6 setae. Body roundly oval, 1.7–1.8 mm. in length.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.08, 0.06, 0.27, 0.15, 0.11, 0.09+0.22; ultimate rostral segment 0.13; hind femur 0.44; hind tibia 0.75;

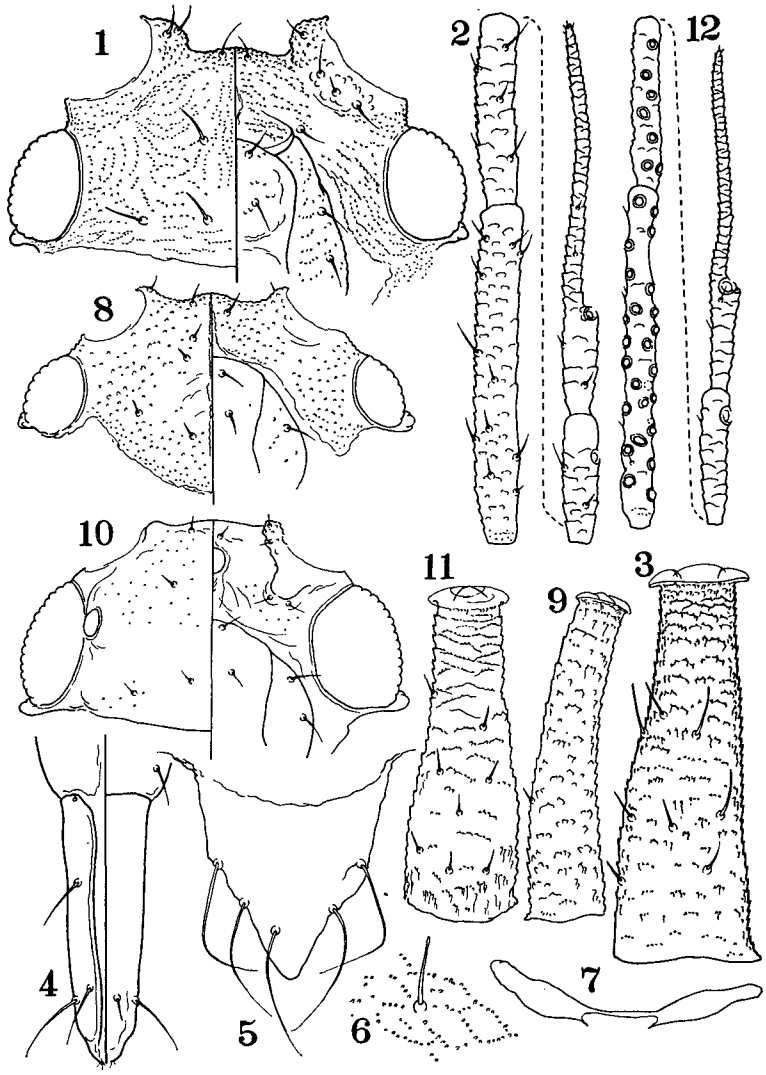

Fig. 25. *Tuberocephalus sakurae* (Matsumura). Apterous fundatrigenia :— 1, head; 2, antenna (3rd-6th segments); 3, siphunculus; 4, ultimate rostral segment; 5, cauda; 6, sculpture of abdominal tergum; 7, mesosternal furca. Fundatrix :— 8, head; 9, siphunculus. Alate viviparous female (emigrant) :— 10, head; 11, siphunculus; 12, antenna (3rd-6th segments).

hind tarsus (2nd segment) 0.09; siphunculus 0.27; cauda 0.11; longest dorsal setae 0.040 on head, 0.043 on abdominal disc, 0.045 on 8th abdominal segment.

On the basis of the specimens collected in the course of the present study, a redescription of the alate viviparous female and fundatrix may be given as follows:—

Alate viviparous female (emigrant). Differs from the apterous fundatrigenia as follows:—

Head sparsely spinulous dorsally, with thin short setae; antennal tubercles gibbous, very low. Antenna 3/5–5/7 as long as body; 3rd segment longer than 4th and 5th together; processus terminalis 2.0–2.6 times as long as basal part of 6th; number of secondary rhinaria 24–56 on 3rd segment, 3–22 on 4th and 0–4 on 5th. Clypeus and mandibular lamina smooth. Rostrum with ultimate segment 1.3–1.6 times as long as 2nd segment of hind tarsus, tapering, rather blunt at tip. Abdomen with marginal sclerites on 2nd–4th, 6th and 7th segments, with developed sclerotic bands on 3rd–6th, which are sometimes partly fused with each other, without marginal tubercles; 2nd–4th segments each with 7–12, mostly 7–9 setae between marginal sclerites, the longer setae being 15–25 μ in length; 8th with 3–5 setae 25–30 μ long. Siphunculus 3.8–4.5 times as long as wide at middle, with 1–8 short setae. Cauda shortly triangular, 1/3–1/2 as long as siphunculus, with 5 or 6 setae.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.08, 0.06, 0.41, 0.24, 0.15, 0.10+0.26; ultimate rostral segment 0.12; hind femur 0.48; hind tibia 0.91; hind tarsus (2nd segment) 0.09; siphunculus 0.20; cauda 0.10; dorsal setae 0.015 on head, 0.017 on abdominal disc, 0.025 on 8th abdominal segment.

Fundatrix. Differs from the apterous fundatrigenia in the following points:—

Thoracic and abdominal tergites pale and membranous, not or faintly reticulated, sometimes partly sclerotized and pigmented; 7th and 8th abdominal tergites scabrous and pigmented. Antenna 5-segmented, about 2/7–2/5 of body length; processus terminalis 1.0–1.5 times as long as basal part of 5th segment. Mesosternal furca with arms widely separated from each other. Abdominal disc with setae 20–50 μ in length; 8th abdominal segment with 2 setae 25–35 μ in length. Siphunculus 3.5–4.5 times as long as wide at middle, with 0–3 short setae. Head small as compared with body, strongly narrowed toward apex.

Measurements in mm. Body 2.1; antennal segments (1st–5th): 0.06, 0.06, 0.32, 0.10, 0.11+0.16; ultimate rostral segment 0.12; hind femur 0.44; hind tibia 0.76; hind tarsus (2nd segment) 0.08; siphunculus 0.21; cauda 0.10; dorsal setae 0.025 on head, 0.023 on abdominal disc, 0.030 on 8th abdominal segment.

Specimens examined: A lot of apterous fundatrigeniae, Sapporo, Hokkaidô, 16-vii-'15, ex *Prunus* sp., without collector's name (syntypes of *Myzus sakurae* Matsumura); Sapporo, 4-vii-64, ex *Prunus* spp.; Lake Shikotsu, Hokkaidô, 24-vi-64, ex *Prunus maximowiczii*; Akkeshi, Hokkaidô, 19-vii-66, ex *Prunus* sp.; Kawachi-nagano, Ôsaka Pref. 3-v-59, ex *Prunus* sp., R. Takahashi leg.; Ôsaka, 5-v-54, ex *Prunus* sp., R, Takahashi leg.; Yumura, Hyôgo Pref., 14-v-66, ex *Prunus* sp.; Takasakiyama, Ôita Pref., 21-v-65, ex *Prunus* sp.; Lake Shidaka, Ôita Pref., 22-v-65, ex *Prunus jamasakura*; Udo, Miyazaki Pref., 23-iv-65, ex *Prunus jamasakura*. Some alate viviparous females, Mt. Apoi, Hokkaidô, 12-vii-66, ex *Prunus* sp.; Mt. Kongô, Ôsaka Pref., 1-vi-58, ex *Prunus* sp., R. Takahashi leg. Many fundatrices, Mt. Apoi, 12-vii-66, ex *Prunus* sp.; Ikeda, Ôsaka Pref., 21-iv-61, ex *Prunus* sp., R. Takahashi leg.; Okayama, 25-iv-66,

ex *Prunus* sp.; Kôchi, 25-iv-65, ex *Prunus* sp., H. Takada leg.; Lake Shidaka, 22-v-65, ex *Prunus jamasakura*; Kumamoto, 18-iv-65, ex *Prunus* sp.; Sata, Kagoshima Pref., 25-iv-65, ex *Prunus* sp.

Host plants: *Prunus* spp. (cherry trees) including *P. jamasakura* & *P. maximowiczii*. The infested leaf is curled up into a tube, the colour turning red, or sometimes deformed into a bag-shaped gall formed on the margin of the leaf.

Distribution: Japan; Korea.

4. ***Tuberocephalus higansakurae*** (Monzen), comb. n.

Myzus higansakurae Monzen, 1927: 2.
Myzus higansakurae: Monzen, 1929: 59.
Trichosiphoniella momonis: Hille Ris Lambers, 1965a: 198.

This species is closely related to *T. sakurae* (Matsumura), differing therefrom in the following points:—

Apterous fundatrigenia. Body reddish yellow in life; tergum pale when cleared. Setae on body, antenna and siphunculus shorter than in *sakurae*, their length being as follows:—20–28 μ on cephalic disc, 20–35 μ on abdominal disc, 25–35 μ on 8th abdominal segment, 10–13 μ on 3rd antennal segment and 10–20 μ on siphunculus. In larva hind tibia with many spinules confined to apical part of the tibia.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.08, 0.06, 0.33, 0.16, 0.11, 0.08+0.20; ultimate rostral segment 0.13; hind femur 0.49; hind tibia 0.78; hind tarsus (2nd segment) 0.09; siphunculus 0.21; cauda 0.11.

Specimens examined: Some apterous fundatrigeniae, Sapporo, Hokkaidô, 27-vii-68 & 4-vii-64, ex *Prunus* spp.

Host plants: *Prunus* spp. (cherry trees). The infested leaves are curled up marginally, turning red in colour.

Distribution: Japan.

The present species may be rightly identified with *higansakurae* mainly because of the colouration of the body and the shape of the pseudogalls caused on leaves of cherry trees.

5. ***Tuberocephalus momonis*** (Matsumura), comb. n.

Myzus momonis Matsumura, 1917: 402.
Myzus momonis: Hori, 1929: 94.
Trichosiphoniella momonis: Tao, 1963: 167 & 1966: 24.
Trichosiphoniella formosana Hille Ris Lambers, 1965a: 198. **Syn. n.**

This species closely resembles *T. sakurae* (Matsumura), differing therefrom in the following aspects:—

Apterous fundatrigenia. Head strongly narrowed toward apex, with dorsal setae at most 20 μ in length. Antenna usually 6-segmented, 2/5–1/2 of body length; processus terminalis 1.6–2.1 times as long as basal part of terminal segment; 3rd–6th segments as 23 : 10 : 7 : 8+14 in length. Rostrum just passing middle coxa; ultimate segment 1.1–1.3 times as long as 2nd segment of hind tarsus, with 2 or 3 secondary setae. Mesosternal furca with arms widely separated from each other, sometimes connected by a chitinous band. Tibiae sparsely or densely spinulated. Abdomen pale, areolated with spinules; 2nd–4th segments each with 8 or 9 setae besides marginal ones, the longer setae being 13–28 μ in length; 8th with 4 setae about 25 μ in length.

Siphunculus stout, tapering, about 3 times as long as wide at middle, with 4–9 setae which are at most 15 μ in length. Cauda 4/7–5/8 as long as siphunculus. Body more round than in *sakurae*, 1.4–1.8 mm. in length.

Measurements in mm. Body 1.6; antennal segments (1st–6th): 0.06, 0.05, 0.28, 0.09, 0.07, 0.08+0.14; ultimate rostral segment 0.11; hind femur 0.37; hind tibia 0.52; hind tarsus (2nd segment) 0.09; siphunculus 0.18; cauda 0.10.

Specimens examined: Some apterous fundatrigeniae (syntypes of *Myzus momonis* Matsumura), Sapporo, Hokkaidô, 16-vii-'15, ex *Prunus persica*, without collector's name. An apterous fundatrigenia (syntype of *Trichosiphoniella formosana* Hille Ris Lambers), Kagi, Taiwan, viii-'28, ex *Prunus persica*, R. Takahashi leg. Some apterous

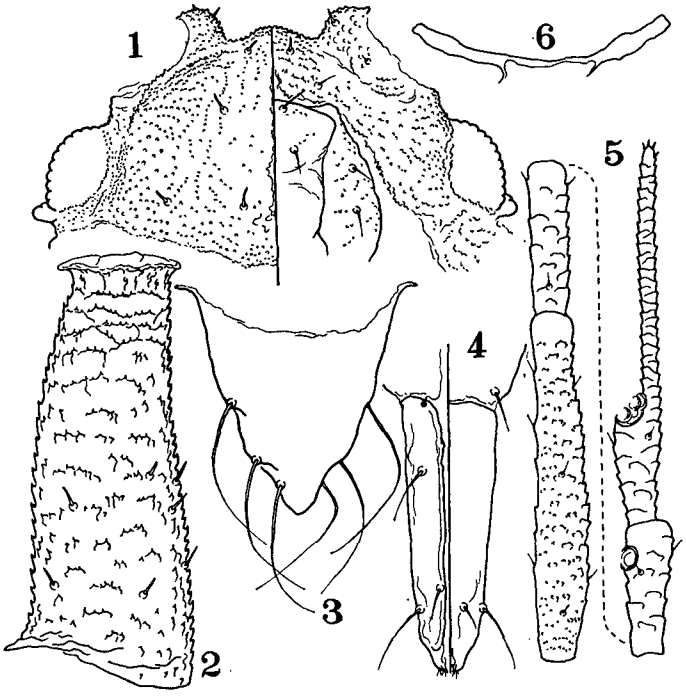

Fig. 26. *Tuberocephalus momonis* (Matsumura). Apterous fundatrigenia:— 1, head; 2, siphunculus; 3, cauda; 4, ultimate rostral segment; 5, antenna (3rd–6th segments); 6, mesosternal furca.

fundatrigeniae, Chunchon, Korea, 25-vi-65, ex *Prunus persica*, W. H. Paik leg.; Changju, Korea, 17-vi-58, ex *Prunus persica*.

Host plants: *Prunus persica*.

Distribution: Japan; Korea; Taiwan.

Having compared a syntype of *Trichosiphoniella formosana* Hille Ris Lambers with syntypes of *Myzus momonis* Matsumura, I have come to the conclusion that they should be treated as a single species.

6. ***Tuberocephalus*** sp.

This form closely resembles the fundatrigenia of *T. sakurae* (Matsumura), differing

therefrom in the following points:—

Apterous alienicola. Siphunculus long and stout, weakly bent inward, cylindrical basally, tapering on apical 1/3, as long as or longer than 3rd and 4th antennal segments together, 4.5–5.0 times as long as wide at middle, with a huge flange twice as wide as apical width of siphunculus, with 5–10 short setae. Body with dorsal setae much shorter than in *sakurae*, the longer setae being about 15 μ on head, 13–18 μ on abdominal disc and 15–25 μ on 8th abdominal segment. Antenna about half as long as

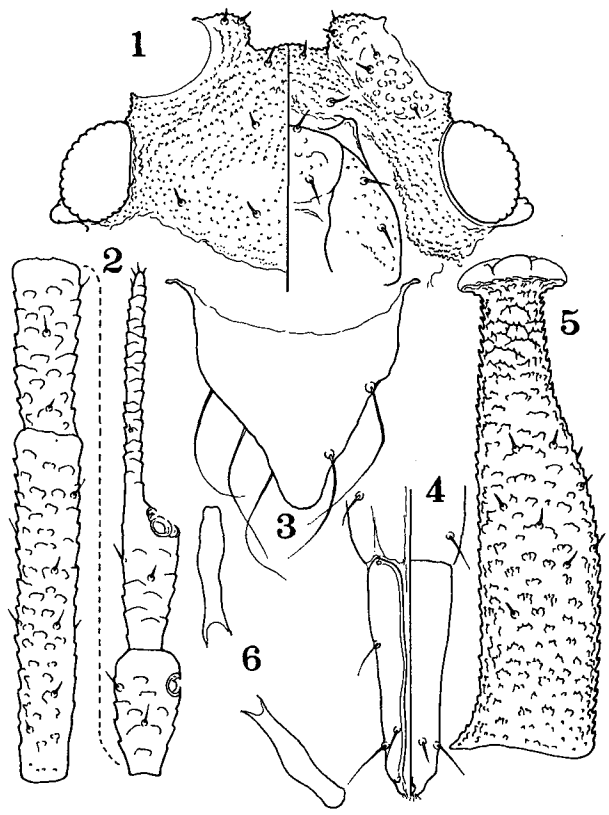

Fig. 27. *Tuberocephalus* sp. Apterous alienicola:—
1, head; 2, antenna (3rd–6th segments);
3, cauda; 4, ultimate rostral segment;
5, siphunculus; mesosternal furca.

body; processus terminalis 1.8–2.4 times as long as basal part of 6th segment. Rostrum reaching hind coxa; ultimate segment 1.3–1.4 times as long as 2nd segment of hind tarsus.

Measurements in mm. Body 1.5; antennal segments (1st–6th): 0.08, 0.05, 0.21, 0.10, 0.08, 0.09+0.16; ultimate rostral segment 0.13; hind femur 0.41; hind tibia 0.65; hind tarsus (2nd segment) 0.09; siphunculus 0.31; cauda 0.09.

Specimens examined: Some apterous viviparous females, Sapporo, Hokkidô, 5-ix-68, ex *Artemisia montana*.

Host plants: *Artemisia montana*. This aphid infests the root of the host.

Distribution: Japan.

This form is readily distinguished from the fundatrigenia of *T. momonis* (Matsumura) by the black tergum and by the more strongly developed flange of the siphunculus.

It is characteristic of this species that the apterous alienicola is *Myzus*-like in general appearance. Furthermore, it should be noted that the alienicola of this species lives on the root of *Artemisia*, while the *Phorodon*-like alienicolae known in *T. sasakii* (Matsumura) and *T. artemisiae* Shinji live on the leaf of *Artemisia*. In reality, this species may represent a group different from that comprising species with *Phorodon*-like alienicolae. To make the systematic position of this species clear, however, it needs further information on the life-cycles of this species and related forms.

This species is not named until the fundatrigeniae become available.

32. Genus ***Jacksonia*** Theobald

Jacksonia Theobald, 1923 b: 19 [type-species: *Jacksonia papillata* Theobald, 1923].

Xenosiphonaphis Takahashi, 1961 d: 6 [type-species: *Xenosiphonaphis conandri* Takahashi, 1961].

This is a small genus represented by 3 species, *J. papillata* Theobald from Europe and *J. japonica* (Takahashi) and *J. conandri* (Takahashi) from Japan, the last one having been recorded also from India. The genus is close to *Myzus*, from which it may be distinguished by the peculiar shape of the siphunculus and by the different type of the abdominal sclerotization in the alate viviparous females.

Key to the species

Alate viviparous females

1 Siphunculus transversely wrinkled basally, about 4.0–4.5 times as long as wide at middle. Abdomen with sclerotic bands of first 7 segments only slightly apart from each other, often consolidated. Body small, about 2.1 mm. in length. On *Conandron*. . . . . 1. *J. conandri* (Takahashi)

– Siphunculus transversely grooved basally, about 6.0–6.5 times as long as wide at middle. Abdomen with sclerotic bands of first 7 segments widely separated from each other, partly fused with neighbouring ones marginally on 3rd–5th segments. Body large, 2.8–3.0 mm. in length. On *Stachyurus*. . . . . 2. *J. japonica* (Takahashi)

1. ***Jacksonia conandri*** (Takahashi)

Xenosiphonaphis conandri Takahashi, 1961 d: 7.

Jacksonia conandri: Ghosh et Raychaudhuri, 1968: 183.

Specimens examined: Some apterous and alate viviparous females (syntypes of *Xenosiphonaphis conandri* Takahashi) collected at the following localities:— Honshû— Oda, Mie Pref. (M. Sorin leg.); Kawachi-nagano & Kobuka, Ôsaka Pref. (M. Sorin leg.).

Host plants: All the specimens examined were collected from *Conandron ramondioides*. Ghosh et Raychaudhuri (1968) record the aphid from a gramineous plant in India.

Distribution: Japan; India.

Judging from a diagnosis given by Ghosh et Raychaudhuri (1968), the Indian form may be slightly different from the Japanese one by the spinulous siphunculus and by the smaller size of the body.

2. ***Jacksonia japonica*** (Takahashi), comb. n.

Xenosiphonaphis japonica Takahashi, 1961 d : 9.

Only the alate viviparous female has been described. On the basis of the present specimens a description of the fundatrix is given below :—

Fundatrix. Body globular, 3.1 mm. in length. Head scabrous with irregularly shaped granules over dorsum and on venter anteriorly, smooth or spinulated postero-

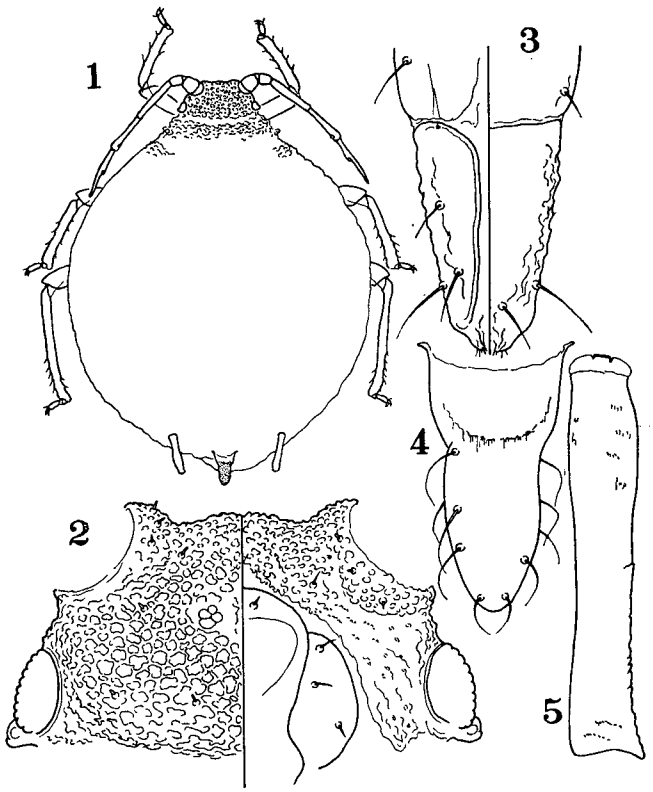

Fig. 28. *Jacksonia japonica* (Takahashi). Fundatrix :— 1, Outline of the aphid ; 2, head ; 3, ultimate rostral segment ; 4, cauda ; 5, siphunculus.

ventrally ; dorsal setae blunt, about 1/3–1/2 as long as middle width of 3rd antennal segment ; antennal tubercle hardly or a little developed, with 2 or 3 setae apically and 1–3 setae mid-ventrally ; front nearly straight or shallowly W-shaped. Antenna 5-segmented, about 1/3 as long as body ; 3rd segment faintly imbricated apically, with setae at most about 1/3 as long as middle width of the segment, without rhinaria ; processus terminalis shorter than basal part of 5th segment. Clypeus with 2 setae anteriorly ; mandibular lamina smooth, sometimes with a few spinules, with 3 or 4 setae. Rostrum reaching middle coxa ; ultimate segment as long as 2nd segment of hind tarsus, with 2 secondary setae. Legs short ; femora dark brown, paler basally, spinulated apically ; tibiae dark brown, pale at middle, smooth, with setae at most

about 4/7 as long as middle width of hind tibia; hind tarsus with 2nd segment, 3.5–4.0 times as long as wide at middle, bearing 2 dorsal and 1 ventral secondary setae; first tarsal chaetotaxy 3 : 3 : 2 or 3 : 2 : 2. Pronotum sclerotic and scabrous, with 2 mesial setae; meso- and metanotum and abdominal tergum membranous. Abdomen with dorsal setae of anterior segments 1/2–5/7 as long as middle width of 3rd antennal segment, without marginal tubercles; 8th segment with 2 or 3 setae. Siphunculus dusky, darker at apex, weakly wrinkled, slightly swollen on apical half, about as long as 5th antennal segment, without distinct flange. Cauda black, thick and blunt, constricted near middle, nearly twice as long as wide, 4/5 as long as siphunculus, with 8–10 setae.

Measurements in mm. Body 3.1; antennal segments (1st–5th): 0.01, 0.08, 0.36, 0.17, 0.15+0.13; ultimate rostral segment 0.12; hind femur 0.67; hind tibia 0.89; hind tarsus (2nd segment) 0.12; siphunculus 0.30; cauda 0.24; longest dorsal seta 0.013 on head, 0.025 on abdominal disc and on 8th abdominal segment.

Specimens examined: A few fundatrices, Kobuka, Ôsaka Pref., 19-v-61, ex *Stachyurus praecox*, M. Sorin leg.; Mt. Hikosan, Fukuoka Pref., 8-vi-65, H. Takada leg. Many alate viviparous females collected at Chihaya (ex *Stachyurus praecox*, R. Takahashi leg., syntypes of *Xenosiphonaphis japonica* Takahashi) & Kobuka (ex *Stachyurus praecox*, R. Takahashi leg.), Ôsaka Pref.; Mt. Hikosan (H. Takada leg.).

Host plants: *Stachyurus praecox*.

Distribution: Japan.

33. Genus ***Phorodon*** Passerini

Phorodon Passerini, 1860: 27 [type-species: *Aphis humuli* Schrank, 1801].

1. ***Phorodon japonensis*** Takahashi

Phorodon humuli japonensis Takahashi, 1965c: 39.
Phorodon humuli: Shinji, 1941: 987 (partim).

Specimens examined: Some apterous fundatrigeniae collected at Kibi, Wakayama Pref. (ex *Prunus mume*, R. Takahashi leg., syntypes of *Phorodon humuli japonensis* Takahashi); Mt. Iwawaki, Ôsaka Pref. (ex *Prunus salicina*, M. Sorin leg.). Many apterous and alate alienicolae collected at Kawatabi, Miyagi Pref. (ex *Humulus japonicus*); Kitakata, Fukushima Pref. (ex *Humulus japonicus*); Tôkyô (ex *Humulus japonicus*, R. Takahashi leg., syntypes of *P. humuli japonensis* Takahashi).

Host plants: Primary hosts—*Prunus mume* & *P. salicina*. Secondary hosts—*Humulus japonicus*.

34. Genus ***Diphorodon*** Börner

Diphorodon Börner, 1939: 79 [type-species: *Phorodon cannabis* Passerini, 1860; described as a subgenus of the genus *Phorodon* Passerini].

1. ***Diphorodon cannabis*** (Passerini)

Phorodon cannabis Passerini, 1860: 34.
Phorodon (*Diphorodon*) *cannabis*: Börner, 1939: 79; Takahashi, 1965c: 40.
Diphorodon cannabis: Heinze, 1960: 832.
Phorodon asacola Matsumura, 1917: 405.

Phorodon humuli: Hori, 1929: 78; Shinji, 1941: 987 (partim).
Capitophorus cannabifoliae Shinji, 1924: 357.

Specimens examined: Some apterous and a few alate viviparous females collected at Tôkyô (R. Takahashi leg.) and Ôsaka (M. Sorin leg.).

Host plants: All the specimens examined were collected from *Cannabis sativa*.

Distribution: Japan; Europe.

35. Genus ***Ovatus*** van der Goot

Ovatus van der Goot, 1913: 84 [type-species: (*Myzus mespili* van der Goot, 1912)=*Aphis crataegaria* Walker, 1850].

Key to the species

1 Antenna 5-segmented, if 6-segmented then 3rd segment much shorter than head width across eyes. Ultimate rostral segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Siphunculus 5–6 times as long as wide at middle. Larva with spinulated hind tibia. Body white. On a plant of Compositae. . . . . 3. *O. compositae* Takahashi

– Antenna 6-segmented, with 3rd segment longer than head width across eyes. Ultimate rostral segment more than 1.3 times as long as 2nd segment of hind tarsus. Siphunculus more than 6.5 times as long as wide at middle. Larva with smooth hind tibia. 2

2(1) Siphunculus dusky, smooth at apex, 6.5–7.0 times as long as wide at middle. Antenna dark, pale on 3rd segment basally; 1st segment protrudent at inner apex. Ultimate rostral segment as long as or slightly longer than basal part of 6th antennal segment. Body yellow. On *Mentha*. . . . . 2. *O. nipponicus* Takahashi

– Siphunculus pale, dark at apex, imbricated throughout, 8–10 times as long as wide at middle. Antenna pale, dark apically; 1st segment roundly convex. Ultimate rostral segment 1.2–1.4 times as long as basal part of 6th antennal segment. Body pale green. On *Malus*. . . . . 1. *O. crataegarius* (Walker)

1. ***Ovatus crataegarius*** (Walker)

Aphis crataegaria Walker, 1850a: 46.
Ovatus crataegarius: Heinze, 1960: 826; Doncaster, 1961: 50; Paik, 1965: 61; Eastop, 1966: 469.
Aphis menthae Walker, 1852: 1045.
Ovatus menthae (Walker): Cottier, 1953: 263; Tao, 1963: 166 & 1966: 21.
Siphonophora menthae Buckton, 1876: 120.
Myzus menthae (Buckton): Takahashi, 1923: 22.
Phorodon menthae (Buckton): Palmer, 1952: 345; Hori, 1929: 80; Shinji, 1941: 997.
Myzus mespili van der Goot, 1912: 64.
Ovatus mespili: van der Goot, 1915: 136.
Myzus malicolens Hori, 1929: 89. **Syn. n.**

The present specimens from Japan slightly differ from European specimens at hand in the following points:— Apterous viviparous femele—Antenna with 5th segment distinctly shorter than 4th; length of 3rd–6th segments as 53 : 41 : 29 : 11+48 (37 : 25 : 25 : 10+49 in European form); ultimate rostral segment 1.3–1.4 times as long as 2nd segment of hind tarsus (1.4–1.6 times so) and 1.4–1.5 times as long as basal part of 6th antennal segment (1.2–1.3 times so). Furthermore, among the specimens from Japan, there is an alatoid nymph just before the molt, which shows some 50 & 60 rhinaria under the old skin of the 3rd antennal segments (the rhinaria on the 4th and 5th segments are vague and not countable).

Specimens examined: A few apterous viviparous females, Sapporo, Hokkaidô, 20-vii-64, ex *Cydonia oblonga*.

Host plants: Primary hosts—*Cydonia oblonga*; *Malus pumila* var. *domestica* (after Hori, 1929). It is known that the aphid migrates from *Crataegus* and *Cydonia* to *Mentha* (in Europe, after Heinze, 1960).

Distribution: Cosmopolitan.

Having read the original description of *Myzus malicolens* Hori, I am much inclined to consider that it should be suppressed as a synonym of *Ovatus crataegarius* (Walker).

2. ***Ovatus nipponicus*** Takahashi

Ovatus minutus nipponicus Takahashi, 1965c: 45.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Ôsaka (ex *Mentha* sp., R. Takahashi leg.) & Hirao, Ôsaka Pref. (ex *Mentha* sp., M. Sorin leg.) (syntypes of *Ovatus minutus nipponicus* Takahashi); Hirao (from a plant of Labiatae, M. Sorin leg.). Kyûshû—Miyakonojô, Miyazaki Pref. (ex *Mentha* sp., T. Tanaka leg.).

Host plants: *Mentha* spp. & a plant of Labiatae.

Distribution: Japan.

3. ***Ovatus compositae*** Takahashi

Ovatus compositae Takahashi, 1965c: 43.

Specimens examined: Some apterous viviparous females collected at Taishi, Ôsaka Pref. (from a plant of Compositae, R. Takahashi leg., syntypes of *O. compositae* Takahashi).

Host plants: A plant of Compositae.

Distribution: Japan.

This species is an aberrant member of the genus. It differs from any other congeneric species by the larva with spinulous hind tibiae and in infesting a plant of Compositae instead of Labiatae.

36. Genus ***Myzus*** Passerini

Myzus Passerini, 1860: 27 [type-species: *Aphis cerasi* Fabricius, 1775].

Nectarosiphon Schouteden, 1901: 112 [type-species: *Aphis convolvuli* Kaltenbach, 1843].

Myzodes Mordvilko, 1914: 52 [type-species: (*Myzodes tabaci* Mordvilko, 1914)=*Aphis persicae* Sulzer, 1776].

Myzoides van der Goot, 1913: 84 [type-species: *Aphis cerasi* Fabricius, 1775].

Prunomyzus Hille Ris Lambers et Rogerson, 1946: 105 [type-species: *Myzus* (*Prunomyzus*) *padellus* Hille Ris Lambers et Rogerson, 1946; described as a subgenus of the genus *Myzus*].

Tubaphis Hille Ris Lambers, 1947: 312 [type-species: *Aphis ranunculina* Walker, 1852].

Sciamyzus Stroyan, 1954: 10 [type-species: *Myzus* (*Sciamyzus*) *cymbalariae* Stroyan, 1954, nec *Aphis cymbalariae* Schouteden, 1900) = *Myzus* (*Sciamyzus*) *cymbalariellus* Stroyan, 1967; described as a subgenus of the genus *Myzus*].

This is one of the largest and morphologically highly variegated genera of the tribe, being distributed all over the world. It is known that with a few exceptions the host-alternating species of the genus take plants of Prunoidea as primary hosts. In this paper are given 26 species occurring in Japan, of which two are new to science and other one new to Japan.

Key to the species

1 Larva with spinulous hind tibia. 2
– Larva with smooth hind tibia. 13
2(1) Distance between 6th and 7th abdominal spiracles not shorter than that between 5th and 6th. 3
– Distance between 6th and 7th abdominal spiracles shorter than that between 5th and 6th. 7
3(2) Siphunculus about 2.5 times as long as wide. Cephalic disc roughly papillated, mingled with fine granules marginally and mesially. Abdominal tergum membranous, often with brown blotches irregularly occurring. Orange-red to brick-red in life. On *Polygonum*. . . . . 22. *M. kawatabiensis*, sp. n.
– Siphunculus more than 6 times as long as wide at middle. Cephalic disc spinulous, finely denticulated or smooth. Abdominal tergum membranous or sclerotized, never with blotches irregularly occurring 4
4(3) Abdominal tergum quite membranous and smooth. Antenna wholly black except at base of 3rd segment. Siphunculus and tibiae wholly black. Cauda shortly triangular. Yellow, with transverse green stripes in life. On *Philadelphus* and *Deutzia*. . . . . 17. *M. philadelphi* Takahashi
– Abdominal tergum more or less sclerotized, wrinkled. Antenna, siphunculus and tibiae not wholly black. Cauda not shortly triangular. 5
5(4) Siphunculus bent outward at apex, roughly imbricated, smooth just below flange. Tibiae imbricated basally. Antenna with processus terminalis much shorter than siphunculus. Dull yellow in life. On *Urtica*. . . . . 5. *M. dycei* Carver (part., see 24)
– Siphunculus not bent at apex, moderately imbricated throughout. Tibiae not or hardly imbricated basally. Antenna with processus terminalis longer than siphunculus. 6
6(5) Siphunculus swollen. Cauda distinctly constricted at middle. Ultimate rostral segment parallel-sided or convex marginally. Front of head conspicuously convex. Abdominal tergum finely craped. Green in life. On *Stellaria*. . . . . 18. *M. stellariae* (Strand)
– Siphunculus cylindrical. Cauda without constriction at middle. Ultimate rostral segment tapering. Front of head hardly convex. Abdominal tergum rather roughly wrinkled. White in life. On *Boehmeria*. . . . . 16. *M. boehmeriae* Takahashi
7(2) Abdominal tergum pigmented. Siphunculus and cauda wholly black. Black in life. On *Prunus*, *Galium* and *Artemisia*. . . . . 1. *M. cerasi* (Fabricius)
– Abdominal tergum not pigmented. Siphunculus and cauda pale. 8
8(7) Siphunculus stout, denticulated especially strongly on mesial surface. 9
– Siphunculus rather slender, uniformly imbricated. 10
9(8) Antenna 5-segmented. Cauda only a little longer than wide. Abdomen with 7th tergite conspicuously produced posteriorly, the hind margin being bluntly pointed mesially. Ultimate rostral segment 1.4 times as long as 2nd segment of hind tarsus. White in life. On *Fatoua*. . . . . 25. *M. fatouae* Shinji
– Antenna 6-segmented. Cauda more than twice as long as wide. Abdomen with 7th tergite weakly produced posteriorly, the hind margin being gently convex. Ultimate rostral segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Pale yellowish green in life. On *Pilea*. . . . . 26. *M. pileae* Takahashi
10(8) Abdomen with 7th tergite conspicuously produced posteriorly. Ultimate rostral segment 1.3–1.5 times as long as 2nd segment of hind tarsus. 11
– Abdomen with 7th tergite not produced posteriorly. Ultimate rostral segment 1.0–1.2 times as long as 2nd segment of hind tarsus. 12
11(10) Siphunculus with a distinct flange. Tibiae usually strongly imbricated. Yellow or white in life. On *Plectranthus*. . . . . 7. *M. siegesbeckiae* Takahashi
– Siphunculus without flange. Tibiae only faintly striated basally. Yellow in life. On

Plectranthus. . . . . 8. *M. isodonis* (Takahashi)

12(10) Mesosternal furca with a distinct stem. Antenna with 1st segment hardly produced at inner apex. Siphunculus cylindrical, dilated at base, with flange a little wider than middle width of the siphunculus. Yellow or pale green in life. On *Plantago*. . . . . 21. *M. ranunculinus* (Walker)

– Mesosternal furca sessile. Antenna with 1st segment conspicuously produced at inner apex. Siphunculus tapering, with flange as wide as or narrower than middle width of the siphunculus. Green in life. On *Clematis*. . . . . 24. *M. clematophilus* Takahashi

13(1) Siphunculus swollen on apical half. 14

– Siphunculus not swollen on apical half (at most slightly puffed subapically). 17

14(13) Abdominal tergum evenly pigmented. Ultimate rostral segment 0.8–0.9 as long as 2nd segment of hind tarsus. Blackish brown in life. On *Lactuca* and *Youngia*. . . . . 10. *M. lactucicola* Takahashi

– Abdominal tergum not pigmented. Ultimate rostral segment 0.9–1.4 times as long as 2nd segment of hind tarsus. 15

15(14) Mesosternal furca with a stem slightly longer than wide at middle. Ultimate rostral segment 1.4 times as long as 2nd segment of hind tarsus. Distance between 6th and 7th abdominal spiracles distinctly longer than that between 5th and 6th. Brownish to greenish in life. On various plants. . . . . 9. *M. ascalonicus* Doncaster

– Mesosternal furca sessile or at most broadly based. Ultimate rostral segment at most 1.2 times as long as 2nd segment of hind tarsus. Distance between 6th and 7th abdominal spiracles about as long as that between 5th and 6th. 16

16(15) Siphunculus shorter than head width across eyes. Hind tarsus with 2nd segment usually bearing 2 secondary setae ventrally. Antenna at most 3/4 as long as body; processus terminalis 2.5–3.0 times as long as basal part of 6th segment. Dull yellow to yellowish green in life. On *Aster* and *Kalimeris*. . . . . 11. *M. asteriae* Shinji

– Siphunculus as long as or longer than head width across eyes. Hind tarsus with 2nd segment usually bearing 4 secondary setae ventrally. Antenna often longer than 3/4 of body length; processus terminalis often over 3 times as long as basal part of 6th segment. White, yellowish, greenish or reddish in life. On various plants. . . . . 12. *M. persicae* (Sulzer) (part., see 27)

17(13) Antennal tubercle with a small protuberance at inner apex. Cauda elongate, constricted at base. Siphunculus constricted just below flange. 18

– Antennal tubercle without a protuberance at inner apex. Cauda not constricted at base, if constricted then rather short. Siphunculus not constricted just below flange. 19

18(17) Head and siphunculus black. Ultimate rostral segment 1.6 times as long as 2nd segment of hind tarsus. Siphunculus 7–8 times as long as wide at middle. Whitish yellow in life. . . . . 20. *M. asamensis* Takahashi

– Head and siphunculus pale. Ultimate rostral segment 1.3–1.4 times as long as 2nd segment of hind tarsus. Siphunculus 10–13 times as long as wide at middle. Pale yellow or pale yellowish green in life. On *Rosa*. . . . . 19. *M. japonensis* Miyazaki

19(17) Abdominal tergum evenly pigmented. 20

– Abdominal tergum pale or at most locally pigmented. 21

20(19) Genital plate produced posteriorly. Head often without granules dorsally. Siphunculus more or less dilated near base in most cases, not swollen apically. Pale green, dark green or yellowish brown in life. On *Malus* and *Chaenomeles*. . . . 3. *M. malisuctus* Matsumura

– Genital plate not produced posteriorly. Head with many minute granules dorsally, leaving a rather small smooth disc at middle. Siphunculus often not dilated near base and slightly puffed subapically. Body dark brown in life. On *Prunus* and *Salvia*. . . . . 2. *M. yamatonis*, sp. n.

21(19) Abdomen with a large central and postsiphuncular sclerites. Antenna with flagellum wholly black except at base of 3rd segment. Siphunculus wholly black. On *Parthenocissus*. . . .

. . . . . 4. *M. parthenocissi* Takahashi

- Abdomen without central and postsiphuncular sclerites. Antenna with flagellum not wholly black. Siphunculus pale at least basally, rarely wholly black. 22

22 (21) Tibiae with spinules or imbrications at base. 23

- Tibiae smooth at base. 25

23 (22) Abdominal tergum hardly sclerotized, faintly areolated with weak spinules or denticles, with long pointed setae. Ultimate rostral segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Pale green in life. On *Prunus*. . . . . 15. *M. mumecola* (Matsumura)

- Abdominal tergum more or less sclerotized, wrinkled, with minute, blunt setae. Ultimate rostral segment over 1.3 times as long as 2nd segment of hind tarsus. 24

24 (23) Genital plate strongly produced posteriorly, nearly triangular. Siphunculus straight, 12–14 times as long as wide at middle. Distance between 6th and 7th abdominal spiracles much shorter than that between 5th and 6th. Green in life. On *Siegesbeckia*. . . . . 6. *M. siegesbeckicola* Strand

- Genital plate not produced posteriorly. Siphunculus curved outward at apex, about 8 times as long as wide at middle. Distance between 6th and 7th abdominal spiracles about as long as that between 5th and 6th. Dull yellow in life. On *Urtica*. . . . . 5. *M. dycei* Carver (part., see 5)

25 (22) Siphunculus shorter than head width across eyes. Cauda with 4 setae. 26

- Siphunculus as long as or longer than head width across eyes. Cauda with 6 or more setae. 27

26 (25) Ultimate rostral segment 1.0–1.1 times as long as 2nd segment of hind tarsus. Siphunculus not darkened. Pale yellowish green or white in life. On *Hemerocallis*. . . . . 23. *M. hemerocallis* Takahashi

- Ultimate rostral segment 1.3 times as long as 2nd segment of hind tarsus. Siphunculus often dark apically or wholly. Yellowish green in life. On *Prunus*. . . . . 14. *M. mushaensis* Takahashi

27 (25) Siphunculus jet-black apically. Antenna with 3rd–5th segments black apically. Cauda with 6–10 setae. Pale yellowish green or pale green in life. On *Prunus* and *Clematis*. . . . . 13. *M. varians* Davidson

- Siphunculus pale or dusky at apex. Antenna with 3rd–5th segments pale at apex. Cauda at most with 6 setae. Whitish, yellowish, greenish or reddish in life. On various plants. . . . . 12. *M. persicae* (Sulzer) (part., see 16)

1. ***Myzus cerasi*** (Fabricius)

Aphis cerasi Fabricius, 1775: 734.

Myzus cerasi: Palmer, 1952: 335; Cottier, 1953: 270; Doncaster, 1961: 28, 69 & 145; Eastop, 1966: 464.

Akkaia umefoliae Shinji, 1924: 348.

Phorodon umefoliae: Shinji, 1941: 1007 (partim) & 1944: 544 (partim).

Myzus cerasi umefoliae: Takahashi, 1965a: 53.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Prunus* sp. & *Galium* sp.). Honshû—Taishi (ex *Prunus mume*, R. Takahashi leg.) & Suibun (ex *Artemisia capillaris*, R. Takahashi leg.), Ôsaka Pref.

Host plants: Primary hosts—*Prunus* spp. (including *P. mume*). Secondary hosts—*Galium* sp. & *Artemisia capillaris*. Furthermore, in the literature are recorded as hosts various plant genera such as *Asperula* & *Euphrasia* (in England, after Doncaster, 1961), *Cardamine* & *Cornopus* (in New Zealand, after Cottier, 1953) and *Veronica* (in Australia, after Eastop, 1966).

Distribution: Cosmopolitan.

2. ***Myzus yamatonis***, sp. n.

Myzus sakurae: Moritsu, 1947: 42; Takahashi, 1965a; 70.
Prunomyzus sakurae: Tao, 1963: 168 & 1967: 3; Paik, 1965: 69.

This species has hitherto beed erroneously identified with *Myzus sakurae* Matsumura which is, in reality, a species of *Tuberocephalus*. As no proper scientific name

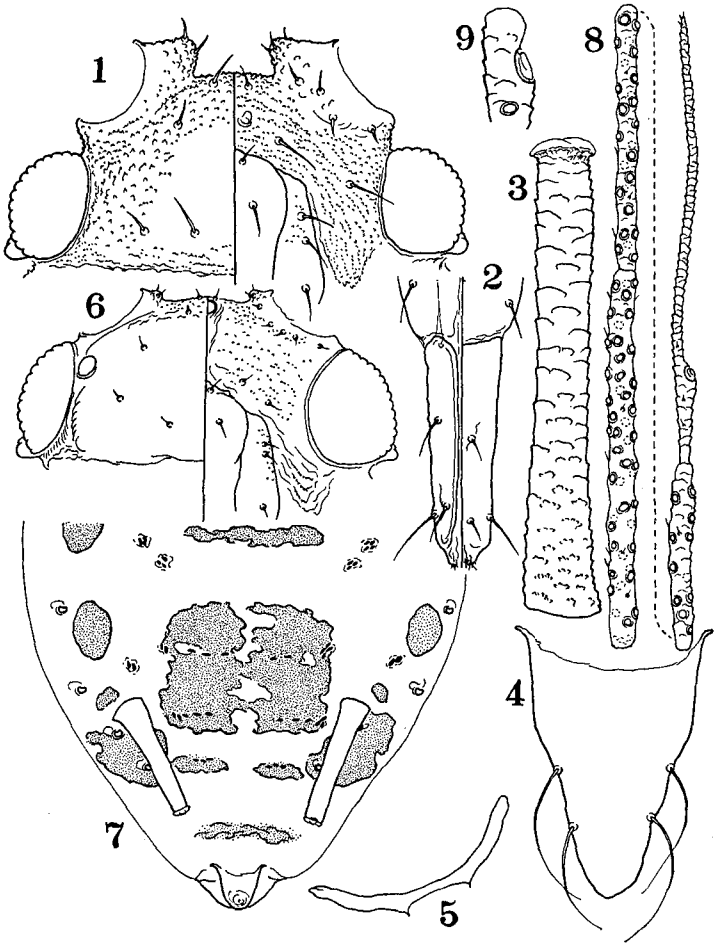

Fig. 29. *Myzus yamatonis*, sp. n. Apterous alienicola:— 1, head; 2, ultimate rostral segment; 3, siphunculus; 4, cauda; 5, mesosternal furca. Alate alienicola:— 6, head; 7, pattern of sclerites of abdomen; 8, antenna (3rd–6th segments); 9, apical part of 5th antennal segment.

has been proposed for the present species, it is described here as a new species. Takahashi (1965) and Moritsu (1947) give detailed accounts of the fundatrigeniae. On this occasion a brief description of the alienicolae may be given as follows:—

Apterous alienicola. Body black in life. Antenna pale, black apically. Legs pale;

tibiae at apex and tarsi black. Eye, siphunculus and cauda black. Body oval, 1.4–1.6 mm. in length.

Head with dorsal setae blunt or pointed, at most 1.3 times as long as middle width of 3rd antennal segment. Antenna 6-segmented, imbricated throughout, 0.7–0.9 as long as body; 3rd segment with setae 1/3–1/2 as long as middle width of the segment; processus terminalis about 3 times as long as basal part of 6th. Mandibular lamina spinulous, with 3 or 4 setae. Rostrum reaching hind coxa; ultimate segment slender, 1.7 times as long as 2nd segment of hind tarsus, 2.7–3.0 times as long as wide, with 4–7 secondary setae. Prothorax with a marginal tubercle on each side. Femora smooth or weakly imbricated apically; tibiae smooth, with setae about as long as middle width of hind tibia; 1st tarsal chaetotaxy 3 : 3 : 2. In larva hind tibia smooth, sometimes spinulated. Abdominal tergum strongly sclerotized, pigmented and wrinkled; 2nd–4th segments each with 2–4 blunt setae besides marginal ones, these setae being about 1/3–1/2 as long as middle width of 3rd antennal segment, with or without marginal tubercles; 6th with 2 or 3 setae between siphunculi; distance between 6th and 7th spiracles as long as that between 5th and 6th; 8th with 2–4 pointed setae, of which the longest is 1.1–1.4 times as long as middle width of 3rd antennal segment. Genital plate oval. Siphunculus slender, cylindrical, sometimes slightly dilated subapically, imbricated, 8–10 times as long as wide at middle, a little shorter than head breadth across eyes, with a distinct flange. Cauda about 2/5 as long as siphunculus, with 4–6 setae.

Measurements in mm. Body 1.6; antennal segments (1st–6th): 0.07, 0.05, 0.29, 0.20, 0.16, 0.10+0.32; ultimate rostral segment 0.12; hind femur 0.47; hind tibia 0.86; hind tarsus (2nd segment) 0.07; siphunculus 0.31; cauda 0.13; dorsal setae 0.009–0.033 on head, about 0.013 on abdominal disc and 0.028 on 8th abdominal segment.

Alate alienicola. Head smooth dorsally, finely spinulated ventrally; dorsal setae pointed, about half as long as middle width of 3rd antennal segment. Antenna fuscous, as long as or a little shorter than body; 3rd segment with 46–48 rhinaria scattered on whole surface of the segment; 4th with 23–27 rhinaria; 5th with 8–10 secondary rhinaria and with a large, cilia-less primary rhinarium; processus terminalis about 3 times as long as basal part of 6th. Wings of normal venation. Abdomen membranous, with developed intersegmental areolations, without marginal tubercles, with sclerites as follows:—a perforated central sclerite extending on 4th–6th segments; antesiphuncular sclerite small; postsiphuncular sclerite well developed, fused with marginal sclerite on 7th; narrow transverse bands on 1st–3rd and 8th; a pair of pleural sclerites on 7th. Siphunculus cylindrical, dilated at base, spinulously imbricated, 7–8 times as long as wide at middle. Cauda conical, with 5 setae. Body 1.6–1.8 mm. in length.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.09, 0.06, 0.43, 0.29, 0.20, 0.12+0.38; ultimate rostral segment 0.12; hind femur 0.48; hind tibia 1.00; hind tarsus (2nd segment) 0.07; siphunculus 0.25; cauda ?; dorsal setae 0.009–0.033 on head, about 0.013 on abdominal disc and 0.020 on 8th abdominal segment.

Specimens examined: Syntypes—28 apterous fundatrigeniae, Morioka, Iwate Pref., 4-ix-64, ex *Prunus* sp., no. 595; Tôkyô, 18-viii-64, ex *Prunus yedoensis*, no. 484, & 23-vii-56, ex *Prunus* sp., R. Takahashi leg.; Kawachi-nagano, Ôsaka Pref., 13-v-62 & 11-ix-60, ex *Prunus* sp., R. Takahashi leg. 7 apterous and 2 alate alienicolae, Ogose,

Saitama Pref., 14-x-66, ex *Salvia nipponica*, no. 2045.

Host plants: Primary hosts—*Prunus* spp. (cherry trees) including *P. yedoensis*. Secondary hosts—*Salvia nipponica*. This aphid causes a heavy leaf-curl on cherry trees. The alienicolae have been collected from the flower part of *Salvia nipponica*.

Distribution: Japan; Korea; China; Taiwan.

In the antennal rhinariation and the abdominal sclerotization of the alate viviparous female, this species is closely related to *M. malisuctus* Matsumura, from which it may be distinguished by the round genital plate, etc. as shown in the key.

As apparent from the specimens examined, this aphid is seen on *Prunus* through the growing season. This suggests that the migration of the aphid to *Salvia* may be facultative.

3. ***Myzus malisuctus*** Matsumura

Myzus malisuctus Matsumura, 1918: 16.
Myzus malisuctus: Hori, 1929: 91; Shinji, 1941: 939 & 1944: 528; Takahashi, 1965a: 61.
Aphis japonica Essig et Kuwana, 1918: 70.
Myzus japonica: Monzen, 1929: 53.
Myzus sp., Takahashi, 1925a: 13.
Myzus takahashii Strand, 1929: 22.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Malus pumila*, *M. baccata* var. *mandschurica* & *Chaenomeles speciosa*). Honshû—Tsumagoi, Gumma Pref. (ex *Malus sieboldii*, R. Takahashi leg.); Yasu, Shiga Pref, (ex *Malus pumila*, K. Ando leg.); Kyôto (ex *Malus pumila*, M. Sorin leg.); Ôsaka (ex *Malus pumila*, M. Sorin leg.). An alate viviparous female collected at Nishigahara, Tôkyô Distr., ex *Malus pumila*, S. I. Kuwana leg. (holotype of *Aphis japonica* Essig et Kuwana).

Host plants: *Malus pumila*, *M. sieboldii*, *M. baccata* var. *madschurica* & *Chaenomeles speciosa*; a plant of Compositae (after Moritsu, 1954).

Distribution: Japan; China; Taiwan.

4. ***Myzus parthenocissi*** Takahashi

Myzus parthenocissi Takahashi, 1965a: 65.

Specimens examined: Some apterous viviparous females collected at Ôdaigahara, Nara Pref. (ex *Parthenocissus tricuspidata*, M. Sorin leg., syntypes of *M. parthenocissi* Takahashi).

Host plants: *Parthenocissus tricuspidata*.

Distribution: Japan.

This species is readily distinguished from any other congeneric species from Japan by the abdomen of the apterous viviparous female bearing a large central sclerite and postsiphuncular sclerites.

5. ***Myzus dycei*** Carver

Myzus dycei Carver, 1961: 69.
Myzus dycei: Takahashi, 1965a: 76; Eastop, 1966: 464.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Urtica platyphylla*). Kyûshû—Hirado, Nagasaki Pref. (ex *Urtica thumbergiana*).

Host plants: *Urtica platyphylla* & *U. thunbergiana* (in Japan); *U. incisa* (in Australia, after Carver, 1961).

Distribution: Japan; Nepal; Australia.

This species is easily recognized by the peculiar shape of the siphunculus. In general appearance the species is close to *M. siegesbeckiae* Takahashi and its allies, from which it may differ on account of the 6th abdominal segment not reduced in size.

6. ***Myzus siegesbeckicola*** Strand

Myzus sp., Takahashi, 1925a: 14.
Myzus siegesbeckicola Strand, 1929: 22.
Myzus siegesbeckicola: Takahashi, 1937c: 93; Tao, 1963: 171 & 1967: 13.

This species is new to Japan. On the basis of the present specimens a redescription may be given as follows:—

Apterous viviparous female. Body pale green to dark green in life. Eye black. Antenna pale, black apically. Legs pale; tibiae at apex and tarsi black. Siphunculus pale, fuscous at apex. Cauda pale. Body elongately oval, 1.2–1.4 mm. in length.

Head scabrous over venter and on dorsum except at central area; dorsal setae minute and blunt. Antennal tubercle well developed, protruding inward. Antenna 6-segmented, 3rd and 4th or 3rd–5th segments fused in some specimens, as long as or a little shorter than body, imbricated throughout, without secondary rhinaria; processus terminalis about 4.0–4.5 times as long as basal part of 6th. Mandibular lamina imbricated, with 2 or 3 setae. Rostrum reaching hind coxa; ultimate segment 3–4 times as long as wide, 1.3–1.4 times as long as 2nd segment of hind tarsus, with 4–6 secondary setae. Prothorax with a marginal tubercle on each side. Femora roughly imbricated on apical 2/3, with short, blunt setae. Tibiae imbricated dorso-basally (especially so in hind leg), rather sparsely haired, the longest setae being about as long as middle width of hind tibia. In larva hind tibia wanting spinules. First tarsal chaetotaxy 3 : 3 : 2, rarely 3 : 3 : 3. Abdominal tergum pale, weakly sclerotic, faintly papillated or wrinkled, strongly scabrous around 6th and 7th spiracles; 2nd–4th segments with mesial and marginal setae in single pairs, with small, indistinct marginal tubercles, and with protuberant spiracular plates; 6th with spiracles closely placed to those of 7th, without mesial setae; 7th produced posteriorly, with a pair of mesial setae; 8th with 2–4 minute setae. Genital plate triangular, with 5–8 setae along hind margin and a pair of setae anteriorly. Siphunculus straight, tapering, strongly imbricated, 12–14 times as long as wide at middle, 3.5–4.0 times as long as cauda, with a distinct flange; distance between siphunculi short. Cauda conical apically, cylindrical basally, about 1.5 times as long as wide, with 5 or 6 setae.

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.07, 0.06, 0.29, 0.19, 0.14, 0.10+0.41; ultimate rostral segment 0.12; hind femur 0.47; hind tibia 0.84; hind tarsus (2nd segment) 0.09; siphunculus 0.42; cauda 0.12; dorsal setae 0.008 on head, 0.006 on abdominal disc and on 8th abdominal segment.

Specimens examined: Some apterous viviparous females, Yoan, Amami-ôshima Isl., 4-v-65, ex *Siegesbeckia pubescens*.

Host plants: *Siegesbeckia pubescens* (in Japan). *S. orientalis* (in Formosa, after Takahashi, 1925); *S. glabrescens* (in Korea, after Paik, 1965).

Distribution: Japan; Korea; Taiwan; Sumatra.

This species may be close to *M. siegesbeckiae* Takahashi and *M. isodonis* (Takahashi), from which it is readily distinguished by the genital plate produced posteriorly, by the abdominal tergum less strongly sclerotized and by the larvae with the hind tibia bearing no spinules.

7. ***Myzus siegesbeckiae*** Takahashi

Myzus siegesbeckiae Takahashi, 1965a: 73.

Takahashi (1965) gives a detailed account of this species on the apterous viviparous female. The alate viviparous female differs therefrom as follows:—

Head sparsely spinulous dorsally and ventrally; antennal tubercle only slightly bulging. Antenna dark brown (in cleared and mounted specimens), 0.8 as long as body; 3rd segment with 26–28 large rhinaria distributed on whole surface of the segment, about as long as 4th and 5th together; 4th with 9 or 10 rhinaria; 5th with 1–3 secondary rhinaria and a ciliated primary rhinarium; processus terminalis 3.5–4.0 times as long as basal part of 6th. Wings of normal venation, narrowly and faintly bordered along veins. Ultimate rostral segment 1.4–1.6 times as long as 2nd segment of hind tarsus. Femora spinulated and darkened apically; tibiae dark at apex, smooth, with pale striations basally. Abdomen with well developed sclerites as follows:—a large central sclerite extending on 3rd–6th segments, partly broken into separate bands on 3rd and 6th; a transverse band on 1st, 2nd, 7th and 8th each; marginal sclerites on 2nd–6th (those on 7th are connected with transverse band). Intersegmental areolations also developed. Distance between 6th and 7th spiracles about as long as that between 5th and 6th. Siphunculus dark brown, moderately imbricated, slightly dilated at base and apex, 9–11 times as long as wide at middle, about 2.5 times as long as cauda.

Measurements in mm. Body 1.4; antennal segments (1st–6th): 0.08, 0.06, 0.31, 0.17, 0.13, 0.08+0.32; ultimate rostral segment 0.12; hind femur 0.37; hind tibia 0.72; hind tarsus (2nd segment) 0.08; siphunculus 0.24; cauda 0.09; dorsal setae 0.018 on head, 0.015 on abdominal disc, 0.018 on 8th abdominal segment.

Apterous viviparous female. In the specimens collected at Mt. Maya, Hyôgo Pref. (21–viii–58, M. Sorin leg.), the head is quite smooth and the tibiae are hardly imbricated.

Specimens examined: A few alate viviparous females, Ôsaka, 22–vii–56, M. Sorin leg. A lot of apterous viviparous females collected at the following localities:—Honshû—Sukayu, Aomori Pref. (ex *Plectranthus trichocarpus*); Mt. Hayachine, Iwate Pref. (ex *Plectranthus* sp.); Kawatabi, Miyagi Pref. (ex *Plectranthus inflexus*); Mt. Yahiko, Niigata Pref. (R. Takahashi leg., syntypes of *M. siegesbeckiae* Takahashi); Mt. Iwawaki, Mt. Nijô & Taishi, Ôsaka Pref. (R. Takahashi leg.); Mt. Maya, Hyôgo Pref. (M. Sorin leg.).

Host plants: *Plectranthus* spp. (including *P. inflexus* & *P. trichocarpus*). Takahashi (1965) gives with doubt *Siegesbeckia glabrescens* as a host plant. This may not be a true host of the aphid.

Distribution: Japan.

8. ***Myzus isodonis*** (Takahashi), comb. n.

Metaphorodon isodonis Takahashi, 1965a: 37.

Specimens examined: A few apterous viviparous females collected at Mt. Tanzawa, Kanagawa Pref. (ex *Plectranthus* sp., R. Takahashi leg., syntypes of *Metaphorodon isodonis* Takahashi).

Host plants: *Plectranthus* sp. (=*Isodon* sp.).

Distribution: Japan.

In the original description this species is referred to *Metaphorodon* on account of the tapering, flange-less siphunculus. Apart from the peculiar siphunculus, however, this species is very closely allied to *M. siegesbeckiae* Takahashi.

9. ***Myzus ascalonicus*** Doncaster

Myzus ascalonicus Doncaster, 1946: 27.
Myzus (Nectarosiphon) ascalonicus: Stroyan, 1954: 13; Eastop, 1958: 54; Takahashi, 1965a: 50.
Myzus (Sciamyzus) ascalonicus: Eastop, 1966: 466.
Rhopalomyzus ascalonicus: Heinze, 1961: 834.

Specimens examined: Some apterous viviparous females collected at Mt. Kongô, Ôsaka Pref. (ex *Rorippa indica*, *Stellaria* sp. & *Viola* sp., R. Takahashi leg.).

Host plants: Polyphagous. In Japan this aphid is recorded from *Rorippa indica*, *Stellaria* sp. & *Viola* sp.

Distribution: Japan; Europe; North America; Australia; New Zealand.

10. ***Myzus lactucicola*** Takahashi

Myzus lactucicola Takahashi, 1934: 245.
Myzus lactucicola: Takahashi, 1965a: 59.

Specimens examined: Some apterous and alate viviparous females collected at the following localities:— Honshû—Iwami, Tottori Pref. (ex *Lactuca* sp., M. Sorin leg.). Kyûshû—Kumamoto (ex *Youngia japonica*); Naze & Asato, Amami-ôshima Isl. (R. Takahashi leg.).

Host plants: *Youngia japoncia* & *Lactuca* sp.; *Crepidiastrum lanceolatum* (after Takahashi, 1934).

Distribution: Japan.

This species may be close to *M. asteriae* Shinji, differing from the latter chiefly by the abdominal tergum of the apterous viviparous female deeply pigmented and by the antenna of the alate viviparous female bearing secondary rhinaria on the 3rd, 4th and often also 5th segments.

11. ***Myzus asteriae*** Shinji

Myzus asteriae Shinji, 1941: 905.
Myzus asteriae: Shinji, 1944: 523; Takahashi, 1965a: 50.

Specimens examined: Many apterous and alate viviparous females have been examined, their localities being as follows:— Honshû—Sukayu, Aomori Pref. (ex *Aster* sp.); Koiwai, Iwate Pref. (ex *Aster* sp.); Tôkyô (ex *Aster* sp.); Ôsaka (ex *Aster* sp., R. Takahashi leg.); Iwakuni, Yamaguchi Pref. (ex *Kalimeris yomena*); Taisha, Shimane Pref. (ex *Aster* sp.). Kyûshû—Hitoyoshi, Kumamoto Pref. (ex *Kalimeris yomena*); Asato, Amami-ôshima Isl. (ex *Kalimeris yomena*).

Host plants: *Kalimeris yomena* & *Aster* spp.

Distribution: Japan.

12. ***Myzus persicae*** (Sulzer)

Aphis persicae Sulzer, 1776: 105.
Myzus persicae: Hori, 1929: 99; Shinji, 1941: 959 & 1944: 531; Palmer, 1952: 340; Cottier, 1953: 281; Tao, 1963: 171 & 1967: 11; Takahashi, 1965a: 67; Paik, 1965: 67.
Myzus (Nectarosiphon) persicae: Eastop, 1958: 55 & 1966: 465.
Myzodes persicae: Heinze, 1960: 842.

Specimens examined: Numerous specimens have been examined, their localities being as follows:— Hokkidô—Sapporo; Obihiro; Kushiro; Kunneppu; Kitami-mombetsu. Honshû—Sukayu, Aomori Pref.; Morioka, Iwate Pref.; Kawatabi, Miyagi Pref.; Niigata; Utsunomiya, Tochigi Pref.; Kamikôchi, Nagano Pref. (H. Higuchi leg.); Wakayama (R. Takahashi leg.); Ôsaka (R. Takahashi leg.); Shimonoseki, Yamaguchi Pref. Shikoku—Kôchi (H. Takada leg.). Kyûshû—Fukuoka; Saga; Nagasaki & Hirado, Nagasaki Pref.; Kumamoto, Yatsushiro & Hitoyoshi, Kumamoto Pref.; Miyazaki & Hyûga, Miyazaki Pref.; Kagoshima; Uragami & Ôkachi, Amami-ôshima Isl.

Host plants: Polyphagous.

Distribution: Cosmopolitan.

13. ***Myzus varians*** Davidson

Myzus varians Davidson, 1912: 409.
Myzus varians: Takahashi, 1924: 29; Tao, 1963: 171 & 1967: 16; Paik, 1965: 67.
Myzus (Nectarosiphon) varians: Takahashi, 1965a: 78.
Phorodon varians: Heinze, 1960: 831.
Myzus tropicalis Takahashi, 1923: 24 & 81.
Macrosiphum sumomocola Monzen, 1929: 70. **Syn. n.**

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Honshû—Kawatabi, Miyagi Pref. (ex *Prunus persica*); Ôizawa, Yamagata Pref. (ex *Prunus persica*); Tôkyô (ex *Prunus persica*); Kyôto (ex *Prunus persica*, H. Takada leg.); Mt. Ikoma (ex *Prunus persica*, R. Takahashi leg.) & Mt. Iwawaki (ex *Clematis* sp., R. Takahashi leg.), Ôsaka Pref. Kyûshû—Nagasaki (ex *Clematis terniflora* var. *robusta* & *C. apiifolia*); Uragami & Yoan, Amami-ôshima Isl. (ex *Prunus persica*).

Host plants: Primary hosts—*Prunus persica*; *P. salicina* (after Monzen, 1929). Secondary hosts—*Clematis* spp. (including *C. terniflora* var. *robusta* & *C. apiifolia*).

Distribution: Japan; Korea; China; Taiwan; Europe; North America.

14. ***Myzus mushaensis*** Takahashi

Myzus sakurae (?): Takahashi, 1925a: 15.
Myzus mushaensis Takahashi, 1931: 67.
Myzus mushaensis: Moritsu, 1947: 46; Takahashi, 1965a: 64.
Prunomyzus mushaensis: Tao, 1963: 169 & 1967: 2.

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Mt. Iwawaki, Ôsaka Pref. (ex *Prunus* sp., R. Takahashi leg.); Wakayama & Kibi, Wakayama Pref. (ex *Prunus* spp., R. Takahashi leg.); Iwami-masuda, Shimane Pref. (ex *Prunus* sp.). Kyûshû—Ibusuki, Kagoshima Pref. (ex *Prunus* sp.).

Host plants: *Prunus* spp. (cherry trees).

Distribution: Japan; Taiwan.

15. ***Myzus mumecola*** (Matsumura)

Macrosiphum mumecola Matsumura, 1917: 399.
Myzus mumecola: Hori, 1929: 97; Shinji, 1941: 946 & 1944: 530; Takahashi, 1965a: 62.
Myzus umecola Shinji, 1924: 368.

Specimens examined: Many apterous and alate viviparous females collected at Sapporo, Hokkaidô (ex *Prunus mume*).

Host plants: *Prunus mume*; *P. armeniaca* var. *ansu* (after Hori, 1929).

Distribution: Japan.

Unlike the typical members of *Myzus*, this species has long pointed setae on the body and antennae as Takahashi (1965) has already pointed out. It should be noted, however, that in certain species such as *M. persicae* (Sulzer) and *M. varians* Davidson setae on the body and antennae of the apterous fundatrigeniae (on *Prunus*) are pointed and much longer than those of the apterous alienicolae.

16. ***Myzus boehmeriae*** Takahashi

Myzus boehmeriae Takahashi, 1923: 26.
Myzus boehmeriae: Takahashi, 1965a: 52; Tao, 1963: 171 & 1967: 8.

Alate male. Differs from the alate viviparous female in the following points:—

Antenna 1.3–1.5 times as long as body, with numerous rhinaria, the number of secondary rhinaria being 46–50 on 3rd segment, about 25 on 4th and 10–15 on 5th. Mesosternum smooth. Abdomen with central patch divided into segmentally arranged bands; anterior 4 segments each with 5 or 6 setae between marginal sclerites; 8th with 2 setae. Siphunculus subcylindrical or distinctly swollen apically, 3 times as long as cauda, about half as long as 3rd antennal segment. Cauda 1.2–1.4 times as long as wide. Body 1.5–1.7 mm. in length.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.10, 0.07, 0.46, 0.38, 0.36, 0.16+0.60; ultimate rostral segment 0.11; hind femur 0.55; hind tibia 1.02; hind tarsus (2nd segment) 0.07; siphunculus 0.24; cauda 0.08; dorsal setae 0.020 on head, 0.015 on abdominal disc, 0.030 on 8th abdominal segment.

Oviparous female. Closely resembles the apterous viviparous female, differing in the following points:—

Ultimate rostral segment 1.2–1.4 times as long as 2nd segment of hind tarsus. Hind tibia slightly swollen at middle. Abdominal tergum areolated. Siphunculus 7–9 times as long as wide at middle, 2.5–3.0 times as long as cauda which is 1.3–1.5 times as long as wide.

Measurements in mm. Body 1.6; antennal segments (1st–6th): 0.09, 0.07, 0.35, 0.27, 0.23, 0.14+0.50; ultimate rostral segment 0.11; hind femur 0.49; hind tibia 0.89; hind tarsus (2nd segment) 0.08; siphunculus 0.34; cauda 0.12; dorsal setae 0.018–0.025 on head, 0.010 on abdominal disc, 0.026 on 8th abdominal segment.

Specimens examined: Males and oviparae, Kawachi-nagano, Ôsaka Pref., 11-xi-56, ex *Boehmeria spicata*, R. Takahashi leg. Many apterous and alate viviparous females have also been examined, their localities being as follows:— Honshû—Lake Kamakita, Saitama Pref. (ex *Boehmeria spicata*); Kawachi-nagano & Mt. Iwawaki, Ôsaka Pref. (ex *Boehmeria nipononivea* & *B. spicata*, R. Takahashi leg.). Kyûshû—Takachiho, Miyazaki Pref. (ex *Boehmeria spicata*); Sata, Kagoshima Pref. (ex *Boehmeria nipononivea*); Tekibu, Amami-ôshima Isl. (ex *Boehmeria nipononivea*).

Host plants: *Boehmeria nipononivea* & *B. spicata*.

Distribution: Japan; Taiwan.

The occurrence of the ovipara on *Boehmeria* shows that this aphid may complete its life-cycle on *Boehmeria*.

17. ***Myzus philadelphi*** Takahashi

Myzus philadelphi Takahashi, 1965a: 67.

Fundatrix. Closely resembles the apterous viviparous female, slightly differing therefrom as follows:—

Head with dorsal setae blunt and minute (8–10 μ in length); antennal tubercles strongly diverging at inner sides, not gibbous at inner apex (in apterous viviparous female gibbous, though hardly protruding inward). Antenna 5-segmented, processus terminalis 1.5 times as long as basal part of 5th segment. Mesosternal furca sessile, the basal part being much wider than length of arms. Dorsal setae of abdomen minute, roughly equal in length to those of head.

Measurements in mm. Body 2.3; antennal segments (1st–5th): 0.10, 0.07, 0.66, 0.36, 0.20+0.31; ultimate rostral segment 0.12; hind femur 0.63; hind tibia 1.08; hind tarsus (2nd segment) 0.12; siphunculus 0.62; cauda 0.22.

Specimens examined: A fundatrix, Matsuyama, Ehime Pref., 30-iv-65, H. Takada leg. Many apterous and alate viviparous females collected at Nara (ex *Philadelphus* sp., R. Takahashi leg.) and Chihaya, Ôsaka Pref. (ex *Deutzia crenata*, R. Takahashi leg.) (syntypes of *M. philadelphi* Takahashi); Kyôto (H. Takada leg.); Matsuyama (H. Takada leg.).

Host plants: *Philadelphus* sp. & *Deutzia crenata*.

Distribution: Japan.

This is an aberrant member of the genus, peculiar in the membranous abdominal tergum and in the fat body covered with thick wax wool in life (in the apterous viviparous female). It is also characteristic of the species that in the alate viviparous female the rhinaria of the antenna are in most cases bunched together on the basal half of the 3rd antennal segment.

18. ***Myzus stellariae*** (Strand)

Amphorophora sp., Takahashi, 1925a: 27.

Amphorophora stellariae Strand, 1929: 22.

Myzus stellariae: Takahashi, 1931: 70 & 1965a: 74; Tao, 1963: 170 & 1967: 14.

Specimens examined: Some apterous and alate viviparous females collected at Tôkyô (ex *Stellaria* sp., R. Takahashi leg.).

Host plants: *Stellaria* sp.

Distribution: Japan; Taiwan.

This species is unique in that the central abdominal sclerite of the alate viviparous female occupies the 3rd and 4th abdominal tergites only. In the apterous viviparous female the species is characterized mainly by the head markedly convex at front, by the ultimate rostral segment spindle-shaped and by the swollen siphunculus.

19. ***Myzus japonensis*** Miyazaki

Myzus japonensis Miyazaki, 1968b: 274.

Fundatrix. Much resembles the apterous viviparous female, differing therefrom

by the following aspects:—

Antennal tubercle with apical projection shorter than wide. Antenna only 0.7–0.8 as long as body; processus terminalis 3.0–3.5 times as long as basal part of 6th; 3rd–6th segments as 42 : 24 : 24 : 13+40 in length. Ultimate rostral segment 1.0–1.3 times as long as 2nd segment of hind tarsus, with 4 secondary setae. Mesosternal furca with short arms widely separated from each other. Siphunculus 12–16 times as long as wide at middle, about 3.0–3.5 times as long as cauda.

Measurements in mm. Body 2.2; antennal segments (1st–6th): 0.10, 0.07, 0.44, 0.28, 0.26, 0.11+0.38; ultimate rostral segment 0.11; hind femur 0.61; hind tibia 1.00; hind tarsus (2nd segment) 0.09; siphunculus 0.61; cauda 0.18; dorsal setae 0.009–0.018 on head, about 0.008 on abdominal disc, 0.015 on 8th abdominal segment.

Specimens examined: Some fundatrices, Sapporo, Hokkaidô, 19–v–68. Many apterous and alate viviparous females collected at Sapporo & Akkeshi, Hokkaidô, and some alate males and oviparous females collected at Sapporo (syntypes of *M. japonensis* Miyazaki).

Host plants: All the specimens examined were collected from *Rosa rugosa*.

Distribution: Japan.

This species and the following *M. asamensis* Takahashi may belong to the same species-group which is characterized by the small protuberance on the inner apex of the antennal tubercle.

20. ***Myzus asamensis*** Takahashi

Myzus asamensis Takahashi, 1965a: 71.

Specimens examined: A few apterous viviparous females collected at Karuizawa, Nagano Pref. (ex ? *Saxifraga* sp., R. Takahashi leg., syntypes of *M. asamensis* Takahashi).

Host plants: ? *Saxifraga* sp.

Distribution: Japan.

21. ***Myzus ranunculinus*** (Walker)

Aphis ranunculina Walker, 1852: 1046.

Acyrthosiphon ranunculinum: Mordvilko, 1919: 239.

Myzus ranunculinus: Theobald, 1926: 316.

Tubaphis ranunculina: Hille Ris Lambers, 1947: 312; Doncaster, 1961: 113; Heinze, 1961: 29.

Myzus (*Tubaphis*) *ranunculinus*: Stroyan, 1954: 15; Takahashi, 1965a: 70.

Specimens examined: Some apterous viviparous females collected at Mt. Iwawaki, Ôsaka Pref. (ex *Ranunculus* sp., R. Takahashi leg.).

Host plants: *Ranunculus* sp.

Distribution: Japan; Europe.

22. ***Myzus kawatabiensis***, sp. n.

Apterous viviparous female. Body in life orange-red to brick-red; head black. Antenna pale, dusky apically. Legs pale; femora at apex, tibiae at apex and tarsi fuscous. Siphunculus and cauda black. Body roundly oval, 1.1–1.3 mm. in length.

Head on dorsal disc with coarse papillae, mingled with fine granules marginally and mesially, the ventral surface being roughly granulated; dorsal setae pointed,

somewhat shorter than middle width of 3rd antennal segment. Antennal tubercles small, gibbous, diverging at inner sides, each with 2 or 3 setae apically and 1 or 2 setae ventrally. Antenna 6-segmented, imbricated throughout, about half length of body; 3rd segment with a few pointed setae at most half as long as middle width of the segment; processus terminalis 2.5–3.0 times as long as basal part of 6th; 3rd–6th as 11 : 6 : 6 : 5+15 in length. Mandibular lamina roughly imbricated, with 1 or 2

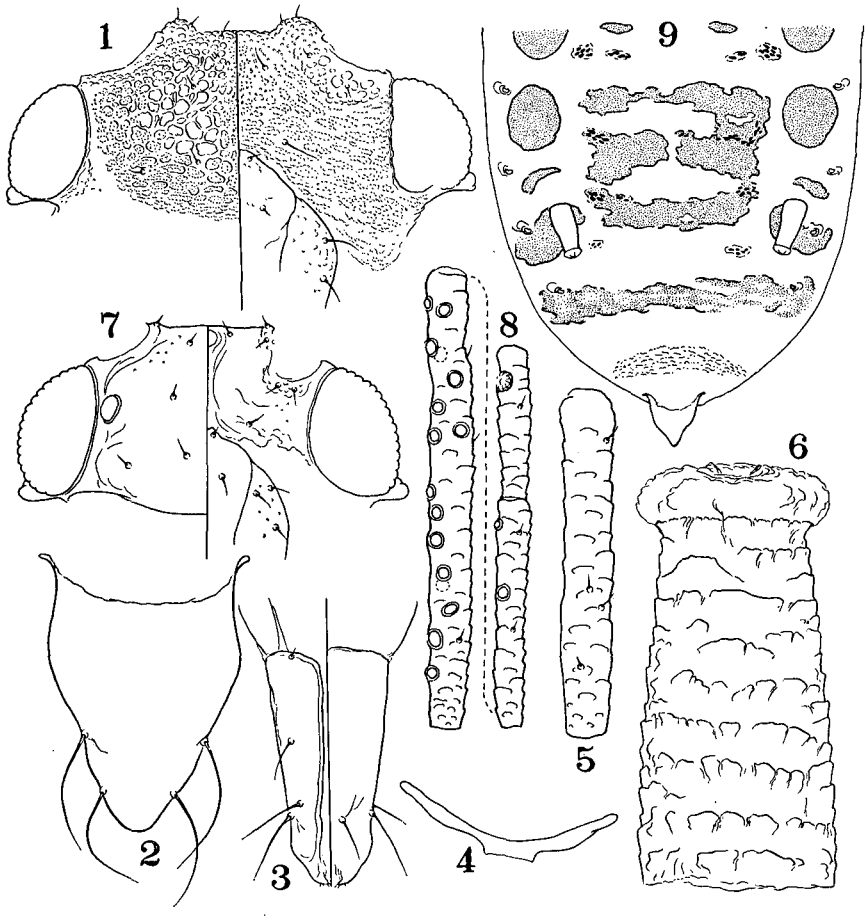

Fig. 30. *Myzus kawatabiensis*, sp. n. Apterous viviparous female:— 1, head; 2, cauda; 3, ultimate rostral segment; 4, mesosternal furca; 5, antenna (3rd segment); 6, siphunculus. Alate viviparous female:— 7, head; 8, antenna (3rd–5th segments); 9, pattern of sclerites of abdomen.

setae. Rostrum reaching middle coxa; ultimate segment tapering, 1.1–1.3 times as long as 2nd segment of hind tarsus, as long as or shorter than siphunculus, with 2 thin secondary setae. Prothorax without marginal tubercles. Mesosternal furca sessile. Femora imbricated along whole length in fore and middle legs, sparsely and weakly imbricated at apex in hind leg, with pointed setae at most about half as long as

middle width of hind femur. Tibia smooth, with setae nearly as long as middle width of hind tibia. In larva hind tibia spinulated apically. Tarsi with 2nd segment bearing 1 or 2 secondary setae dorsally; first tarsal chaetotaxy 3 : 3 : 2. Abdominal tergum smooth, membranous, with dark intersegmental areolations and frequently with sporadic brown blotches of irregular size, without marginal tubercles; 2nd–4th segments each with 4 or 5 pointed setae besides marginal ones, these setae being about half as long as middle width of 3rd antennal segment; 6th with 2 or 3 setae between siphunculi; 7th usually with 4 setae between spiracles; 8th with 2 setae; distance between 6th and 7th spiracles about as long as that between 5th and 6th. Genital plate oval, with 9–11 setae along hind margin and a pair of setae anteriorly. Siphunculus tapering, sometimes constricted at extreme base, strongly imbricated, about 2.5 times as long as wide at middle, only a little longer than cauda, with a well developed flange. Cauda galeate, somewhat longer than wide, with 2–4 (mostly 4) setae.

Measurements in mm. Body 1.2; antennal segments (1st–6th): 0.06, 0.04, 0.15, 0.09. 0.08, 0.07+0.18; ultimate rostral segment 0.08; hind femur 0.27; hind tibia 0.46; hind tarsus (2nd segment) 0.07; siphunculus 0.08; cauda 0.07; dorsal setae 0.018 on head, 0.010 on abdominal disc, 0.020 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Head nearly smooth or with sparse small spinules dorsally, with some imbrications antero-ventrally; antennal tubercle very small. Antenna 2/3–5/7 as long as body; 3rd segment with 12–17 rhinaria; 4th with 1–5 rhinaria; 5th with 0 or 1 secondary rhinarium; processus terminalis 2.5–3.5 times as long as basal part of 6th; 3rd–6th as 28 : 17 : 11 : 9+25 in length. Wings of normal venation. Abdomen with transverse bands on 4th–6th segments, which are often broken at middle or connected with each other laterally, with marginal sclerites developed on 2nd–6th, those on 5th being small, sometimes with pleural sclerites on 3rd, and with a transverse band on 7th. Body 1.5–1.6 mm. in length.

Measurements in mm. Body 1.5; antennal segments (1st–6th): 0.07, 0.06, 0.31, 0.17, 0.10, 0.09+0.27; ultimate rostral segment 0.08; hind femur 0.39; hind tibia 0.72; hind tarsus (2nd segment) 0.07; siphunculus 0.08; cauda 0.08; dorsal setae 0.018 on head and on abdominal disc, 0.025 on 8th abdominal segment.

Specimens examined: Syntypes—43 apterous and 3 alate viviparous females, Kawatabi, Miyagi Pref., 8-x-66, ex *Polygonum thunbergii*, no. 2009.

Host plants: *Polygonum thunbergii*. The infested leaves are curled up marginally.

Distribution: Japan.

This species may be distinguished from any other species of *Myzus* by the membranous abdominal tergum bearing sporadic brown blotches, by the short, strongly imbricated siphunculus and by the characteristically sculptured head of the apterous viviparous female.

Judging from the original description, *M. polygoniyonai* Shinji may resemble the present species. However, it sharply differs from the latter in the apterous viviparous female which has many dark brown plates on the abdomen at the bases of the dorsal setae.

23. ***Myzus hemerocallis*** Takahashi

Myzus hemerocallis Takahashi, 1921b: 24.

Myzus hemerocallis: Takahashi, 1965a: 59.

Myzus hemerocallidis: Tao, 1963: 171 & 1796: 9.

Specimens examined: Some apterous viviparous females collected at Yokohama, Kanagawa Pref. (ex *Hemerocallis* sp., Yoshida leg.).

Host plants: *Hemerocallis* sp. Tao (1967) gives *H. auranticae* & *H. fulva* as hosts in China.

Distribution: Japan; China; Taiwan.

Judging from a diagnosis given by Tao (1967), this species is erratic in that the central abdominal sclerite of the alate viviparous female is undeveloped. In other respects the species comes near *M. varians* Davidson, from which it is readily distinguished by the following characters of the apterous viviparous female:—Antenna only half as long as body, not markedly pigmented on each of 3rd–5th segments apically, with processus terminalis at most 3 times as long as basal part of 6th segment; siphunculus shorter than head width across eyes, the flange being slightly slanting; cauda 1.4–1.5 times as long as wide, with 4 setae.

24. ***Myzus clematophilus*** Takahashi

Myzus (Tubaphis) clematophilus Takahashi, 1965a: 55.

Specimens examined; A few apterous and alate viviparous females collected at Makiosan (R. Takahashi leg.) & Sakai (M. Sorin leg.), Ôsaka Pref. (syntypes of *M. (T.) clematophilus* Takahashi).

Host plants: All the specimens examined were collected from *Clematis* sp.

Distribution: Japan.

On account of the absence of the central abdominal sclerites in the alate viviparous female, this species may not be a true representative of *Myzus*. However, I prefer to follow Takahashi (1965) in including the species in *Myzus*, since in other characters it comes most closely to *M. ranunculinus* (Walker).

25. ***Myzus fatouae*** Shinji

Myzus fataunae Shinji, 1924: 367.

Myzus fataunae: Shinji, 1941: 919; Takahashi, 1965a: 56.

Specimens examined: Many apterous and some alate viviparous females (neotypes of *M. fataunae* Shinji designated by Takahashi, 1965) collected at the following localities:— Honshû—Tôkyô (ex *Pilea hamaoi*, M. Sorin leg.); Ôsaka (ex *Pilea hamaoi*, M. Sorin leg.); Mt. Kongô (ex *Boehmeria* sp., M. Sorin leg.) & Kawachi-nagano (ex *Boehmeria* sp. M. Sorin leg.), Ôsaka Pref.

Host plants: *Pilea hamaoi* & *Boehmeria* sp.; *Fatoua villosa* (after Shinji, 1924).

Distribution: Japan.

This species is erratic in that the alate viviparous female is devoid of central sclerites on the abdomen. In other features it comes closest to *M. cerasi* (Fabricius). The *ranunculinus*-like cauda, which is constricted just basally, may not necessarily mean a close affinity of the species to *M. ranunculinus* (Walker), as the same caudal character also occurs in various species such as *M. japonensis* Miyazaki, *M. siegesbeckiae* Takahashi and their relatives.

The specific name of this aphid should be spelled *fatouae* (nec *fataunae*), since the host plant recorded in the original description of the species is *Fatoua villosa* (nom. Jap.: Kuwakusa), from which the aphid name has apparently been formed.

26. ***Myzus pileae*** Takahashi

Myzus pileae Takahashi, 1965a: 68.

Specimens examined: Many apterous and some alate viviparous females collected at Hirao, Ôsaka Pref. (ex *Pilea hamaoi*, M. Sorin leg., syntypes of *M. pileae* Takahashi).

Host plants: *Pilea hamaoi.*

Distribution: Japan.

In general appearance this species resembles *M. fatouae* Shinji, from which it differs in the alate viviparous female mainly by the antennal rhinariation; in the apterous viviparous female it differs from *fatouae* by the caudal length, etc. as shown in the key.

37. Genus ***Neotoxoptera*** Theobald

Neotoxoptera Theobald, 1915: 131 [type-species: (*Neotoxoptera violae* Theobald, 1915, nec *Rhopalosiphum violae* Pergande, 1900)=*Micromyzus oliveri* Essig, 1935].

Key to the species

Alate viviparous female

1 Antenna with about 45–50 rhinaria on 3rd segment; primary rhinarium on the 5th very large, protuberant, without cilia. Head smooth dorsally. Abdomen with central sclerite small, not touching marginal sclerites. Yellowish brown in life. On *Allium*. . . . . 1. *N. formosana* (Takahashi)

– Antenna with 6–13 rhinaria on 3rd segment; primary rhinarium on the 5th of normal size, flat, with cilia. Head spinulous dorsally. Abdomen with central sclerite large, often touching marginal sclerites. Greenish in life. On *Abelia*. . . . . 2. *N. abeliae* Takahashi

1. ***Neotoxoptera formosana*** (Takahashi)

Fullawayella formosana Takahashi, 1921b: 29.
Fullawayella formosana: Takahashi, 1923: 33 & 89; Shinji, 1941: 1046.
Micromyzus formosanus: Takahashi, 1929: 251.
Neotoxoptera formosanus: Tao, 1963: 168 & 1966: 26.
Micromyzus alliumcepa Essig, 1936: 157.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Tôkyô (ex *Allium fistulosum*); Ôsaka (ex *Allium cepa*, R. Takahashi leg.); Shimonoseki, Yamaguchi Pref. (ex *Allium* sp.).

Host plants: *Allium* spp. (including *A. fistulosum* & *A. cepa*).

Distribution: Japan; China; Taiwan.

2. ***Neotoxoptera abeliae*** Takahashi

Neotoxoptera abeliae Takahashi, 1965c: 34.

Specimens examined: Many alate viviparous females and a few fundatrices collected at Mt. Kongô, Ôsaka Pref. (ex *Abelia spathulata*, R. Takahashi leg., syntypes of *N. abeliae* Takahashi).

Host plants: *Abelia spathulata.*

Distribution: Japan.

38. Genus ***Neomyzus*** van der Goot

Neomyrus van der Goot, 1915: vii [type-species: *Siphonophora circumflexa* Buckton, 1876].

1. ***Neomyzus circumflexus*** (Buckton)

Siphonophora circumflexa Buckton, 1876: 130.

Myzus circumflexus: Theobald, 1926: 331; Hori, 1929: 87; Shinji, 1941: 913; Palmer, 1952: 336.

Neomyrus circumflexus: van der Goot, 1915: vii.

Neomyzus circumflexus: van der Goot, 1917b: 50; Eastop, 1958: 58 & 1966: 467; Tao, 1963: 176; Paik, 1965: 71.

Aulacorthum (Neomyzus) circumflexum: Hille Ris Lambers, 1949: 198; Takahashi, 1965b: 109.

Aulacorthum circumflexum: Cottier, 1953: 242.

Specimens examined: Some apterous viviparous females collected at Mt. Kongô (ex *Corydalis* sp., R. Takahashi leg.) & Chihaya (ex *Corydalis ophiocarpa*, M. Sorin leg.), Ôsaka Pref.

Host plants: Polyphagous. In Japan this aphid is recorded from the following plants:—*Corydalis ophiocarpa* & *Corydalis* sp.; *Cyclamen europeanum*, *Calceolaria corymbosa*, *Heliotrops laevis*, *Cineraria renifolia* & *Gloxinia digitaliflora* (after Hori, 1929).

Distribution: Cosmopolitan.

39. Genus ***Kaochiaoja*** Tao

Kaochiaoja Tao, 1963: 169 [type-species: *Myzus arthroxoni* Takahashi, 1921].

1. ***Kaochiaoja pollinae*** (Shinji), comb. n.

Macrosiphum pollinae Shinji, 1924: 364.

On the basis of the present specimens, a redescription may be given as follows:—

Apterous viviparous female. Body in life pale salmon-pink, orange-red or reddish brown; head and a large patch on abdomen black. Antenna pale; flagellum black apically. Legs pale; tibiae at apex and tarsi black. Siphunculus black, pale at middle. Cauda same in colour as body. Body oval, 1.0–1.3 mm. in length.

Head strongly scabrous over dorsum and venter; frontal setae blunt, usually more than half as long as middle width of 3rd antennal segment, other dorsal setae being minute; ventral setae long and pointed. Antennal tubercles diverging at inner sides, each with 1 apical and 1 or 2 ventral setae. Antenna 1.1–1.3 times as long as body, without secondary rhinaria; processus terminalis 5–6 times as long as basal part of 6th segment; 3rd–6th segments as 31 : 22 : 17 : 9+52 in length. Clypeus smooth, with 2 or 4 setae anteriorly; mandibular lamina spinulous, with 2 setae. Rostrum attaining or just passing middle coxa; ultimate segment short, tapering, somewhat rostrate, as long as or shorter than 2nd segment of hind tarsus, with 2 secondary setae. Mesosternal furca sessile. Femora imbricated apically, with short, blunt setae. Tibiae smooth (hind tibia weakly imbricated at apex), with setae shorter than middle width of hind leg. In larva hind tibia densely spinulous apically. Tarsi with 2nd segment bearing 0–2 dorsal and 0 or 1 ventral secondary setae; 1st tarsal chaetotaxy 3 : 3 : 2, rarely 3 : 3 : 3. Pronotum wrinkled, with a pair of brown spots postero-pleurally and a pair of small marginal tubercles; mesonotum pigmented, sometimes pale mesially; metanotum and abdominal tergum fused together, with a large horseshoe-shaped patch extending down to 5th abdominal segment; 6th–8th abdominal segments each with a brown band. Abdomen, as well as meso- and metathorax, with wart-like areolations

dorsally, without marginal tubercles; 2nd–4th segments with mesial and marginal setae in single pairs, with or without a pair of pleural setae, these setae being minute and blunt; 8th with 4 setae 1/2–4/5 as long as width of 3rd antennal segment. Genital plate oval, with 6–8 setae along hind margin and a pair of setae anteriorly. Siphunculus slender, tapering or cylindrical apically, imbricated, 11–14 times as long as wide at middle, about as long as head breadth across eyes, with a distinct flange. Cauda conical, 1/3–3/7 as long as siphunculus, with 4–6, mostly 5 setae.

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.07, 0.06, 0.33, 0.25, 0.20, 0.10+0.51; ultimate rostral segment 0.07; hind femur 0.46; hind tibia 0.90;

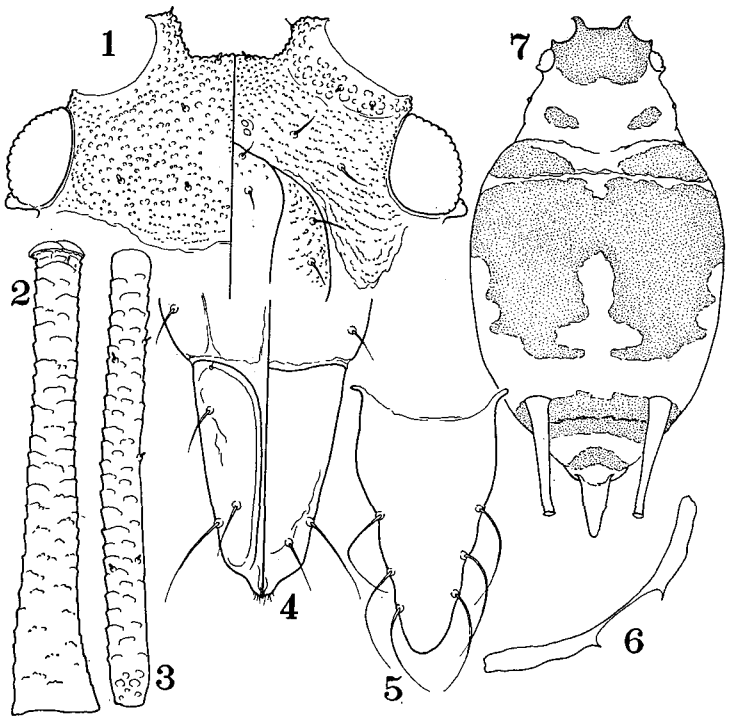

Fig. 31. *Kaochiaoja pollinae* (Shinji). Apterous viviparous female:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, ultimate rostral segment; 5, cauda; 6, mesosternal furca; 7, pattern of pigmentation of body.

hind tarsus (2nd segment) 0.08; siphunculus 0.35; cauda 0.16; dorsal setae about 0.005 on cephalic and abdominal discs, 0.015 on 8th abdominal segment.

Specimens examined: Many apterous viviparous females, Kawatabi, Miyagi Pref., 23-viii-67, ex *Digitaria adscendens*; Tôkyô, 20-x-64, ex *Microstegium vimineum*; Nikkô, Tochigi Pref., 6-x-67, ex *Microstegium vimineum*.

Host plants: *Microstegium vimineum* & *Digitaria adscendens*.

Distribution: Japan.

Judging from its original description, *K. arthroxoni* (Takahashi) from Taiwan resembles closely *K. pollinae* (Shinji). In the present paper *pollinae* is for the time

being separated from *arthroxoni* by the black head and the roughly imbricated siphunculus.

40. Genus ***Myzosiphum*** Tao

Myzosiphum Tao, 1964b: 229 [type-species: *Myzosiphum ryukyuense* Tao, 1964].

This genus is monobasic, characterized by the reticulated siphunculus combined with scabrous, converging antennal tubercles.

1. ***Myzosiphum ryukyuense*** Tao

Myzosiphum ruykyuensis Tao, 1964b: 229.

Specimens examined: No representatives of this species have been available to the present study.

Host plants: *Polygonum* sp. (after Tao, 1964).

Distribution: Japan (Ryukyu).

The name of this species was originally spelled "*ruykyuensis*". It seems that this spelling is an apparent lapsus for *ryukyuensis*, as "*ryukyuensis*" formed from "Ryukyu Islands" appears elswhere in the original publication.

31. Genus ***Micromyzus*** van der Goot

Micromyzus van der Goot, 1917b: 52 [type-species: *Micromyzus nigrum* van der Goot, 1917].
Myzopsis Matsumura, 1918: 19 [type-species: *Myzopsis diervillae* Matsumura, 1918]. **Syn. n.**

Eastop (1955) has divided this genus into 3 subgenera, *Micromyzus*, *Micromyzella* and *Kugegania*. *Myzopsis* Matsumura is, in my opinion, at most of subgeneric value, being allied to the subgenus *Micromyzus* in the first tarsal chaetotaxy. It differs, however, from the latter by the alate viviparous female with a central abdominal sclerite and with wing veins only narrowly bordered as in *Micromyzella*, and by the larvae with spinulous hind tibia. So far as their habits are known, the species of this genus are mostly anholocyclic or holocyclic on ferns.

Key to the species

1 Antenna with flagellum pale basally; 3rd segment without rhinaria; processus terminalis twice as long as basal part of 6th segment. Siphunculus slender, dilated basally, much longer than head width across eyes. Tibiae pale basally. First segment of all tarsi with 4 (sometimes 3) setae. Larva with spinulous hind tibia. Green in life. On *Weigela*. . . . . 1. *M. diervillae* (Matsumura)

– Antenna with flagellum wholly black; 3rd segment with a few rhinaria; processus terminalis over 2.5 times as long as basal part of 6th segment. Siphunculus stout, not longer than head width across eyes. Tibiae wholly black. First segment of all tarsi with 3 setae. Larva with smooth hind tibia. 2

2(1) Antenna with 3rd segment shorter than head width across eyes; processus terminalis 2.5–3.5 times as long as basal part of 6th segment. Cauda elongate and round at apex, over twice as long as wide. Yellow in life. On *Osmunda*. . . . . 2. *M. osmundae* Takahashi

– Antenna with 3rd segment longer than head width across eyes; processus terminalis 4–5 times as long as basal part of 6th segment. Cauda shortly triangular, about 1.4 times as long as wide. Whitish to pale yellow in life. On *Athyrium*. . . 3. *M. nikkoensis* Miyazaki

1. ***Micromyzus diervillae*** (Matsumura), comb. n.

Myzopsis diervillae Matsumura, 1918: 19.

Micromyzus weigelae Takahashi, 1965c: 28. **Syn. n.**

Specimens examined: Some apterous and alate viviparous females (syntypes of *Micromyzus weigelae* Takahashi) collected at the following localities in Honshû:— Kobuka, Ôsaka Pref. (ex *Weigela hortensis*, R. Takahashi leg.); Mt. Rokkô, Hyôgo Pref. (ex *Weigela coraeensis*, R. Takahashi leg.).

Host plants: *Weigela hortensis* & *W. coraeensis*; *W. japonica* (=*Diervilla japonica*; after Matsumura, 1918).

Distribution: Japan.

Having compared the original description of *Myzopsis diervillae* Matsumura with syntypes of *Micromyzus weigelae* Takahashi, I have been convinced that they are synonymous.

2. ***Micromyzus osmundae*** Takahashi

Micromyzus osmundae Takahashi, 1963: 59.

Specimens examined: A few apterous viviparous females collected at Karuizawa, Nagano Pref. (ex *Osmunda claytoniana*, R. Takahashi leg., syntypes of *M. osmundae* Takahashi).

Host plants: *Osmunda claytoniana*.

Distribution: Japan.

3. ***Micromyzus nikkoensis*** Miyazaki

Micromyzus nikkoensis Miyazaki, 1968c: 20.

Specimens examined: Some apterous viviparous females collected at Nikkô, Tochigi Pref. (ex *Athyrium pycnosorum*, syntypes of *M. nikkoensis* Miyazaki).

Host plants: *Athyrium pycnosorum*.

Distribution: Japan.

42. Genus ***Pentalonia*** Coquerel

Pentalonia Coquerel, 1859: 259 [type-species: *Pentalonia nigronervosa* Coquerel, 1859].

This is a peculiar genus distributed in the tropical and subtropical regions. It comprises 2 species, *P. gavarri* Eastop and *P. nigronervosa* Coquerel, the latter having been reported from the southernmost part of Japan.

1. ***Pentalonia nigronervosa*** Coquerel

Pentalonia nigronervosa Coquerel, 1859: 260.

Pentalonia nigronervosa: Hille Ris Lambers, 1949: 221; Tao, 1963: 163 & 1966: 2; Eastop, 1958: 60 & 1966: 470.

Pentalonia caladii van der Goot, 1917b: 57.

Specimens examined: Some apterous viviparous females collected in Okinawa (ex *Alpinia japonica*, K. Iba leg.).

Host plants: *Alpinia japonica*. Furthermore, this aphid is recorded from various plants of Musaceae, Araceae, Zingiberaceae and Commelinaceae (after Eastop, 1966).

Distribution: Circumtropical.

43. Genus ***Trichosiphonaphis*** Takahashi

Trichosiphonaphis Takahashi, 1922: 205 [type-species: *Myzus polygoniformosanus* Takahashi, 1921].

Xenomyzus Aizenberg, 1935: 152 [type-species: *Xenomyzus corticis* Aizenberg, 1935]. **Syn. n.**

Acanthulipes Börner, 1952: 132 [type-species: (*Alphitoaphis carpathica* Knechtel et Manolache, 1942)=*Xenomyzus corticis* Aizenberg, 1935].

Metaphorodon Takahashi, 1961d: 1 [type-species: *Phorodon ishimikawae* Shinji, 1941]. **Syn. n.**

Aphorodon Takahashi, 1961d: 3 [type-species: *Myzus polygonifoliae* Shinji, 1944]. **Syn. n.**

Hille Ris Lambers (1969) pointed out that *Acanthulipes* Börner, *Metaphorodon* Takahashi and *Aphorodon* Takahashi should be suppressed as synonyms of *Xenomyzus* Aizenberg which is, according to him, a taxon separate from *Trichosiphonaphis* Takahashi. In the present paper, however, *Xenomyzus* is considered to be of subgeneric value at most, since they differ from each other essentially in the shape of the siphunculi alone.

This genus is comparatively rich in species in South-East Asia. So far as their habits are known, the species of this genus are associated with *Lonicera* as primary hosts and with *Polygonum* as secondary hosts. From Japan have been known 8 species, of which one is new to science and other one new to Japan.

Key to the species

1 Siphunculus with a distinct flange. 2
– Siphunculus without a flange. 3
2(1) Siphunculus with about 15–30 setae which are longer than width of flange. Cauda with 4 or 5 setae. Tibiae spinulated except at apex. Body dull yellow to nearly black. . . . . 1. *T. polygoniformosana* (Takahashi)
– Siphunculus with about 5–20 setae which are shorter than width of flange. Cauda with 9–15 setae. Tibiae smooth, at most spinulous on apical half. Body dark brown to black. . . . . 2. *T. lonicerae* (Uye)
3(1) Siphunculus tapering toward apex, not swollen apically. 4
– Siphunculus narrowest near middle, more or less dilated apically. 6
4(3) Antenna about as long as body; 1st segment with a finger-like projection at inner apex. Ultimate rostral segment 1.3–1.4 times as long as 2nd segment of hind tarsus. Body yellow. . . . . 3. *T. cornuta*, sp. n.
– Antenna much shorter than body; 1st segment without a finger-like projection at inner apex. Ultimate rostral segment 1.0–1.2 times as long as 2nd segment of hind tarsus. . . 5
5(4) Siphunculus pale. Tibiae nearly smooth basally, spinulated apically. Body yellow. . . . . 4. *T. ishimikawae* (Shinji)
– Siphunculus black. Tibiae scabrous except at apex. Body dark green. . . . . 5. *T. polygoni* (van der Goot)
6(3) Siphunculus about 15 times as long as wide at middle, much longer than head width across eyes. Cauda with over 10 setae. Body greenish brown. . . . . 6. *T. horii*, nom. n.
– Siphunculus at most 13 times as long as wide at middle, as long as or shorter than head width across eyes. Cauda with less than 10 setae. 7
7(6) Head with ventral setae minute and blunt like dorsal ones; antennal tubercles roundly diverging at inner sides. Siphunculus with a weak constriction at tip. Cauda with 6–9 setae. Body brown or reddish brown. . . . . 7. *T. polygonifoliae* (Shinji)
– Head with ventral setae pointed, much longer than dorsal ones; antennal tubercles often angulated, slightly protruding inward at apex. Siphunculus without a constriction at tip. Cauda with 5–7 setae. Body dark green or dark yellowish brown. . . . 8. *T. tade* (Shinji)

1. ***Trichosiphonaphis polygoniformosana*** (Takahashi)

Myzus polygoniformosanus Takahashi, 1921b: 18.

Trichosiphonaphis polygoniformosanus: Takahashi, 1922: 205, 1923: 19 & 1965c: 41; Shinji, 1941: 1041; Tao, 1963: 167 & 1966: 23; Paik, 1965: 63.

Specimens examined: Many apterous and a few alate viviparous females collected at the following localities:— Honshû—Kawatabi, Miyagi Pref. (ex *Polygonum thunbergii*); Kuroyama, Saitama Pref. (ex *Polygonum thunbergii*); Taishi (ex *Polygonum* sp., R. Takahashi leg.) & Mt. Nijôsan, (ex *Polygonum thunbergii*, M. Sorin leg.), Ôsaka Pref.

Host plants: *Polygonum* spp. (including *P. thunbergii*).
Distribution: Japan; Korea; Taiwan; China.

2. ***Trichosiphonaphis lonicerae*** (Uye)

Macrosiphum lonicerae Uye, 1923: 4.
Trichosiphonaphis lonicerae: Takahashi, 1965c: 43.

Specimens examined: Many apterous and a few alate viviparous females have been examined, their localities being as follows:— Honshû—Sendai, Miyagi Pref. (ex *Lonicera japonica*, H. Takada leg.); Tôkyô (ex *Lonicera japonica*, R. Takahashi leg.); Kyôto (ex *Lonicera japonica*, H. Takada leg.); Ôsaka (ex *Lonicera* spp., R. Takahashi leg.). Shikoku—Ichiu-mura, Tokushima Pref. (ex *Lonicera* sp., R. Takahashi leg.). Kyûshû—Dazaifu, Fukuoka Pref. (ex *Lonicera japonica*); Mt. Hikosan, Fukuoka Pref. (ex *Lonicera* sp., van den Bosh leg.); Kawakami, Saga Pref.; Kagoshima (ex *Lonicera japonica*).

Host plants: *Lonicera* spp. (including *L. japonica*).
Distribution: Japan.

3. ***Trichosiphonaphis cornuta***, sp. n.

Apterous viviparous female. Body yellow in life, oval, 1.2–1.3 mm. in length. Head densely scabrous over dorsum and venter; dorsal setae blunt or pointed, about as long as or longer than middle width of 3rd antennal segment by anterior ones, about 1/2 as long as that width by posterior ones; ventral setae pointed, about as long as anterior dorsal ones. Antennal tubercles developed, diverging at inner sides, each bearing a projection about as long as wide, with 1 or 2 setae on the projection and 2–4 setae mid-ventrally. Antenna 6-segmented, heavily imbricated throughout, about as long as body; 1st segment with a long finger-like projection protruding somewhat downward; 3rd with setae at most 1/3 as long as middle width of the segment; 5th about equal in length to 4th, with primary rhinarium wanting cilia; processus terminalis 3.5–4.0 times as long as basal part of 6th; 3rd–6th segments as 27 : 18 : 18 : 10 +35 in length. Clypeus with some spinules and 4 setae anteriorly; mandibular lamina densely scabrous, with 2 or 3 setae. Rostrum reaching hind coxa; ultimate segment parallel-sided or tapering, 1.3–1.4 times as long as 2nd segment of hind tarsus, about as long as basal part of 6th antennal segment, with 2–5 secondary setae. Femora imbricated except at base. Tibiae densely scabrous except at tip, with setae a little shorter than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 2; hind tarsus with 2nd segment bearing 1 or 2 setae dorsally and a seta ventrally. Abdominal tergum irregularly reticulated with ridged wrinkles, without marginal tubercles; first 5 segments with minute, blunt setae arranged in single pairs mesially and marginally; 6th with spiracle closely located to that of 7th, with a pair of mesial setae situated

a little ahead of line connecting siphunculi; 7th smooth, with a pair of long mesial and a pair of short pleural setae; 8th with 2 setae 0.8–1.4 times as long as middle width of 3rd antennal segment. Genital plate round, with 9–11 setae along hind margin and 7–9 setae anteriorly. Siphunculus pale, strongly scabrous, stout at base, tapering toward apex, truncate at tip, 10–13 times as long as wide at middle, distinctly longer than head width across eyes, with some short blunt setae, without flange. Cauda pale, 2/7–1/3 as long as siphunculus, attenuated at middle, slightly constricted at base, with 4 or 5 setae.

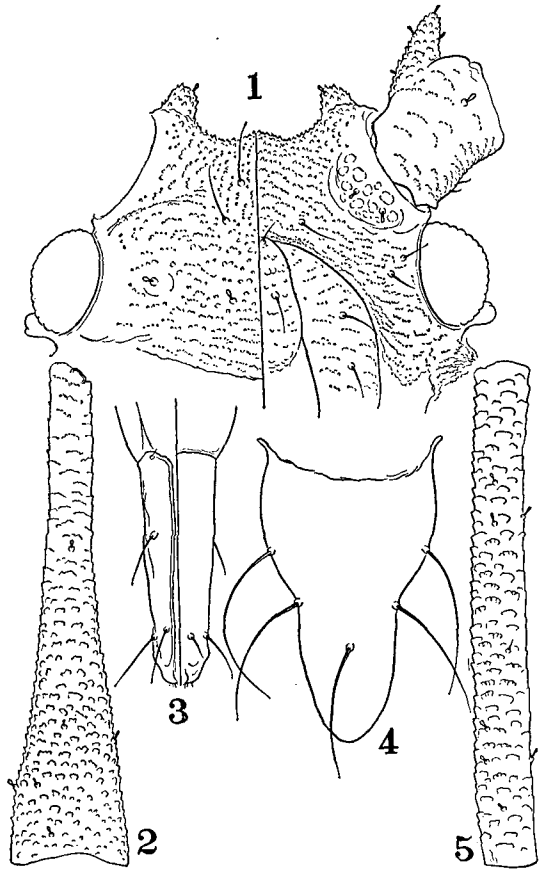

Fig. 32. *Trichosiphonaphis cornuta*, sp. n. Apterous viviparous female:— 1, head; 2, siphunculus; 3, ultimate rostral segment; 4, cauda; 5, antenna (3rd segment).

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.08, 0.06, 0.30, 0.21, 0.21, 0.10+0.39; ultimate rostral segment 0.11; hind femur 0.43; hind tibia 0.76; hind tarsus (2nd segment) 0.08; siphunculus 0.44; cauda 0.14; setal length:—0.035 on head antero-dorsally, 0.013 on head postero-dorsally, 0.008 on abdominal disc, 0.035 on 8th abdominal segment.

Specimens examined: Syntypes—9 apterous viviparous females, Mt. Daisen, Tottori Pref., 21-viii-67, ex *Polygonum thunbergii*, H. Higuchi leg., no. a359.

Host plants: *Polygonum thunbergii*.

Distribution: Japan.

This species is readily distinguished from any other congeneric species by the presence of a finger-like projection on the 1st antennal segment.

4. ***Trichosiphonaphis ishimikawae*** (Shinji), comb. n.

Phorodon ishimikawae Shinji, 1941: 994.

Metaphorodon ishimikawae: Takahashi, 1961d: 2.

Myzus polygoni (?): Takahashi, 1924: 106.

Specimens examined: A lot of apterous and some alate viviparous females collected at Tôkyô (R. Takahashi leg.) and Ôsaka (M. Sorin leg. & R. Takahashi leg.).

Host plants: All the specimens examined were collected from *Polygonum perfoliatum*.

Distribution: Japan.

5. ***Trichosiphonaphis polygoni*** (van der Goot)

Phorodon polygoni van der Goot, 1917b: 44.
Trichosiphonaphis polygoni: Takahashi, 1937: 205.
Metaphorodon polygoni: Tao, 1963: 167 & 1966: 22.

This species is new to Japan. On the basis of the present specimens, a brief redescription is given below.

Apterous viviparous female. Closely resembles *T. ishimikawae* (Shinji), differing therefrom as follows:—

Body in life dark green, sometimes nearly black, with mesial area of abdomen yellowish brown on account of embryos inside. Antenna black; 3rd segment yellowish brown or yellow at base. Legs yellow; femora and tibiae dusky at apex, tarsi black. Siphunculus brownish black. Cauda pale. Body 1.3–1.6 mm. in length.

Antenna 0.8–0.9 as long as body; 3rd–6th segments as 27 : 16 : 16 : 9+40 in length. Ultimate rostral segment 1.0–1.2 times as long as 2nd segment of hind tarsus. Tibiae distinctly scabrous except at apex. Siphunculus 10–11 times as long as wide at apex (13–17 times so in *ishimikawae*), distinctly shorter than 6th antennal segment (about as long as that segment in *ishimikawae*).

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.08, 0.06, 0.24, 0.16, 0.15, 0.09+0.42; ultimate rostral segment 0.09; hind femur 0.39; hind tibia 0.66; hind tarsus (2nd segment) 0.08; siphunculus 0.35; cauda 0.12; dorsal setae 0.006–0.013 on head, 0.008 on abdominal disc, 0.011 on 8th abdominal segment.

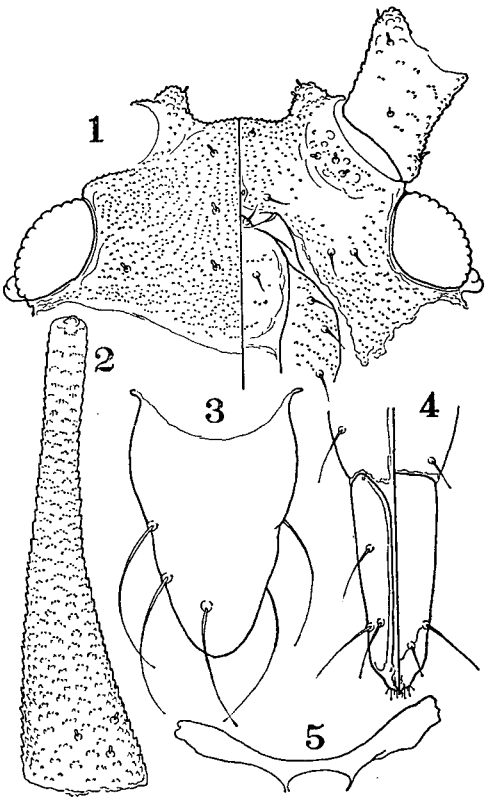

Fig. 33. *Trichosiphonaphis polygoni* (van der Goot). Apterous viviparous female:— 1, head; 2, siphunculus; 3, cauda; 4, ultimate rostral segment; 5, mesosternal furca.

Alate viviparous female. Slightly differs from the alate viviparous female of *T. ishimikawae* by the following points:—

Abdomen dark green, yellow centrally on account of embryos inside. Siphunculus black. Body 1.4–1.6 mm. in length. Head with fine spinules dorsally and ventrally. Antenna with fewer rhinaria, the number being 22–28 on 3rd segment, 9–14 on 4th and 4–9 on 5th. Hind wing with 1 or 2 oblique veins.

Measurements in mm. Body 1.6; antennal segments (1st–6th): 0.09, 0.06, 0.40, 0.21, 0.22, 0.11+0.55; ultimate rostral segment 0.09; hind femur 0.47; hind tibia 0.88; hind tarsus (2nd segment) 0.08; siphunculus 0.29; cauda 0.11; dorsal setae 0.006–0.013 on head, 0.008 on abdominal disc, 0.023 on 8th abdominal segment.

Specimens examined: Many apterous and alate viviparous females, Sapporo, Hokkaidô, 5- & 13-ix-68, ex *Polygonum longisetum*.

Host plants: *Polygonum longisetum* (in Japan). *P. serrulatum* (in China, after Takahashi, 1937); *P. perfoliatum* (in China, after Tao, 1966). This aphid has been collected from the root of the host.

Distribution: Japan; China; Taiwan; Java.

The present specimens (apterous viviparous females) agree well with the original description of *polygoni* van der Goot. Judging from a redescription of *polygoni* v. d. G. given by Tao (1966), the Japanese form may be slightly different from the Taiwanese one in the alate viviparous female with much fewer rhinaria on the antenna.

6. ***Trichosiphonaphis horii***, nom. n.

Aulacorthum lonicerae Hori, 1938: 161, nec *Macrosiphum lonicerae* Uye, 1923.
Acanthulipes (?) *lonicerae* (Hori): Takahashi, 1965c: 37.

Specimens examined: An apterous viviparous female, Sapporo, Hokkaidô, 8-vi-'22, ex *Lonicera morrowii*, M. Hori leg. (on this material is based the redescription of *lonicerae* Hori given by Takahashi, 1965). A few alate viviparous females (immigrants), Sapporo, 1-x-'24, ex *Lonicera morrowii*, M. Hori leg.

Host plants: *Lonicera morrowii*.

Distribution: Japan.

Takahashi (1965) has given a detailed redescription of this species. Contrary to the redescription, this species has some minute setae on the siphunculus. Therefore, the species comes near *T. polygonifoliae* (Shinji), from which it may be distinguished mainly by the following features:—In apterous viviparous female siphunculus longer, about 15 times as long as wide at middle (10–12 times so in *polygonifoliae*); in alate viviparous female (emigrant) antenna with more numerous rhinaria, i.e. 30–33 rhinaria on 3rd segment, 4 or 5 on 4th (after Hori, 1938) (in alate alienicola of *polygonifoliae* antenna with 16–25 rhinaria on 3rd segment, none on the 4th). To make further comparison with *polygonifoliae*, it is necessary to examine the alienicola of the present species, which presumably lives on *Polygonum* as *polygonifoliae* does.

7. ***Trichosiphonaphis polygonifoliae*** (Shinji), comb. n.

Myzus polygonifoliae Shinji, 1944: 536.
Aphorodon polygonifoliae: Takahashi, 1961d: 5.

Specimens examined: Many apterous and alate viviparous females collected at Sapporo, Hokkaidô and Hirao, Ôsaka Pref. (M. Sorin leg.).

Host plants: All the specimens examined were collected from *Polygonum longisetum*. The aphid infests the root of the host.

Distribution: Japan.

8. ***Trichosiphonaphis tade*** (Shinji), comb. n.

Carolinaia tade Shinji, 1927: 55.
Carolinaia tade: Shinji, 1941: 601.
Macrosiphum polygoni-japonica Shinji, 1941: 875. **Syn. n.**
Aphorodon polygoniphaga Takahashi, 1961d: 3. **Syn. n.**

Alate viviparous female. Body yellowish brown in life. Head, thorax and antenna black. Legs brown; femora at apex, tibiae at apex and tarsi black. Siphunculus

brown, black at apex. Cauda fuscous. Body 1.6–1.9 mm. in length.

Head spinulous on dorsum and venter; antennal tubercle small but distinct. Antenna 1.0–1.3 times as long as body; 1st segment spinulous; 2nd and following segments imbricated; 3rd with 29–47 rhinaria, with a few short setae; 4th with 12–22 rhinaria; 5th with 5–11 secondary rhinaria, with a large, cilia-less primary rhinarium; processus terminalis 5–6 times as long as basal part of 6th. Clypeus and mandibular lamina with fine spinules. Ultimate rostral segment 1.4–1.5 times as long as 2nd segment of hind tarsus, with 4 secondary setae. Femora spinulous except on basal part. Tibiae smooth, with setae about as long as middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3, rarely 3 : 3 : 2. Hind wing with 1 oblique vein. Abdomen with marginal sclerites on first 6 segments, with dorsal bands on 1st, 7th and 8th segments and with some small sclerites on 2nd and 6th segments, without marginal tubercles; 2nd–4th segments each with 3–5, mostly 4 minute setae between marginal sclerites; 6th with 2 setae between siphunculi; 7th with 4 setae; 8th with 2 setae 0.8–1.4 times as long as middle width of 3rd antennal segment. Siphunculus narrowest at middle, gradually dilated toward both ends, truncated at tip, spinulously imbricated, 9–10 times as long as wide at middle. Cauda shortly triangular, sometimes attenuated at middle, 1/4–1/3 as long as siphunculus, with 5 or 6 setae.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.08, 0.07, 0.53, 0.27, 0.25, 0.11+0.62; ultimate rostral segment 0.11; hind femur 0.52; hind tibia 0.94; hind tarsus (2nd segment) 0.08; siphunculus 0.27; cauda 0.09; dorsal setae 0.008–0.023 on head, 0.008 on abdominal disc, 0.038 on 8th abdominal segment.

Specimens examined: Some alate viviparous females, Ogose, Saitama Pref., 14-x-66. Many apterous viviparous females collected at the following localities in Honshû:—Ogose; Mt. Kongô (M. Sorin leg., syntypes of *Aphorodon polygoniphaga* Takahashi) & Hirao (R. Takahashi leg.), Ôsaka Pref.

Host plants: All the specimens examined were collected from *Polygonum thunbergii*. This aphid infests stalks of the host.

Distribution: Japan.

Having compared the original description of *Carolinaia tade* Shinji with the present specimens which should be identified with *Trichosiphonaphis polygoniphaga* (Takahashi), I have come to the conclusion that the two names should be united. Judging from the original description of *Macrosiphum polygonijaponica* Shinji, this also comes close to *T. polygoniphaga* (Tak.) except for the antenna which is about twice as long as the body. I am much inclined to the opinion that *polygonijaponica* Shinji, as well as *polygoniphaga* Takahashi, should be suppressed as a synonym of *tade* Shinji.

The specimens from Ogose slightly differ from the original descriptions of *tade* Shinji and *polygoniphaga* Takahashi in that the colour of the body is yellowish brown.

44. Genus ***Juncomyzus*** Hille Ris Lambers

Juncomyzus Hille Ris Lambers, 1965a: 193 [type-species: *Juncomyzus obscurus* Hille Ris Lambers, 1965].

This genus comes near *Taiwanomyzus* Tao chiefly because of such characters as follows:—in alate viviparous female abdomen without central sclerites and wing veins narrowly bordered; in apterous viviparous female head scabrous and antenna usually

with rhinaria on the 3rd segment; in larvae hind tibia smooth. It differs, however, from *Taiwanomyzus* by the low, diverging antennal tubercles and by the cylindrical siphunculi. In this paper will be given 4 species, of which 2 are described as new hereinafter. So far as their habits are known, the species are associated with *Rhus*, possibly as a primary host, and *Juncus* and *Carex* as secondary hosts.

Key to the species

1 Frontal sinus much wider than twice its depth. Femora strongly scabrous beyond apical half. 2

– Frontal sinus not wider than twice its width. Femora smooth or weakly imbricated on apical half. 3

2(1) Siphunculus tapering, longer than 3rd antennal segment. Abdominal tergum conspicuously reticulated. Antenna with 1–5 rhinaria on 3rd segment; processus terminalis 4 times as long as basal part of 6th segment. Dark yellowish brown to black in life. On *Juncus*. . . . . 1. *J. obscurus* Hille Ris Lambers

– Siphunculus somewhat swollen at middle, shorter than 3rd antennal segment. Abdominal tergum not reticulated. Antenna without rhinaria on 3rd segment; processus terminalis only twice as long as basal part of 6th segment. Blackish in life. On *Rhus*. . . . . 4. *J. niger*, sp. n.

3(1) Abdominal tergum sclerotized, pigmented. Antenna with processus terminalis 1.5–2.0 times as long as basal part of 6th segment. Ultimate rostral segment 1.0–1.1 times as long as 2nd segment of hind tarsus. Yellowish brown to reddish brown in life. On *Juncus* and *Carex*. . . . . 2. *J. floris*, sp. n.

– Abdominal tergum membranous, pale. Antenna with processus terminalis 2.5–3.0 times as long as basal part of 6th segment. Ultimate rostral segment 1.2 times as long as 2nd segment of hind tarsus. Yellowish brown in life. On *Rhus*. . . . . 3. *J. rhois* Takahashi

1. ***Juncomyzus obscurus*** Hille Ris Lambers

Juncomyzus obscurus Hille Ris Lambers, 1965a: 193.

Specimens examined: Many apterous and some alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Bibai (ex *Juncus effusus*). Honshû—Ôhazama, Iwate Pref. (ex *Juncus effusus*); Nara (ex ? *Juncus* sp., van den Bosh leg., paratypes of *J. obscurus* Hille Ris Lambers).

Host plants: *Juncus effusus*. This aphid makes colonies on leaves and stalks near the ground, often being covered with an earth shelter provided by ants.

Distribution: Japan.

2. ***Juncomyzus floris***, sp. n.

Apterous viviparous female. Body yellowish brown to reddish brown in life. Eye black. Antenna pale; flagellum at apex and basal 2 segments dark. Legs pale; femora at apex, tibiae at apex and tarsi black. Siphunculus black, paler basally. Cauda fuscous. Body oval, 1.4–1.7 mm. in length.

Head roughly trapezoid in outline, wrinkled dorsally, sparsely scabrous ventrally; frontal sinus very narrow; dorsal setae blunt, 1/3–1/2 as long as middle width of 3rd antennal segment. Antennal tubercle low but distinct, gibbous at inner apex, bulging ventrally, with 0–2 setae apically, 1–3 setae ventrally. Antenna about half as long as body, imbricated throughout; 3rd segment with 1 or 2 rhinaria near base, the rhinariated area being gently swollen; 4th subequal in length to 5th; processus terminalis about 1.5–2.0 times as long as basal part of 6th; 3rd–6th as 28 : 13 : 13 : 11+19 in

length. Rostrum reaching or passing middle coxa; ultimate segment 1.0–1.1 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Mesosternal furca sessile. Femora weakly imbricated at apex. Tibiae smooth, with setae shorter than middle width of hind tibia. In larva hind tibia smooth. First tarsal segment of all legs with 3 setae. Metanotum and first 7 abdominal tergites fused together, sclerotized, pigmented and wrinkled. Abdomen with 2nd–4th segments each bearing marginal tubercles and about 6 minute setae besides marginal ones; 8th free, with 2 or

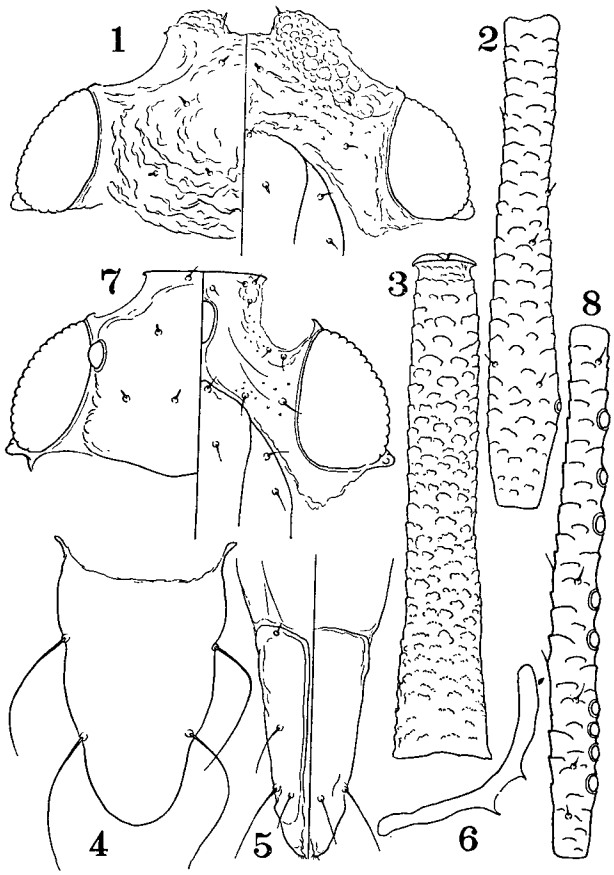

Fig. 34. *Juncomyzus floris*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (3rd segment); 3, siphunculus; 4, cauda; 5, ultimate rostral segment; 6, mesosternal furca. Alate viviparous female:— 7, head; 8, antenna (3rd segment).

3 setae at most 2/3 as long as middle width of 3rd antennal segment. Siphunculus cylindrical or gently tapering, attenuated at apex, sometimes slightly swollen apically, strongly imbricated, 7–8 times as long as wide at middle, as long as or shorter than head width across eyes. Cauda round at apex, at most 2/5 as long as siphunculus, with 4 or 5 setae.

Measurements in mm. Body 1.6; antennal segments (1st-6th): 0.06, 0.04, 0.23, 0.10, 0.11, 0.09+0.19; ultimate rostral segment 0.10; hind femur 0.40; hind tibia 0.69; hind tarsus (2nd segment) 0.10; siphunculus 0.36; cauda 0.15; longest dorsal seta 0.011 on head, 0.005 on abdominal disc, 0.015 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Abdomen in life dull yellow, reddish brown around siphunculi, with 3 rows of dark green longitudinal stripes. Head, thorax and antenna black. Siphunculus and cauda fuscous. Body 1.5–1.7 mm. in length.

Head sparsely spinulous ventrally; antennal tubercle low, gibbous apically. Antenna about 4/5 as long as body; 3rd segment with 9–15 large, flat rhinaria in a line along its whole length; processus terminalis about twice as long as basal part of 6th segment. Wings of normal venation. Abdomen membranous, without central sclerites; marginal sclerites developed on 2nd–4th and 6th segments, small on 1st and 5th; 2nd–4th segments each with 4–6 stiff pointed setae between marginal sclerites; 8th with 2 setae nearly as long as middle width of 3rd antennal segment. Siphunculus 7–10 times as long as wide at middle, about as long as 3rd antennal segment. Cauda conical, about 3/8 as long as siphunculus.

Measurements in mm. Body 1.6; antennal segments (1st-6th): 0.07, 0.06, 0.30, 0.20, 0.16, 0.13+0.26; ultimate rostral segment 0.09; hind femur 0.43; hind tibia 0.34; hind tarsus (2nd segment) 0.09; siphunculus 0.29; cauda 0.11; longest dorsal seta 0.015 on head, 0.010 on abdominal disc, 0.025 on 8th abdominal segment.

Specimens examined: Syntypes—15 apterous and 6 alate viviparous females, Sapporo, Hokkaidô, 27-vi-68 (no. 2497) & 21-vii-68 (no. 2512), ex *Carex rhynchophysa*; Sapporo, 21-vii-68, ex *Juncus effusus* var. *decipiens*, no. 2521. Some apterous and alate viviparous females have also been collected at Mt. Shirai, Hokkaidô, 24-vi-68, ex *Juncus effusus* var. *decipiens*.

Host plants: *Juncus effusus* var. *decipiens* & *Carex rhynchophysa*. This aphid infests the flower part of the hosts.

Distribution: Japan.

This species is readily distinguished from any other congeneric species by the short processus terminalis and by the sclerotized, pigmented and corrugated abdominal tergum of the apterous viviparous female.

3. ***Juncomyzus rhois*** (Takahashi), comb. n.

Myzus rhois Takahashi, 1924: 102.
Sitomyzus japonicus Takahashi, 1963: 58, partim.
Sumoia rhois: Hille Ris Lambers, 1965a: 195.

Specimens examined: A few apterous viviparous females, Hirao, Ôsaka Pref., 23-iv-61, ex *Rhus trichocarpa*, M. Sorin leg.

Host plants: *Rhus trichocarpa*; *R. verniciflua* (after Takahashi, 1924).

Distribution: Japan.

Under the name of *Sitomyzus japonicus* Takahashi, Takahashi (1963) has given a detailed redescription of this species on the apterous and the alate viviparous females and the fundatrix. Having reexamined his material, I have come to the conclusion that the specimens determined by him as the fundatrix of *japonicus* may belong to a different species, which is described below as *J. niger*, sp. n.

4. ***Juncomyzus niger***, sp. n.

Sitomyzus japonicus [fundatrix]: Takahashi, 1963: 58.

Apterous viviparous female. Body blackish brown in life, elongately oval, 1.8–2.0 mm. in length. In cleared specimens antenna dark brown, with 3rd segment pale except at apex; legs black except femora at extreme base and tibiae at base where they are pale; siphunculus and cauda black.

Head smooth dorsally, scabrous ventrally; dorsal setae blunt, 1/3–1/2 as long as middle width of 3rd antennal segment. Antennal tubercles very low and strongly diverging at inner sides, each bearing 0–2 setae apically, none ventrally; front weakly concave. Antenna 0.7 as long as body, roughly imbricated throughout; 3rd segment without rhinaria, with a few short setae; 4th equal in length to 5th; processus terminalis about twice as long as basal part of 6th. Rostrum reaching middle coxa; ultimate segment tapering, as long as 2nd segment of hind tarsus, with 2 secondary setae. Femora strongly spinulous except at base, with short stiff setae. Tibiae smooth, with setae much shorter than middle width of hind tibia. Tarsi with 2nd segment bearing 2 dorsal and 0–1 ventral secondary setae; first tarsal chaetotaxy 3 : 3 : 3. Thoracic and first 5 abdominal segments each with a sclerotic band which is partly fused with neighbouring ones or, in less sclerotized specimens, irregularly broken into several sclerites. Abdomen with 2nd–4th segments bearing marginal tubercles on small sclerites and 4 short blunt setae each; 5th with small antesiphuncular sclerites and 2 setae between siphunculus; 6th with large postsiphuncular sclerites; 8th with 2 setae 3/4 as long as middle width of 3rd antennal segment. Siphunculus somewhat swollen at middle, weakly imbricated, about 6 times as long as wide at middle, much shorter than head width across eyes, with a distinct flange. Cauda conical or attenuated on apical half, half as long as siphunculus, with 4 or 5 setae.

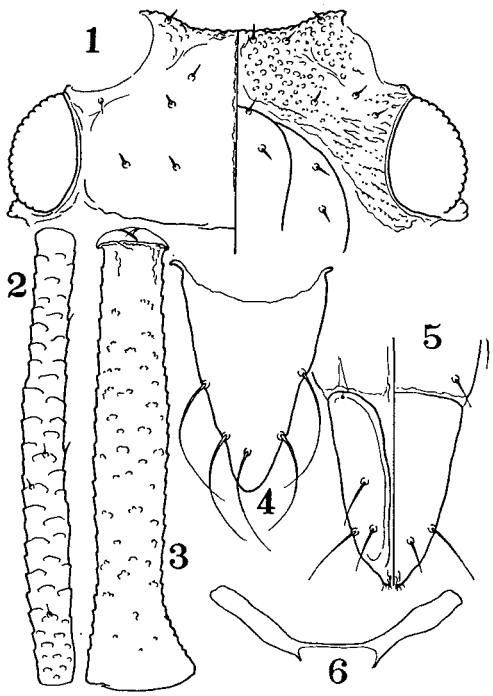

Fig. 35. *Juncomyzus niger*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (3rd segment); 3, siphunculus; 4, cauda; 5, ultimate rostral segment; 6, mesosternal furca.

Measurements in mm. Body 2.0; antennal segments (1st–6th): 0.09, 0.07, 0.36, 0.21, 0.21, 0.15+0.32; ultimate rostral segment 0.10; hind femur 0.46; hind tibia 0.80; hind tarsus (2nd segment) 0.10; siphunculus 0.30; cauda 0.16; longest dorsal seta 0.009 on head, 0.008 on abdominal disc, 0.019 on 8th abdominal segment.

Specimens examined: Syntypes—2 apterous viviparous females, Hirao, Ôsaka

Pref., 23-iv-61, ex *Rhus trichocarpa*, M. Sorin leg.

Host plants: *Rhus trichocarpa*.

Distribution: Japan.

This species is closely related to *J. rhois* (Takahashi), from which it differs by the following points:—(1) Abdominal tergum with pigmented sclerites. (2) Femora strongly spinulous. (3) Head with antennal tubercles very low and strongly diverging at inner sides. (4) Ultimate rostral segment shorter than in *rhois*. (5) Antenna without secondary rhinaria.

45. Genus ***Taiwanomyzus*** Tao

Taiwanomyzus Tao, 1963: 179 [type-species: *Myzus montanus* Takahashi, 1925].

This genus is close to *Micromyzus*, from which it may be distinguished by the combination of the following characters:—First tarsal chaetotaxy 3 : 3 : 3; alate viviparous female without central sclerites on abdomen; apterous viviparous female with secondary rhinaria distributed along whole length of 3rd antennal segment. The genus has been represented by a single species. On this occasion a new species is described.

Key to the species

1 Siphunculus wholly black, well imbricated, longer than head width across eyes. Antenna with 4–26 rhinaria on 3rd segment, with 0–4 rhinaria on 4th. Body in life dark yellow, black over dorsum. On *Astilbe*. . . . . 1. *T. montanus* (Takahashi)

– Siphunculus often pale at middle, smooth or faintly imbricated, shorter than head width across eyes. Antenna with 3–14 rhinaria on 3rd segment, without rhinaria on 4th. Body in life pale brown to reddish brown. On *Chrysosplenium*. . . . . 2. *T. chrysosplenii*, sp. n.

1. ***Taiwanomyzus montanus*** (Takahashi)

Myzus montanus Takahashi, 1925 a: 17.
Micromyzus montanus: Takahashi, 1963: 60.
Taiwanomyzus montanus: Tao, 1963: 180.

Specimens examined: Many apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo & Zenibako (ex *Astilbe thunbergii* var. *congesta*). Honshû—Mt. Kongô & Mt. Iwawaki, Ôsaka Pref. (ex *Astilbe* sp., R. Takahashi leg.).

Host plants: *Astilbe* spp. (including *A. thunbergii* var. *congesta*).

Distribution: Japan; Taiwan.

2. ***Taiwanomyzus chrysosplenii***, sp. n.

Apterous viviparous female. Body pale brown to reddish brown in life. Antenna, eye and cauda black. Legs pale; femora at apex, tibiae at apex and tarsi black. Siphunculus black, often pale at middle. Body roundly oval, 1.3–1.6 mm. in length.

Head wholly scabrous except postero-dorsally; dorsal setae minute and blunt; ventral setae pointed, nearly as long as middle width of 3rd antennal segment. Antennal tubercle developed, roundly protruding inward at apex, with a minute blunt seta ventrally and a few similar setae apically. Antenna 1.1–1.3 times as long as body, strongly imbricated throughout; 3rd segment about as long as head breadth across eyes, with 3–14 rhinaria on basal 1/2 to whole length of the segment and with a few

minute, blunt setae; processus terminalis as long as or longer than 4th and 5th segments together, about 3 times as long as basal part of 6th segment; 3rd–6th as 39 : 26 : 23 : 17+53 in length. Clypeus with 0–2 setae and a few spinules anteriorly; mandibular lamina sparsely spinulous, with 1–3 short setae. Rostrum reaching 2nd or 3rd abdominal segment; ultimate segment tapering or dilated at middle, 1.5–1.6 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Mesosternal furca shortly stemmed or sessile. Femora spinulously imbricated, with sparse short setae; tibiae smooth, with setae about as long as middle width of hind tibia; first tarsal chaetotaxy 3 : 3 : 3. In larva hind tibia smooth. Pro- and mesonotum sclerotized and pigmented. Metanotum and first 6 abdominal tergites consolidated, pigmented at middle; in less sclerotized specimens, metanotum free from abdomen, and 6th abdominal tergite often membranous. Abdomen with tergum smooth anteriorly; 2nd–4th segments each with 1–4 minute blunt setae besides marginal ones; 5th sometimes with small antesiphuncular sclerites; 6th with 2 setae between postsiphuncular sclerites; 7th with a sclerotic band bearing 2 or 4 setae between spiracles; distance between 6th and 7th spiracles about equal to that between 5th and 6th; 8th with 2 or 3 setae. Siphunculus smooth or faintly imbricated, gradually swollen, about 6 times as long as largest width, a little shorter than head width across eyes, with a distinct flange. Cauda conical, 1.5 times as long as wide, 1/3–3/7 as long as siphunculus, with 4 or 5 setae.

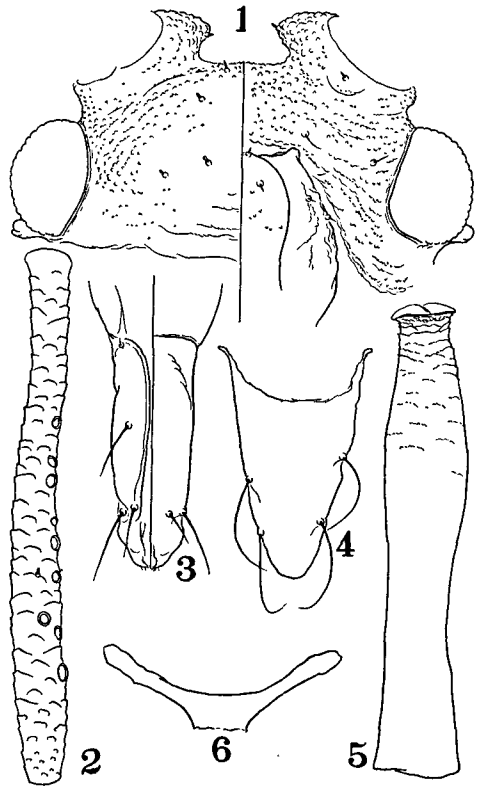

Fig. 36. *Taiwanomyzus chrysosplenii*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (3rd segment); 3, ultimate rostral segment; 4, cauda; 5, siphunculus; 6, mesosternal furca.

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.09, 0.06, 0.38, 0.24, 0.23, 0.18+0.52; ultimate rostral segment 0.12; hind femur 0.45; hind tibia 0.87; hind tarsus (2nd segment) 0.08; siphunculus 0.32; cauda 0.14; dorsal setae of head and abdominal disc about 0.005, those on 8th abdominal segment about 0.008.

Specimens examined: Syntypes—11 apterous viviparous females, Oirase, Aomori Pref., 25–viii–66, ex *Chrysosplenium flagelliferum*, no. 1962.

Host plants: *Chrysosplenium flagelliferum*. This aphid was collected from the undersurface of leaves of the host which grew on a rock wet with splash of a stream.

Distribution: Japan.

This species is readily distinguished from *T. montanus* (Takahashi) by the siphuncular length, antennal rhinariation, etc. as shown in the key.

46. Genus ***Utamphorophora*** Knowlton

Utamphorophora Knowlton, 1946: 1 [type-species: *Utamphorophora timpanogos* Knowlton, 1946].

1. ***Utamphorophora filicis*** Miyazaki

Utamphorophora filicis Miyazaki, 1968c: 22.

Specimens examined: Many apterous and alate viviparous females and alate males including syntypes of *U. filicis* Miyazaki have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Athyrium yokoscense* & *Osmunda japonica*); Yukomambetsu (ex *Dryopteris austriaca*). Honshû—Sukayu, Aomori Pref. (from a fern).

Host plants: *Athyrium yokoscense, Dryopteris austriaca* & *Osmunda japonica.*

Distribution: Japan.

47. Genus ***Galiaphis*** Ossiannilsson

Galiaphis Ossiannilsson, 1954: 123 [type-species: *Galiaphis annae* Ossiannilsson, 1954].

Key to the species

1 Rostrum reaching middle coxa; ultimate segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Head smooth postero-dorsally. Siphunculus gently swollen. Green in life. . . . . 1. *G. japonica* Takahashi

– Rostrum reaching much beyond hind coxa; ultimate segment 1.6 times as long as 2nd segment of hind tarsus. Head spinulous over dorsum. Siphunculus abruptly swollen. Pale in life. On *Cryptotaenia*. . . . . 2. *G. cryptotaeniae* Takahashi

1. ***Galiaphis japonica*** Takahashi

Galiaphis japonica Takahashi, 1965c: 26.

Specimens examined: A few apterous viviparous females collected at Kawachinagano, Ôsaka Pref. (ex ? *Anemone* sp., M. Sorin leg., syntypes of *G. japonica* Takahashi).

Host plants: ? *Anemone* sp.

Distribution: Japan.

2. ***Galiaphis cryptotaeniae*** Takahashi

Galiaphis cryptotaeniae Takahashi, 1965c: 27.

Specimens examined: A few apterous viviparous females collected at Mt. Ikoma, Nara Pref. (ex *Cryptotaenia japonica*, M. Sorin leg., syntypes of *G. cryptotaeniae* Takahashi).

Host plants: *Cryptotaenia japonica.*

Distribution: Japan.

48. Genus ***Paramyzus*** Börner

Paramyzus Börner, 1933: 4 [type-species: *Paramyzus heraclei* Börner, 1933].

In general features this genus resembles *Galiaphis* Ossiannilsson, from which it may be distinguished by the alate viviparous female with protuberant rim-less rhinaria on the antenna. So far as I am aware only one species of the genus has been described. In the course of the present study another species has been found from Japan.

Key to the species

1 Antenna with 4–15 rhinaria on 3rd segment. Ultimate rostral segment 1.3–1.6 times as long as 2nd segment of hind tarsus, shorter than basal part of 6th antennal segment. On *Heracleum*. . . . . 1. *P. heraclei* Börner

– Antenna with 1–4 rhinaria on 3rd segment. Ultimate rostral segment 1.5–1.8 times as long as 2nd segment of hind tarsus, as long as or slightly longer than basal part of 6th antennal segment. On *Potentilla*. . . . . 2. *P. longirostris*, sp. n.

1. ***Paramyzus heraclei*** Börner

Paramyzus heraclei Börner, 1933: 4.
Paramyzus heraclei: Heinze, 1961: 67.
Paramyzus heraclei similis Takahashi, 1963: 56. **Syn. n.**

Specimens examined: Many apterous viviparous females collected at Mt. Iwawaki (ex *Angelica pubescens*, syntypes of *P. heraclei similis* Takahashi), Mt. Kongô (ex *Heracleum moellendorffii*) & Kobuka (ex *Heracleum moellendorffii*), Ôsaka Pref. All the specimens were collected by R. Takahashi.

Host plants: *Heracleum moellendorffii* & *Angelica pubescens* (in Japan). *Haracleum sphondylium* (in Europe, after Heinze, 1961).

Distribution: Japan: Europe.

2. ***Paramyzus longirostris***, sp. n.

Apterous viviparous female. Body pale yellow to yellow in life. Eye dark reddish brown. Antenna fuscous; flagellum black at apex. Legs pale; tibiae at apex and tarsi black. Siphunculus and cauda pale. Body oval, 1.1–1.4 mm. in length.

Head spinulous; posterior and subapical setae on dorsum minute, inverted bottle-shaped; anteriormost setae about half as long as middle width of 3rd antennal segment; ventral setae pointed, a little shorter than middle width of 3rd antennal segment. Antennal tubercles developed, parallel or converging at inner sides, with 1 or 2 minute setae apically, 3 or 4 ventrally. Antenna 1.3–1.5 times as long as body, imbricated throughout; 3rd segment with 1–4 rim-less protruding rhinaria near base; processus terminalis 4–5 times as long as basal part of 6th; 3rd–6th as 38 : 28 : 22 : 12+56 in length. Clypeus smooth or with a few spinules, with 4 setae anteriorly; mandibular lamina with many spinules and 1–4 setae. Rostrum reaching 3rd abdominal segment; ultimate segment slightly tapering, blunt at apex, 3.0–3.5 times as long as wide, 1.5–1.8 times as long as 2nd segment of hind tarsus, with 2–4 secondary setae. Mesosternal furca sessile. Femora scabrous on apical 1/2–2/3, with blunt setae about 1/5 as long as middle width of hind femur. Tibiae smooth or with imbrications basally and apically, with setae a little shorter than middle width of hind tibia. Tarsi with 2nd segment bearing 2 dorsal and 1 ventral secondary setae; first tarsal chaetotaxy 3 : 3 : 3. In larva hind tibia smooth. Abdomen pale, membranous; 2nd–4th segments each with a pair of mesial setae, with a pair of pleural setae which are often eliminated, and with some marginal setae; 6th with 2 setae between siphunculi; 8th with 4–6 setae; setae on abdominal disc minute and inverted bottle-shaped, those on 8th pointed, about half as long as middle width of 3rd antennal segment. Siphunculus imbricated, gently swollen, at most as long as head width across eyes, 2.3–2.5 times as long as cauda, with a distinct flange. Cauda elongately conical, weakly constricted at middle and at extreme base, 1.5–1.7 times as long as wide, with 4 or 5 setae.

Measurements in mm. Body 1.3; antennal segments (1st–6th): 0.09, 0.06, 0.40, 0.29, 0.21, 0.12+0.52; ultimate rostral segment 0.12; hind femur 0.45; hind tibia 0.85; hind tarsus (2nd segment) 0.07; siphunculus 0.29; cauda 0.13; dorsal setae 0.007–0.014 on head, 0.004 on abdominal disc, 0.010 on 8th abdominal segment.

Specimens examined: Syntypes—25 apterous viviparous females, Sapporo, Hokkaidô, 27-vi-68, ex *Potentilla* sp., no. 2500.

Host plants: *Potentilla* sp. This aphid infests the underside of leaves.

Distribution: Japan.

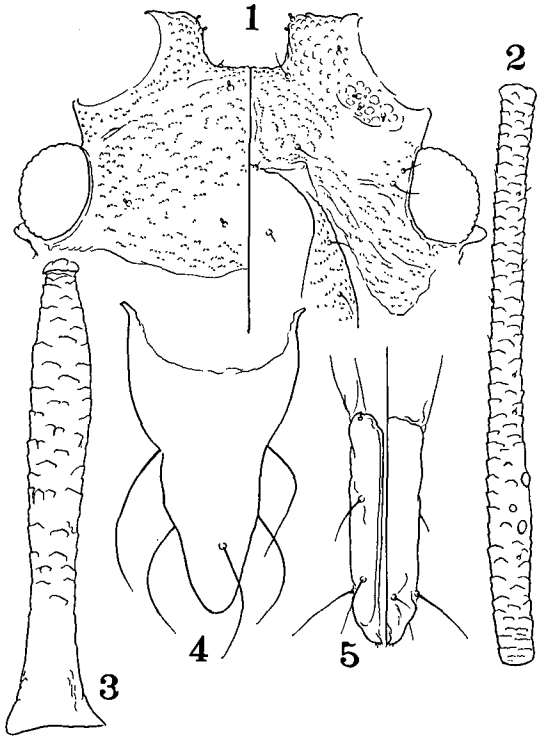

Fig. 37. *Paramyzus longirostris*, sp. n. Apterous viviparous female:—
1, head; 2, antenna (3rd segment); 3, siphunculus;
4, cauda; 5, ultimate rostral segment.

This species resembles closely *P. heraclei* Börner, and yet it is readily distinguished from the latter by the longer rostrum with a longer ultimate segment.

49. Genus ***Neorhopalomyzus*** Tao

Neorhopalomyzus Tao, 1963: 181 [type-species: *Amphorophora lonicericola* Takahashi, 1921].

This genus is monobasic.

1. ***Neorhopalomyzus lonicericola*** (Takahashi)

Amphorophora lonicericola Takahashi, 1921a: 20 & 29.
Amphorophora lonicericola: Hori, 1938: 160.

Micromyzus lonicericola (?): Takahashi, 1965c: 36.
Neorhopalomyzus lonicericolus: Tao, 1963: 181.

As a supplement to the original description, following accounts may be added:—

Fundatrix. Body in life yellow, hemispherical, about 2.7 mm. in length. Head spinulous over dorsum and venter; dorsal setae very short and blunt; antennal tubercles developed, roundly diverging at inner sides; median tubercle a little developed. Antenna without secondary rhinaria; processus terminalis about 2.5 times as long as basal part of 6th segment. Mandibular lamina with a few spinules. Rostrum reaching middle coxa; ultimate segment 1.4 times as long as 2nd segment of hind tarsus, with 4 secondary setae. Prothorax with 2 pairs of mesial setae. Mesosternal furca with arms widely separated from each other. First tarsal chaetotaxy 2 : 2 : 2. Abdominal tergum membranous, without any ornamentation; abdominal disc with a few minute setae; 8th segment with 4 setae at most 3/4 as long as middle width of 3rd antennal segment. Siphunculus stout, gradually swollen on apical 2/3, attenuated at apex, faintly imbricated, 5–6 times as long as wide, slightly shorter than head width across eyes, with a distinct flange. Cauda attenuated at middle, half as long as siphunculus, with 10 setae.

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.10, 0.07, 0.48, 0.28, 0.22, 0.14+0.34; ultimate rostral segment 0.13; hind femur 0.56; hind tibia 0.91; hind tarsus (2nd segment) 0.09; siphunculus 0.41; cauda 0.20; longest dorsal seta 0.009 on head, 0.005 on abdominal disc, 0.024 on 8th abdominal segment.

Oviparous female. Differs from the fundatrix as follows:—

Body oval, 1.2–1.4 mm. in length. Antenna about as long as body; processus terminalis 3.0–3.5 times as long as basal part of 6th segment. Clypeus and mandibular lamina with many spinules. Rostrum passing middle coxa; ultimate segment 1.2–1.3 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Hind tibia swollen, with many pseudosensoria. First tarsal chaetotaxy 3 : 3 : 2. Siphunculus sparsely imbricated apically, wrinkled basally, 4–5 times as long as wide, about as long as 4th antennal segment.

Measurements in mm. Body 1.4; antennal segments (1st–6th): 0.08, 0.06, 0.29, 0.25, 0.21, 0.10+0.36; ultimate rostral segment 0.10; siphunculus 0.22; cauda 0.11; dorsal setae 0.006–0.013 on head, about 0.011 on abominal disc, 0.025 on 8th abdominal segment.

Specimens examined: A few fundatrices, Sapporo, Hokkaidô, 13-vi-68; Sapporo, 6-vi-'24, M. Hori leg. Some alate viviparous females, Sapporo, 16-vi-'22, M. Hori leg. Some oviparous females, Sapporo, 1-x-'24, M. Hori leg.

Host plants: All the specimens examined were collected from *Lonicera morrowii*. Tao (1963) gives *L. maackii* as a host plant in China.

Distribution: Japan; China.

50. Genus ***Hyperomyzus*** Börner

Hyperomyzus Börner, 1933: 2 [type-species: *Aphis lactucae* Linné, 1758].
Rhopalosiphum del Guercio, 1921: 135, nec Koch, 1854 [type-species: (*Aphis lactucae* Kaltenbach, 1843)=*Aphis lactucae* Linné, 1758].

This genus is especially rich in species in the Palaearctic region, the species migrating between Ribesiaceae and Compositae or holocyclic or anholocyclic on Com-

positae or Scrophulariaceae. In this paper are dealt with 2 species, of which one is new to Japan.

Key to the species

1 Dorsal setae of body long, those on 8th abdominal segment being 30–35 μ in length. Siphunculus more strongly swollen; diameter at swollen portion 1.6–1.8 times that at basal cylindrical portion. Antenna with processus terminalis about 6.5–8.0 times as long as basal part of 6th segment. . . . . 1. *H. lactucae* (Linné)

– Dorsal setae of body short, those on 8th abdominal segment being 12–18 μ in length. Siphunculus gently swollen; diameter at swollen portion 1.2–1.3 times that at basal cylindrical portion. Antenna with processus terminalis 4.7–5.8 times as long as basal part of 6th segment. . . . . 2. *H. carduellinus* (Theobald)

1. ***Hyperomyzus lactucae*** (Linné)

Aphis lactucae Linné, 1758: 452.
Hyperomyzus lactucae: Börner, 1933: 2; Hille Ris Lambers, 1949: 286; Eastop, 1966: 448.
Rhopalosiphum ribis: Buckton, 1879: 9; van der Goot, 1915: 146.
Amphorophora cosmopolitana Mason, 1925: 16.
Amphorophora cosmopolitana: Theobald, 1926: 199; Shinji, 1941: 732.
Rhopalosiphum ribijaponica Shinji, 1924: 361.
Amphorophora sonchicola Shinji, 1939c: 14. **Syn. n.**
Amphorophora sonchicola Shinji, 1941: 770. **Syn. n.**

Specimens examined: Some apterous and alate viviparous females collected at Sapporo, Hokkaidô (ex *Sonchus oleraceus*). Some fundatrices collected at Sapporo (ex *Ribes japonicum*).

Host plants: Primary host—*Ribes japonicum*. Secondary host—*Sonchus oleraceus*. The infested leaves of *Ribes* are loosely shriveled.

Distribution: Japan; Morocco; Europe; North America; Hawaii; Australia; Africa.

Amphorophora sonchicola Shinji (1939) and *A. sonchicola* Shinji (1941) are apparently the same thing, their original descriptions coinciding with each other. The diagnoses of *sonchicola* given in these descriptions agree enough with those of *Hyperomyzus lactucae* (L.) except for the fewer numbers of the antennal rhinaria in the alate viviparous female. I am much inclined to the opinion that *sonchicola* and *lactucae* should be united.

2. ***Hyperomyzus carduellinus*** (Theobald)

Rhopalosiphum carduellinum Theobald, 1915: 113.
Rhopalosiphum carduellinum: Theobald, 1920: 67.
Hyperomyzus carduellinus: Müller et Schöll, 1958: 396; Eastop, 1966: 448.
Amphorophora sonchifoliae Takahashi, 1923: 31.

This is the first record of *carduellinus* from Japan. On account of the following characters, the present specimens may be identified with the species.

Apterous viviparous female. Body pale green, deep green or yellowish green in life. Antenna pale, 3rd and following segments black at apex. Legs pale; femora at apex, tibiae at apex and tarsi black. Siphunculus pale, dark apically. Cauda pale. Body 1.9–2.5 mm. in length.

Head smooth, with dorsal setae 9–13 μ in length, 1/4–1/3 as long as middle width

of 3rd antennal segment. Antennal tubercles usually low and diverging at inner sides, each with 1 or 2 setae apically and a seta ventrally; front shallowly W-shaped. Antenna 1.0–1.2 times as long as body; 3rd segment imbricated, with 7–30 rhinaria distributed on basal 3/4 to whole length of the segment; 4th with 0–8 rhinaria; 6th with basal part as long as or longer than ultimate rostral segment and with processus terminalis 4.7–5.8 times as long as the basal part; 3rd–6th as 78 : 49 : 38 : 14+79 in length. Rostrum reaching between middle and hind coxae; ultimate segment tapering, 0.8–1.0 as long as 2nd segment of hind tarsus, about twice as long as wide, with 6–8 secondary setae. Mesosternal furca with a broad base. First tarsal chaetotaxy 3 : 3 : 3. Abdomen with tergum pale, membranous; 2nd–4th segments each with 5–7 setae as long as those on dorsum of head and with marginal tubercles; 8th with 4, sometimes 2 setae, of which the longest one is 12–18 μ in length. Siphunculus gently swollen, weakly imbricated, about as long as head width across eyes, 6.8–7.7 times as long as wide at swollen portion; width at swollen portion 1.2–1.3 times that at basal cylindrical portion. Cauda elongate, blunt at apex, usually constricted at middle, 5/9–5/7 as long as siphunculus, with 6–10 setae.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.11, 0.08, 0.73, 0.46, 0.39, 0.15+0.76; ultimate rostral segment 0.13; hind femur 0.94; hind tibia 1.69; hind tarsus (2nd segment) 0.15; siphunculus 0.50; cauda 0.30; longest dorsal seta 0.011 on head, 0.010 on abdominal disc, 0.013 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Abdomen green, with black patches. Head, thorax and antenna black. Body 2.2–2.4 mm. in length. Head with dorsal setae 9–12 μ long, at most 1/3 as long as middle width of 3rd antennal segment. Antenna 1.1–1.3 times as long as body; 3rd segment with 40–50 rhinaria; 4th with 12–28 rhinaria; 5th with 2–12 secondary rhinaria; processus terminalis 4.8–5.6 times as long as basal part of 6th segment. Wings of normal venation. Abdomen with marginal sclerites developed on 2nd–7th segments, those on 5th and 7th being smaller than others, and with a large central patch extending on 4th–6th segments (irregularly broken along mesial line); 8th pale, with 4 setae 10–15 μ in length. Siphunculus smooth or faintly imbricated, 6.0–6.8 times as long as wide at swollen portion; width at swollen portion 1.3–2.1 times that at basal cylindrical portion.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.10, 0.07, 0.85, 0.48, 0.40, 0.15+0.77; ultimate rostral segment 0.11; hind femur 0.90; hind tibia 1.72; hind tarsus (2nd segment) 0.14; siphunculus 0.41; cauda 0.26; longest dorsal seta 0.010 on head and abdominal disc, 0.013 on 8th abdominal segment.

Specimens examined: A lot of apterous and some alate viviparous females, Himeji, Hyôgo Pref., 18-iv-66, ex *Sonchus oleraceus*; Lake Shidaka, Ôita Pref., 22-v-65, ex *Prenanthes tanakae*; Nobeoka, Miyazaki Pref., 20-v-65, ex *Sonchus oleraceus*; Kagoshima, 13-v-65, ex *Sonchus oleraceus*.

Host plants: *Sonchus oleraceus* & *Prenanthes tanakae* (in Japan). *Senecio consanguineus* var. *major* & *Sonchus* spp. (in South Africa, after Müller et Schöll, 1958); *Sonchus arvensis* (in Taiwan, after Takahashi, 1923).

Distribution: Japan; Taiwan; India; Java; Australia; Fiji; Africa.

This species closely resembles *H. lactucae* (L.). However, it may be distinguished from the latter by the following characters in addition to those given in the key (in

the apterous viviparous female). (1) Ultimate rostral segment 1.9–2.3 times as long as basal width, shorter than basal part of 6th antennal segment (2.8 times as long as basal width and longer than basal part of 6th antennal segment in *lactucae*). (2) Siphunculus 6.8–7.7 times as long as wide at swollen portion (5.8–6.5 times so), evenly imbricated (usually smooth). (3) Frontal sinus rather shallowly W-shaped (deeply W-shaped). (4) Longest seta on antennal tubercle 9–13 μ (25–28 μ), that on 3rd antennal segment 8–12 μ (18–20 μ).

51. Genus ***Rhopalosiphoninus*** Baker

Rhopalosiphoninus Baker, 1920: 58 [type-species: *Amphorophora latysiphon* Davidson, 1912].
Clavosiphum Shinji, 1922: 790 [type-species: (*Clavosiphum adenocauli* Shinji, 1922) = *Rhopalosiphum tiliae* Matsumura, 1918].
Arthromyzus Börner, 1950: 12 [type-species: *Rhopalosiphum staphyleae* Koch, 1854, designated by Börner, 1952; described as a subgenus of the genus *Hyperomyzus* Börner].

This genus as here understood contains at least two more or less distinct groups of species: one including *R. tiliae* (Matsumura) and *R. deutzifoliae* Shinji is characterized by the smooth head and by the 3rd antennal segment normally devoid of rhinaria, the other including *R. hydrangeae* (Matsumura) is characterized by the densely spinulous head and by the 3rd antennal segment bearing rhinaria (in the apterous viviparous females). The former may correspond to *Rhopalosiphoninus* Baker in the strict sense, the latter to *Arthromyzus* Börner. In this paper, however, *Arthromyzus* is considered to be at most of subgeneric value to *Rhopalosiphoninus*.

Key to the species

1 In alate viviparous female primary rhinarium of 5th antennal segment cilia-less, its longer axis being 1.2–1.4 times as long as middle width of the segment; ultimate rostral segment with 7 or 8 secondary setae. On *Weigela*. . . . . 1. *R. celtifoliae* Shinji
– In alate viviparous female primary rhinarium of 5th antennal segment ciliated, its longer axis being at most as long as middle width of the segment; ultimate rostral segment with 2–4 secondary setae. 2
2(1) Head densely spinulous over dorsum and venter; setae on cephalic disc at most 1/3 as long as middle width of 3rd antennal segment. Pale yellow in life. On *Hydrangea*. . . . . 2. *R. hydrangeae* (Matsumura)
– Head smooth, at most with sparse spinules ventrally; setae on cephalic disc more than half as long as middle width of 3rd antennal segment. 3
3(2) Ultimate rostral segment as long as or shorter than 2nd segment of hind tarsus. First tarsal chaetotaxy 3 : 3 : 2. Siphunculus abruptly puffed; diameter at swollen portion 2.8–3.8 times as long as that at basal cylindrical portion. Green in life. On *Deutzia*. . . . . 3. *R. deutzifoliae* Shinji
– Ultimate rostral segment over 1.2 times as long as 2nd segment of hind tarsus. First tarsal chaetotaxy 3 : 3 : 3. Siphunculus gradually swollen; diameter at swollen portion 1.8–2.0 times as long as that at basal cylindrical portion. Green in life. On *Tilia* and *Adenocaulon*. . . . . 4. *R. tiliae* (Matsumura)

1. ***Rhopalosiphoninus celtifoliae*** Shinji

Rhopalosiphunicus celtifoliae Shinji, 1924: 366.
Rhopalosiphoninus celtifoliae: Shinji, 1941: 1023.

On the basis of the present specimens, a redescription may be given as follows:—

Fundatrix. Body globular, 3.0–3.2 mm. in length. In cleared and mounted specimens, body pale with head and thorax brownish; antenna pale except flagellum dark brown apically; siphunculus pale, dark brown apically; cauda pale.

Head wholly scabrous with fine granules and spinules, with minute blunt setae.

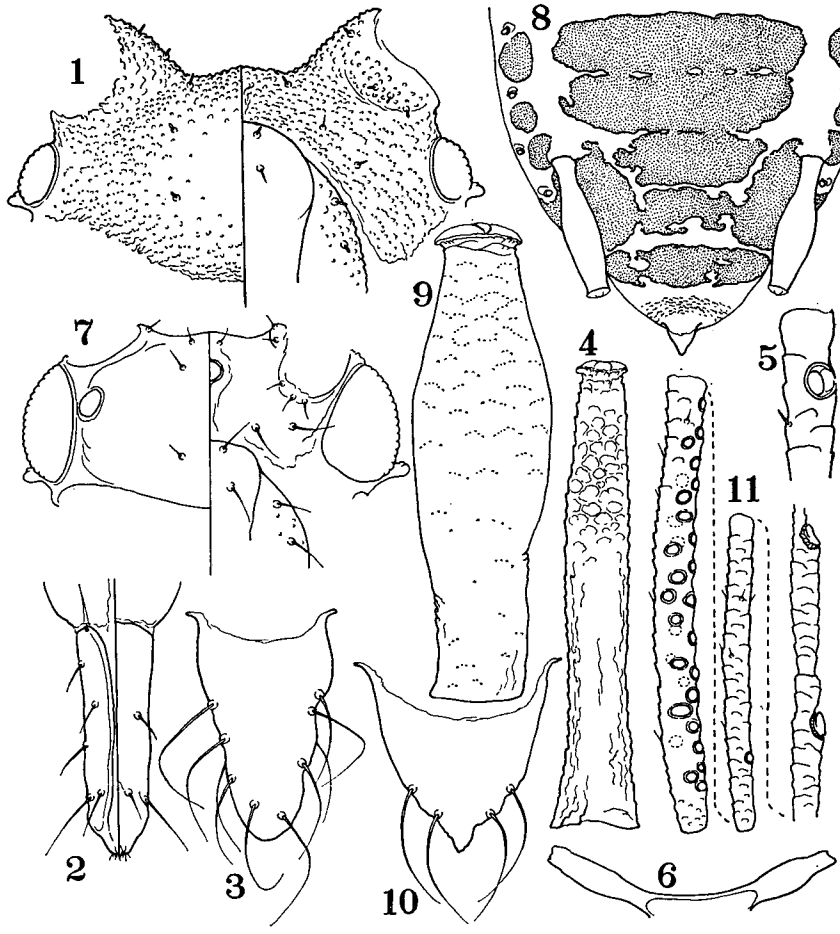

Fig. 38. *Rhopalosiphoninus celtifoliae* Shinji. Fundatrix:— 1, head; 2, ultimate rostral segment; 3, cauda; 4, siphunculus; 5, apical part of 5th antennal segment; 6, mesosternal furca. Alate viviparous female:— 7, head; 8, pattern of sclerites of abdomen; 9, siphunculus; 10, cauda; 11, antenna (3rd & 4th segments and parts of 5th & 6th segments, of different magnifications).

Antennal tubercles strongly diverging at inner sides, with 0–3 setae apically and 2 or 3 setae ventrally. Antenna 1/2–3/5 as long as body; 1st segment spinulous; 2nd smooth or sparsely spinulous; 3rd smooth, often imbricated at apex, without rhinaria, with sparse minute setae; primary rhinaria on 5th and 6th small; processus terminalis

2.0–2.5 times as long as basal part of 6th; 3rd–6th as 55 : 32 : 25 : 15+33 in length. Mandibular lamina with some spinules and 1–3 setae. Rostrum reaching hind coxa; ultimate segment 1.4–1.6 times as long as 2nd segment of hind tarsus, with 8 short secondary setae. Mesosternal furca sessile, with arms widely apart from each other. Femora imbricated apically, with sparse short setae. Tibiae smooth, with setae much shorter than middle width of hind tibia. First tarsal chaetotaxy 2 : 2 : 2. Abdomen membranous, without any ornamentation; dorsal setae minute; spiracles round. Siphunculus cylindrical or weakly swollen subapically, faintly imbricated, 7–10 times as long as wide at middle, a little longer than head width across eyes, with a distinct flange. Cauda tongue-shaped, slightly constricted at extreme base, 1/3–1/2 as long as siphunculus, with 10–12 setae.

Measurements in mm. Body 3.2; antennal segments (1st–6th): 0.10, 0.07, 0.53, 0.30, 0.26, 0.14+0.33; ultimate rostral segment 0.16; hind femur 0.73; hind tibia 1.10; hind tarsus (2nd segment) 0.10; longest seta 0.008 on cephalic and abdominal discs, 0.025 on 8th abdominal segment.

Alate viviparous female. In cleared and mounted specimens head, thorax, antenna, siphunculus and sclerites on abdomen dark brown; legs pale brown with femora at apex, tibiae at apex and tarsi darker; cauda pale. Body 1.9–2.3 mm. in length.

Head quite smooth; dorsal setae pointed, 3/7–5/7 as long as middle width of 3rd antennal segment. Antenna 1.0–1.2 times as long as body; 3rd segment with 30–40 rather large rhinaria distributed on whole surface of the segment, with setae half as long as middle width of the segment; 4th with 0–4 rhinaria; primary rhinarium of 5th very large, flat, without cilia, its longer axis being 1.2–1.4 times as long as middle width of the segment; processus terminalis 5.0–5.5 times as long as basal part of 6th; 3rd–6th as 47 : 28 : 29 : 15+83 in length. Ultimate rostral segment 1.4–1.6 times as long as 2nd segment of hind tarsus, 3.5–3.7 times as long as wide, with 7 or 8 secondary setae. Wings with media twice branched. Femora smooth or spinulated at apex. Tibiae smooth, with setae as long as middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 2. Abdomen with developed marginal sclerites on 2nd–6th segments, with a large trapezoid central patch extending on 3rd–6th (often divided into transverse bands on 5th and 6th), with a transverse band on 1st and 7th each; spiracles round; 2nd–4th segments each with 7–12 setae between marginal sclerites, without marginal tubercles; 8th with 2 setae 1.0–1.5 times as long as middle width of 3rd antennal segment. Siphunculus much shorter than head width across eyes, imbricated with fine spinules, cylindrical on basal 1/3, dilated at middle, the largest diameter being 1.5–2.0 times as large as the smallest. Cauda galeate, about as long as wide, 1/4 as long as siphunculus, with 4–6 setae.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.08, 0.04, 0.48, 0.30, 0.29, 0.16+0.85; ultimate rostral segment 0.13; hind femur 0.76; hind tibia 1.43; hind tarsus (2nd segment) 0.09; siphunculus 0.36; cauda 0.09; longest seta 0.023 on cephalic disc, 0.018 on abdominal disc, 0.048 on 8th abdominal segment.

Specimens examined: Some fundatrices, Yokoyama-mura, Osaka Pref., 3-v-57, ex *Diervilla middendorffiana*, M. Sorin leg.; Kobuka, Ôsaka Pref., 7-v-61, ex *Deutzia* sp., R. Takahashi leg. A fundatrix and many alate viviparous females, Mt. Iwawaki, Ôsaka Pref., 29-vi-60, ex *Weigela hortensis*, R. Takahashi leg.

Host plants: Primary hosts—*Weigela hortensis*, *Diervilla middendorffiana* &

Deutzia sp.

Distribution: Japan.

This species may be distinguished from any other species of this genus by the alate viviparous female with large, cilia-less primary rhinaria on the antenna and the long, setose ultimate rostral segment. Judging from the fundatrix and the alatoid nymph, the heads of which are spinulous, this species may come near *R. hydrangeae* (Matsumura).

2. ***Rhopalosiphoninus hydrangeae*** (Matsumura)

Rhopalosiphum hydrangeae Matsumura, 1918: 8.
Rhopalosiphoninus hydrangeae: Takahashi, 1939a: 119; Shinji, 1941: 1030.
Clavisiphum sambucifoliae Shinji, 1922: 791.

As a supplement to the original description, the following accounts may be added:—

Apterous viviparous female. Body in life pale yellow to dull yellow, sometimes with a greenish tinge, globular, 2.3–2.4 mm. in length. Head spinulous antero-dorsally and ventrally; dorsal setae blunt, at most half as long as middle width of 3rd antennal segment; antennal tubercle somewhat gibbous at inner apex. Antenna 1.2–1.3 times as long as body, imbricated throughout; 3rd segment with 0–3 rhinaria near base; processus terminalis about 4.5 times as long as basal part of 6th. Rostrum just attaining hind coxa; ultimate segment 1.0–1.3 times as long as 2nd segment of hind tarsus, with 2–4 secondary setae. Mesosternal furca sessile. First tarsal chaetotaxy 3 : 3 : 3. Abdomen pale, membranous, not reticulated dorsally, without marginal tubercles; 2nd–4th segments each with 6–8 short, blunt setae; 8th with 4 setae at most half as long as middle width of 3rd antennal segment. Siphunculus pale, dark at apex, stout, cylindrical on basal 1/6–1/4, swollen at middle, smooth, corrugated below flange, about as long as head width across eyes; diameter at swollen portion 1.5–2.0 times that at basal cylindrical portion. Cauda triangular, round at apex, about 1/3 as long as siphunculus, with a weak constriction at middle, with 5 setae.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.14, 0.09, 0.73, 0.55, 0.42, 0.18+0.79; ultimate rostral segment 0.13; hind femur 0.93; hind tibia 1.77; hind tarsus (2nd segment) 0.13; siphunculus 0.58; cauda 0.18; dorsal setae 0.008–0.023 on head, about 0.009 on abdominal disc, about 0.025 on 8th abdominal segment.

Fundatrix. Differs from the apterous viviparous female as follows:—

Antennal tubercles strongly diverging at inner sides. Antenna 5/7–5/6 as long as body, without secondary rhinaria; processus terminalis less than twice as loug as basal part of 6th segment. Mesosternal furca with arms widely separated from each other. Siphunculus less markedly swollen than in apterous viviparous female.

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.14, 0.08, 0.58, 0.30, 0.28, 0.17+0.27; ultimate rostral segment 0.14; hind femur 0.75; hind tibia 1.38; hind tarsus (2nd segment) 0.12; siphunculus 0.64; cauda 0.20; longest dorsal seta 0.015 on head, 0.010 on abdominal disc, 0.020 on 8th abdominal segment.

Alate viviparous female (emigrant). Antenna 1.3–1.5 times as long as body; 3rd segment with 22–30 flat rhinaria along whole length of the segment; 4th with 1–4 rhinaria; processus terminalis about 5 times as long as basal part of 6th. Wings with media twice branched. Abdomen with a large central sclerite extending on 3rd–6th segments, with developed marginal sclerites on 2nd–6th, and with sclerotic bands on

1st, 2nd, 7th and 8th. Siphunculus black, often pale at middle, swollen more abruptly than in apterous viviparous female.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.14, 0.09, 0.75, 0.56, 0.45, 0.17+0.84; ultimate rostral segment 0.14; hind femur 1.00; hind tibia 1.87; hind tarsus (2nd segment) 0.12; siphunculus 0.58; cauda 0.18; longest dorsal seta 0.028 on head, 0.018 on abdominal disc, 0.030 on 8th abdominal segment.

Alate viviparous female (immigrant). Slightly differs from the emigrant in the following points—

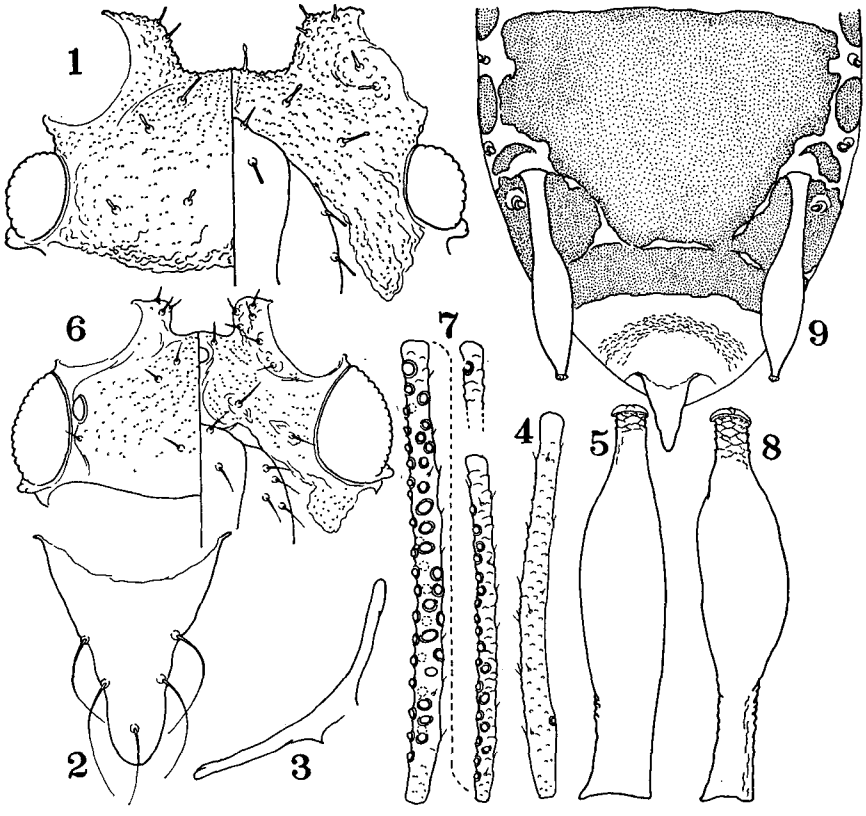

Fig. 39. *Rhopalosiphoninus hydrangeae* (Matsumura). Apterous viviparous female:—1, head; 2, cauda; 3, mesosternal furca; 4, antenna (3rd segment); 5, siphunculus. Alate viviparous female:— 6, head; 7, antenna (3rd & 4th segments and apical part of 5th); 8, siphunculus; 9, pattern of sclerites of abdomen.

Antenna with 45–64 secondary rhinaria on 3rd segment, 8–22 on 4th, 0–3 on 5th; processus terminalis 5.5–6.5 times as long as basal part of 6th. Ultimate rostral segment 1.3–1.4 times as long as 2nd segment of hind tarsus. Dorsal setae of head and abdomen slightly longer than in emigrant.

Alate male. Differs from the alate viviparous female as follows:—

Body about 1.9 mm. in length. Antenna with 53–67 secondary rhinaria on 3rd

segment, 21–30 on 4th, 9–13 on 5th. Abdomen with dorsal sclerites reduced in size, the central sclerite being perforated. Dorsal setae of body thin and poined, those on 8th abdominal segment being longer than middle width of 3rd antennal segment. Siphunculus rather thin, shorter than head breadth across eyes.

Oviparous female. Slightly differs from the apterous viviparous female as follows:—

Body 1.6–2.1 mm. in length. Antenna wholly black, about as long as body; 3rd segment sometimes with a small rhinarium. Hind tibia stout, with numerous pseudosensoria except on basal and apical small areas. Cauda short, about as long as wide.

Specimens examined: Many apterous viviparous females, Sapporo, Hokkaidô, 8-vi-65 & 13-vi-65, ex *Hydrangea paniculata*; Mt. Eniwa, Hokkaidô, 1-vii-66, ex *Hydrangea paniculata*. Many alate viviparous females, Sapporo, 20-ix-66, ex *Hydrangea paniculata* & 17-x-64, ex *Hydrangea macrophylla* var. *thunbergii*; Mt. Eniwa, 1-vii-66, ex *Hydragea paniculata*. Some alate males and many oviparous females, Sapporo, 17-x-64, ex *Hydrangea paniculata*.

Host plants: Primary hosts—*Hydrangea paniculata* & *H. macrophylla* var. *thunbergii*. This aphid infests the underside of the leaves and young shoots without causing any marked deformations.

Distribution: Japan.

3. ***Rhopalosiphoninus deutzifoliae*** Shinji

Rhopalosiphunicus deutzifoliae Shinji, 1924: 366.
Rhopalosiphoninus deutzifoliae: Shinji, 1941: 1025 & 1944: 545.

On the basis of the present specimens, a redescription may be given as follows:—

Apterous viviparous female. Body green in life, 2.4–2.7 mm. in length. Antenna pale; 3rd–5th segments at apex and 6th fuscous. Legs pale; femora at apex, tibiae at both ends and tarsi fuscous. Siphunculus and cauda fuscous.

Head smooth, sparsely spinulous on ventral surface of antennal tubercle; dorsal setae pointed, as long as or a little shorter than middle width of 3rd antennal segment; antennal tubercles high, diverging at inner sides, each with 2–4 setae apically and 0–3 setae ventrally; median tubercle conspicuous. Antenna 1.1–1.2 times as long as body; basal 2 segments spinulous; 3rd smooth, with setae shorter than middle width of the segment, without rhinaria; 4th smooth; 5th imbricated, with a large ciliated primary rhinarium, its longer axis including rim being slightly longer than middle width of the segment; processus terminalis 4.5–5.0 times as long as basal part of 6th. Mandibular lamina smooth, with a seta. Rostrum passing middle coxa; ultimate segment about as long as 2nd segment of hind tarsus, 2.5–3.0 times as long as wide, 2 secondary setae. Mesosternal furca with a short, broad stem. Femora spinulously imbricated apically. First tarsal chaetotaxy 3 : 3 : 2. Abdominal tergum pale, membranous and smooth; 2nd–4th tergites each with 6–10 setae besides marginal ones, without marginal tubercles; 8th with 4 setae 1.0–1.2 times as long as middle width of 3rd antennal segment. Siphunculus puffed and smooth at middle, wrinkled at basal cylindrical portion, areolated at apex, the largest diameter being 2.6–3.3 times as large as diameter at basal cylindrical portion. Cauda triangular, about 1.5 times as long as wide, 2/7–1/3 as long as siphunculus, with 5 setae.

Measurements in mm. Body 2.6; antennal segments (1st–6th): 0.15, 0.09, 0.72,

0.61, 0.52, 0.14+0.72; ultimate rostral segment 0.14; hind femur 0.99; hind tibia 1.75; hind tarsus (2nd segment) 0.14; longest dorsal seta 0.040 on head, 0.023 on abdominal disc, 0.055 on 8th abdominal segment.

Fundatrix. Differs from the apterous viviparous female in the following points:—

Antennal tubercles low and strongly diverging at inner sides. Dorsal setae of head about half as long as middle width of 3rd antennal segment. Antenna slightly longer than half length of body; primary rhinarium of 5th segment small; processus terminalis at most 1.5 times as long as basal part of 6th segment. Mesosternal furca sessile. Siphunculus about twice as long as cauda; diameter at swollen portion 2.0–2.5 times that at basal cylindrical portion; apical areolation often reduced. Body 3.2 mm. in length.

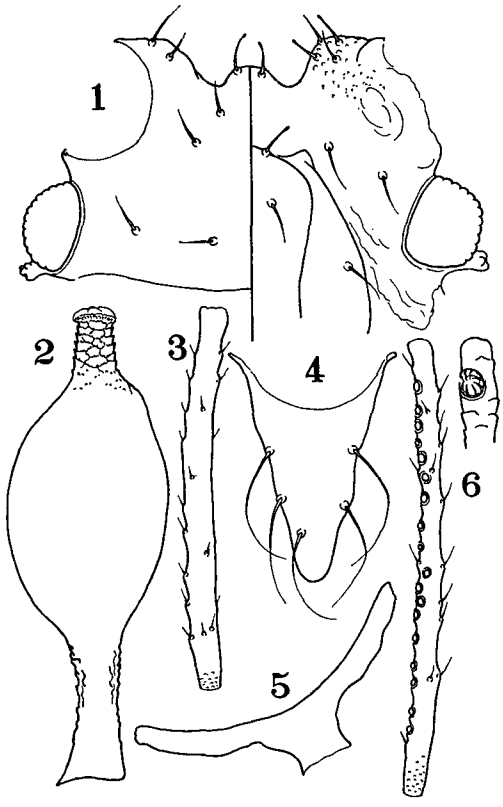

Fig. 40. *Rhopalosiphoninus deutzifoliae* shinji. Apterous viviparous female:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, cauda; 5, mesosternal furca. Alate viviparous female:— 6, antenna (3rd segment and apical part of 5th, of different magnifications).

Measurements in mm. Body 3.2; antennal segments (1st–6th): 0.14, 0.08, 0.52, 0.30, 0.30, 0.19+0.27; ultimate rostral segment 0.14; hind femur 0.78; hind tibia 1.37; hind tarsus (2nd segment) 0.14; siphunculus 0.60; cauda 0.27; longest seta 0.020 on cephalic disc, 0.010 on abdomianl disc, 0.030 on 8th abdominal segment.

Alate viviparous female (emigrant). Differs from the apterous viviparous female in the following points:—

Body 2.2–2.9 mm. in length, green in life, with head, thorax and sclerites on abdomen black. Antenna black except 3rd segment pale at base.

Antennal tubercles parallel or somewhat converging at inner sides. Antenna 1.1–1.3 times as long as body: 3rd segment with 12–20 rhinaria arranged in a line along whole length of the segment; 4th without rhinaria. Wings of normal venation. Abdomen with a large central sclerite extending on 3rd–7th segments; marginal sclerites on 2nd–5th segments developed, often fused with central sclerite; pleural sclerites present on 1st and 2nd segments. Siphunculus swollen more abruptly than in apterous viviparous female, with basal cylindrical stem long and slender.

Measurements in mm. Body 2.2; antennal segments (1st–6th): 0.13, 0.09, 0.70, 0.55, 0.47, 0.14+0.68; ultimate rostral segment 0.13; hind femur 0.96; hind tibia 1.82; hind tarsus (2nd segment) 0.13; siphunculus 0.57; cauda 0.18; longest seta 0.038 on

cephalic disc, 0.028 on abdominal disc, 0.038 on 8th abdominal segment.

Specimens examined: Some apterous and alate viviparous females, Taishi, Ôsaka Pref., 29-iv-61, R. Takahashi leg.; Kobuka, Ôsaka Pref., 7-v-61, R. Takahashi leg.; Chihaya, Ôsaka Pref., 22-v-60, M. Sorin leg. Some alate viviparous females, Wakamiya, Kôchi, Pref., 25-iv-65, H. Takada leg. Some fundatrices, Shôdo-shima Isl., Kagawa Pref., 27-iv-66.

Host plants: All the specimens examined were collected from *Deutzia crenata* (primary host). This aphid infests the leaves and stalks of the host, curling the leaves.

Distribution: Japan.

4. ***Rhopalosiphoninus tiliae*** (Matsumura)

Rhopalosiphum tiliae Matsumura, 1918: 11.
Rhopalosiphoninus tiliae: Shinji, 1941: 1035; Takahashi, 1939a: 119.
Clavosiphum adenocauli Shinji, 1922: 790. **Syn. n.**
Rhopalosiphoninus adenocauli: Shinji, 1941: 1018.
Rhopalosiphoninus nobukii adenocauli Shinji, 1933c: 364. **Syn. n.**

As a supplemnt to the original description, the following accounts may be added:—

Apterous fundatrigenia. Body yellowish green in life. Antenna fuscous; 3rd-5th segments darkened at apex or wholly black. Legs black; femora at base and tibiae often at middle pale. Siphunculus black, paler at base. Cauda pale or slightly fuscous. Body 2.7-3.0 mm. in length.

Head smooth, with sparse spinules postero-ventrally, with pointed setae at most as long as middle width of 3rd antennal segment. Antennal tubercles high, converging at inner sides (rather low and roundly diverging in some specimens). Antenna as long as or a little shorter than body; 3rd segment smooth, longer than 4th and 5th together, with 0-40 rhinaria (specimens with rhinaria show features of alatiform in some degree); 4th imbricated, normally without rhinaria (with 1-5 rhinaria in alatiform specimens); processus terminalis 5-6 times as long as basal part of 6th; 3rd-6th as 80 : 40 : 32 : 13+67 in length. Rostrum reaching hind coxa; ultimate segment 1.2-1.5 times as long as 2nd segment of hind tarsus, 2.5-3.0 times as long as wide, with 2 secondary setae. Femora scabrous at apex. Tibiae smooth, with setae shorter than middle width of hind tibia. First tarsal chaetotoxy 3 : 3 : 3. Abdomen with tergum thick, wrinkled, pale (with brown patches in some alatiform specimens); 2nd-4th segments each with a pair of marginal tubercles and about 8 setae besides marginal ones; 8th with 4, sometimes 6 setae, which are slightly longer than middle width of 3rd antennal segment. Siphunculus cylindrical on basal 1/3, swollen in a spindle-shape apically, the largest diameter being 2.0-2.5 times as large as diameter at basal cylindrical portion, smooth, striated or imbricated at apex, as long as or slightly shorter than head width across eyes. Cauda triangular, 3/8-3/7 as long as siphunculus, with 5-7 setae.

Measurements in mm. Body 3.0; antennal segments (1st-6th): 0.11, 0.09, 0.83, 0.45, 0.30, 0.12+0.74; ultimate rostral segment 0.18; hind femur 0.98; hind tibia 1.77; hind tarsus (2nd segment) 0.13; siphunculus 0.56; cauda 0.23; longest seta 0.035 on cephalic disc, 0.040 on abdominal disc, 0.058 on 8th abdominal segment.

Apterous alienicola. Much the same as the apterous fundatrigenia morphologically.

Alate viviparous female (emigrant). Differs from the apterous viviparous female as follows:—

Body yellowish green; head, thorax and abdominal sclerites black. Antenna black. Legs black; femora pale at extreme base. Siphunculus black. Body 2.9–3.4 mm. in length.

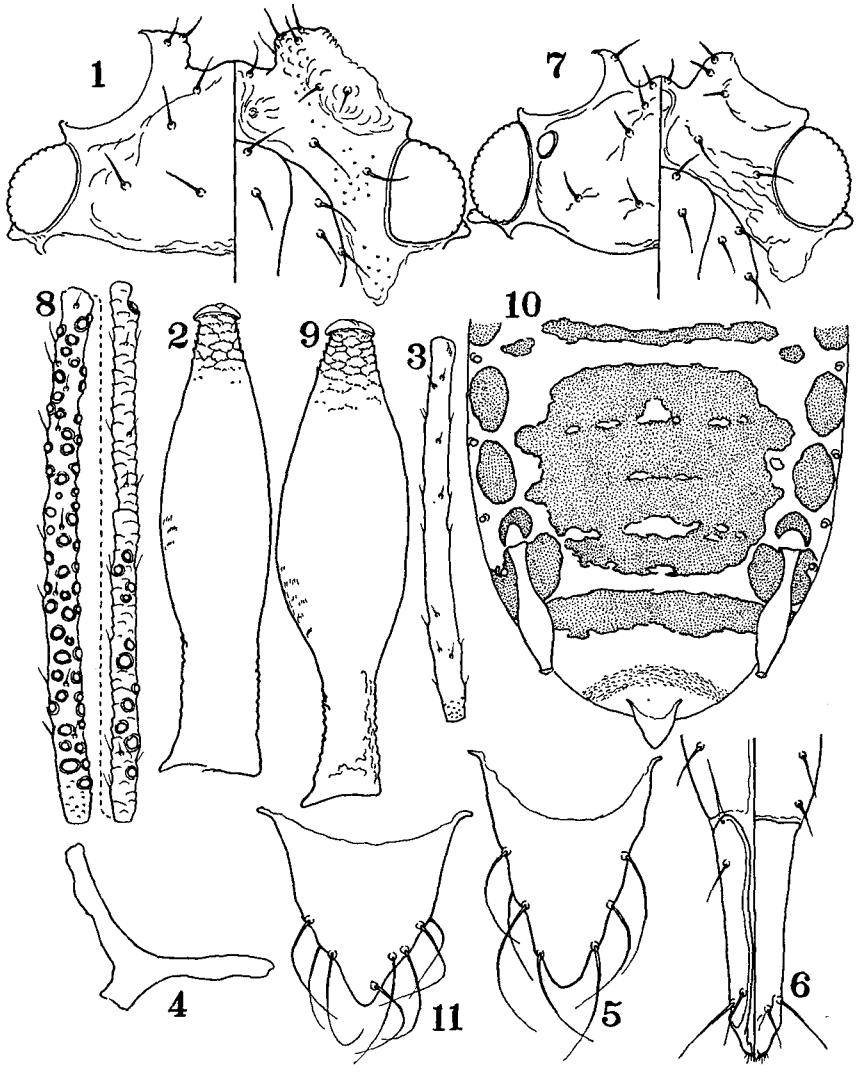

Fig. 41. *Rhopalosiphoninus tiliae* (Matsumura). Apterous viviparous female:— 1, head; 2, siphunculus; 3, antenna (3rd segment); 4, mesosternal furca; 5, cauda; 6, ultimate rostral segment. Alate viviparous female:— 7, head; 8, antenna (3rd–5th segments); 9, siphunculus; 10, pattern of sclerites of abdomen; 11, cauda.

Antenna with 48–70 rhinaria on 3rd segment, 4–14 on 4th; 3rd segment a little shorter to a little longer than 4th and 5th together. Wings of normal venation. Abdomen with a large quadrate central patch extending on 3rd–6th segments, with

marginal sclerites on 2nd-6th, with a sclerotic band on 1st, 2nd, 7th and 8th each, without marginal tubercles.

Measurements in mm. Body 3.1; antennal segments (1st-6th): 0.11, 0.09, 0.87, 0.49, 0.38, 0.14+0.70; ultimate rostral segment 0.19; hind femur 1.12; hind tibia 2.24; hind tarsus (2nd segment) 0.16; siphunculus 0.52; cauda 0.18; longest seta 0.035 on cephalic disc, 0.040 on abdominal disc, 0.060 on 8th abdominal segment.

Alate viviparous female (immigrant). Slightly differs from the emigrant in the antenna bearing more numerous rhinaria, i.e. 65-80 rhinaria on 3rd segment, 9-28 on 4th and 0-6 secondary ones on 5th.

Specimens examined: Numerous apterous and alate viviparous females, Sapporo, Hokkaidô, 9-vi-68, 17-vi-64 & 10-vii-65, ex *Tilia maximowicziana*; Sapporo, 20-ix-67, ex *Adenocaulon himalaicum*; Mt. Shirai, Hokkaidô, 24-vi-68, ex *Tilia japonica*; Kuroyama, Saitama Pref., 14-x-66, ex *Adenocaulon himalaicum*; Shirabu-takayu, Yamagata Pref., 30-vi-67, ex *Tilia japonica*, H. Higuchi leg.

Host plants: Primary hosts—*Tilia japonica* & *T. maximowicziana*. Secondary hosts—*Adenocaulon himalaicum*. The infested leaves of *Tilia* are curled up. *Adenocaulon* is infested on leaves and flower stalks, without showing any deformations.

Distribution: Japan.

This species was described separately from *Tilia* as *Rhopalosiphum tiliae* Matsumura (1918) and from *Adenocaulon* as *Clavosiphum adencauli* Shinji (1922) which was unnecessarily renamed *nobukii adenocauli* by Shinji (1933). In the course of the present study it became clear that the two forms were respectively the fundatrigenia and the alienicola of the same species.

52. Genus ***Shinjia*** Takahashi

Microtarsus Shinji, 1929a: 43, nec Eyton, 1839 [type-species: *Microtarsus pteridifoliae* Shinji, 1929].

Microtarsus Shinji, 1930a: 188 [type-species: (*Microtarsus pteridifoliae* Shinji, 1930) = *M. pteridifoliae* Shinji, 1929].

Shinjia Takahashi, 1938b: 6 [type-species: *Microtarsus pteridifoliae* Shinji, 1929].

This genus is represented by a single species.

1. ***Shinjia pteridifoliae*** (Shinji)

Microtarsus pterydifoliae Shinji, 1929a: 44.

Microtarsus pterydifoliae Shinji, 1930a: 188.

Microtarsus pteridifoliae: Shinji, 1941: 901.

Shinjia pterydifoliae: Takahashi, 1938b: 6.

Shinjia pteridifoliae: Moritsu, 1946a: 94; Sorin, 1962: 21; Tao, 1963: 163 & 1965: 74; Paik, 1965: 53; Eastop, 1966: 475; Miyazaki, 1968c: 21.

Specimens examined: Many fundatrices collected at Ôsaka (ex *Viburnum dilatatum*, M. Sorin leg.) & Takachiho, Miyazaki Pref. (ex *Viburnum erosum*). Many apterous and alate viviparous females collected at the following localities:—Sapporo, Hokkaidô & Lake Kamakita, Saitama Pref. (ex *Pteridium aquilinum* var. *latiusculum*); Takachiho (ex *Viburnum erosum*). Some alate males collected at Sapporo (ex *Pteridium aquilinum* var. *latiusculum*, H. Higuchi leg.) & Ôsaka (ex *Viburnum dilatatum*, M. Sorin leg.). Some oviparous females collected at Ôsaka (ex *Viburnum dilatatum*, M. Sorin leg.).

Host plants: Primary hosts—*Viburnum dilatatum* & *V. erosum*; *V. japonicum*

(after Moritsu, 1946).

Distribution: Japan; Korea; China; Nepal; Australia.

53. Genus ***Polytrichaphis***, gen. n.

Type-species: *Polytrichaphis fragilis*, sp. n.

Tergum membranous, abounds with long flagellate setae. Head with low antennal tubercles. Antenna long, without secondary rhinaria in aperous viviparous female. All tarsi with 1st segment bearing 2 setae which are much removed from apex of the segment. Siphunculus subcylindrical, imbricated, with a distinct flange. Cauda elongately tongue-shaped. In alate viviparous female antenna with secondary rhinaria on 3rd–5th segments; abdomen without any sclerites; wing veins bordered with black bands.

In general facies the new genus resembles *Indiaphis* Basu, but it is distinguished from the latter by the following features:—(1) First segment of all tarsi with 2 setae much removed from apex of the segment. (2) Abdomen without any sclerites in both apterous and alate viviparous females. (3) Eye with a distinct triommatidion.

1. ***Polytrichaphis fragilis***, sp. n.

Apterous viviparous female. Body in life yellow to pale yellowish green. Eye and siphunculus dark brown. Cauda pale. Legs pale; tarsi black. Antenna pale; 3rd–5th segments at apex and 6th at rhinariated portion darkened. Body shortly oval, 1.6–1.8 mm. in length, with slight wax powder marginally.

Body hairy; tergum pale and membranous; dorsal setae irregularly arranged, long and flagellate, 3–4 times as long as middle width of 3rd antennal segment. Head smooth, with about 12 setae dorsally; antennal tubercles low and diverging at inner sides, each with 1 or 2 setae apically and 0 or 1 seta mid-ventrally; front weakly convex at middle. Antenna 6-segmented, as long as or a little shorter than body, without secondary rhinaria; 1st and 2nd segments spinulous; 3rd segment imbricated, roughly equal in length to 4th or 5th, with sparse setae nearly twice as long as middle width of the segment; 5th with a small, cilia-less primary rhinarium, with a few setae much shorter than those on 3rd; processus terminalis 3.0–3.5 times as long as basal part of 6th; 3rd–6th as 30 : 29 : 29 : 15+50 in length. Clypeus with 4 setae anteriorly; mandibular lamina smooth, with 2–6 setae. Rostrum reaching hind coxa; ultimate segment convex laterally, 1.3–1.4 times as long as 2nd segment of hind tarsus, with fine spinules and 4–7 secondary setae. Prothorax with about 10 setae dorsally besides 2 pairs of lateral setae, without marginal tubercles. Mesosternal furca sessile, with arms separated from each other. Femora spinulated apically, with sparse setae much longer than middle width of hind femur; dorsal surface near apex straight or weakly concave in profile. Tibiae angulated dorso-basally, usually smooth in fore and middle legs, sparsely spinulous apically in hind leg, with many long setae dorsally and shorter setae ventrally. Frist segment of all tarsi with 2 setae much removed from apex of the segment; 2nd segment without secondary setae; empodial setae reaching apex of claws. In larva hind tibia smooth. Abdomen without marginal tubercles; spiracles on 1st segment separated from that on 2nd by 5–10 times its longer axis; 8th segment with 9–13 setae. Genital plate oval, with 8–12 setae along hind margin and 2 setae anteriorly. Siphunculus tapering, spinulously imbricated

throughout, about 2.5 times as long as wide at base, 1.7–1.9 times as long as cauda, with a distinct flange. Cauda elongately tongue-shaped, 1.5 times as long as wide, with 6–9 setae.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.10, 0.07, 0.29, 0.28, 0.30, 0.14+0.43; ultimate rostral segment 0.11; hind femur 0.58; hind tibia 1.11;

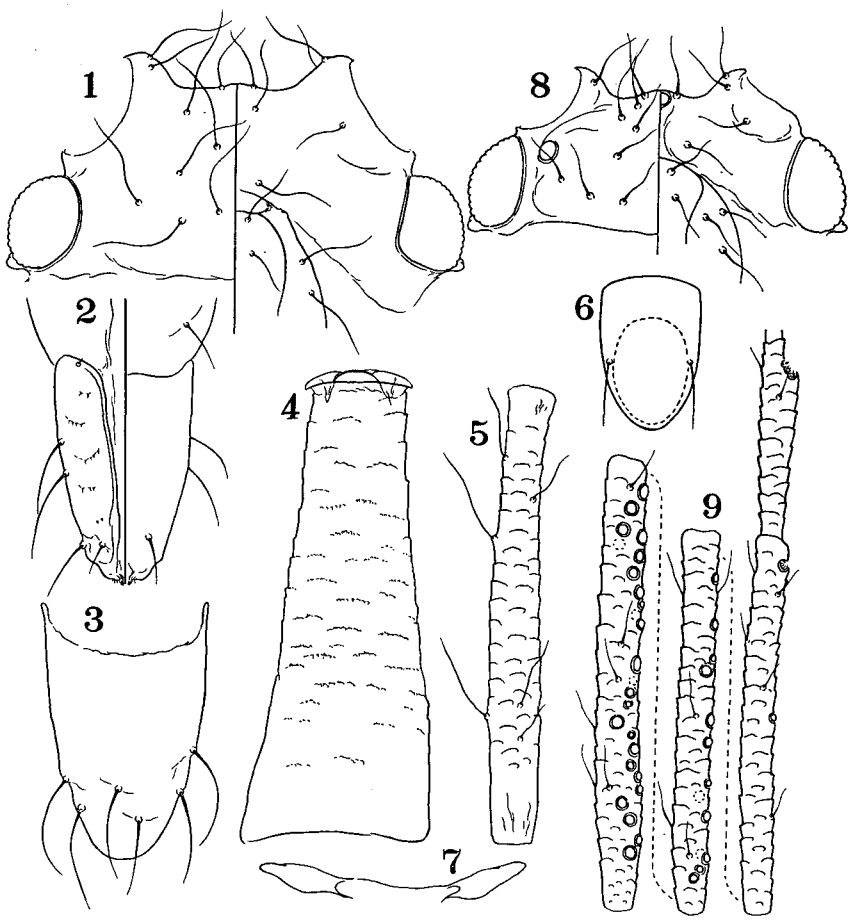

Fig. 42. *Polytrichaphis fragilis*, sp. n. Apterous viviparous female:— 1, head; 2, ultimate rostral segment; 3, cauda; 4, siphunculus; 5, antenna (3rd segment); 6, 1st segment of hind tarsus (ventral view); 7, mesosternal furca. Alate viviparous female:— 8, head; 9, antenna (3rd–5th segments and basal part of 6th).

hind tarsus (2nd segment) 0.08; siphunculus 0.29; cauda 0.15; dorsal setae about 0.110 on head and abdomen.

Alate viviparous female. Differs from the apterous viviparous females as follows:—

Body 1.5–2.0 mm. in length. Head and thorax dark brown. Antenna with basal 2 segments fuscous; 3rd segment longer than 4th, with 22–29 flat, round rhinaria; 4th

with 5–14 rhinaria; 5th with 0–2 secondary rhinaria. Wing veins bordered with narrow black bands; media of fore wing twice branched. Abdomen membranous, with dark intersegmental areolations, without any sclerites. Siphunculus sub-cylindrical or tapering, about half as long as processus terminalis of antenna.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.09, 0.07, 0.38, 0.32, 0.32, 0.16+0.49; ultimate rostral segment 0.10; hind femur 0.63; hind tibia 1.25; hind tarsus (2nd segment) 0.07; siphunculus 0.26; cauda 0.15; dorsal setae 0.055 on head, 0.080 on abdomen.

Specimens examined: Syntypes—20 apterous viviparous females, Mt. Hikosan, Fukuoka Pref., 24-v-65, no. 1239; Mt. Hikosan, 6-vi-65, H. Takada leg., no. 65249. 4 alate viviparous females, Mt. Hikosan, 24-v-65, no. 1239.

Host plants: All the specimens examined were collected from *Illicium anisatum*. The aphid infests the underside of leaves of the host, without causing peculiar deformationts.

Distribution: Japan.

54. Genus ***Liosomaphis*** Walker

Liosomaphis Walker, 1868: 1119 [type-species: *Aphis berberidis* Kaltenbach, 1843].

So far as their habits are known, the species of this genus are associated with Berberidaceae (*Berberis* & *Mahonia*). From Japan, *L. berberidis* (Kaltenbach) has been recorded by Shinji (1930). In the course of the present study a new species has been found.

Key to the species

1 Antenna with processus terminalis 1.6–1.9 times as long as basal part of 6th segment. Abdomen with 4 or 5 setae on 8th segment. In fundatrix and usually also in apterous viviparous female abdominal tergum pigmented. In alate viviparous female abdomen with a large central patch. . . . . 1. *L. ornata*, sp. n.

– Antenna with processus terminalis 0.8–1.4 times as long as basal part of 6th segment. In fundatrix and apterous viviparous female abdominal tergum not pigmented. In alate viviparous female abdomen without a central patch. . . . . 2. *L. berbridis* (Kaltenbach)

1. ***Liosomaphis ornata***, sp. n.

Apterous viviparous female. Body oval, 1.4–2.1 mm. in length, reddish brown or dark brown, mottled with dull green in life. Eyes black. Antenna and siphunculus pale; darkened apically. Legs pale; tarsi and sometimes tibiae at apex dark. Cauda dusky or black.

Head smooth, pigmented, with dorsal setae 1/3–1/2 as long as middle width of 3rd antennal segment, with a pair of large, weak swellings mesially to eyes; antennal tubercle as high as or lower than median tubercle, with 2 setae apically; front markedly W-shaped in most cases. Antenna 6-segmented (sometimes 5-segmented in summer form), about half as long as body; 3rd segment faintly imbricated, without rhinaria; processus terminalis 1.6–1.9 times as long as basal part of 6th; 3rd–6th as 22 : 12 : 12 : 11+18 in length. Thoracic tergites corrugated or papillated, with a brown band segmentally. Rostrum reaching middle or hind coxa; ultimate segment obtuse, 0.8–0.9 as long as 2nd segment of hind tarsus, about twice as long as wide, with 2 secondary

setae. Femora smooth, sparsely imbricated at tip. Tibiae smooth, with setae at most as long as middle width of hind tibia. In larva hind tibia smooth, sometimes with a few spinules at apex. First tarsal chaetotaxy 3 : 3 : 3. Abdominal tergum sclerotized, corrugated or papillated; 1st–6th tergites pigmented, usually irregularly lightened in colour mesially; 7th and 8th tergites each with a dark broad band; 2nd–4th tergites each with 5–8 short pointed setae besides marginal ones, without marginal tubercles;

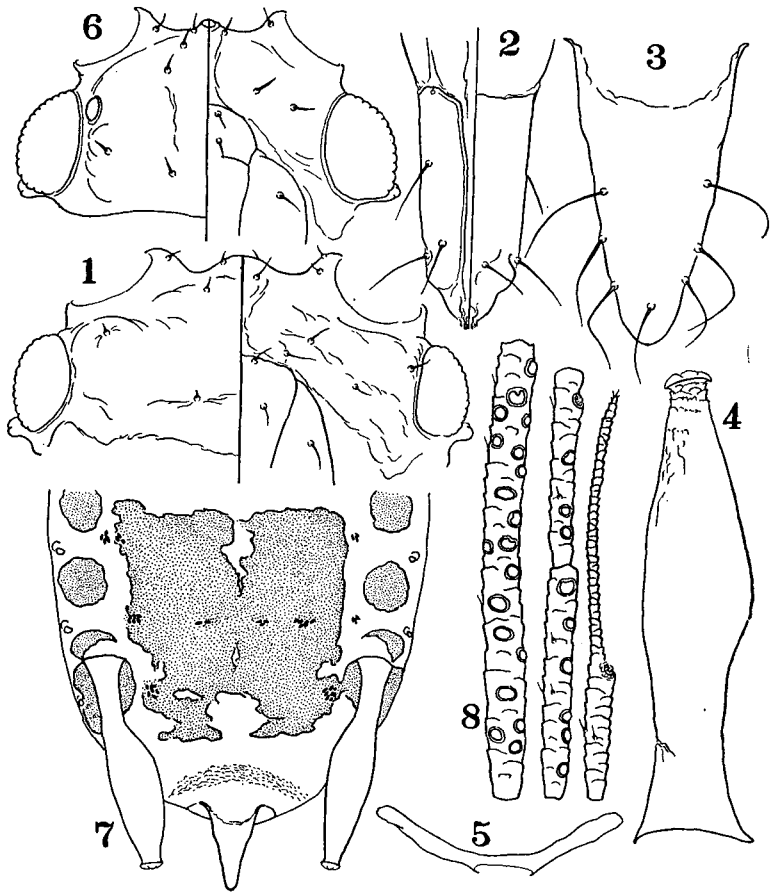

Fig. 43. *Liosomaphis ornata*, sp. n. Apterous viviparous female:— 1, head; 2, ultimate rostral segment; 3, cauda; 4, siphunculus; 5, mesosternal furca. Alate viviparous female:— 6, head; 7, pattern of sclerites of abdomen; 8, antenna (3rd–6th segments).

8th with 4 or 5 setae at most as long as middle width of 3rd antennal segment. Siphunculus markedly swollen, more strongly convex on inner side than on outer side, smooth, with a few rows of transverse striae at apex, as long as or longer than head width across eyes, 2–3 times as long as cauda; largest diameter 1.6–2.1 times as large as smallest diameter of basal cylindrical portion, 2.1–3.3 times as large as smallest diameter just below flange. Cauda conical or finger-shaped, blunt at apex, without

constrictions, with 5–8 setae.

In specimens collected in June and July, body yellowish green in life, quite pale when cleared and mounted.

Measurements in mm. Body 1.9; antennal segments (1st–6th): 0.07, 0.06, 0.26, 0.14, 0.13, 0.12+0.20; ultimate rostral segment 0.10; hind femur 0.48; hind tibia 0.83; hind tarsus (2nd segment) 0.12; siphunculus 0.50; cauda 0.20; longest seta 0.010 on cephalic disc, 0.009 on abdominal disc, 0.018 on 8th abdominal segment.

Fundatrix. Slightly differs from the apterous viviparous female as follows:—

Body with dark transverse bands arranged in pairs from prothorax to 8th abdominal segment, the bands often being fused irregularly with those of neighbouring segments. Antenna 6- rarely 5-segmented, about 2/5 as long as body; processus terminalis at most as long as basal part of 6th segment. Ultimate rostral segment about as long as 2nd segment of hind tarsus.

Measurements in mm. Body 2.2; antennal segments (1st–6th): 0.08, 0.06, 0.25, 0.14, 0.13, 0.13+0.13; ultimate rostral segment 0.13; hind femur 0.46; hind tibia 0.80; hind tarsus (2nd segment) 0.13; siphunculus 0.54; cauda 0.21; longest seta 0.015 on cephalic disc, 0.012 on abdominal disc, 0.018 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Antenna 3/4–7/8 as long as body; 3rd segment with 21–31 flat rhinaria scattered on whole surface of the segment; 4th with 5–8 rhinaria; 5th with 1–4 secondary rhinaria; processus terminalis 1.3–1.6 times as long as basal part of 6th. Wings of normal venation. Abdomen with a large rectangular sclerite which is extending on 3rd–6th segments and areolated with spinules; 1st and 2nd segments with some sclerites between marginal sclerites; 2nd–7th with pale, spinulously imbricated marginal sclerites; 7th segment without a sclerotic band. Body 1.6–1.8 mm. in length.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.07, 0.06, 0.43, 0.25, 0.19, 0.14+0.22; ultimate rostral segment 0.10; hind femur 0.53; hind tibia 0.94; hind tarsus (2nd segment) 0.12; siphunculus 0.42; cauda 0.15; longest seta 0.018 on cephalic and abdominal discs, 0.025 on 8th abdominal segment.

Specimens examined: Syntypes—30 apterous viviparous females, Sapporo, Hokkaidô, 1–vi–68 (no. 2407), 13–vi–66 (no. 1653), 8–vii–65 (no. 1325) & 20–ix–66 (no. 1978), ex *Berberis thunbergii*; Sapporo, 17–x–64, ex *Berberis amurensis* var. *japonica*, no. 629. 5 alate viviparoes females, Sapporo, 1–vi–68 (no. 2407) & 13–vi–66 (no. 1653), ex *Berberis thunbergii*. 14 fundatrices, Sapporo, 7–v–68, ex *Berberis amurensis* var. *japonica*, no. 2372 & 16–v–67, ex *Berberis thunbergii*, no. 2094.

Host plants: *Berberis thunbergii* & *B. amurensis* var. *japonica*. This aphid infests leaves and tender branches of the host plants.

Distribution: Japan.

The new species is characterized mainly by the apterous viviparous female with a pigmented tergum and by the alate viviparous female with a large central patch on the abdomen. On account of the pigmented tergum of the apterous viviparous female, the species comes close to *L. atra* Hille Ris Lambers from Pakistan. It may be distinguished, however, from the latter by the following characters:—(1) Front of head markedly W-shaped. (2) Siphunculus as long as or longer than head breadth across eyes, more gently swollen than in *atra*. (3) Rostrum not or just attaining hind coxa. (4) Cauda never with constriction at base. (5) Antenna with prosessus terminalis 1.6–

1.9 times as long as basal part of terminal segment.

In the shape of the head, the length of the rostrum, etc. of the apterous viviparous female, this species resembles *L. himalayensis* Basu. Furthermore, according to Ghosh (1969), the alate viviparous female of *himalayensis* has a central abdominal patch as in the present species. As compared with syntypes of *himalayensis* (apterous viviparous females), however, the present specimens differ mainly as follows:—(1) Abdominal tergum usually pigmented, markedly corrugated or papillated in most cases (pale, weakly corrugated in *himalayensis*). (2) Triommatidion protruded laterally to eye (placed underside of eye). (3) Dorsal setae of body shorter, 7–14 μ on head and abdominal disc, 11–25 μ on 8th abdominal segment (28–33 μ on head, 15–16 μ on abdominal disc, about 55 μ on 8th abdominal segment).

2. ***Liosomaphis berberidis*** (Kaltenbach)

Aphis berberidis Kaltenbach, 1843: 95.
Siphocoryne berberidis: van der Goot, 1915: 158.
Rhopalosiphum berberidis: Gillette et Palmer, 1932: 480; Palmer, 1952: 212.
Liosomaphis berberidis: Shinji, 1930c: 48 & 1941: 642; Cottier, 1953: 292; Heinze, 1960: 805; Eastop, 1966: 452.

Specimens examined: No specimens from Japan have been seen. Some European specimens have been examined, their localities being as follows:—Bennekom, Netherlands (ex *Berberis thunbergii*, Hille Ris Lambers leg.); Harpenden, Herts, England (L. R. Taylor leg.).

Host plants: *Berberis thunbergii* & *B. sieboldii* (in Japan, after Shinji, 1941); *Mahonia* & *Berberis* (in Europe, after Heinze, 1960).

Distribution: Japan; Europe; North America; New Zealand; Australia.

55. Genus ***Tricaudatus*** Narzikulov

Tricaudatus Narzikulov, 1957: 683 [type-species: *Rhopalosiphoninus polygoni* Narzikulov, 1953].

On the basis of its primary host, Hille Ris Lambers et Basu (1966) pointed out that this genus is a close relative of *Myzus* Passerini. The presence of 2 pairs of mesial setae on the prothorax, however, may suggest that this genus belongs to the *Liosomaphis-Cavariella* group. Since the central abdominal sclerite of the alate viviparous females, which is developed in this genus, has been known to occur also in certain species of *Liosomaphis* Walker (e. g. *L. ornata*, sp. n. and *L. himalayensis* Basu), the difference between the two genera becomes rather trifle. In this paper *Tricaudatus* is differentiated from *Liosomaphis* by the following features:—Adbomen with a median tubercle on 8th segment and often also on the 7th; head spinulated ventrally in apterous viviparous female; larval hind tibia densely spinulous.

This genus is represented by 2 species, *T. polygoni* Narzikulov from Tadzhikistan and *T. tuberculatus* Hille Ris Lambers et Basu from India, both infesting *Spiraea* and *Polygonum*. In this case I give Japan as a new locality of *tuberculatus*.

1. ***Tricaudatus tuberculatus*** Hille Ris Lambers et Basu

Tricaudatus polygoni tuberculatus Hille Ris Lambers et Basu, 1966: 27.

The present specimens from Japan agree enough with the original description of

T. tuberculatus Hille Ris Lambers et Basu except for the following points:—(1) Rostrum reaching or passing middle coxa. (2) Siphunculus gradually swollen. (3) Cauda long, 0.19–0.22 mm. in length, 4/7–4/6 as long as siphunculus.

Specimens examined: Many apterous and a few alate viviparous females, Mt. Hodaka, Nagano Pref., 28–viii–67, ex *Polygonum viviparum*, H. Higuchi leg.

Host plants: *Polygonum viviparum* (in Japan); *Spiraea corymbosa* & *Polygonum molle* (in India, after Hille Ris Lambers et Basu, 1966). The present specimens have been collected from the flower part of the host plant.

Distribution: Japan; India.

56. Genus ***Elatobium*** Mordvilko

Elatobium Mordvilko, 1914: 72 [type-species: *Aphis abietina* Walker, 1849].
Neomyzaphis Theobald, 1926: 262 [type-species: *Aphis abietina* Walker, 1849].
Ericolophium Tao, 1963: 187 [type-species: *Macrosiphum itoe* Takahashi, 1925]. **Syn. n.**
Neoacyrthosiphon Tao, 1963: 189 [type-species: *Acyrthosiphon taiheisanum* Takahashi, 1935]. **Syn. n.**

The genus as here understood comprises species widely divergent biologically. It may consists of more or less distinct natural groups, namely *Elatobium* associated with Coniferae and *Ericolophium* and *Neoacyrthosiphon* associated with Ericaceae; *trochodendri* and *hidaensis* belong to another group. *Ericolophium* and *Neoacyrthosiphon* may be distinguished from *Elatobium* by the tarsi bearing many spinules especially in the alate viviparous females. However, it is my opinion that the first two are distinct only subgenerically from the last, since in other respects they are so close to each other. In this paper will be given 5 species, of which one is new to science and other one new to Japan.

Key to the species

1 Abdominal tergum membranous, smooth, with or without scleroites. 2
– Abdominal tergum more or less sclerotized, papillated, never with scleroites. 4
2(1) Abdomen without scleroites at base of dorsal setae. Rostrum reaching 4th abdominal segment. Antenna over 4/5 as long as body; processus terminalis 2.3–3.6 times as long as basal part of terminal segment. On *Abies* & *Picea*. . . . . 1. *E. momii* (Shinji)
– Abdomen with some scleroites at base of dorsal setae. Rostrum at most reaching hind coxa. Antenna 2/5–3/5 as long as body; processus terminalis 2.0–2.3 times as long as basal part of terminal segment. 3
3(2) Ultimate rostral segment 1.4–1.6 times as long as 2nd segment of hind tarsus. Abdomen with large postsiphuncular sclerites; 7th segment with a broad sclerotic band which may be broken along mesial line. Third antennal segment imbricated, with fine setae at most as long as half middle width of the segment. Siphunculus about 9 times as long as wide at middle. On *Rhododendron*. . . . . 2. *E. itoe* (Takahashi)
– Ultimate rostral segment as long as 2nd segment of hind tarsus. Abdomen without postsiphuncular sclerites; 7th segment with scleroites at base of dorsal setae. Third antennal segment smooth, with stout setae longer than half middle width of the segment. Siphunculus about 6 times as long as wide at middle. On a plant of Umbelliferae. . . . . 3. *E. taisetsusana*, sp. n.
4(1) Siphunculus black apically, imbricated more strongly on inner surface than on outer surface. Cauda with 12–15 setae. Ultimate rostral segment very stout, about twice as long as wide. On *Trochodendron*. . . . . 4. *E. trochodendri* Takahashi

- Siphunculus pale, evenly imbricated. Cauda with 4 or 5 setae. Ultimate rostral segment of normal shape, 2.4–2.7 times as long as wide. On *Salix*. . . 5. *E. hidaensis* (Takahashi)

1. ***Elatobium momii*** (Shinji)

Aphis momii Shinji, 1922: 797.
Myzus momii: Shinji, 1941: 942.
Elatobium momii: Takahashi, 1960b: 37.
Aphis momifoliae Shinji, 1924: 355.
Phorodon abietifoliae Shinji, 1924: 360.
Phorodon abietifoliae: Shinji, 1941: 986.
Neomyzaphis piceana Inouye, 1939: 132.
Liosomaphis piceana: Inouye, 1941: 28.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Sendai, Miyagi Pref. (H. Takada leg.); Asakawa, Tôkyô (R. Takahashi leg.).

Host plants: All the specimens examined were collected from *Abies firma*. Inouye (1939) gives *Picea yezoensis* as a host.

Distribution: Japan.

2. ***Elatobium itoe*** (Takahashi), comb. n.

Macrosiphum itoe Takahashi, 1925a: 11.
Ericolophium itoe: Tao, 1963: 187.

This species is new to Japan. As a supplement to the original description, the following accounts may be added.

Apterous viviparous female. Body elongately oval, 1.8–2.0 mm. in length, reddish brown with a greenish tint in life. Antenna black; 3rd segment sometimes pale basally. Legs, siphunculus and cauda black. Larva and nymph pale yellowish green, with deep green longitudinal stripes.

Head smooth; setae on cephalic disc pointed, shorter than middle width of 3rd antennal segment; antennal tubercles low, diverging at inner sides, each with a seta apically; median tubercle distinct, not visible from above. Antenna 4/7–3/5 as long as body; 3rd segment weakly imbricated, with setae at most half as long as middle width of the segment, without rhinaria; 4th subequal in length to 5th; processus terminalis about twice as long as basal part of 6th segment. Clypeus with 2 setae anteriorly; mandibular lamina with a seta. Rostrum reaching hind coxa; ultimate segment 1.4–1.6 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Tarsi with first segment smooth, with 2nd segment bearing some spinules on imbrications (bearing many spinules on ventral surface); first tarsal chaetotaxy 3 : 3 : 3. In larva hind tibia with a few spinules at apex. Mesosternal furca sessile, the arms being separated from each other. Abdominal tergum membranous, smooth; 2nd–4th tergites each with about 8 fine setae between marginal sclerites, often with a pair of sclerites mesially; 6th with large postsiphuncular sclerites and a pair of mesial scleroites; 7th with a broad sclerotic band often broken mesially; 8th sclerotized, with 4 setae. Siphunculus cylindrical, imbricated, about 9 times as long as wide at middle, as long as head width across eyes, with a distinct flange. Cauda conical or constricted at basal 1/3, about half as long as siphunculus, with 5–7 setae.

Measurements in mm. Body 2.0; antennal segments (1st–6th): 0.06, 0.06, 0.35,

0.18, 0.17, 0.11+0.25; ultimate rostral segment 0.14; hind femur 0.46; hind tibia 0.82; hind tarsus (2nd segment) 0.10; siphunculus 0.45; cauda 0.23; dorsal setae 0.018–0.030 on head, about 0.018 on abdominal disc, 0.038 on 8th abdominal segment.

Alate viviparous female. Body 2.1–2.2 mm. in length, green in life; head and thorax yellowish brown. Antenna about as long as body; 3rd segment with 30–38 rhinaria; 4th with 4–7 rhinaria; 5th usually without secondary rhinaria (rarely with 1 or 2 secondary rhinaria); processus terminalis 1.8–2.2 times as long as basal part of 6th. Ultimate rostral segment 1.2 times as long as 2nd segment of hind tarsus. Tarsi with 1st segment bearing 3 setae and some spinules, with 2nd segment bearing many spinules on imbrications. Abdomen with marginal sclerites on 2nd–6th segments, often with scleroites which are in some cases developed and fused with each other to form incomplete transverse bands. Siphunculus straight or curved outwards, 11–13 times as long as wide at middle, much longer than head width across eyes.

Measurements in mm. Body 2.2; antennal segments (1st–6th): 0.07, 0.06, 0.59, 0.35, 0.31, 0.16+0.35; ultimate rostral segment 0.13; hind femur 0.59; hind tibia 1.18; hind tarsus (2nd segment) 0.11; siphunculus 0.55; cauda 0.19; dorsal setae 0.030–0.035 on head, about 0.023 on abdominal disc, up to 0.040 on 8th abdominal segment.

Specimens examined: Some apterous and alate viviparous females, Mt. Seppiko, Hyôgo Pref., 19-iv-66, ex *Rhododendron reticulatum*; Shôdo-shima Isl., Kagawa Pref., 26-iv-66, ex *Rhododendron* sp. near *reticulatum*.

Host plants: *Rhododendron* spp. (including *R. reticultaum*).

Distribution: Japan, Taiwan.

3. ***Elatobium taisetsusanum***, sp. n.

Apterous viviparous female. Body green in life, covered with wax powder. Antenna, legs, siphunculus and canda black. Body elongately oval, 2.2–2.3 mm. in length.

Head smooth; dorsal setae pointed, as long as or slightly longer than middle width of 3rd antennal segment; antennal tubercles hardly or a little developed; front shallowly W-shaped. Antenna shorter than half length of body; 3rd segment smooth, without rhinaria, with sparse setae about 5/7 as long as middle width of the segment; processus terminalis twice as long as basal part of 6th. Clypeus with 4 or 5 setae anteriorly; mandibular lamina smooth, with 1 or 2 setae. Rostrum reaching between middle and hind coxae; ultimate segment tapering, as long as 2nd segment of hind tarsus, with 2 or 3 secondary setae. Femora spinulated in fore legs, smooth in middle and hind legs. Tibiae smooth, with setae nearly as long as middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3. Prothorax with 4 setae on scleroites arranged in anterior and posterior pairs, with small marginal tubercles. Mesosternal furca sessile, with arms separated from each other. Meso- and metathorax and first 6 abdominal segments with mesial and marginal scleroites arranged in simple longitudinal rows, rarely with pleural scleroites unilaterally; 2nd–5th abdominal segments with small marginal tubercles, with about 4 setae besides marginal ones; 7th abdominal segment with 4 setae on scleroites between spiracles, with or without mesial tubercles; 8th abdominal segment sclerotized, with 6 or 7 setae twice as long as middle width of 3rd antennal segment. Siphunculus cylindrical, imbricated throughout, about 6 times as long as wide at middle, 1.5–2.0 times as long as cauda, with a developed flange. Cauda elongately conical, round apically, with 5 setae.

Measurements in mm. Body 2.3; antennal segments (1st–6th): 0.08, 0.07, 0.26, 0.12, 0.12, 0.10+0.20; ultimate rostral segment 0.13; hind femur 0.49; hind tibia 0.81; hind tarsus (2nd segment) 0.13; siphunculus 0.24; cauda 0.15; longest dorsal seta 0.016 on head, 0.013 on abdominal disc, 0.025 on 8th abdominal segment.

Specimens examined: Syntypes:—2 apterous viviparous females, Mt. Taisetsu (Tenninkyô), Hokkaidô, 30-vii-67, from a plant of Umbelliferae, no. 2222.

Host plants: A plant of Umbelliferae. This aphid infests the host on the stalk hidden under the leaf sheath.

Distribution: Japan.

On account of the membranous tergum with conspicuous scleroites, this species comes close to *E. itoe* (Takahashi), from which it differs by characters given in the

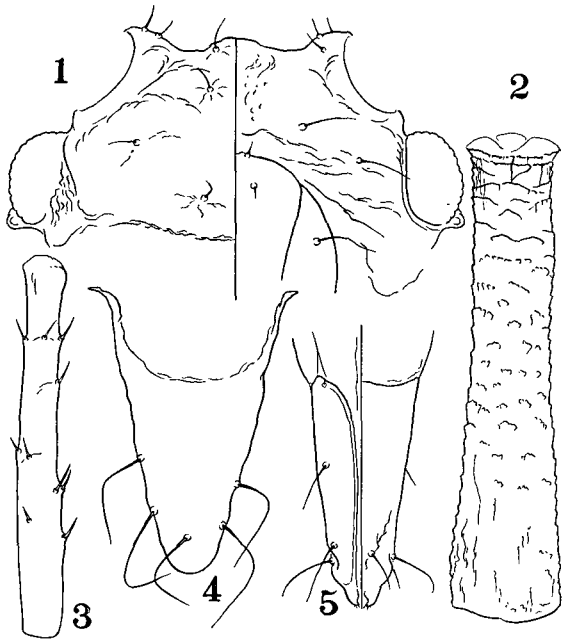

Fig. 44. *Elatobium taisetsusanum*, sp. n. Apterous viviparous female:—
1, head; 2, siphunculus; 3, antenna (3rd segment); 4, cauda;
5, ultimate rostral segment.

key. It may be distinguished from *taiheisanum* Takahashi from Taiwan by the shorter, evenly imbricated siphunculus, by the shorter cauda bearing fewer setae, by the smooth tergum, etc., and from *setosum* Hille Ris Lambers et Basu from India by the different type of sclerotization of the 6th and 7th abdominal segments, by shorter setae of the body, by the shorter rostrum with a comparatively shorter ultimate segment, etc.

4. ***Elatobium trochodendri*** Takahashi

Elatobium trochodendri Takahashi, 1960b: 37.

Apterous viviparous female. Tergum thicker than that of *momii* or *itoe*; in the specimens collected at Mt. Hikosan it is rather sclerotic, conspicuously papillated.

Larval tibiae with sparse spinules at apex in hind leg and often also in middle and fore legs. In the specimens from Mt. Hikosan, ultimate rostral segment much longer than that of syntypes, about as long as 2nd segment of hind tarsus.

Specimens examined: A lot of apterous viviparous females, Mt. Rokkô, Hyôgo Pref., 27-x-56, R. Takahashi leg. (syntypes of *E. trochodendri* Takahashi) & Mt. Hikosan, Fukuoka Pref., 24-v-65.

Host plants: All the specimens examined were collected from *Trochodendron aralioides*.

Distribution: Japan.

5. ***Elatobium hidaensis*** (Takahashi), comb. n.

Cavariella hidaensis Takahashi, 1961e: 7.

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Kaigake, Niigata Pref. (H. Higuchi leg.); Nikkô, Tochigi Pref. (H. Higuchi leg.); Kamikôchi, Nagano Pref. (H. Higuchi leg.); Mt. Norikura, Gifu Pref. (R. Takahashi leg., syntypes of *Cavariella hidaensis* Takahashi).

Host plants: All the specimens examined were collected from *Salix* sp.

Distribution: Japan.

This species sharply differs from the members of *Cavariella* by the 8th abdominal tergite flat, bearing 4 setae and by the head with prominent antennal tubercles. On account of these characters it may be better referred to *Elatobium* rather than to *Cavariella* or any other described genus.

57. Genus ***Cavariella*** del Guercio

Cavariella del Guercio, 1911a: 323 [type-species: *Aphis pastinacae* Linné, 1758].
Corynosiphon Mordvilko, 1914: 73 [type-species: *Aphis capreae* Fabricius, 1775].
Nipposiphum Matsumura, 1917: 410 [type-species: *Nipposiphum salicicola* Matsumura, 1917].
Metaphis Matsumura, 1918: 1 [type-species: *Metaphis angelicae* Matsumura, 1918].
Neocavariella Shinji, 1932a: 122 [type-species: *Cavariella araliae* Takahashi, 1921].

The members of this genus constitute a well defined natural group alternating between *Salix* and Umbelliferae or Araliaceae. In this paper are recognized 13 species occurring in Japan.

Key to the species

1 Supracaudal process as long as or longer than 2nd antennal segment. 2
- Supracaudal process distinctly shorter than 2nd antennal segment (often reduced to a low swelling). 9

2(1) Antenna with processus terminalis 3.0-4.0 times as long as basal part of terminal segment. Setae on abdominal disc about as long as middle width of 3rd antennal segment. Body yellowish green. . . . . 8. *C. angelicae* (Matsumura)
- Antenna with processus terminalis less than 3.0 times as long as basal part of terminal segment. Setae on abdominal disc much shorter than middle width of 3rd antennal segment. 3

3(2) Antenna with processus terminalis less than 1.3 times as long as basal part of terminal segment. 4
- Antenna with processus terminalis at least 1.3 times as long as basal part of terminal segment. 7

4(3) Ultimate rostral segment shorter than 2nd segment of hind tarsus, without secondary setae.

Body yellowish green to green. . . . . 1. *C. aegopodii* (Scopoli)
- Ultimate rostral segment as long as or longer than 2nd segment of hind tarsus, with secondary setae. 5
5(4) Siphunculus stout, at most 5 times as long as wide at swollen portion, at most twice as long as cauda. Ultimate rostral segment at most 1.2 times as long as 2nd segment of hind tarsus. Body dull yellowish green. . . . . 2. *C. salicicola* (Matsumura)
- Siphunculus slender, at least 5 times as long as wide at swollen portion, at least twice as long as cauda. Ultimate rostral segment 1.3–1.4 times as long as 2nd segment of hind tarsus. 6
6(5) Siphunculus club-shaped, with a distinct flange. Antenna about half as long as body, with processus terminalis distinctly shorter than basal part of terminal segment. Body white. . . . . 4. *C. nipponica* Takahashi
- Siphunculus slightly swollen, without a distinct flange. Antenna about 1/3 as long as body, with processus terminalis about as long as basal part of terminal segment. Body white. . . . . 7. *C. gilibertiae* Takahashi
7(3) Mesosternal furca with arms connected by a chitinous band. Supracaudal process shorter than cauda. Ultimate rostral segment 1.0–1.2 times as long as 2nd segment of hind tarsus. Body green or bluish green. . . . . 3. *C. konoi* Takahashi
- Mesosternal furca with arms separated from each other. Supracaudal process longer than cauda. Ultimate rostral segment at least 1.3 times as long as 2nd segment of hind tarsus. . 8
8(7) Supracaudal process much longer than cauda. Cauda, genital plate and siphunculus pale. Body white to yellow. . . . . 5. *C. araliae* Takahashi
- Supracaudal process about as long as cauda. Cauda, genital plate and siphunculus dark. . . . . 6. *C. nigrocaudata* Takahashi
9(1) Femora with sparse rigid setae shorter than half middle width of hind femur. 10
- Femora with dense flagellate setae longer than half middle width of hind femur. . . . 11
10(9) Tergum pigmented. Cauda with 6–8 setae. Ultimate rostral segment 1.4–1.6 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Body 1.5–2.4 mm. in length, pink to brown, sometimes with a greenish tinge. . . . . 9. *C. japonica* (Essig et Kuwana)
- Tergum pale. Cauda with 9–16 setae. Ultimate rostral segment 1.5–2.0 times as long as 2nd segment of hind tarsus, with 4 secondary setae. Body 2.6–3.1 mm. in length, white. . . . . 10. *C. heraclei* Takahashi
11(9) Antenna frequently with secondary rhinaria on 3rd–5th segments. Tergum variably pigmented. Body white to pale yellowish green. . . . . 12. *C. oenanthi* (Shinji)
- Antenna without secondary rhinaria. Tergum pale. Body white to pale yellowish green. . . . . 11. *C. sapporoensis* Takahashi

1. ***Cavariella aegopodii*** (Scopoli)

Aphis aegopodii Scopoli, 1763: 137.

Cavariella aegopodii: Palmer, 1952: 196; Cottier, 1953: 144; Eastop, 1958: 30 & 1966: 435; Heinze, 1960: 810; Takahashi, 1961e: 3.

Specimens examined: Many apterous and some alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Salix integra*). Honshû—Shirabu-takayu, Yamagata Pref. (ex *Salix* sp., H. Higuchi leg.); Mikuni, Niigata Pref. (ex *Salix* sp., H. Higuchi leg.); Tôkyô (ex *Salix* sp.); Sugadaira, Nagano Pref. (ex *Salix* sp., R. Takahashi leg.); Mt. Yatsugatake, Nagano Pref. (ex *Salix* sp., H. Higuchi leg.). Kyûshû— Kijima-kôgen, Ôita Pref. (ex *Oenanthe* sp.).

Host plants: Primary hosts—*Salix* spp. (including *S. integra*). Secondary hosts—*Oenanthe* sp. Furthermore, in literature are recorded various genera of Umbelliferae as secondary hosts (see Eastop, 1966).

Distribution: Japan; Europe; Africa; North & South America; Australia; New

Zealand.

This species may be readily recognized by the ultimate rostral segment devoid of secondary setae.

2. ***Cavariella salicicola*** (Matsumura)

Nipposiphum salicicola Matsumura, 1917: 410.
Cavariella salicicola: Shinji, 1941: 608; Takahashi, 1961e: 3 & 4; Tao, 1962: 97 & 1964a: 115.
Cavariella capreae: Paik, 1965: 96.
Siphocoryne bicaudata Essig et Kuwana, 1918: 64.
Cavariella bicaudata: Hori, 1929: 149.
Cavariella mitsubae Shinji, 1924: 356.
Cavariella azamii Shinji, 1930g: 153. **Syn. n.**
Cavariella azamii: Shinji, 1941: 603.

Specimens examined: Numerous apterous and alate viviparous females have been examined their localities being as follows:— Hokkaidô—Sapporo (ex *Salix miyabeana*); Kunneppu (ex *Cryptotaenia japonica*). Honshû—Morioka, Iwate Pref. (ex *Salix* sp.); Inawashiro, Fukushima Pref. (ex *Salix* sp.); Chiba (ex *Cryptotaenia japonica*, K. Sekiguchi leg.); Tôkyô (ex *Salix* sp., S. I. Kuwana leg., syntypes of *Siphocoryne bicaudata* Essig et Kuwana); Ôsaka (ex *Salix* sp., R. Takahashi leg.). Shikoku—Kôchi (ex *Salix* sp., H. Takada leg.). Kyûshû—Kijima-kôgen, Ôita Pref. (ex *Oenanthe* sp.); Nobeoka, Miyazaki Pref (ex *Salix subfragilis*); Miyakonojô, Miyazaki Pref. (ex *Salix babylonica*); Yatsushiro, Kumamoto Pref. (ex *Salix eriocarpa*); Koniya, Amami-ôshima Isl. (ex *Salix* sp.).

Host plants: Primary hosts—*Salix* spp. (including *S. babylonica*, *S. eriocarpa*, *S. miyabeana* & *S. subfragilis*). Secondary hosts—*Cryptotaenia japonica* & *Oenanthe* sp.

Distribution: Japan; Korea; China; Taiwan.

Judging from the original description of *C. azamii* Shinji, its morphological detailes agree enough with those of *C. salicicola* (Matsumura) except for the antenna with a processus terminalis about twice as long as the basal part of the terminal segment. Shinji (1930) gives *Taraxacum officinale* as a host plant of *azamii*, while the name *azamii* implies its association with "azami", a plant of *Cirsium*. In any case either of the plants seems not to be a true host of this aphid.

3. ***Cavariella konoi*** Takahashi

Cavariella konoi Takahashi, 1939a: 117.
Cavariella konoi: Takahashi, 1961e: 3 & 4; Stroyan, 1969: 10.

Specimens examined: A lot of apterous and some alate vivpiarous females collected at the following localities:— Hokkaidô—Sapporo (ex *Salix rorida* & *Angelica anomala*); Mt. Apoi (ex *Heracleum dulce*). Honshû—Kamikôchi, Nagano Pref. (ex *Salix* sp., H. Higuchi leg.). Kyûshû—Hitoyoshi, Kumamoto Pref. (ex *Salix koriyanagi*).

Host plants: Primary hosts—*Salix* spp. (including *S. rorida* & *S. koriyanagi*). Secondary hosts—*Angelica anomala* & *Heracleum dulce* (in Japan); *Angelica*, *Apium*, *Cicuta* & *Sium* (in North America, after Stroyan, 1969).

Distribution: Japan; Europe; North America.

In general facies this species is close to *C. nipponica* Takahashi. However, it may be distinguished from *nipponica* and its allies by the mesosternal furca, the arms of which are connected by a chitinous band. *C. angelicae* (Matsumura), which has a

similar mesosternal furca, stands apart from the present species in the cylindrical siphunculus, long dorsal setae of the body, etc.

4. ***Cavariella nipponica*** Takahashi

Cavariella nipponica Takahashi, 1961e: 8.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Salix sachalinensis*). Honshû—Tôkyô (*Salix* sp., R. Takahashi leg., syntypes of *C. nipponica* Takahashi); Okukinu, Tochigi Pref. (ex *Salix* sp., H. Higuchi leg.); Kobuka, Ôsaka Pref. (ex *Heracleum moellendorffii*, R. Takahashi leg.); Okutsu, Okayama Pref. (ex *Salix* sp.); Tottori (ex *Salix* sp.). Kyûshû—Fukuoka (ex *Salix kinuyanagi*); Mt. Hikosan, Fukuoka Pref. (ex *S. sieboldiana*); Kijima-kôgen, Ôita Pref. (ex *Salix* sp.).

Host plants: Primary hosts—*Salix* spp. (including *S. kinuyanagi*, *S. sieboldiana* & *S. sachalinensis*). Secondary hosts—*Heracleum moellendorffii*.

Distribution: Japan.

5. ***Cavariella araliae*** Takahashi

Cavariella araliae Takahashi, 1921b: 37.

Cavariella araliae: Takahashi, 1923: 35 & 93 and 1961e: 3 & 4; Tao, 1962: 97 & 1964a: 112; Paik, 1965: 94.

Neocavariella araliae: Shinji, 1932a: 122 & 1941: 645.

Cavariella neocapreae Takahashi, 1921b: 37.

Cavariella neocapreae: Takahashi, 1923: 36 & 93 and 1924: 40.

Neocavariella neocapreae: Shinji, 1941: 648.

Specimens examined: Many apterous and alate viviparous females collected at the following localities:— Honshû—Mt. Yahiko, Niigata Pref. (ex *Aralia* sp., R. Takahashi leg.); Tôkyô (ex *Aralia cordata*, R. Takahashi leg.); Ôsaka (ex *Silix* sp., R. Takahashi leg.); Hirao, Ôsaka Pref. (ex *Aralia elata*, M. Sorin leg.). Kyûshû—Fukuoka, (ex *Tetrapanax papyriferus*, H. Takada leg.); Nagasaki (ex *Tetrapanax papyriferus*); Kagoshima (ex *Tetrapanax papyriferus*); Gusuku, Amami-ôshima Isl. (ex *Tetrapanax papyriferus*, H. Takada leg.).

Host plants: Primary hosts—*Salix* spp. Secondary hosts—*Aralia elata*, *A. cordata* & *Tetrapanax papyriferus* (in Japan); *Aralia lato* (in Korea, after Paik, 1965); *Schefflera octophylla* (in China, after Tao, 1964).

Distribution: Japan; Korea; China; Taiwan.

In the present specimens collected from *Tetrapanax papyriferus*, the ultimate rostral segment is comparatively longer than in the specimens collected from other host plants: it is 1.4–1.7 times as long as the 2nd segment of the hind tarsus (1.3–1.4 times so in others).

6. ***Cavariella nigrocaudata*** Takahashi

Cavariella nigrocaudata Takahashi, 1965c: 48.

Specimens examined: Some apterous and an alate viviparous females collected at Fukuoka (ex *Tetrapanax papyriferus*, M. Shiga leg., syntypes of *C. nigrocaudata* Takahashi).

Host plants: *Tetrapanax papyriferus*.

Distribution: Japan.

7. ***Cavariella gilibertiae*** Takahashi

Cavariella gilibertiae Takahashi, 1961e : 4.

Specimens examined: Some apterous viviparous females collected at Tôkyô (ex *Gilibertia pellucidopunctata,* M. Sorin leg., syntypes of *C. gilibertiae* Takahashi); Mt. Rokkô, Hyôgo Pref. (ex *Dendropanax trifidus,* R. Takahashi leg.).

Host plants: *Gilibertia pellucidopunctata* & *Dendropanax trifidus.*

Distribution: Japan.

8. ***Cavariella angelicae*** (Matsumura)

Metaphis angelicae Matsumura, 1918: 1.

Cavariella angelicae: Paik, 1965: 97; Stroyan, 1969: 7.

On the basis of the present specimens a redescription may be given as follows:—

Apterous viviparous female. Body yellowish green in life, 2.1 mm. in length. Antenna, siphunculus and cauda pale. Legs pale; tibiae at apex and tarsi dark.

Head corrugated; dorsal setae blunt, about as long as middle width of 3rd antennal segment; antennal tubercle little developed, with 1 or 2 setae apically and 0 or 1 seta mid-ventrally. Antenna 5-segmented, about half as long as body; 3rd segment faintly imbricated, with setae about half as long as middle width of the segment; processus terminalis 3.0–3.5 times as long as basal part of 5th segment; 3rd–5th as 39 : 9 : 9+30 in length. Rostrum just passing hind coxa; ultimate segment 3 times as long as wide, 1.2 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Tibiae smooth, with setae a little longer than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 3. Mesosternal furca sessile, with arms connected by a chitinous band. Abdomen with tergum moderately papillated; 2nd–4th segments each with small marginal tubercles, with 4–6 blunt setae, of which the longer ones are as long as middle width of 3rd antennal segment; postsiphuncular area and 8th tergite strongly imbricated; supracaudal process rectangular, much smaller than cauda, as long as or a little longer than wide at base, with 2 setae 1.5–2.0 times as long as middle width of 3rd antennal segment. Siphunculus cylindrical, attenuated below flange, roughly imbricated, about 7 times as long as wide at middle, a little shorter than 3rd antennal segment. Cauda shortly tongue-shaped, about 2/5 as long as siphunculus, with 5 setae.

Measurements in mm. Body 2.1; antennal segments (1st–5th): 0.08, 0.06, 0.39, 0.09, 0.09+0.28; ultimate rostral segment 0.18; hind femur 0.61; hind tibia 1.10; hind tarsus (2nd segment) 0.15; siphunculus 0.35; cauda 0.13; longest seta 0.033 on cephalic disc, 0.030 on abdominal disc, 0.050 on 8th abdominal segment.

Alate viviparous female. Head smooth; dorsal setae pointed, as long as or a little shorter than middle width of 3rd antennal segment. Antenna 5-segmented, about 7/10 of body length; 3rd segment subequal in length to 4th and 5th together, with 47–54 large tuberculate rhinaria on whole surface of the segment; 4th without secondary rhinaria; processus terminalis about 3.5–4.5 times as long as basal part of 5th segment; 3rd–5th as 62 : 13 : 10+40 in length. Rostrum with ultimate segment 1.1–1.2 times as long as 2nd segment of hind tarsus. Femora and tibiae spinulous apically. Abdomen with sclerotic bands on 3rd–6th segments, with some sclerites on 1st and 2nd, with large scabrous marginal sclerites on 2nd–6th, without marginal tubercles; 7th and 8th pale, imbricated; supracaudal process distinct, much lower than wide;

setae on abdominal disc as long as or slightly shorter than middle width of 3rd antennal segment. Siphunculus cylindrical, attenuated below flange, imbricated, 6–7 times as longs as wide at middle, about half as long as 3rd antennal segment. Cauda conical, round at apex, about half as long as siphunculus, with 5–7 setae.

Measurements in mm. Body 2.1; antennal segments (1st–5th): 0.08, 0.06, 0.62, 0.13, 0.10+0.41; ultimate rostral segment 0.17; hind femur 0.63; hind tibia 1.30; hind tarsus (2nd segment) 0.14; siphunculus 0.30; cauda 0.14; longest seta 0.035 on cephalic disc, 0.033 on abdominal disc, 0.040 on 8th abdominal segment.

Specimens examined: Some apterous and alate viviparous females, Shirabu-takayu, Yamagata Pref., 29–vi–67, ex *Angelica pubescens*, H. Higuchi leg.

Host plants: *Angelica pubescens*. *Angelica ursina* (in Japan, after Matsumura, 1918); *Heracleum moellendorffii*, *Sium suave* var. *nipponicum* & *Alangium platanifolium* (in Korea, after Paik, 1965),

Distribution: Japan; Korea.

This species is readily recognized by the 5-segmented antenna with a long processus terminalis, by the long and stout dorsal setae of the body, by the mesosternal furca with the arms connected by a chitinous band, etc. It is closely related to *C. theobaldi* (Gillette et Bragg) from Europe and North America, being distinguished from the latter by the following points:—(1) Antenna 5-segmented in both apterous and alate viviparous females. (2) Ultimate rostral segment longer than in *theobaldi* (0.17–0.18 mm. in length, distinctly longer than cauda).

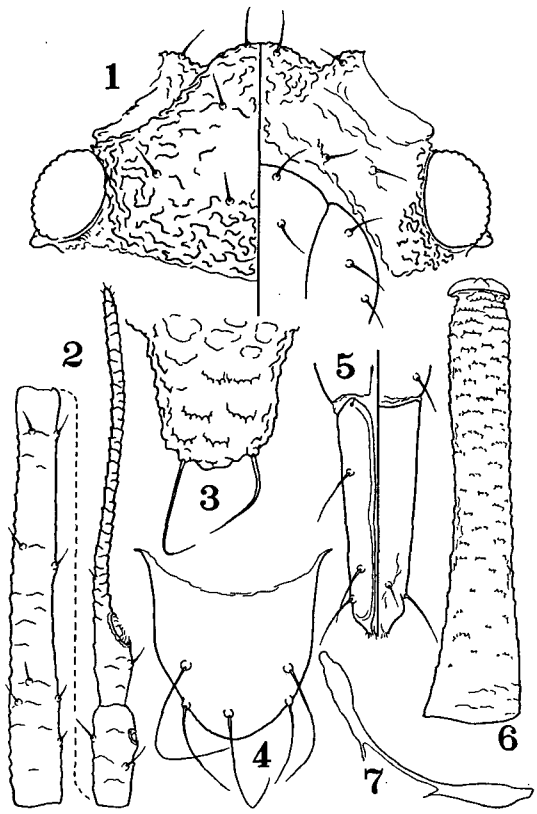

Fig. 45. *Cavariella angelicae* (Matsumura). Apterous viviparous female:— 1, head; 2, antenna (3rd–5th segments); 3, supracaudal process; 4, cauda; 5, ultimate rostral segment; 6, siphunculus; 7, mesosternal furca.

9. ***Cavariella japonica*** (Essig et Kuwana)

Siphocoryne japonica Essig et Kuwana, 1918: 66.

Cavariella japonica: Shinji, 1941: 604; Takahashi, 1961 e: 3; Tao, 1962: 97 & 1964 a: 114; Paik, 1965: 97.

Specimens examined: A lot of apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Salix* sp. & *Angelica acutiloba*). Honshû—Ikezuki & Kawatabi, Miyagi Pref. (ex *Salix* spp.); Yahiko, Niigata Pref. (ex *Dystaenia ibukiensis*, R. Takahashi leg.); Kuroyama, Saitama Pref.

(ex *Angelica polymorpha*); Hirao (ex *Salix* sp., R. Takahashi leg.) & Mt. Iwawaki (ex *Cryptotaenia japonica*, R. Takahashi leg.), Ôsaka Pref.; Mt. Kôya, Wakayama Pref. (ex *Cryptotaenia japonica*, R. Takahashi leg.). Kyûshû—Mt. Hikosan, Fukuoka Pref. (ex *Cryptotaenia japonica*); Hitoyoshi, Kumamoto Pref. (ex *Cryptotaenia japonica*).

Host plants: Primary hosts—*Salix* spp. Secondary hosts—*Angelica polymorpha*, *A. acutiloba*, *Cryptotaenia japonica* & *Dystaenia ibukiensis* (in Japan); *Angelica dahurica* (in Korea, after Paik, 1965).

Distribution: Japan; Korea; China; Taiwan.

10. ***Cavariella heraclei*** Takahashi

Cavariella heraclei Takahashi, 1961e: 6.

Specimens examined: Many apterous and some alate viviparous females collected at the following localities:— Honshû—Yahiko, Niigata Pref. (ex *Heracleum moellendorffii*, R. Takahashi leg.); Kobuka, Ôsaka Pref. (ex *Heracleum mollendorffii*, R. Takahashi leg., syntypes of *C. heraclei* Takahashi); Kyôto (H. Takada leg.); Mt. Kôya, Wakayama Pref. (ex *Heracleum moellendorffii*, R. Takahashi leg.). Shikoku—Motoyama-chô, Kôchi Pref. (S. Takagi leg.).

Host plants: *Heracleum moellendorffii*. This aphid infests the host on the root or on the stalk near the ground.

Distribution: Japan.

11. ***Cavariella sapporoensis*** Takahashi

Cavariella sapporoensis Takahashi, 1961e: 9.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (including syntypes of *C. sapporoensis* Takahashi): Zenibako; Mt. Yûbari; Nibushi; Toikambetsu; Sarobetsu. Honshû—Ikezuki, Miyagi Pref.

Host plants: All the specimens examined were collected from *Heracleum dulce*. The aphid infests the host plant on the stalk hidden under the leaf-sheath or on the stalk under the ground.

Distribution: Japan; Korea.

12. ***Cavariella oenanthi*** (Shinji)

Hydronaphis oenanthi Shinji, 1922: 790.
Hydronaphis oenauthi Shinji, 1941: 638.
Cavariella oenanthi: Takahashi, 1961e: 2 & 3.

Specimens examined: Many apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Mt. Apoi; Toikambetsu (ex *Angelica ursina*). Honshû—Morioka, Iwate Pref. (ex *Oenanthe javanica*, R. Takahashi leg.); Mt. Yatsugatake, Nagano Pref. (H. Higuchi leg.); Mt. Iwawaki (ex *Oenanthe javanica*, R. Takahashi leg.) & Mt. Nijô (ex *Angelica* sp., R. Takahashi leg.), Ôsaka Pref.

Host plants: *Oenaethe javanica*, *Cryptotaenia japonica*, *Angelica ursina* & *Angelica* sp. This aphid infests the hosts on the stalks, often being conceiled under the earth-shelter provided by ants.

Distribution: Japan.

It is characteristic of this species that the apterous viviparous female has secondary

rhinaria on the antenna, the number of rhinaria being as follows:—0–13 on 3rd antennal segment, 0–8 on 4th, 0–4 on 5th. The pigmentation of the tergum is highly variable, with wholly black, sclerotized tergum on one extreme, quite pale, membranous tergum on the other extreme.

Species of *Cavariella* not included in the key

13. ***Cavariella takahashii*** Hille Ris Lambers

Cavariella takahashii Hille Ris Lambers, 1965a: 200.

Host plants: *Salix* sp. (after Hille Ris Lambers, 1965).

Distribution: Japan.

This species is excluded from the present key since I have seen no representatives. Judging from the original description, this species may be distinguished from any other species of *Cavariella* occurring in Japan by the femora bearing two types of setae (long flagellate setae and short spiny ones).

58. Genus ***Aspidophorodon*** Verma

Aspidophorodon Verma, 1966: 507 [type-species: *Aspidophorodon harvensis* Verma, 1966].

This genus has hitherto been represented by a single species, *A. harvensis* Verma, described from Kashmir. In the course of the present study has been found a second species in Japan.

1. ***Aspidophorodon salicis***, sp. n.

Apterous viviparous female (spring form). Body white, pale yellow or pale yellowish green in life. Antenna, legs, siphunculus and cauda white. Eye black. Body flat, elongately oval, 1.4–1.6 mm. in length.

Head smooth, faintly areolated dorsally and latero-ventrally, with 3 pairs of pointed setae on the disc and with a pair of ventral setae; dorsal setae slightly shorter than half middle width of 3rd antennal segment; median tubercle well developed, rectangular or with an indent at middle, with 3 or 4 setae in all; antennal tubercle not developed, with an apical projection about as high as median tubercle and bearing a seta at tip. Eye without a distinct triommatidion. Antenna 5-segmented, 2/5 as long as body; 1st segment produced at inner apex where 3 or 4 setae are present, the joint to 2nd segment slanting; 3rd weakly imbricated, with 1 or 2 setae about half as long as middle width of the segment, without rhinaria; 4th with primary rhinarium small and ciliated; processus terminalis 0.8 as long as basal part of 5th; 3rd–5th segments as 20 : 14 : 11+9 in length. Clypeus produced forward, with 2 setae anteriorly and with a distinct transverse incision at middle; mandibular lamina with a seta. Rostrum reaching between middle and hind coxae; ultimate segment tapering, 1.1 times as long as 2nd segment of hind tarsus, 2.3–2.4 times as long as wide, without secondary setae. Femora smooth or sparsely imbricated with fine spinules, angulated at apex, with thin, pointed setae nearly as long as half middle width of hind femur. Tibiae with spinules arranged on imbrications at apex, with stiff pointed setae about as long as or shorter than middle width of hind tibia. In larva hind tibia with a few fine spinules arranged on faint imbrications. Tarsi with 2nd segment bearing minute spinules on imbrications, wanting secondary setae; first tarsal chaetotaxy 3 : 3 : 2, rarely 3 : 3 : 3. Pro-

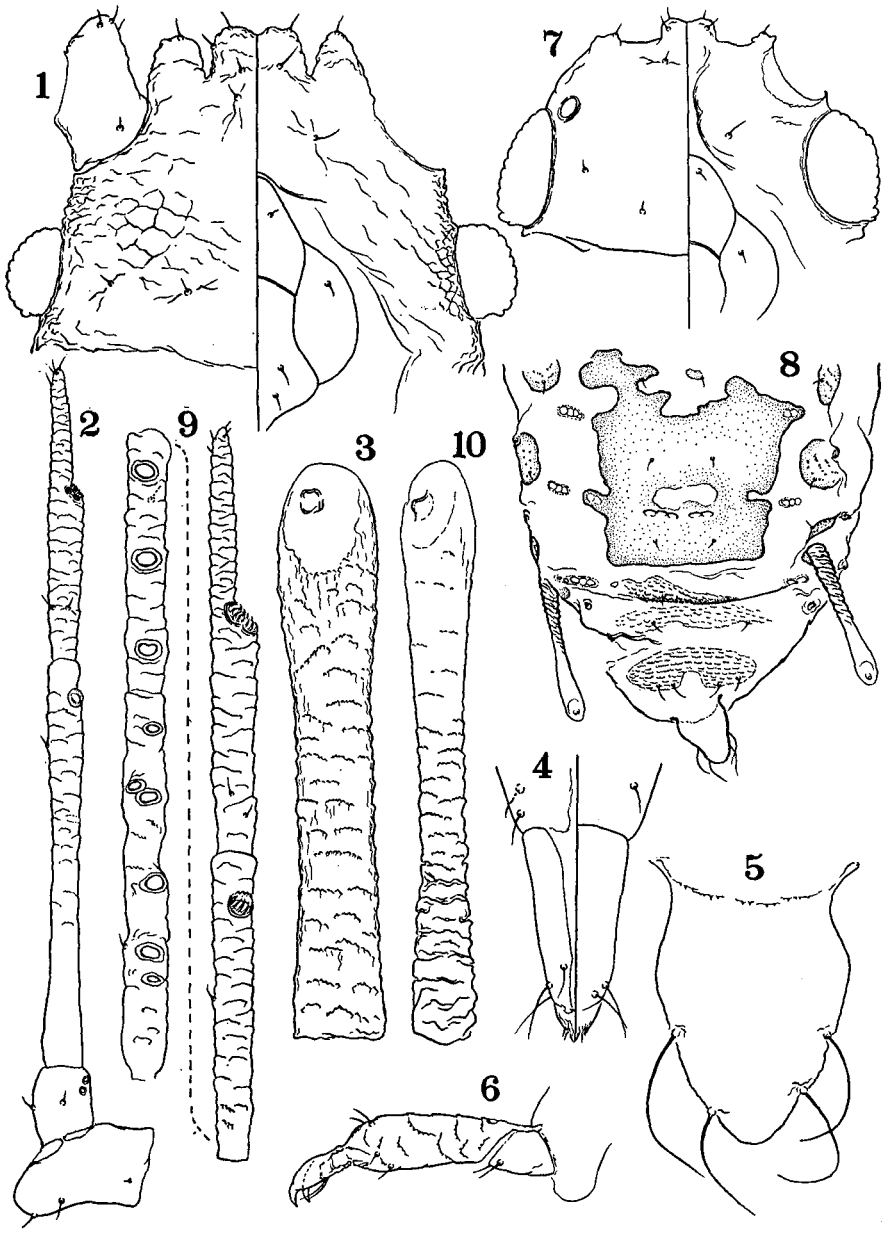

Fig. 46. *Aspidophorodon salicis*, sp. n. Apterous viviparous female:— 1, head; 2, antenna (1st–4th segments); 3, siphunculus; 4, ultimate rostral segment; 5, cauda; 6, hind tarsus. Alate viviparous female:— 7, head; 8, pattern of sclerites of abdomen; 9, antenna (3rd–5th segments); 10, siphunculus.

thorax with a pair of setae mesially and 2 or 3 pairs of setae marginally. Mesosternal furca sessile, with small arms separated far apart from each other. Abdominal tergum membranous, faintly areolated, without marginal tubercles; spiracles reniform, on tuberculate sclerites; 2nd–4th segments each with 2–4 short pointed setae besides marginal ones; 6th with 2 setae between siphunculi; 7th with 2 setae between spiracles; 8th with 4 setae slightly shorter than middle width of 3rd antennal segment. Siphunculus spoon-shaped, obliquely truncated at tip, wrinkled basally, with faint imbrications adorned with minute spinules, 9–11 times as long as wide at middle, 2.2–2.5 times as long as cauda. Cauda shortly tongue-shaped, 1.4 times as long as wide, with a constriction at base, with 4 setae.

Measurements in mm. Body 1.4; antennal segments (1st–5th): 0.05, 0.04, 0.18, 0.12, 0.10+0.08; ultimate rostral segment 0.09; hind femur 0.27; hind tibia 0.52; hind tarsus (2nd segment) 0.08; siphunculus 0.25; cauda 0.10; dorsal setae about 0.010 on head and on abdominal disc, 0.018 on 8th abdominal segment.

Apterous viviparous female (summer form). Slightly differs from the spring form in the following points:—

Antenna 4-segmented, 1/3–2/5 of body length; processus terminalis 0.6–0.7 as long as basal part of 4th segment; 3rd and 4th segments as 15 : 8+5 in length. Ultimate rostral segment 1.0–1.2 times as long as 2nd segment of hind tarsus, 1.6–2.0 times as long as wide. Tarsi with 1st segment bearing 2 or 3 setae in fore and middle legs and 2 setae in hind leg. Siphunculus as long as or slightly shorter than 3rd antennal segment. Body 0.9–1.4 mm. in length.

Measurements in mm. Body 1.0; antennal segments (1st–4th); 0.03, 0.03, 0.14, 0.07+0.05; ultimate rostral segment 0.06; siphunculus 0.14; cauda 0.06; dorsal setae about 0.008 on head and on abdominal disc, 0.013 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous females in the following points:—

Abdomen with a large central patch extending on 3rd–5th segments, with marginal sclerites on 2nd–4th segments, with ante- and postsiphuncular sclerites very small, and with sclerotic bands on 6th–8th segments. Head black; median tubercle produced; antennal tubercle without a distinct projection. Antenna black, 5-segmented, but 3rd segment sometimes divided into 2 segments, about 1/2–3/5 as long as body; 3rd segment with 7–10 rhinaria which are flat, oval or circular and are thickly rimmed; 4th sometimes with a secondary rhinarium; 3rd–5th as 28 : 16 : 12+8 in length. Siphunculus strongly corrugated basally, about 13 times as long as wide at middle.

Measurements in mm. Body 0.15; antennal segments (1st–5th): 0.05, 0.06, 0.31, 0.16, 0.11+0.09; ultimate rostral segment 0.08; hind femur 0.37; hind tibia 0.69; hind tarsus (2nd segment) 0.08; siphunculus 0.20; cauda 0.09; dorsal setae about 0.015 on head and on abdominal disc, 0.023 on 8th abdominal segment.

Specimens examined: Syntypes:—24 apterous viviparous females, Sapporo, Hokkaidô, 26-v-68 (no. 2393), 2-vi-68 (no. 2418), 28-vi-68 (T. Kocha leg.), 10-vii-67 (M. Suzuki leg.), 6-ix-67 (no. 2264) & 15-ix-67 (no. 2284); 4 alate viviparous females, Sapporo, 2-vi-68, no. 2418.

Host plants: All the specimens examined were collected from *Salix sachalinensis*. The aphid infests the underside of leaves of the host.

Distribution: Japan.

This species is readily distinguished from *A. harvensis* Verma by the following aspects:—(1) Projection on antennal tubercle as high as median tubercle (much higher than median tubercle in *harvensis*). (2) Antenna with 1st segment less protruded at inner apex. (3) Dorsal setae on body and antenna pointed (blunt, sometimes capitate). (4) In alate viviparous female 3rd antennal segment with 7–10 rhinaria (with 18–19 rhinaria).

59. Genus ***Coloradoa*** Wilson

Coloradoa Wilson, 1910: 323 [type-species: *Aphis rufomaculata* Wilson, 1908].

Stephensonia Das, 1918: 175 [type-species: (*Stephensonia lahorensis* Das, 1918)= *Aphis rufomaculata* Wilson, 1908].

Capitophoraphis Blanchard, 1944: 34 [type-species: (*Capitophoraphis williamsoni* Blanchard, 1944)= *Aphis rufomaculata* Wilson, 1908].

Neaphis Nevsky, 1929: 206 [type-species: *Neaphis viridis* Nevsky, 1929].

Lidaja Börner, 1952: 117 [type-species: *Hyalopterus abrotani* Koch, 1854].

This genus comprises about 20 species, the greater part of them being palaearctic in distribution. So far as their habits are known the species are holocyclic on Compositae (especially *Artemisia*). In Japan only 2 species have been known to occur.

Key to the species

1 Body with many setae strongly expanded apically (often funnel-shaped). Siphunculus dark, 5–7 times as long as wide at middle. Head smooth. On *Chrysanthemum*. . . . . 1. *C. rufomaculata* (Wilson)

– Body with sparse setae weakly expanded apically (not funnel-shaped). Siphunculus pale, 8–9 times as long as wide at middle. Head wrinkled. On *Artemisia*. . . . . 2. *C. artemisicola* Takahashi

1. ***Coloradoa rufomaculata*** (Wilson)

Aphis rufomaculata Wilson, 1908: 261.

Coloradoa rufomaculata: Wilson, 1910: 323; Cottier, 1953: 199; Eastop, 1958: 33 & 1966: 439; Heinze, 1960: 794; Tao, 1962: 100 & 1964a: 125; Paik, 1965: 102.

Rhopalosiphum rufomaculatum: Palmer, 1952: 221.

Stephensonia lahorensis Das, 1918: 175.

Rhopalosiphum lahorensis: Takahashi, 1924: 39.

Rhopalosiphum kiku Hori, 1929: 129.

Rhopalosiphum kiku: Shinji, 1941: 658.

Capitophoraphis williamsoni Blanchard, 1944: 35.

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Mashiko, Tochigi Pref.; Tôkyô (from chrysanthemums, R. Takahashi leg.).

Host plants: Cultivated chrysanthemums.

Distribution: Cosmopolitan.

As compared with European specimens of *rufomaculata*, Japanese ones slightly differ by the siphunculus which is black, at most pale near the base.

2. ***Coloradoa artemisicola*** Takahashi

Coloradoa artemisiae artemisicola Takahashi, 1965c: 49.

Specimens examined: Many apterous and alate viviparous females collected at

the following localities:— Hokkaidô—Sapporo & Wassamu (ex *Artemisia montana*). Honshû—Wakayama (ex *Artemisia princeps*, R. Takahashi leg., syntypes of *C. artemisiae artemisicola* Takahashi); Mt. Gozaisho, Mie Pref. (ex *Artemisia princeps*); Shigisan, Ôsaka Pref. (ex *Artemisia princeps*, M. Sorin leg.); Mt. Rokkô, Hyôgo Pref. (ex *Artemisia princeps*, R. Takahashi leg.). Shikoku—Syôdo-shima Isl., Kagawa Pref. (ex *Artemisia princeps*). Kyûshû— Beppu, Ôita Pref. (ex *Artemisia princeps*). Some oviparous females collected at Wassamu (ex *Artemisia montana*).

Host plants: *Artemisia princeps* & *A. montana*.

Distribution: Japan.

60. Genus ***Micraphis*** Takahashi

Micraphis Takahashi, 1931: 53 [type-species: *Anuraphis artemisiae* Takahashi, 1924].

This genus is close to *Coloradoa* Wilson, the difference from the latter being chiefly as follows:—Mesosternal furca sessile; dorsal setae of body minute, pointed; ultimate rostral segment not stiletto-shaped. The following is the only representative of this genus.

1. ***Micraphis artemisiae*** (Takahashi)

Cerosipha sp., Takahashi, 1923: 42.
Anuraphis artemisiae Takahashi, 1924: 46.
Micraphis artemisiae: Takahashi, 1931: 53; Tao, 1962: 103 & 1964a: 145.

This species is new to Japan. The specimens examined agree well with the descriptions of *M. artemisiae* (Takahashi) mentioned above. As a supplement to those accounts, the following aspects may be added.

Apterous viviparous female. Antenna 0.3–0.4 as long as body; processus terminalis 1.2–2.0 times as long as basal part of terminal segment. Head corrugated dorsally. Thoracic and abdominal tergites sclerotic, papillated or corrugated. Dorsal setae of body minute, the longest ones being about 5 μ long on cephalic disc, 4–5 μ on abdominal disc and 7–10 μ on 8th abdominal segment. Prothorax with a pair of mesial setae. Mesosternal furca sessile, with arms separated from each other or connected by a chitinous band. Ultimate rostral segment stout, not stiletto-shaped, 1.0–1.1 times as long as 2nd segment of hind tarsus, with 2 secondary setae. Legs with short stout setae sparsely; first tarsal chaetotaxy 3 : 3 : 3 or 3 : 3 : 2. In larva hind tibia quite smooth. Abdominal disc papillated; mesial and pleural setae simple, sometimes duplicated unilaterally; marginal setae of anterior segments simple to triplicated; 7th segment roundly produced posteriorly; distance between 5th and 6th spiracles longer than that between 6th and 7th spiracles; 8th tergite free from foregoing ones which are consolidated, with 4 setae. Genital plate round, depressed posteriorly, with 7–10 short stout setae along hind margin and 2 setae anteriorly.

Specimens examined: Some apterous viviparous females, Shôdo-shima Isl., Kagawa Pref., 27-iv-66, ex *Artemisia capillaris*.

Host plants: *Artemisia capillaris*.

Distribution: Japan; China; Taiwan.

61. Genus ***Brevicoryne*** van der Goot

Brevicoryne (Das, MS.) van der Goot, 1915: 245 [type-species: *Aphis brassicae* Linné, 1758].

Brevicoryne Das, 1918: 179 [type-species: *Aphis brassicae* Linné, 1758].

1. ***Brevicoryne brassicae*** (Linné)

Aphis brassicae Linné, 1758: 452.

Brevicoryne brassicae: van der Goot, 1915: 246; Monzen, 1929: 46; Hori, 1929: 121; Shinji, 1941: 597 & 1944: 488; Palmer, 1952: 194; Cottier, 1953: 302; Eastop, 1958: 27 & 1966: 431; Tao, 1962: 101 & 1964a: 135; Paik, 1965: 105.

Specimens examined: Many apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Brassica oleracea* var. *capitata*). Honshû—Ôsaka (ex *Brassica campestris* var. *napus*, *B. oleracea* var. *capitata* & *Raphanus sativus* var. *acanthiformis*, R. Takahashi leg.). Kyûshû—Mt. Hikosan, Fukuoka Pref. (ex *Brassica cernua*).

Host plants: *Brassica campestris* var. *napus*, *B. cernua*, *B. oleracea* var. *capitata* & *Raphanus sativus* var. *acanthiformis*.

Distribution: Cosmopolitan.

62. Genus ***Lipaphis*** Mordvilko

Lipaphis Mordvilko in Filipjev, 1928: 200 [type-species: *Aphis erysimi* Kaltenbach, 1843].

1. ***Lipaphis erysimi*** (Kaltenbach)

Aphis erysimi Kaltenbach, 1843: 99.

Lipaphis erysimi: Cottier, 1953: 307; Eastop, 1958: 43 & 1966: 453; Heinze, 1960: 768; Tao, 1963: 101 & 1964a: 136; Paik, 1965: 106.

Aphis pseudobrassicae Davis, 1914: 231.

Rhopalosiphum pseudobrassicae: Hori, 1929: 134; Shinji, 1941: 669 & 1944: 503; Palmer, 1952: 220.

Specimens examined; Many apterous and alate viviparous females collected at the following localities:— Honshû—Ôsaka (ex *Rorippa indica*, R. Takahashi leg.). Kyûshû— Ôkachi, Amami-ôshima Isl. (ex *Brassica campestris* var. *pekinensis*).

Host plants: *Brassica campestris* var. *pekinensis* & *Rorippa indica*. In the literature, various genera of Cruciferae are recorded as hosts of this aphid (see Heinze, 1960).

Distribution: Cosmopolitan.

63. Genus ***Semiaphis*** van der Goot

Semiaphis van der Goot, 1913: 105 [type-species: (*Aphis carotae* Koch, 1854) = *Aphis dauci* Fabricius, 1775].

Brachysiphoniella Takahashi, 1921b: 61 [type-species: (*Brachycolus gramini* Takahashi, 1920) = *Semiaphis montana* van der Goot, 1917].

Key to the species

1 Cauda elongate and round at apex, with a distinct constriction at basal 1/3, with over 15 setae. Siphunculus stump-shaped, not longer than wide at base, with opening not slanting mesially. Ultimate rostral segment at most 1.3 times as long as wide at base. Body black. On *Leersia* & *Microstegium*. . . . . 1. *S. montana* van der Goot

– Cauda shortly conical, without distinct constrictions, with less than 15 setae. Siphunculus not shorter than wide at base, with opening more or less slanting mesially. Ultimate rostral segment over 1.7 times as long as wide at base. 2

2(1) Antenna over twice as long as head width across eyes. Ultimate rostral segment 2.2–2.6

times as long as wide at base, with 4 secondary setae. Cauda with 6–10 setae. Body pale green to yellowish green. On *Lonicera* and various genera of Umbelliferae. . . . . 2. *S. heraclei* (Takahashi)

– Antenna about 1.5 times as long as head width across eyes. Ultimate rostral segment 1.7–2.1 times as long as wide at base, with 2 secondary setae. Cauda with 11–13 setae. Body white. On *Impatiens*. . . . . 3. *S. moiwaensis* Takahashi

1. ***Semiaphis montana*** van der Goot

Semiaphis montana van der Goot, 1917b: 119.
Brachycolus gramini Takahashi, 1920a: 77.
Brachycolus gramini: Takahashi, 1920b: 197.
Brachysiphoniella gramini: Takahashi, 1921b: 62, 1923: 43 & 113 and 1924: 52; Shinji, 1941: 594; Tao, 1962: 102 & 1964a: 141.

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Utsunomiya, Tochigi Pref. (ex *Microstegium vimineum*, T. Tanaka leg.); Tôkyô (ex *Leersia* sp., R. Takahashi leg.); Minabe, Wakayama Pref. (ex *Leersia* sp., R. Takahashi leg.). Okinawa (ex *Leersia* sp., K. Inami leg.).

Host plants: *Leersia* spp. & *Microstegium vimineum*.

Distribution: Japan; China; Taiwan; India; Malaysia; Java.

2. ***Semiaphis heraclei*** (Takahashi)

Brachycolus heraculi Takahashi, 1921b: 60.
Brachycolus heraclei: Takahashi, 1924: 50; Tao, 1962: 101 & 1964a: 138; Paik, 1965: 107.
Semiaphis heraclei: Takahashi, 1965c: 53.
Hyalopterus albus Monzen, 1929: 47.
Brachycolus lonicerae Shinji, 1939a: 39.
Brachycolus lonicerae: Shinji, 1944: 490.

Specimens examined: Numerous apterous and alate viviparous females have been examined, their localities being as follows:— Honshû—Oirase, Aomori Pref. (ex *Spuriopimpinella calycina*); Mt. Yahiko, Niigata Pref. (ex *Heracleum* sp., R. Takahashi leg.); Numanami, Chiba Pref. (ex *Cryptotaenia japonica*, K. Sekiguchi leg.); Ôsaka (ex *Daucus carota*, R. Takahashi leg.). Kyûshû—Kumamoto (ex *Osmorhiza aristata*); Tekibu (ex *Angelica japonica*) & Yuwan (ex *Torilis japonica*), Amami-ôshima Isl.

Host plants: Secondary hosts—*Angelica japonica, Cryptotaenia japonica, Daucus carota, Heracleum* sp., *Osmorhiza aristata, Spuriopimpinella calycina* & *Torilis japonica*. Primary hosts—*Lonicera gracilipes* (after Shinji, 1939).

Distribution: Japan; Korea; China; Taiwan; India; Sumatra; Hawaii.

3. ***Semiaphis moiwaensis*** Takahashi

Semiaphis moiwaensis Takahashi, 1965c: 52.

Specimens examined: Many apterous and some alate viviparous females collected at Sapporo, Hokkaidô (ex *Impatiens noli-tangere*, including syntypes of *S. moiwaensis* Takahashi).

Host plants: *Impatiens noli-tangere*. This aphid infests the host on the root or the stalk.

Distribution: Japan.

64. Genus ***Hayhurstia*** del Guercio

Hayhurstia del Guercio, 1917: 206 [type-species: (*Hayhurstia deformans* del Guercio, 1917) =*Aphis atripricis* Linné, 1761].

1. ***Hayhurstia atriplicis*** (Linné)

Aphis atriplicis Linné, 1761: 262.
Hyalopterus atriplicis: Theobald, 1927: 26; Shinji, 1941: 634 & 1944: 497; Palmer, 1952: 205; Tao, 1962: 101 & 1964a: 139; Paik, 1965: 108.
Hayhurstia atriplicis: Heinze, 1960: 761.
Aphis chenopodii Schrank, 1801: 109.
Hyalopterus chenopodii: Takahashi, 1924: 48.
Hayhurstia deformans del Guercio, 1917: 206.

Specimens examined; Many apterous and some alate viviparous females collected at the following localities:— Hokkaidô—Sapporo; Obihiro. Honshû—Morioka, Iwate Pref.; Ôizawa, Yamagata Pref.; Tôkyô.

Host plants: All the specimens examined were collected from *Chenopodium album* var. *centrorubrum*. In the literature are recorded as hosts *Chenopodium*, *Atriplex* and *Obione* (in Europe, after Heinze, 1960).

Distribution: Japan; Korea; China; Taiwan; India; Middle Asia; Europe; North America.

65. Genus ***Longicaudinus*** Hille Ris Lambers

Longicaudinus Hille Ris Lambers, 1965a: 197 [type-species: (*Hyalopteroides sinensis* Tao, 1963)=*Pergandeidia corydalisicola* Tao, 1962].

This genus is close to *Hayhurstia* but is distinguished from the latter by the presence of the central sclerotic patch on the abdomen in the alate viviparous female. The following species is the only representative of the genus.

1. ***Longicaudinus corydalisicola*** (Tao)

Pergandeidia corydalisicola Tao, 1962: 102.
Longicaudus corydalisicola: Tao, 1964a: 144.
Hayhurstia corydalisicola: Takahashi, 1965c: 54.
Longicaudinus corydalisicola: Hille Ris Lambers, 1965a: 197.
Hyalopteroides sinensis Tao, 1963: 185.

The specimens examined slightly differs from the original description of *corydalisicola* Tao by the apterous viviparous female which has a pigmented tergum. On the basis of the present specimens a brief redescription may be given as follows:—

Apterous viviparous female. Body dark green, darker pleurally, covered with white wax powder. Eye dark brown. Antenna pale; flagellum black apically. Legs pale; femora at apex, tibiae at apex and tarsi black. Siphunculus and cauda pale. Body spindle-shaped, about 1.8 mm. in length.

Head smooth, with short pointed setae; antennal tubercles low; front shallowly W-shaped. Antenna about 5/7 of body length; 3rd segment weakly imbricated, without rhinaria; processus terminalis 2.0–2.6 times as long as basal part of 6th; 3rd–6th as 34 : 20 : 18 : 11+25 in length. Rostrum reaching middle coxa; ultimate segment 0.6–0.7 as long as 2nd segment of hind tarsus, with 2–4 secondary setae. Prothorax with a pair of mesial setae, without marginal tubercles. Mesosternal furca with a short

stem. Femora smooth or imbricated, with short pointed setae. First tarsal chaetotaxy 3 : 3 : 3, rarely 3 : 3 : 2. Abdomen sclerotized and pigmented pleurally, without marginal tubercles; 2nd–4th segments each with 4–8 short pointed setae besides marginal ones; 8th with 4 setae. Siphunculus tapering or cigar-shaped, imbricated, about twice as long as wide, 2/3–3/4 as long as cauda, with a distinct flange. Cauda elongately conical, round at apex, often with a weak constriction at basal 1/3, with 6 setae.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.07, 0.06, 0.37, 0.22, 0.19, 0.12+0.27; ultimate rostral segment 0.08; hind femur 0.49; hind tibia 0.80; hind tarsus (2nd segment) 0.12; siphunculus 0.14; cauda 0.18; dorsal setae 0.013 on head, 0.015 on abdominal disc, 0.023 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

In cleared and mounted specimens, antenna, head, thorax and siphunculus dark brown; abdomen with sclerites dark brown. Antenna 4/5 as long as body; 3rd segment with 6–9 flat rhinaria arranged in a line. Abdomen with a large rectangular sclerite extending on 3rd–6th segments, a narrow sclerotic band on 7th and large marginal sclerites on 2nd–4th (those on 1st and 5th small, those on 6th invisible on account of the bad condition of the specimens).

Measurements in mm. Body 2.0; antennal segments (1st–6th): 0.08, 0.08, 0.42, 0.29, 0.24, 0.15+0.33; ultimate rostral segment 0.09; hind femur 0.57; hind tibia 1.02; hind tarsus (2nd segment) 0.13; siphunculus 0.12; cauda 0.15; dorsal setae 0.013 on head, 0.020 on abdominal disc, 0.028 on 8th abdominal segment.

Fundatrix. Closely resembles the apterous viviparous female except following points:—

Abdomen membranous, without any ornamentation except dark intersegmental areolations. Antenna about half as long as body, with processus terminalis 1.2–1.5 times as long as basal part of 6th segment. Mesosternal furca sessile. Body 1.9–2.1 mm. in length.

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.08, 0.07, 0.29, 0.18, 0.18, 0.13+0.16; ultimate rostral segment 0.08; hind femur 0.50; hind tibia 0.77; hind tarsus (2nd segment) 0.13; siphunculus 0.13; cauda 0.20; dorsal setae 0.015 on head, 0.018 on abdominal disc, 0.025 on 8th abdominal segment.

Specimens examined: Many apterous and a few alate viviparous females, Ogose, Saitama Pref., 14-x-66; Mt. Kongô, Ôsaka Pref., 22- & 25-ix-55, M. Sorin leg. and 17-v-59, R. Takahashi leg. Some fundatrices, Chihaya, Ôsaka Pref., 30-iv-61, R. Takahashi leg.

Host plants: All the specimens examined were collected from *Corydalis heterocarpa* var. *japonica*.

Distribution: Japan; China; Taiwan.

66. Genus ***Cryptosiphum*** Buckton

Cryptosiphum Buckton, 1879: 144 [type-species: *Cryptosiphum artemisiae* Buckton, 1879].

Pseudolachnus Shinji, 1922: 730 [type-species: (*Pseudolachnus yomogi* Shinji, 1922)=*Cryptosiphum artemisiae* Buckton, 1879].

This genus is palaearctic in distribution, being represented by about 5 species living on *Artemisia*. In Japan only one species has been recorded.

1. ***Cryptosiphum artemisiae*** Buckton

Cryptosiphum artemisiae Buckton, 1879: 145.
Aphis artemisiae Passerini, 1860: 35, nec Boyer de Fonscolombe, 1841.
Aphis gallarum Kaltenbach, 1856: 236, nec Gmelin, 1788.
Cryptosiphum gallarum: Theobald, 1927: 325; Monzen, 1929: 48; Shinji, 1941: 623 & 1944: 494; Tao, 1962: 96 & 1964a: 111; Paik, 1965: 93.
Pseudolachnus yomogi Shinji, 1922: 730.
Cryptosiphum pseudogallarum Shinji, 1941: 626.

Specimens examined: A lot of apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Artemisia montana*); Kunneppu (ex *Artemisia montana*). Honshû— Sukayu, Aomori Pref. (ex *Artemisia princeps*); Koiwai, Iwate Pref. (ex *Artemisia princeps*); Ôsaka (ex *Artemisia* sp., R. Takahashi leg.). Kyûshû—Nagasaki (ex *Artemisia princeps*). Some alate males, Mt. Gozaisho, Mie Pref. (ex *Artemisia princeps*). Some oviparous females, Kawatabi, Miyagi Pref. (ex *Artemisia princeps*); Mt. Rokkô, Hyôgo Pref. (ex *Artemisia* sp., R. Takahashi leg.).

Host plants: *Artemisia* spp. (including *A. princeps* & *A. montana*). The infested leaves are heavily curled up and turn purplish red in colour.

Distribution: Japan; Korea; China; Taiwan; Europe.

The original description of *Cryptosiphum pseudogallarum* Shinji disagrees with its accompanied figures in the shape of the siphunculus and cauda. There may be a confusion with other aphids such as *Aphis kurosawai* Takahashi. I tentatively follow Tao (1962 & 1964) and Paik (1965) in synonymyzing *pseudogallarum* Shinji with *artemisiae* Buckton, relying upon Shinji's figures.

67. Genus ***Brachycaudus*** van der Goot

Brachycaudus van der Goot, 1913: 97 [type-species: (*Aphis myosotidis* Koch, 1854)=*Aphis helichrysi* Kaltenbach, 1843].
Mordvilkomemor Shaposhnikov, 1950: 225 [type-species: *Dentatus pilosus* Mordvilko, 1928].

According to Eastop (1966), this genus comprises about 25 species, with *Acaudus* van der Goot, *Appelia* Börner, *Brachycaudina* Börner and *Nevskyaphis* Shaposhnikov as subgenera. The following is the only representative of the genus so far known from Japan.

1. ***Brachycaudus helichrysi*** (Kaltenbach)

Aphis helichrysi Kaltenbach, 1843: 102.
Aphis helichrysi: Palmer, 1952: 142.
Anuraphis helichrysi: Shinji, 1941: 472 & 1944: 469.
Brachycaudus helichrysi: Cottier, 1953: 123; Eastop, 1958: 26 & 1966: 429.
Siphocoryne cacaliae Matsumura, 1918: 5. **Syn. n.**
Aphis prunus Shinji, 1922: 798. **Syn. n.**
Anuraphis pruni (lapsus of *prunus*): Shinji, 1941: 486 & 1944: 474.
Anuraphis ammobii Hori, 1929: 143. **Syn. n.**
Anuraphis ammobii: Shinji, 1941: 462.
Anuraphis mumecola Shinji, 1930g: 156. **Syn. n.**

Specimens examined: Numerous apterous and alate viviparous females have been examined, their localities being as follows:— Hokkaidô—Sapporo (ex *Achillea sibirica*, *Aconitum* sp., *Ammobium alatum*, *Anaphalis margalitacea*, *Cacalia hastata* var. *ori-*

entalis, Eupatorium sp., *Prunus mume, P. salicina* & *Senecio vulgaris*); Wassamu (ex *Eupatorium chinense* var. *sachalinense*). Honshû—Tôkyô (ex *Prunus mume*). Ôsaka (ex *Prunus mume*, R. Takahashi leg.); Himeji, Hyôgo Pref. (ex *Prunus mume*). Kyûshû—Mt. Hikosan, Fukuoka Pref. (ex *Bidens tripartita, Cacalia delphiniifolia* & *Eupatorium chinense* var. *simplicifolium*); Nagasaki (ex *Prunus mume*); Yatsushiro, Kumamoto Pref. (from cherry tree); Udo, Miyazaki Pref. (ex *Bothryospermum tenellum*); Kise (ex *Ageratum* sp.) & Koniya (ex *Senecio* sp.), Amami-ôshima Isl.

Host plants: Primary hosts—*Prunus mume, P. salicina* & *Prunus* sp. (cherry tree). Secondary hosts—*Achillea sibirica, Aconitum* sp., *Ageratum* sp., *Ammobium alatum, Anaphalis margalitacea, Bidens tripartita, Bothryospermum tenellum, Cacalia delphiniifolia, C. hastata* var. *orientalis, Eupatorium* spp. (including *E. chinense* var. *sachalinense* & *E. chinense* var. *simplicifolium*), *Senecio* spp. (including *S. vulgaris*).

Distribution: Cosmopolitan.

Having read the original descriptions of *Siphocoryne cacaliae* Matsumura, *Anuraphis prunus* Shinji, *A. ammobii* Hori and *A. mumecola* Shinji, I have been convinced that they should be suppressed as synonyms of *Brachycaudus helichrysi* (Kaltenbach), because these descriptions agree enough with the present specimens of *helichrysi* collected from the host plants given in the descriptions, i.e. *Cacalia hastata, Prunus mume, Ammobium alatum* and *Prunus mume* respectively.

68. Genus ***Amphicercidus*** Oestrund

Amphicercidus Oestrund, 1922: 126 [type-species: *Aphis pulverulens* Gillette, 1911].
Melanosiphum Shinji, 1942a: 228 [type-species: (*Melanosiphum lonicericola* Shinji, 1942)= *Anuraphis japonica* Hori, 1927]. **Syn. n.**

This genus is represented by 4 species, *A. pulverulens* (Gillette) and *A. flocculosus* (Gillette et Palmer) from North America, *A. indicus* Hille Ris Lambers et Basu from India and *A. japonicus* (Hori) from Japan. All the species live on the plants of Caplifoliaceae (*Lonicera* & *Symphoricarpos*).

1. ***Amphicercidus japonicus*** (Hori)

Anuraphis japonica Hori, 1927: 193.
Anuraphis japonica: Shinji, 1941: 474.
Amphicercidus japonicus: Hori, 1938: 161.
Melanosiphum lonicericola Shinji, 1942a: 229. **Syn. n.**

On the basis of the present specimens a redescription may be given as follows:—

Apterous viviparous female. Body dull yellowish brown with a greenish tinge in life. Antenna pale; flagellum fuscous apically. Legs pale; femora at apex, tibiae at apex and tarsi dark. Siphunculus fuscous, paler basally. Cauda fuscous. Body elongately oval, 2.5–3.6 mm. in length, heavily powdery with white wax.

Head smooth, with 4 pairs of long pointed setae more than 1.5 times as long as middle width of 3rd antennal segment; antennal tubercles hardly developed; front weakly concave. Antenna 3/4–9/10 of body length; 3rd segment smooth, weakly imbricated apically, longer than 4th and 5th together, with 13–33 rhinaria scattered on basal 1/2–2/3, with setae much longer than middle width of the segment; processus terminalis about 2.5 times as long as basal part of 6th; 3rd–6th as 75 : 35 : 30 : 16+41 in length. Rostrum just reaching hind coxa; ultimate segment tapering, 0.6–0.8 as

long as 2nd segment of hind tarsus, with 8–10 secondary setae. Prothorax with marginal tubercles. Legs smooth, with many long pointed setae; first tarsal chaetotaxy 3 : 3 : 3; 2nd segment of hind tarsus elongate, 6–7 times as long as wide at middle; empodial setae short, not reaching halfway of claws. Mesosternal furca broadly based. Abdomen membranous, without any ornamentation except dark intersegmental areolations; 2nd–5th segments each with 11–15 setae including marginal ones, with marginal tubercles; longer setae on abdominal disc up to twice as long as middle width of 3rd antennal segment; 8th with 4–8 setae. Genital plate oval, with 12–16 setae along hind margin, about 13 anteriorly. Siphunculus tapering, smooth or transversely striated weakly, 3.5–4.5 times as long as wide at base, a little shorter than head width across eyes, with flange hardly developed. Cauda semi-circular, with 12–17 setae.

Measurements in mm. Body 2.5; antennal segments (1st–6th): 0.11, 0.10, 0.64, 0.29, 0.25, 0.14+0.33; ultimate rostral segment 0.15; hind femur 0.90; hind tibia 1.42; hind tarsus (2nd segment) 0.24; siphunculus 0.46; cauda 0.09; dorsal setae about 0.060 on head, 0.075 on abdomen.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Abdomen in life dull yellowish brown, with a few dark patches dorsally. Head, thorax, antenna, legs, siphunculus and cauda dark; femora and tibiae sometimes lighter in colour basally. Body 2.2–3.1 mm. in length.

Head with low, diverging antennal tubercles. Antenna a little shorter than body; 3rd segment with about 80–100 rhinaria; processus terminalis 2.5–3.0 times as long as basal part of 6th. Wings of normal venation. Hind tarsus with 2nd segment 8–9 times as long as wide at middle. Abdomen with a mesial sclerite on each of 3rd and 4th segments, often with smaller ones on 2nd, 5th and 6th, without marginal sclerites. Siphunculus distinctly striated, either cylindrical, tapering or slightly attenuated at middle. Cauda roundly pentagonal or roundly conical.

Measurements in mm. Body 2.6; antennal segments (1st–6th): 0.10, 0.10, 0.85, 0.35, 0.29, 0.14+0.38; ultimate rostral segment 0.15; hind femur 0.98; hind tibia 1.72; hind tarsus (2nd segment) 0.25; siphunculus 0.45; cauda 0.12; dorsal setae on head 0.055, those on abdomen 0.060.

Fundatrix. Closely resembles the apterous viviparous female, differing therefrom in the following points:—

Antenna 1/2–2/3 of body length, with 10–20 rhinaria on 3rd segment; processus terminalis 1.5–2.0 times as long as basal part of 6th. Mesosternal furca sessile, with arms widely separated from each other.

Measurements in mm. Body 3.3; antennal segments (1st–6th): 0.12, 0.10, 0.60, 0.23, 0.21, 0.13+0.19; ultimate rostral segment 0.16; hind femur 0.93; hind tibia 1.44; hind tarsus (2nd segment) 0.23; siphunculus 0.46; cauda 0.14; dorsal setae about 0.070 on head and abdomen.

Alate male. Differs from the alate viviparous female in the following points:—

Antennal tubercles very low. Antenna slightly longer than body, with secondary rhinaria numbering 65–75 on 3rd segment, 6–8 on 4th, 8–10 on 5th. Abdomen with large mesial sclerites on first 7 segments, developed intersegmental areolations on first 6 segments, and marginal sclerites on first 6 segments. Siphunculus narrowest at middle, less than half as long as width of head across eyes.

Oviparous female. Slightly differs from the apterous viviparous female as follows:—
Antenna 3/5–7/10 of body length; 3rd segment about as long as 4th and 5th together, with 1–6 rhinaria near base. Hind tibia swollen, with many pseudosensoria except on apical small portion. Genital plate with numerous setae scattered on its whole surface.

Specimens examined: Many fundatrices, Sapporo, Hokkaidô, 7-v-68, ex *Lonicera morrowii* & 22-v-67, ex *Lonicera chamissoi.* Many apterous and alate viviparous females, Sapporo, 13-vi-64, 13-vi-66 & 11-vii-64, ex *Lonicera morrowii*; Sapporo, 24-vi-'24, ex *Lonicera morrowii,* M. Hori leg. Some alate males and oviparous females, Sapporo, 20-x-67, ex *Lonicera morrowii.*

Host plants: *Lonicera morrowii* & *L. chamissoi.* This aphid infests young shoots and branches of the host plants.

Distribution: Japan.

This species is closely related to *A. indicus* Hille Ris Lambers et Basu from India. It may be distinguished from the latter by the following points:— In alate viviparous female, abdomen with mesial sclerites of 4th–7th segments not consolidated; antenna with fewer rhinaria than in *indicus.*

69. Genus ***Macchiatiella*** del Guercio

Macchiatiella del Guercio, 1909: 1 [type-species: *Aphis rhamni* Boyer de Fonscolombe, 1841].

Neanuraphis Nevsky, 1928: 192 [type-species: *Neanuraphis tarani* Nevsky, 1928].

Neolachnaphis Shinji, 1924: 353 [type-species: *Neolachnaphis itadori* Shinji, 1924].

1. ***Macchiatiella itadori*** (Shinji)

Neolachnaphis itadori Shinji, 1942: 353.

Acaudus itadori: Shinji, 1927: 53 & 1941: 455; Paik, 1965: 91.

Acaudus jozankeanus Matsumura et Hori in Hori, 1927: 191.

Acaudus rhamni Hori, 1927: 188. **Syn. n.**

Specimens examined: Many apterous and alate viviparous females collected at the following localities:— Hokkaidô—Sapporo (ex *Rhamnus japonica,* M. Hori leg., determined as *Acaudus rhamni* Hori by M. Hori; ex *R. purshiana*); Lake Shikotsu (ex *Polygonum sachalinense*). Honshû—Tsuta, Aomori Pref. (ex *Polygonum cuspidatum*); Ôizawa, Yamagata Pref. (ex *Polygonum cuspidatum*); Karuizawa, Nagano Pref. (ex *Polygonum cuspidatum,* R. Takahashi leg.); Mt. Kôya, Wakayama Pref. (ex *Polygonum cuspidatum,* R. Takahashi leg.); Mt. Nijô, Ôsaka Pref. (ex *Polygonum cuspidatum,* R. Takahashi leg.); Otomura, Nara Pref. (ex *Polygonum fagopyrum,* M. Sorin leg.). A few alate males collected at Mt. Rokkô, Hyôgo Pref. (ex *Polygonum cuspidatum,* R. Takahashi leg.).

Host plants: Primary hosts—*Rhamnus japonica* & *R. purshiana.* Secondary hosts—*Polygonum cuspidatum, P. sachlinense* & *P. fagopyrum.*

Distribution: Japan; Korea.

The original description of *Acaudus rhamni* Hori agrees well with the present specimens of *Macchiatiella itadori* (Shinji) except that the body is green in colour. Furthermore, having examined some apterous viviparous females collected from *Rhamnus japonica* and determined as *Acaudus rhamni* Hori by the late Dr. M. Hori,

I have been convinced that they should be identified with *M. itadori* (Shinji). So, I am much inclined to unite *rhamni* Hori with *itadori* Shinji.

It should be noted here that the alate viviparous females (possibly the immigrants) collected from *Rhamnus purshiana* in Sapporo are yellow in colour.

70. Genus ***Sappaphis*** Matsumura

Sappaphis Matsumura, 1918: 18 [type-species: *Sappaphis pyri* Matsumura, 1918].

Lachnaphis Shinji, 1922: 729 [type-species: (*Lachnaphis yomogi* Shinji, 1922)=*Sappaphis pyri* Matsumura, 1918]. **Syn. n.**

Key to the species

1 Abdominal tergum membranous. Dorsal steae of body flagellate. Siphunculus at most 1.5 times as long as 2nd segment of hind tarsus, with or without flagellate setae. On *Pyrus* and *Artemisia*. . . . . 1. *S. pyri* Matsumura

– Abdominal tergum sclerotized. Dorsal setae of body stiff. Siphunculus 2.0–2.5 times as long as 2nd segment of hind tarsus, with stiff setae. On *Ranunculus*. . . . 2. *S. ranunculi*, sp. n.

1. ***Sappaphis pyri*** Matsumura

Sappaphis piri Matsumura, 1918: 18.
Sappaphis piri: Tao, 1964a: 121; Paik, 1965: 100.
Sappaphis pyri: Tao, 1962: 98.
Anuraphis piricola Okamoto et Takahashi, 1927: 139.
Anuraphis piricola: Hori, 1929: 147; Shinji, 1932a: 119, 1941: 480 & 1944: 472.
Anuraphis nashi Shinji, 1944: 471.
Lachnaphis yomogi Shinji, 1922: 729. **Syn. n.**
Anuraphis artemirhizus Shinji, 1924: 354.
Anuraphis kochi: Shinji, 1932a: 119, 1941: 476 & 1944: 471.

On the basis of the present material a redescription may be given as follows:—

Apterous fundatrigenia. In cleared and mounted specimens body pale; head brown. Antenna pale brown; flagellum dark apically. Legs pale brown. Siphunculus and cauda brown. Body round, 1.8–2.4 mm. in length.

Head areolated; setae long and flagellate, rather sparsely scattered, the longer ones being 1.5–2.0 times as long as middle width of 3rd antennal segment; median and antennal tubercles undeveloped; front gently convex. Antenna 6-segmented, about half length of body, densely hairy; 3rd segment without rhinaria (rarely with a rhinarium); processus terminalis finger-shaped, 1.5–1.8 times as long as basal part of 6th; 3rd–6th as 31 : 15 : 18 : 9+16 in length. Clypeus with 4 setae; mandibular lamina with about 6 setae. Rostrum reaching hind coxa; ultimate segment 1.1–1.4 times as long as 2nd segment of hind tarsus, with 4–6 secondary setae. Thorax densely hairy; prothorax with a pair of marginal tubercles; mesosternal furca sessile, with arms separated from each other. Legs with many long flagellate setae; femora sparsely imbricated with fine spinules along whole length; tibiae smooth, rarely with a few pseudosensoria in hind legs; first tarsal chaetotaxy 3 : 3 : 2. Abdominal tergum membranous, reticulated, without any ornamentation except brown bands on 7th and 8th segments; dorsal setae long, flagellate and numerous in number marginally and posteriorly, while they are sparse and short on abdominal disc; marginal tubercles usually present on 1st–5th segments; 8th segment with up to 25 setae. Genital plate rectangular, with many scattered setae. Siphunculus tapering, 2.0–2.5 times as long as wide

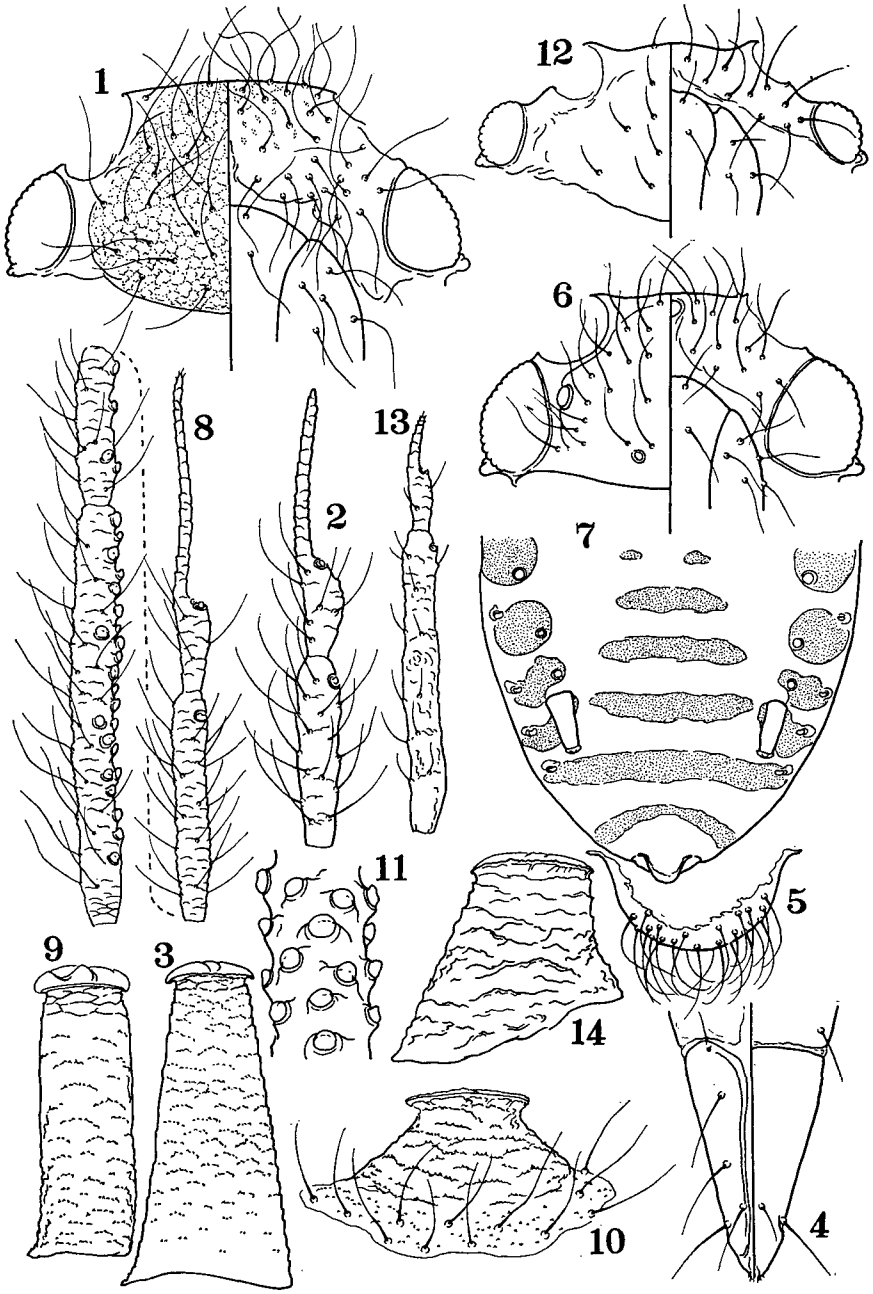

Fig. 47. *Sappaphis pyri* Matsumura. Apterous fundatrigenia:— 1, head; 2, antenna (5th & 6th segments); 3, siphunculus; 4, ultimate rostral segment; 5, cauda. Emigrant:— 6, head; 7, abdomen; 8, antenna (3rd-6th segments); 9, siphunculus. Apterous alienicola:— 10, siphunculus. Immigrant:— 11, antenna (part of 3rd segment). Fundatrix:— 12, head; 13, antenna (3rd & 4th segments); 14, siphunculus.

at base, imbricated, with a distinct flange, sometimes with 1 or 2 setae. Cauda round, much shorter than wide, with many setae.

Measurements in mm. Body 1.8; antennal segments (1st–6th): 0.08, 0.07, 0.23, 0.13, 0.17, 0.09+0.16; ultimate rostral segment 0.16; hind femur 0.47; hind tibia 0.81; hind tarsus (2nd segment) 0.12; siphunculus 0.14; cauda 0.08; dorsal setae up to 0.095 on head, 0.080 on marginal part of abdomen, 0.030 on abdominal disc.

Emigrant. Differs from the apterous fundatrigenia as follows:—

Antenna wholly black, 1/2–2/3 of body length; 3rd segment with 21–25 protuberant rhinaria arranged irregularly on outer side; 4th with 4–9 rhinaria; 5th usually without secondary rhinaria; processus terminalis about twice as long as basal part of 6th; 3rd–6th as 35 : 14 : 19 : 9+18 in length. Wings of normal venation, with veins bordered by narrow dark bands. Abdomen with long sparse setae; 2nd–8th segments with dark transverse bands which become larger from 2nd segment backward; 1st–6th with marginal sclerites; 1st–5th with marginal tubercles. Siphunculus subcylindrical, about 2.5–3.5 times as long as wide.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.07, 0.07, 0.33, 0.14, 0.18, 0.08+0.16; ultimate rostral segment 0.14; hind femur 0.35; hind tibia 0.63; hind tarsus (2nd segment) 0.12; siphunculus 0.15; cauda 0.07; dorsal setae about 0.070 on head and abdomen.

Apterous alienicola (summer form). Differs from the apterous fundatrigenia as follows:—

Body in life orange-red in colour, 1.7–1.9 mm. in length, without distinct wax excretion.

Body with numerous setae long and flagellate; 8th abdominal segment with about 35–45 setae. Siphunculus very short, on a broad sclerotic cone bearing some peripheral setae. Antenna shorter than half length of body; processus terminalis tapering, 1.0–1.5 times as long as basal part of 6th segment; 3rd–6th as 20 : 12 : 17 : 8+8 in length. Rostrum with ultimate segment 1.4–1.7 times as long as 2nd segment of hind tarsus. Legs shorter and stouter than in apterous fundatrigenia.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.06, 0.06, 0.18, 0.06, 0.12, 0.07+0.08; ultimate rostral segment 0.15; hind femur 0.32; hind tibia 0.55; hind tarsus (2nd segment) 0.09; dorsal setae about 0.085 on head, 0.065 on abdominal disc.

The autumnal form of the apterous alienicola is larger than the summer form, i.e. the body is 2.0–2.1 mm. in length.

Alate alienicola (summer form). Differs from the emigrant as follows:—

Body rather densely hairy. Siphunculus short, at most 1.5 times as long as wide, with 5–7 setae basally. Abdomen often without sclerotic bands on first 3 or 4 segments, without marginal tubercles. Antenna with 27–38 rhinaria on 3rd segment, 4–11 on 4th; processus terminalis about 1.5 times as long as basal part of 6th segment.

Body in life orange-red with head, thorax and sclerites on abdomen black, about 1.7 mm. in length. Antenna, siphunculus and cauda black. Legs pale yellowish brown; femora at apex, tibiae at apex and tarsi black.

Measurements in mm. Body 1.7; antennal segments (1st–6th); 0.07, 0.07, 0.33, 0.15, 0.17, 0.07+0.11; ultimate rostral segment 0.15; hind femur 0.49; hind tibia 0.88; hind tarsus (2nd segment) 0.09; siphunculus 0.07; cauda 0.06; dorsal setae about 0.065

on head and abdomen.

Immigrant. Much resembles the alate alienicola, differing therefrom in the following points:—

Antenna with numerous secondary rhinaria distributed on the whole surface of 3rd–5th segments, the number of rhinaria being as follows:—60–90 on 3rd segment, 30–40 on 4th, 20–30 on 5th. Abdomen with well developed sclerotic bands.

Fundatrix. Differs from the apterous fundatrigenia as follows:—

Body very sparsely hairy on dorsum. Antenna 4- or 5-segmented, about 1/3 of body length; processus terminalis much shorter than basal part of terminal segment. Siphunculus short, truncated conical, at most about as long as wide at base. Rostrum with ultimate segment bearing 2 or 3 setae. Legs short and stout.

Measurements in mm. Body 2.7; antennal segments (1st–5th): 0.10, 0.08, 0.40, 0.12, 0.12+0.07; ultimate rostral segment 0.15; hind femur 0.56; hind tibia 0.94; hind tarsus (2nd segment) 0.13; siphunculus 0.09; cauda 0.09; dorsal setae 0.040 on head, 0.030 on abdominal disc, 0.075 on 8th abdominal segment.

Specimens examined: Some fundatrices, Niigata, 10-v-56 & 19-v-58, from pear, K. Shibata leg. Some apterous fundatrigeniae and emigrants, Niigata, 19-v-58, from pears, K. Shibata leg.; Shimo-ina, Nagano Pref., 11-v-59, from pear, T. Miyashita leg. Many apterous alienicolae, Sapporo, Hokkaidô, 15-vii-69 & 5-ix-68, ex *Artemisia montana*; Tôkyô, 22-vii-58, ex *Artemisia* sp., R. Takahashi leg.; Hirao, Ôsaka Pref., 2-vii-60, ex *Artemisia* sp., M. Sorin leg. Many alate alienicolae, Sapporo, 15-vii-68, ex *Artemisia montana*; Hirao, 2-vii-60, ex *Artemisia* sp., M. Sorin leg. Some immigrants, Sapporo, 5-ix-68, ex *Artemisia montana*; Nikkô, Tochigi Pref., 7-x-66, from pears, T. Tanaka leg.

Host plants: Primary hosts—*Pyrus* spp. (pears). Secondary hosts—*Artemisia* spp. (including *A. montana*). This aphid infests *Pyrus* on leaves and *Artemisia* on roots.

Distribution: Japan; Korea; China.

Judging from the original description, *Lachnaphis yomogi* Shinji may be a synonym of *Sappaphis pyri* Matsumura. Except for the "depressed" body, the description of *yomogi* agrees well with *pyri* in both morphological features and biological features.

2. ***Sappaphis ranunculi***, sp. n.

Apterous viviparous female. Body in life yellowish brown to dark brown ventrally, dark dorsally. In cleared and mounted specimens antenna dark with 3rd–5th segments pale terminally; legs, siphunculus and cauda black. Body round, 1.6–2.0 mm. in length.

Body, legs and antennae with long, rigid setae which are about 2.5–3.0 times as long as middle width of 3rd antennal segment on body. Head sparsely spinulous dorsally and ventrally, with a pair of tubercles on vertex; antennal tubercles undeveloped; front gently convex. Antenna 6-segmented, 1/2–7/10 of body length, roughly imbricated throughout; 3rd segment without rhinaria, with setae about twice as long as middle width of the segment; 6th with a large ciliated primary rhinarium, with filiform processus terminalis 2–3 times as long as basal part of the segment; 3rd–6th as 30 : 18 : 16 : 9+21 in length. Clypeus with 4 setae anteriorly; mandibular lamina smooth, with 3 setae. Rostrum reaching 3rd abdominal segment; ultimate segment tapering, 1.9–2.0 times as long as 2nd segment of hind tarsus, with 4–6 secondary setae.

Femora spinulously imbricated, with setae about as long as middle width of hind femur; tibia smooth, with some pseudosensoria in hind legs; first tarsal chaetotaxy 3 : 3 : 2. Pronotum sclerotized, with a pair of large marginal tubercles. Mesosternal furca sessile. Abdomen with tergum uniformly sclerotized, pigmented, smooth, with small marginal tubercles on 1st–5th segments; sternites areolated; 8th segment with 9–11 setae. Genital plate transversely oval, with many long setae. Siphunculus rather short, gradually tapering or abruptly attenuated on apical half, 2.5–3.5 times as long as wide at base, roughly imbricated, with 5–8 long rigid setae, with a well developed flange. Cauda semi-circular, with 4–6 setae.

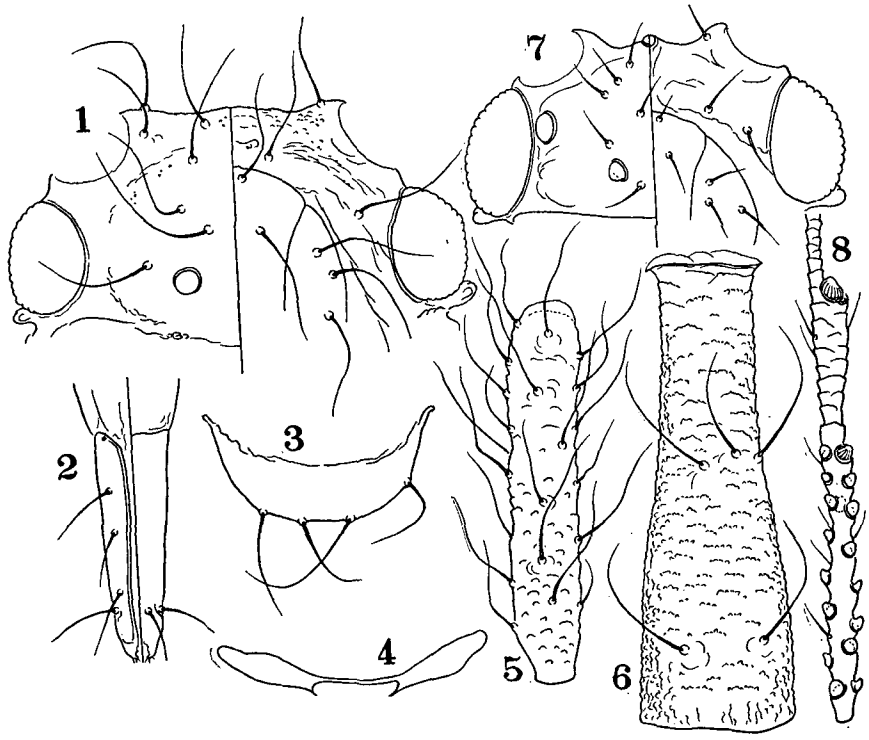

Fig. 48. *Sappaphis ranunculi*, sp. n. Apterous viviparous female:— 1, head; 2, ultimate rostral segment; 3, cauda; 4, mesosternal furca; 5, antenna (3rd segment); 6, siphunculus. Alate viviparous female:— 7, head; 8, antenna (5th segment and basal part of 6th).

Measurements in mm. Body 2.0; antennal segments (1st–6th): 0.08, 0.07, 0.29, 0.19, 0.17, 0.09+0.22; ultimate rostral segment 0.19; hind femur 0.57; hind tibia 1.01; hind tarsus (2nd segment) 0.10; siphunculus 0.25; cauda 0.06; dorsal setae about 0.100 on head and abdomen.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Head smooth; front shallowly W-shaped. Antenna a little shorter than body, with strongly protruding secondary rhinaria on 3rd–5th segments; 3rd longer than 4th and 5th together, with 70–78 rhinaria; 4th with 25–29 rhinaria; 5th with 13–16 secondary

rhinaria, with primary rhinarium protuberant and ciliated; processus terminalis 3-4 times as long as basal part of 6th; 3rd-6th as 68 : 32 : 26 : 12+47 in length. Wings of normal venation. Abdomen with sclerotic bands and marginal sclerites on first 6 segments, with marginal tubercles on first 5 segments; 7th segment with a sclerotic band; 8th with 8-11 setae.

Measurements in mm. Body 2.0; antennal segments (1st-6th): 0.09, 0.07, 0.64, 0.32, 0.23. 0.11+0.41; ultimate rostral segment 0.20; hind femur 0.62; hind tibia 1.30; hind tarsus (2nd segment) 0.10; siphunculus 0.17; cauda 0.07; setae on head about 0.050, those on abdomen about 0.080.

Specimens examined: Syntypes—14 apterous viviparous females, Taishi, Ôsaka Pref., 2- & 3-vii-60, ex *Ranunculus japonicus*, R. Takahashi leg.; 4 alate viviparous females, Hirao, Ôsaka Pref., 24-x-60, ex *Ranunculus japonicus*, R. Takahashi leg.

Host plants: *Ranunculus japonicus*.

Distribution: Japan.

This is not a typical member of *Sappaphis* on accout of the sclerotized tergum and rigid setae of the body. In other respects, however, it may be better referred to *Sappaphis* rather than to any other described genus. It is readily distinguished from *S. pyri* Matsumura by the following characters in addition to those given in the key. (1) Antenna roughly imbricated; processus terminalis over twice as long as basal part of 6th segment; primary rhinaria large. (2) Cauda with fewer setae.

71. Genus ***Sorbaphis*** Shaposhnikov

Sorbaphis Shaposhnikov, 1950: 224 [type-species: *Sorbaphis chaetosiphon* Shaposhnikov, 1950].

This genus is represented by two species, *S. chaetosiphon* Shaposhnikov from South Ural and *S. kurilensis* Ivanovskaya from the Kuril Islands. In this paper *chaetosiphon* is recorded from Japan for the first time.

1. ***Sorbaphis chaetosiphon*** Shaposhnikov

Sorbaphis chaetosiphon Shaposhnikov, 1950: 224.

Sorbaphis chaetosiphon: Shaposhnikov, 1956: 283 & 1964: 584.

The present specimens of the fundatrices agree well with the original description of *Sorbaphis chaetosiphon* Shaposhnikov. As a supplement to the original description, the following accounts may be added:—

Alate viviparous female. Head and thorax black. Abdomen dark brown; dorsal sclerites shining black. Antenna, legs, siphunculus and cauda black. Body 2.4-2.8 mm. in length.

Head sparsely spinulous dorsally and ventrally; antennal and median tubercles distinct; front W-shaped. Antenna 6-segmented, about 4/5 of body length; 3rd segment smooth, not shorter than 4th and 5th together, with 50-68 tuberculate rhinaria; 4th imbricated, with 0-7 rhinaria; 5th with primary rhinarium flat and cilia-less; processus terminalis 4.5-5.5 times as long as basal part of 6th; 3rd-6th as 71 : 40 : 26 : 11+60 in length. Ultimate rostral segment 1.3-1.5 times as long as 2nd segment of hind tarsus, with 6-8 secondary setae. First tarsal chaetotaxy 4 : 4 : 2. Abdomen with a large central sclerite extending on 3rd-7th tergites; 1st tergite with some small sclerites; 2nd with a sclerotic band and marginal sclerites; 3rd and 4th with marginal

sclerites often fused with central sclerite; these sclerites striated with fine spinules; 8th tergite sclerotized, with 13–15 setae; 2nd–7th sternites with sclerites pleurally. Stigmal plates of abdomen striated or reticulated, those on 1st and 2nd abdominal segments being placed closely to each other. Siphunculus cylindrical, imbricated, annularly incised just below flange, 7–8 times as long as wide at middle, about 5/7 of 3rd antennal segment, with 20–30 long setae. Cauda semicircular, shorter than wide, with about 25 setae.

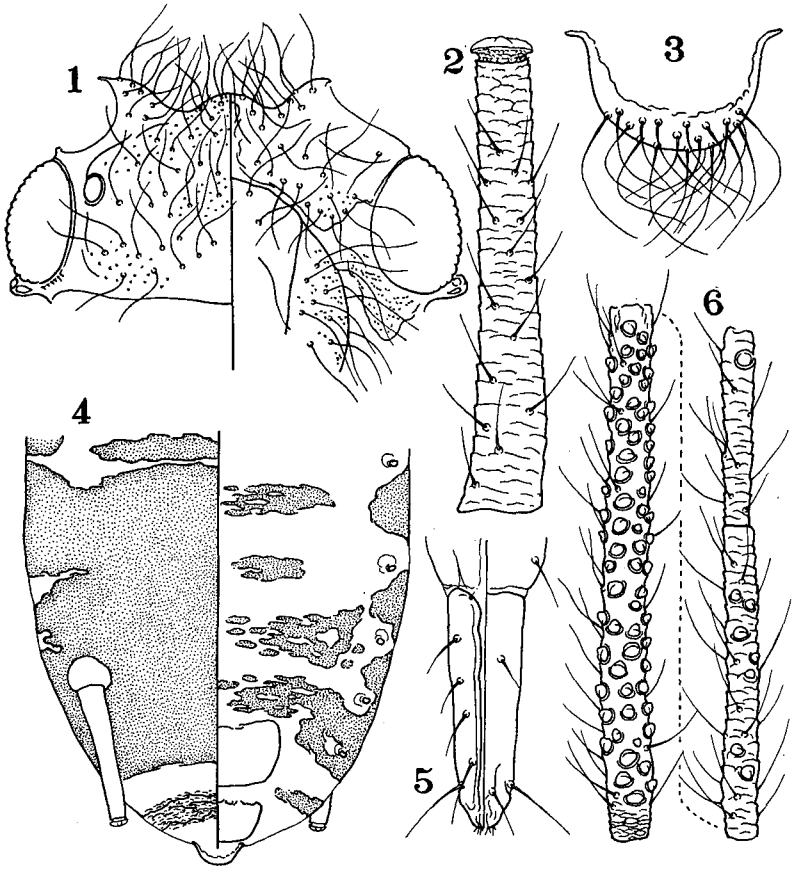

Fig. 49. *Sorbaphis chaetosiphon* Shaposhnikov. Alate viviparous female:—
1, head; 2, siphunculus; 3, cauda; 4, pattern of sclerites of abdomen;
5, ultimate rostral segment; 6, antenna (3rd–5th segments).

Measurements in mm. Body 2.7; antennal segments (1st–6th): 0.12, 0.09, 0.69, 0.37, 0.24, 0.11+0.61; ultimate rostral segment 0.20; hind femur 1.30; hind tibia 1.89; hind tarsus (2nd segment) 0.14; siphunculus 0.47; cauda 0.11; dorsal setae about 0.080 on head and abdomen.

Specimens examined: Some fundatrices and many alate viviparous females, Sapporo, Hokkaidô, 15–vi–69, ex *Sorbus commixta*.

Host plants: *Sorbus commixta*. The infested leaves are curled up downwardly,

turning reddish in colour.

Distribution: Japan; Kuril Islands; Siberia (the lower course of the Amur); South Ural.

72. Genus ***Dysaphis*** Börner

Dysaphis Börner, 1931: 9 [type-species: *Aphis angelicae* Koch, 1854].

Dentatus van der Goot, 1913: 98, nec Gray, 1847 [type-species: *Aphis sorbi* Kaltenbach, 1843].

Pomaphis Börner, 1939: 78 [type-species: *Aphis pyri* Boyer de Fonscolombe, 1841].

Annaja Börner, 1952: 101 [type-species: *Yezabura brancoi* Börner, 1950; described as a subgenus of *Yezabura* Matsumura].

Crataegaria Shaposhnikov, 1964: 582 [type-species: *Aphis crataegi* Kaltenbach, 1843; described as a subgenus of *Dysaphis* Börner].

Umbelliferaria Shaposhnikov, 1964: 582 [type-species: *Yezabura aizenbergi* Shaposhnikov, 1949; described as a subgenus of *Dysaphis* Börner].

Cotoneasteria Shaposhnikov, 1964: 584 [type-species: *Dentatus microsiphon* Nevsky, 1929; described as a subgenus of *Dysaphis* Börner].

This genus is especially rich in species in the Palaearctic region: Stroyan (1957 & 1963) has given accounts for 24 British species of the genus, Shaposhnikov (1964) for 35 species from the European part of Russia. Although only 3 species have been known to occur in Japan, it may be expected that further native species are to be found.

Key to the species

1 Antenna about as long as body. Siphunculus about 10 times as long as wide at middle. Abdomen without scleroites; dorsal setae minute. Body reddish or greenish. On *Plantago*. . . . . 1. *D. plantaginea* (Passerini)

– Antenna much shorter than body. Siphunculus at most 6 times as long as wide at middle. Abdomen with scleroites; dorsal setae moderately long. 2

2(1) Rostrum at most just passing hind coxa; ultimate segment 1.1 times as long as 2nd segment of hind tarsus. Abdominal tergum usually not reticulated. Antenna with 3rd segment bearing setae at most a little longer than width of the segment. Body dull yellow. Polyphagous. . . . . 2. *D. tulipae* (Boyer de Fonscolombe)

– Rostrum reaching far beyond hind coxa; ultimate segment 1.6–1.7 times as long as 2nd segment of hind tarsus. Abdominal tergum usually distinctly reticulated. Antenna with 3rd segment bearing setae much longer than middle width of the segment. Body milky white, pale green or purplish brown. On *Rumex* and *Rheum*. . . . 3. *D. rumecicola* (Hori)

1. ***Dysaphis plantaginea*** (Passerini)

Myzus plantagineus Passerini, 1860: 35.

Myzus plantagineus (?): Takahashi, 1924: 30.

Sappaphis plantaginea: Hille Ris Lambers, 1948: 287; Stroyan, 1957: 24.

Dysaphis plantaginea: Tao, 1967: 4.

Myzus plantagifoliae Shinji, 1924: 368.

Myzus plantagifoliae: Shinji, 1941: 970 & 1944: 533.

Myzus plantagicola Takahashi, 1931: 69.

Specimens examined: Many apterous viviparous females collected at the following localities:— Honshû—Morioka, Iwate Pref.; Tôkyô; Mt. Takao, Tôkyô Distr.; Mt. Iwawaki, Ôsaka Pref. Kyûshû—Yaku-shima Isl., Kagoshima Pref. All the specimens

were collected from *Plantago* spp. by R. Takahashi.

Host plants: *Plantago* spp. In Europe, it is known that this species alternates between apple and *Plantago* spp. (after Stroyan, 1957).

Distribution: Japan; Taiwan; Europe; North America.

2. ***Dysaphis tulipae*** (Boyer de Fonscolombe)

Aphis tulipae Boyer de Fonscolombe, 1841: 167.
Aphis tulipae: Gillette et Palmer, 1932: 450; Palmer, 1952: 181.
Anuraphis tulipae: Moritsu, 1958b: 923.
Chomaphis (Dysaphis) tulipae: Eastop, 1958: 67.
Dysaphis tulipae: Stroyan, 1963: 43; Eastop, 1966: 443.

Specimens examined. Some apterous viviparous females collected at Awa, Chiba Pref. (ex *Tulipa gesneriana*, *Gladiolus gandavensis* & *Iris* sp., K. Sekiguchi leg.).

Host plants: *Tulipa gesneriana*, *Gladiolus gandavensis* & *Iris* sp. (in Japan). According to Stroyan (1963), this aphid is recorded from various plants belonging to Liliaceae, Araceae, Iridaceae and Musaceae.

Distribution: Cosmopolitan.

3. ***Dysaphis rumecicola*** (Hori)

Anuraphis rumecicola Hori, 1927: 198.
Anuraphis rumicicola: Shinij, 1941: 489.

As a supplement to the original description, the following characters may be added:—

Apterous viviparous female. Body in life milky white, pale green or dark purplish brown, slightly powdery. Antenna pale; flagellum dark apically. Legs pale; tibiae at apex, femora at apex and tarsi black. Siphunculus black, sometimes pale basally. Cauda fuscous. Body oval, 2.2–2.6 mm. in length.

Body areolated dorsally, with a series of mesial tubercles arranged from head to 8th abdominal segment, and with large marginal tubercles on prothorax and on 1st–5th and 7th abdominal segments; dorsal setae moderately long and pointed. Prothorax with a broad sclerotic band. Meso- and metathorax with many sclerites. Abdomen with many sclerites on first 5 segments and a sclerotic band on each of 6th–8th segments. Head without distinct antennal tubercles; front weakly convex. Antenna shorter than half length of body; 3rd segment imbricated, with setae up to 1.6 times as long as middle width of the segment; processus terminalis about 2.5 times as long as basal part of 6th. Prothorax with 8–10 mesial setae. Rostrum reaching 3rd abdominal segment; ultimate segment 1.6–1.7 times as long as 2nd segment of hind tarsus, with 5–8 secondary setae. Femora scabrous, with long slender setae. Tibiae smooth, stout, with setae at most slightly longer than middle width of hind tibia. First tarsal chaetotaxy 3 : 3 : 2. Abdomen with 8th segment bearing 4–6 setae about 2.5 times as long as middle width of 3rd antennal segment. Siphunculus imbricated, tapering or barrel-shaped, less than twice as long as wide at base, about 1.5 times as long as cauda. Cauda pentagonal, pointed at apex, with 5–7 setae.

Measurements in mm. Body 2.4; antennal segments (1st–6th): 0.08, 0.07, 0.24, 0.13, 0.10, 0.09+0.21; ultimate rostral segment 0.23; hind femur 0.51; hind tibia 0.88; hind tarsus (2nd segment) 0.14; siphunculus 0.18; cauda 0.12; longest dorsal seta 0.070 on head, 0.060 on abdominal disc, 0.080 on 8th abdominal segment.

Alate viviparous female. Differs from the apterous viviparous female as follows:—

Antenna a little longer than half length of body; 3rd segment with 25–30 rhinaria, with setae slightly longer than middle width of the segment; 4th with 7–9 rhinaria. Ultimate rostral segment about 1.5 times as long as 2nd segment of hind tarsus. Mesial tubercles sometimes absent from thoracic and anterior abdominal segments. Abdomen with a large median sclerite extending on 3rd–6th segments; marginal sclerites on first 4 or 5 segments free from median sclerite; median and marginal sclerites areolated with spinules.

Measurements in mm. Body 2.1; antennal segments (1st–6th): 0.08, 0.08, 0.46, 0.25, 0.15, 0.12+0.28; ultimate rostral segment 0.21; hind femur 0.62; hind tibia 1.17; hind tarsus (2nd segment) 0.14; siphunculus 0.17; cauda 0.11; longest dorsal seta 0.045 on head, 0.060 on abdominal disc, 0.065 on 8th abdominal segment.

Specimens examined: Many apterous and some alate viviparous females, Sapporo, Hokkaidô, 4-ix-68, ex *Rheum undulatum*; Tôkyô, 14-v-58, ex *Rumex* sp., A. Watase leg.; Ôsaka, 15-i-57 & 30-iv-58, ex *Rumex japonicus*, R. Takahashi leg.; Mt. Kôya, Wakayama Pref., ex *Rumex* sp., R. Takahashi leg.

Host plants: *Rheum undulatum* & *Rumex* spp. (including *R. japonicus*); *Rumex crispa* (after Hori, 1927). This aphid infests the hosts on the stalks near the ground, being covered with an earth shelter made by ants.

Distribution: Japan.

73. Genus ***Nearctaphis*** Shaposhnikov

Nearctaphis Shaposhnikov, 1950: 223 [type-species: *Aphis bakeri* Cowen, 1895].

Fitchiella Shaposhnikov, 1950: 224 [type-species: *Aphis crataegifoliae* Fitch, 1851; described as a subgenus of *Nearctaphis* Shaposhnikov].

Amelanchieria Shaposhnikov, 1950: 224 [type-species: *Aphis sensoriata* Gillette et Bragg, 1918; described as a subgenus of *Nearctaphis* Shaposhnikov].

1. ***Nearctaphis bakeri*** (Cowen)

Aphis bakeri Cowen, 1895: 118.

Aphis bakeri: Gillette et Palmer, 1932: 383; Palmer, 1952: 124.

Nearctaphis bakeri: Shaposhnikov, 1950: 223 & 1956: 282; Hille Ris Lambers, 1970: 54.

This species is first recorded from Japan by Hille Ris Lambers (1970). On the basis of the present specimens a brief redescription is given below:—

Apterous viviparous female. Body in life salmon-pink, with a milky tint. Siphunculus pale. Cauda fuscous. Antenna pale; flagellum dark apically. Legs pale; femora at apex, tibiae at apex and tarsi dark. Body roundly oval, 1.5–1.8 mm. in length.

Head granulated over dorsum and venter; antennal tubercles not developed; dorsal setae pointed, the longest one being 1.5–1.8 times as long as middle width of 3rd antennal segment. Antenna 6-segmented, nearly as long as half length of body, imbricated throughout; 3rd segment without rhinaria, with setae a little shorter than middle width of the segment; processus terminalis about 2.5 times as long as basal part of 6th. Rostrum reaching between middle and hind coxae; ultimate segment tapering, a little longer than 2nd segment of hind tarsus, with 2 secondary setae. First tarsal chaetotaxy 3 : 3 : 3 or 3 : 3 : 2. Prothorax with a small finger-like papilla on each side and with a sclerotic band posteriorly which bears about 6 setae. Thoracic and abdominal tergites areolated with fine denticles, with many scleroites which are

often fused together especially on posterior abdominal segments; 2nd–5th abdominal segments each with small marginal tubercles and 7–10 setae besides marginal setae; 8th abdominal segment with 4 pointed setae over twice as long as middle width of 3rd antennal segment. Siphunculus tapering, shorter than cauda, scabrous with transverse rows of denticles, with a distinct flange. Cauda shortly conical, with 5 or 6 setae.

Measurements in mm. Body 1.7; antennal segments (1st–6th): 0.07, 0.05, 0.18, 0.11, 0.09, 0.08+0.19; ultimate rostral segment 0.11; hind femur 0.38; hind tibia 0.66; hind tarsus (2nd segment) 0.10; siphunculus 0.10; cauda 0.12; dorsal setae about 0.040 on cephalic disc, 0.020–0.038 on abdominal disc, 0.055 on 8th abdominal segment.

Specimens examined: Some apterous viviparous females, Mt. Apoi, Hokkaidô, 28-vi-67, ex *Trifolium pratense*, H. Takada leg.; Sapporo, Hokkaidô, 22-i-68, ex *Trifolium pratense* (in a green house).

Host plants: *Trifolium pratense* (in Japan). *Crataegus, Cydonia, Malus* & *Pyrus* as primary hosts and *Medicago, Melilotus* & *Trifolium* as secondary hosts (in North America, after Palmer, 1952).

Distribution: Japan; North America; Europe.

74. Genus ***Nippodysaphis*** Hille Ris Lambers

Nippodysaphis Hille Ris Lambers, 1965b: 389 [type-species: *Neodysaphis deutziae* Hille Ris Lambers, 1965].

Neodysaphis Hille Ris Lambers, 1965a: 191, nec Narzykulov, 1961 [type-species: *Neodysaphis deutziae* Hille Ris Lambers, 1965].

This genus is monobasic.

1. ***Nippodysaphis deutziae*** (Hille Ris Lambers)

Neodysaphis deutziae Hille Ris Lambers, 1965a: 191.
Nippodysaphis deutziae: Hille Ris Lambers, 1965b: 389.

The specimens examined slightly differ from the original description in the following points:—

Fundatrix: First tarsal chaetotaxy 3 : 3 : 2, rarely 3 : 3 : 3 or 3 : 2 : 2; cauda with 5–10 setae. Alate viviparous female: Antenna with 4–10 rhinaria on 3rd segment, 0–5 on 4th; cauda with 5–12, mostly 7 or 8 setae.

Specimens examined: Many fundatrices and alate viviparous females, Ikezuki, Miyagi Pref., 26-v-66; Mt. Kongô, Ôsaka Pref., 17-v-59 & 1-vi-58, R. Takahashi leg.; Mt. Iwawaki, Ôsaka Pref., 29-vi-60, R. Takahashi leg.; Beppu, Ôita Pref., 21-v-65.

Host plants: All the specimens examined were collected from *Deutzia crenata*. The infested leaves of the host are heavily curled up.

Distribution: Japan.

Species of Macrosiphini unknown to the writer

The following species are described as members of Macrosiphini, but their true systematic positions have not yet been known to the writer.

1. ***Acyrthosiphon berkemiae*** Shinji

Acyrthosiphum berkemiae Shinji, 1941: 1158.
Host plants: *Berchemia racemosa*.

2. ***Amphorophora ichigo*** Shinji
   Amphorophora ichigo Shinji, 1922: 789.
   Amphorophora ichigo: Shinji, 1941: 736.
   Host plants: *Rubus trifidus.*
3. ***Amphorophora lilicola*** Shinji
   Amphorophora lilicola Shinji, 1933 b: 350.
   Amphorophora lilicola: Shinji, 1941: 751.
   Host plants: *Lilium auratum* & *L. lancifolium.*
4. ***Amphorophora vicicola*** Shinji
   Amphorophora vicicola Shinji, 1939 c: 15.
   Amphorophora vicicola: Shinji, 1941: 773.
   Host plants: *Vicia faba.*
5. ***Acaudus sanguisorbae*** Shinji
   Acauda Sanguisorbae Shinji, 1924: 353.
   Acaudus sanguisorbae: Shinji, 1941: 461.
   Host plants: *Sanguisorba officinalis.*
6. ***Anuraphis cardui*** Shinji
   Anuraphis cardui Shinji, 1941: 465.
   Host plants: *Sonchus brachyotis.*
7. ***Anuraphis floris*** Monzen
   Anuraphis floris Monzen, 1934: 33.
   Host plants: *Plectranthus longitubus.*
8. ***Anuraphis spiranthi*** (Shinji)
   Aphis spiranthi Shinji, 1922: 799.
   Anuraphis spiranthi: Shinji, 1941: 491.
   Host plants: *Achillea sibirica.*
9. ***Brachycolus dauci*** Fabricius, sensu Shinji
   Anuraphis dauci: Shinji, 1932 b: 1832.
   Brachycolus dauci: Shinji, 1941: 590.
   Host plants: *Daucus carota.*
10. ***Capitophorus gnathalifoliae*** Shinji
    Capitophorus gnathalifoliae Shinji, 1924: 358.
    Host plants: *Gnaphalium* sp.
11. ***Capitophorus prunifoliae*** Shinji
    Capitophorus prunifoliae Shinji, 1924: 359.
    Host plants: *Prunus* sp.
12. ***Carolinaia justiciae*** Shinji
    Carolinaia justiciae Shinji, 1924: 357.
    Host plants: *Justicia procumbens* var. *leucantha.*
13. ***Hyadaphis veratri*** Shinji
    Hyadaphis veratri Shinji, 1942 c: 290.
    Host plants: *Veratrum* sp.
14. ***Macrocaudus phaseoli*** Shinji
    Macrocaudus phaseoli Shinji, 1930 d: 79.
    Macrocaudus phaseoli: Takahashi, 1938 b: 3; Shinji, 1941: 791.
    Host plants: *Phaseolus mungo* var. *subtilobata.*
15. ***Macrosiphoniella kuwakusae*** Uye
    Macrosiphoniella kuwakusae Uye, 1924: 408.
    Host plants: *Fatoua villosa.*
16. ***Macrosiphum coriariae*** Shinji

Macrosiphum coriariae Shinji, 1922: 787.
Host plants: *Coriaria japonica.*

17. ***Macrosiphum kuricola*** Matsumura
Macrosiphum kuricola Matsumura, 1917: 394.
Host plants: *Castanea crenata* & *Quercus mongolica* var. *grosseserrata.*

18. ***Macrosiphum malvicola*** Matsumura
Macrosiphum malvicola Matsumura, 1917: 393.
Host plants: *Syringa reticulata* var. *mandshurica* & *Malva rotundifolia.*

19. ***Macrosiphum naazamii*** Shinji
Macrosiphum naazamii Shinji, 1935 b: 241.
Macrosiphum naazamiae: Shinji, 1941: 1169.
Host plants: *Cirsium japonicum.*

20. ***Macrosiphum petasitis*** Matsumura
Macrosiphum petasitis Matsumura, 1917: 394.
Host plants: *Petasites japonicus.*

21. ***Macrosiphum rubifoliae*** Shinji
Macrosiphum rubifoliae Shinji, 1922: 787.
Macrosiphum rubifoliae: Shinji, 1941: 881.
Host plants: *Rubia akane.*

22. ***Macrosiphum suguri*** Shinji
Macrosiphum suguri Shinji, 1924: 363.
Macrosiphum suguri: Shinji, 1941: 887.
Host plants: *Ribes fasciculatum* &. *Ribes* spp.

23. ***Myzus gumi*** Shinji
Myzus gumi Shinji, 1922: 792.
Myzus gumi: Shinji, 1941: 920.
Host plants: *Elaeagnus* sp.

24. ***Myzus inuzakurae*** Shinji
Myzus inuzakurae Shinji, 1930 f: 141.
Myzus inuzakurae: Shinji, 1941: 927 & 1944: 527.
Host plants: *Prunus buergeriana.*

25. ***Myzus komaumii*** Shinji
Myzus komaumii Shinji, 1943: 34.
Myzus lonicerae Shinji, 1944: 534. **Syn. n.**
Host plants: *Euonymus alatus* form. *ciliatodentatus.*
Myzus komaumii Shinji and *M. lonicerae* Shinji are undoubtedly the same thing, because their original descriptions are identical.

26. ***Myzus kusaki*** Shinji
Myzus kusaki Shinji, 1941: 930.
Host plants: *Orixa japonica.*

27. ***Myzus moriokae*** Shinji
Myzus moriokae Shinji, 1941: 955.
Host plants: *Boehmeria nipononivea.*

28. ***Myzus physaliae*** (Shinji)
Macrosiphoniella physaliae Shinji, 1924: 364.
Myzus physaliae: Shinji, 1941: 964.
Host plants: *Physalis alkekengi.*

29. ***Myzus plectranthi*** Shinji
Myzus plectranthi Shinji, 1939 a: 40.
Myzus plectranthi: Shinji, 1944: 535.

Host plants: *Plectranthus inflexus.*

30. ***Myzus polygoniyonai*** Shinji
Myzus polygoni-yonai Shinji, 1938: 108.
Myzus polygoni-yonai: Shinji, 1944: 537.
Host plants: *Polygonum viscosum.*

31. ***Myzus ribis*** Shinji
Myzus ribis Shinji, 1922: 792.
Myzus suguri Shinji, 1927: 57.
Myzus suguri: Shinji, 1941: 980.
Host plants: *Ribes sinanense.*

32. ***Myzus xanthomelii*** Shinji
Myzus xanthomelii Shinji, 1941: 984.
Host plants: *Zanthoxylum ailanthoides.*

33. ***Myzus yomogi*** Shinji
Myzus yomogi Shinji, 1922: 792.
Host plants: *Artemisia princeps.*

34. ***Nectarosiphon obako*** Shinji
Nectarosiphum obako Shinji, 1922: 788.
Host plants: *Plantago camtschatica.*

35. ***Phorodon viburni*** Matsumura
Phorodon viburni Matsumura, 1918: 14.
Host plants: *Viburnum* sp.

Host list†

Abelia spathulata
Neotoxoptera abeliae Takahashi
Abies firma
Elatobium momii (Shinji)
Acer buergerianum
Myzus persicae (Sulzer)
Achillea sibirica
Anuraphis spiranthi (Shinji)*
Brachycaudus helichrysi (Kaltenbach)
Aconitum chinense
Delphiniobium yezoense, sp. n.
Aconitum kitadakense
Delphiniobium yezoense, sp. n.
Aconitum sachalinense
Delphiniobium yezoense, sp. n.
Aconitum yesoense
Delphiniobium yezoense, sp. n.
Aconitum spp.
Delphiniobium yezoense, sp. n.
Brachycaudus helichrysi (Kaltenbach)
Acronychia pedunculata
Sinomegoura citricola (van der Goot)*
Adenocaulon himalaicum
Rhopalosiphoninus tiliae (Matsumura)
Adenophora triphylla var. ***japonica***
Dactynotus adenophorae (Matsumura)
Ageratum sp.
Brachycaudus helichrysi (Kaltenbach)
Agropyron ciliare var. ***minus***
Macrosiphum akebiae Shinji
Akebia quinata
Macrosiphum akebiae Shinji
Allium cepa
Neotoxoptera formosana (Takahashi)
Allium fistulosum
Neotoxoptera formosana (Takahashi)
Allium spp.
Neotoxoptera formosana (Takahashi)
Alpinia japonica
Pentalonia nigronervosa Coquerel
Amelanchier sp.
Acyrthosiphon solani (Kaltenbach)
Ammobium alatum
Brachycaudus helichrysi (Kaltenbach)

† In this list hosts are restricted to those recorded in Japan. The host-records cited from the literature in the present paper are shown by a single asterisk (*) at the end of aphid names and those which are doubtful by a double asterisk (**).

Anaphalis margaritacea
Brachycaudus helichrysi (Kaltenbach)
Anemone spp.
Galiaphis japonica Takahashi**
Angelica acutiloba
Cavariella japonica (Essig et Kuwana)
Angelica anomala
Cavariella konoi Takahashi
Angelica japonica
Semiaphis heraclei (Takahashi)
Angelica polymorpha
Cavariella japonica (Essig et Kuwana)
Angelica pubescens
Cavariella angelicae (Matsumura)
Paramyzus heraclei Börner
Angelica ursina
Cavariella angelicae (Matsumura)*
Cavariella oenanthi (Shinji)
Angelica spp.
Cavariella oenanthi (Shinji)
Aralia cordata
Cavariella araliae Takahashi
Aralia elata
Acyrthosiphon solani (Kaltenbach)
Cavariella araliae Takahashi
Arctium lappa
Acyrthosiphon solani (Kaltenbach)
Capitophorus elaeagni (del Guercio)
Dactynotus gobonis (Matsumura)
Macrosiphoniella grandicauda Takahashi et Moritsu
Artemisia capillaris
Micraphis artemsiae (Takahashi)
Myzus cerasi (Fabricius)
Artemisia indica
Macrosiphoniella yomogicola (Matsumura)
Artemisia japonica
Macrosiphoniella formosartemisiae Takahashi
Artemisia montana
Acyrthosiphon solani (Kaltenbach)
Capitophorus formosartemisiae (Takahashi)
Coloradoa artemisicola Takahashi
Cryptosiphum artemisiae Buckton
Macrosiphoniella grandicauda Takahashi et Moritsu
Macrosiphoniella hikosanensis Moritsu
Macrosiphoniella hokkaidensis, sp. n.
Macrosiphoniella oblonga (Mordvilko)
Macrosiphoniella yomogicola (Matsumura)
Macrosiphoniella yomogifoliae (Shinji)
Sappaphis pyri Matsumura
Tuberocephalus artemisiae Shinji
Tuberocephalus sp.
Artemisia princeps
Capitophorus formosartemisiae (Takahashi)
Coloradoa artemisicola Takahashi
Cryptosiphum artemisiae Buckton
Macrosiphoniella chaetosiphon Takahashi et Moritsu
Macrosiphoniella grandicauda Takahashi et Moritsu
Macrosiphoniella hikosanensis Moritsu
Macrosiphoniella kuwayamai Takahashi
Macrosiphoniella oblonga Mordvilko
Macrosiphoniella pseudoartemisiae Shinji
Macrosiphoniella sanborni (Gillette)
Macrosiphoniella yomogicola (Matsumura)
Macrosiphoniella yomogifoliae (Shinji)
Myzus yomogi Shinji*
Pleotrichophorus glandulosus (Kaltenbach)
Tuberocephalus artemisiae Shinji
Tuberocephalus sasakii (Matsumura)
Artemisia schmidtiana
Macrosiphoniella yomogicola (Matsumura)
Artemisia spp.
Capitophorus formosartemisiae (Takahashi)
Cryptosiphum artemisiae Buckton
Macrosiphoniella formosartemisiae Takahashi
Macrosiphoniella grandicauda Takahashi et Moritsu
Macrosiphoniella pseudoartemisiae Shinji
Macrosiphoniella yomogicola (Matsumura)
Macrosiphoniella yomogifoliae (Shinji)
Pleotrichophorus glandulosus (Kaltenbach)
Sappaphis pyri Matsumura
Aster ageratoides var. ***ovatus***
Macrosiphoniella yomenae (Shinji)
Aster ageratoides var. ***semiamplexicaulis***
Dactynotus monticola (Takahashi)
Aster scaber
Dactynotus fuchuensis (Shinji)
Aster spp.
Dactynotus amamianus (Takahashi)
Dactynotus lactucicola (Strand)
Macrosiphoniella yomenae (Shinji)
Myzus asteriae Takahashi
Astilbe thunbergii var. ***congesta***
Taiwanomyzus montanus (Takahashi)
Astilbe spp.
Acyrthosiphon solani (Kaltenbach)
Taiwanomyzus montanus (Takahashi)

Athyrium pycnosorum
Amphorophora ampullata Buckton
Micromyzus nikkoensis Miyazaki
Athyrium yokoscense
Amphorophora ampullata Buckton
Utamphorophora filicis Miyazaki
Atractylodes japonica
Dactynotus gobonis (Matsumura)
Berberis amurensis var. ***japonica***
Liosomaphis ornata, sp. n.
Berberis sieboldii
Liosomaphis berberidis (Kaltenbach)*
Berberis thunbergii
Liosomaphis berberidis (Kaltenbach)*
Liosomaphis ornata, sp. n.
Berchemia racemosa
Acyrthosiphon berkemiae Shinji*
Beta vulgaris var. ***rapa***
Myzus persicae (Sulzer)
Bidens tripartita
Brachycaudus helichrysi (Kaltenbach)
Boehmeria niponoivea
Acyrthosiphon solani (Kaltenbach)
Myzus boehmeriae Takahashi
Myzus moriokae Shinji*
Boehmeria nivea var. ***candicans***
Acyrthosiphon solani (Kaltenbach)
Boehmeria spicata
Myzus boehmeriae Takahashi
Boehmeria spp.
Myzus fatouae Shinji
Bothriospermum tenellum
Brachycaudus helichrysi (Kaltenbach)
Brassica campestris
Myzus persicae (Sulzer)
Brassica campestris var. ***napus***
Brevicoryne brassicae (Linné)
Brassica campestris var. ***pekinensis***
Lipaphis erysimi (Kaltenbach)
Brassica cernua
Brevicoryne brassicae (Linné)
Brassica oleracea var. ***capitata***
Brevicoryne brassicae (Linné)
Myzus persicae (Sulzer)
Breea setosa
Capitophorus elaeagni (del Guercio)
Dactynotus cephalonopli Takahashi
Buxus liukiuensis
Sinomegoura citricola (van der Goot)
Cacalia delphiniifolia
Brachycaudus helichrysi (Kaltenbach)
Cacalia hastata var. ***orientalis***
Acyrthosiphon solani (Kaltenbach)
Brachycaudus helichrysi (Kaltenbach)
Calceolaria corymbosa
Neomyzus circumflexus (Buckton)*
Calendula arvensis
Myzus persicae (Sulzer)
Calystegia japonica
Myzus persicae (Sulzer)
Campanula punctata
Dactynotus neocampanulae Takahashi
Campanula sp.
Dactynotus kikioensis (Shinji)*
Dactynotus neocampanulea Takahashi
Cannabis sativa
Diphorodon cannabis (Passerini)
Capsella bursa-pastoris
var. ***triangularis***
Myzus persicae (Sulzer)
Carex rhynchophysa
Juncomyzus floris, sp. n.
Carex spp.
Vesiculaphis cephalata, sp. n.
Carpesium triste
Acyrthosiphon solani (Kaltenbach)
Carpinus laxiflora
Unisitobion corylicola (Shinji)
Carthamus tinctorius
Dactynotus gobonis (Matsumura)
Castanea crenata
Macrosiphum kuricola Matsumura*
Celosia cristata
Myzus persicae (Sulzer)
Centaurea cyanus
Acyrthosiphon solani (Kaltenbach)
Cercidiphyllum japonicum
Acyrthosiphon cercidiphylli (Matsumura)
Cercis chinensis
Acyrthosiphon solani (Kaltenbach)
Chaenomeles sinensis
Myzus persicae (Sulzer)
Chaenomeles speciosa
Myzus malisuctus Matsumura
Chenopodium album var. ***centrorubrum***
Hayhurstia atriplicis (Linné)
Myzus persicae (Sulzer)
Chrysanthemum japonense
Macrosiphoniella sanborni (Gillette)
Chrysanthemum morifolium
Macrosiphoniella sanborni (Gillette)
Macrosiphoniella yomogicola (Matsumura)
Chrysanthemum nipponicum
Macrosiphoniella yomogifoliae (Shinji)

Chrysanthemum ornatum
Macrosiphoniella sanborni (Gillette)
Chrysanthemum spp.
Acyrthosiphon solani (Kaltenbach)
Coloradoa rufomaculata (Wilson)
Chrysosplenium flagelliferum
Taiwanomyzus chrysosplenii, sp. n.
Cineraria renifolia
Neomyzus circumflexus (Buckton)*
Cinnamomum burmiarius
Sinomegoura citricola (van der Goot)*
Cinnamomum camphora
Sinomegoura citricola (van der Goot)
Cinnamomum japonicum
Sinomegoura citricola (van der Goot)
Cinnamomum zeylanicum
Sinomegoura citricola (van der Goot)*
Cirsium aomorense
Capitophorus elaeagni (del Guercio)
Cirsium japonicum
Acyrthosiphon vandenboshi (Hille Ris Lambers)
Capitophorus cirsiiphagus Takahashi
Capitophorus elaeagni (del Guercio)
Capitophorus montanus Takahashi
Dactynotus cephalonopli Takahashi
Macrosiphum naazamii Shinji*
Cirsium kamtschaticum
Acyrthosiphon cirsicola (Takahashi)
Capitophorus elaeagni (del Guercio)
Dactynotus cephalonopli Takahashi
Dactynotus giganteus (Matsumura)
Cirsium spp.
Acyrthosiphon cirsicola (Takahashi)
Acyrthosiphon solani (Kaltenbach)
Acyrthosiphon vandenboshi (Hille Ris Lambers)
Capitophorus cirsiiphagus Takahashi
Capitophorus elaeagni (del Guercio)
Dactynotus cephalonopli Takahashi
Dactynotus giganteus (Matsumura)
Citrus aurantium
Sinomegoura citricola (van der Goot)*
Clematis apiifolia
Macrosiphum clematifoliae Shinji
Myzus persicae (Sulzer)
Myzus varians Davidson
Clematis terniflora var. ***robusta***
Myzus varians Davidson
Clematis spp.
Macrosiphum clematifoliae Shinji
Myzus clematophilus Takahashi
Myzus varians Davidson
Clerodendron japonicum
Myzus persicae (Sulzer)
Clethra barbinervis
Matsumuraja rubifoliae (Takahashi)
Clinopodium gracile
Eumyzus clinopodii Takahashi
Clinopodium sp.
Chaitomyzus hirticornis Takahashi**
Codonopsis lanceolata
Acyrthosiphon codonopsis, sp. n.
Meguroleucon codonopsicola, sp. n.
Compositae
Myzus malisuctus (Matsumura)*
Ovatus compositae Takahashi
Conandron ramondioides
Jacksonia conandri (Takahashi)
Convallaria keiskei
Acyrthosiphon watanabei, sp. n.
Coriaria japonica
Macrosiphum coriariae Shinji*
Cornus brachypoda
Macrosiphum cornifoliae Shinji*
Cornus kousa
Macrosiphum cornifoliae Shinji
Corydalis heterocarpa var. ***japonica***
Longicaudinus corydalisicola (Tao)
Corydalis incisa
Acyrthosiphon solani (Kaltenbach)
Corydalis ophiocarpa
Neomyzus circumflexus (Buckton)
Corydalis spp.
Acyrthosiphon solani (Kaltenbach)
Neomyzus circumflexus (Buckton)
Corylopsis pauciflora
Acyrthosiphon magnoliae (Essig et Kuwana)
Corylus heterophylla var. ***thunbergii***
Unisitobion corylicola (Shinji)*
Corylus sieboldiana
Unisitobion corylicola (Shinji)
Corylus sieboldiana var. ***brevirostris***
Unisitobion corylicola (Shinji)
Crepidiastrum lanceolatum
Myzus lactucicola Takahashi*
Cryptotaenia japonica
Acyrthosiphon solani (Kaltenbach)
Cavariella japonica (Essig et Kuwana)
Cavariella oenanthi (Shinji)
Cavariella salicicola (Matsumura)
Galiaphis cryptotaeniae Takahashi
Myzus persicae (Sulzer)
Semiaphis heraclei (Takahashi)

Cucumis sativus
Acyrthosiphon solani (Kaltenbach)
Cyclamen europeanum
Neomyzus circumflexus (Buckton)*
Cydonia oblonga
Ovatus crataegarius (Walker)
Dahlia pinnata
Acyrthosiphon solani (Kaltenbach)
Datula alba
Myzus persicae (Sulzer)
Daucus carota
Brachycolus dauci (Shinji)*
Semiaphis heraclei (Takahashi)
Dendropanax trifidus
Cavariella gilibertiae Takahashi
Deutzia crenata
Myzus philadelphi Takahashi
Neoceruraphis deutziae (Hille Ris Lambers)
Rhopalosiphoninus deutzifoliae (Shinji)
Deutzia gracilis
Acyrthosiphon magnoliae (Essig et Kuwana)
Deutzia spp.
Rhopalosiphoninus celtifoliae Shinji
Diervilla middendorffiana
Rhopalosiphoninus celtifoliae Shinji
Digitaria adscendens
Kaochiaoja pollinae (Shinji)
Macrosiphum rubiphila Takahashi
Micromyzodium spinulosum, sp. n.
Dryopteris austriaca
Utamphorophora filicis Miyazaki
Dryopteris monticola
Macromyzus woodwardiae (Takahashi)
Dystaenia ibukiensis
Cavariella japonica Takahashi
Eccoilopus cotulifer
Macrosiphum yasumatsui Moritsu*
Elaeagnus pungens
Capitophorus elaeagni (del Guercio)
Elaeagnus umbellata
Capitophorus elaeagni (del Guercio)
Capitophorus javanicus Hille Ris Lambers
Elaeagnus spp.
Capitophorus elaeagni (del Guercio)
Capitophorus javanicus Hille Ris Lambers
Myzus gumi Shinji*
Enkianthus campanulatus
Akkaia polygoni Takahashi
Enkianthus spp.
Akkaia polygoni Takahashi
Erigeron annuus
Acyrthosiphon solani (Kaltenbach)
Myzus persicae (Sulzer)
Eugenia densiflora
Sinomegoura citricola (van der Goot)*
Euonymus alatus form. ***ciliatodentatus***
Myzus komaumii Shinji*
Euonymus japonicus
Acyrthosiphon magnoliae (Essig et Kuwana)
Myzus persicae (Sulzer)
Euonymus sieboldianus
Acyrthosiphon magnoliae (Essig et Kuwana)
Euonymus tanakae
Myzus persicae (Sulzer)
Eupatorium chinense var. ***sachalinense***
Acyrthosiphon solani (Kaltenbach)
Brachycaudus helichrysi (Kaltenbach)
Eupatorium chinense
var. ***simplicifolium***
Acyrthosiphon solani (Kaltenbach)
Brachycaudus helichrysi (Kaltenbach)
Eupatorium spp.
Brachycaudus helichrysi (Kaltenbach)
Euphorbia helioscopia
Myzus persicae (Sulzer)
Eurya japonica
Sinomegoura citricola (van der Goot)
Euscaphis japonica
Indomegoura indica (van der Goot)*
Fagopyrum esculentum
Macrosiphum euphorbiae (Thomas)*
Fatoua villosa
Myzus fatouae Shinji*
Macrosiphoniella kuwakusae Uye*
Festuca rubra
Macrosiphum akebiae Shinji
Ficus obscura
Sinomegoura citricola (van der Goot)*
Filipendula camtschatica
Acyrthosiphon solani (Kaltenbach)
Amphorophora filipendulae, sp. n.
Fragaria ananassa
Chaetosiphon fragaefolii (Cockerell)
Chaetosiphon minor (Forbes)
Galium spurium var. ***echinospermon***
Myzus persicae (Sulzer)
Galium spp.
Myzus cerasi (Fabricuius)
Geranium erianthum
Cryptaphis geranicola (Shinji)
Geranium thunbergii
Cryptaphis geranicola (Shinji)
Geranium spp.
Cryptaphis geranicola (Shinji)

Geum calthifolium var. ***nipponicum***
Acyrthosiphon shinanonus, sp. n.
Macrosiphum euphorbiae (Thomas)
Myzus persicae (Sulzer)
Gilibertia pellucidopunctata
Cavariella gilibertiae Takahashi
Gladiolus gandavensis
Dysaphis tulipae (Boyer)
Macrosiphum akebiae Shinji
Glechoma hederacea var. ***grandis***
Acyrthosiphon glechomae Takahashi
Gloxinia digitaliflora
Neomyzus circumflexus (Buckton)*
Gnaphalium spp.
Capitophorus gnathalifoliae Shinji*
Heliotrops laevis
Neomyzus circumflexus (Buckton)*
Hemerocallis middendorffii
Indomegoura indica (van der Goot)
Hemerocallis spp.
Indomegoura indica (van der Goot)
Myzus hemerocallis Takahashi
Hemistepta lyrata
Capitophorus elaeagni (del Guercio)
Heracleum dulce
Cavariella konoi Takahashi
Cavariella sapporoensis Takahashi
Heracleum moellendorffii
Cavariella heraclei Takahashi
Cavariella nipponica Takahashi
Paramyzus heraclei Börner
Heracleum spp.
Semiaphis heraclei (Takahashi)
Hibiscus mutabilis
Myzus persicae (Sulzer)
Hieracium umbellatum
Dactynotus picridis (Fabricius)
Hosta montana
Acyrthosiphon solani (Kaltenbach)
Humulus japonicus
Phorodon japonensis Takahashi
Hydrangea macrophylla
var. ***thunbergii***
Rhopalosiphoninus hydrangeae (Matsumura)
Hydrangea paniculata
Rhopalosiphoninus hydrangeae (Matsumura)
Illicium anisatum
Polytrichaphis fragilis, sp. n.
Impatiens balsamina
Impatientinum impatiens (Shinji)*
Impatiens noli-tangere
Eumyzus gallicola Takahashi
Eumyzus impatiensae (Shinji)
Hydronaphis impatiens Shinji
Impatientinum balsamines (Kaltenbach)
Semiaphis moiwaensis Takahashi
Impatiens textori
Eumyzus impatiensae (Shinji)
Hydronaphis impatiens Shinji
Impatientinum impatiens (Shinji)
Ipomoea batatas var. ***edulis***
Myzus persicae (Sulzer)
Ipomoea indica
Myzus persicae (Sulzer)
Iris japonica
Acyrthosiphon magnoliae (Essig et Kuwana)
Iris spp.
Dysaphis tulipae (Boyer de Fonscolombe)
Ischaemum aristatum
Macrosiphum akebiae Shinji
Juncus effusus
Juncomyzus floris, sp. n.
Juncomyzus obscurus Hille Ris Lambers
Justicia procumbens var. ***leucantha***
Carolinaia justiciae Shinji
Kalimeris yomena
Acyrthosiphon asteris (Takahashi)
Acyrthosiphon solani (Kaltenbach)
Macrosiphoniella sanborni (Gillette)
Macrosiphoniella yomenae Shinji
Myzus asteriae Shinji
Kerria japonica
Acyrthosiphon magnoliae (Essig et Kuwana)
Acyrthosiphon solani (Kaltenbach)
Labiatae
Ovatus nipponicus Takahashi
Lactuca raddeana
Dactynotus fuchuensis (Shinji)*
Lactuca scariola var. ***sativa***
Dactynotus formosanus (Takahashi)
Myzus lactucicola Takahashi
Lagerstroemia indica
Acyrthosiphon magnoliae (Essig et Kuwana)
Acyrthosiphon solani (Kaltenbach)
Myzus persicae (Sulzer)
Sinomegoura citricola (van der Goot)
Lamium album var. ***barbatum***
Acythosiphon solani (Kaltenbach)
Cryptomyzus taoi Hille Ris Lambers
Laportea bulbifera
Hydronaphis laporteae, sp. n.
Lasianthus spp.
Sinomegoura citricola (van der Goot)*
Lastrea querpaertensis

Amphorophora ampullata Buckton
Amphorophora scabripes Miyazaki

Lathyrus davidii
Megoura japonica (Matsumura)*

Lathyrus japonicus
Acyrthosiphom pisum (Harris)
Megoura japonica (Matsumura)

Leersia spp.
Semiaphis montana van der Goot

Lespedeza bicolor
Acyrthosiphon solani (Kaltenbach)
Megoura lespedezae (Essig et Kuwana)

Lespedeza cyrtobotrya
Megoura lespedezae (Essig et Kuwana)

Lespedeza spp.
Megoura brevipilosa, sp. n.
Megoura lespedezae (Essig et Kuwana)

Leucothoe grayana var. ***oblongifolia***
Acyrthosiphon vaccinii Hille Ris Lambers

Ligustrum ibota
Acyrthosiphon ibotum (Essig et Kuwana)

Ligustrum obtusifolium
Acyrthosiphon ibotum (Essig et Kuwana)

Ligustrum spp.
Acyrthosiphon ibotum (Essig et Kuwana)

Lilium auratum
Amphorophora lilicola Shinji*

Lilium lancifolium
Acyrthosiphon solani (Kaltenbach)
Amphorophora lilicola Shinji*

Limonium wrightii
Staticobium loochooense (Takahashi)

Lindera erythrocarpa
Acyrthosiphon muradachi (Shinji)

Lindera sericea
Acyrthosiphon linderae (Shinji)

Lindera strychnifolia
Acyrthosiphon magnoliae (Essig et Kuwana)

Lindera umbellata
Acyrthosiphon muradachi (Shinji)

Litsea spp.
Sinomegoura citricola (van der Goot)

Lonicera chamissoi
Amphicercidus japonicus (Hori)

Lonicera gracilipes
Semiaphis heraclei (Takahashi)*

Lonicera japonica
Trichosiphonaphis lonicerae (Uye)

Lonicera morrowii
Amphicercidus japonicus (Hori)
Neorhopalomyzus lonicericola (Takahashi)
Trichosiphonaphis horii, nom. n.

Lonicera spp.
Trichosiphonaphis lonicerae (Uye)

Lycium chinense
Acyrthosiphon magnoliae (Essig et Kuwana)
Myzus persicae (Sulzer)

Maesa japonica
Acyrthosiphon magnoliae (Essig et Kuwana)

Magnolia denudata
Myzus persicae (Sulzer)

Magnolia kobus
Acyrthosiphon magnoliae (Essig et Kuwana)

Malus baccata var. ***mandshurica***
Myzus malisuctus Matsumura

Malus halliana
Acyrthosiphon magnoliae (Essig et Kuwana)
Myzus persicae (Sulzer)

Malus pumila var. ***domestica***
Myzus malisuctus Matsumura
Ovatus crataegarius (Walker)*

Malus sieboldii
Myzus malisuctus Matsumura

Malva rotundifolia
Macrosiphum malvicola Matsumura*

Malva sylvestris var. ***mauritiana***
Myzus persicae (Sulzer)

Medicago sativa
Acyrthosiphon kondoi Shinji
Acyrthosiphon pisum (Harris)

Melastoma spp.
Acyrthosiphon solani (Kaltenbach)

Mentha spp.
Acyrthosiphon solani (Kaltenbach)
Cryptaphis menthae Takahashi
Ovatus nipponicus Takahashi

Microstegium vimineum
Kaochiaoja pollinae (Shinji)
Macrosiphum rubiphila Takahashi
Semiaphis montana van der Goot

Murraya exotica
Sinomegoura citricola (van der Goot)*

Musa basjoo
Sinomegoura citricola (van der Goot)

Nepeta subsessilis var. ***yezoensis***
Acyrthosiphon nepetifolii (Miyazaki)

Oenanthe javanica
Cavariella oenanthi (Shinji)

Oenanthe spp.
Cavariella aegopodii (Scopoli)
Cavariella salicicola (Matsumura)

Orixa japonica
Acyrthosiphon magnoliae Essig et Kuwana

Myzus kusaki Shinji*

Osmanthus aurantiacus var. ***thunbergii***
Acyrthosiphon magnoliae (Essig et Kuwana)

Osmorhiza aristata
Semiaphis heraclei (Takahashi)

Osmunda claytoniana
Micromyzus osmundae Takahashi

Osmunda japonica
Utamphorophora filicis Miyazaki

Oxalis martiana
Myzus persicae (Sulzer)

Paederia scandens var. ***mairei***
Acyrthosiphon esakii (Takahashi)
Acyrthosiphon nipponicum (Essig et Kuwana)

Paederia scandens var. ***maritima***
Acyrthosiphon nipponicum (Essig et Kuwana)

Paeonia lactiflora
Myzus persicae (Sulzer)

Parabenzoin praecox
Acyrthosiphon muradachi (Shinji)

Parabenzoin trilobum
Acyrthosiphon muradachi (Shinji)

Parthenocissus tricuspidata
Myzus parthenocissi Takahashi

Perilla frutescens var. ***crispa***
Acyrthosiphon perillae (Shinji)
Eomyzus nipponicus (Moritsu)*

Perilla spp.
Eomyzus nipponicus (Moritsu)

Petasites japonicus
Macrosiphoniella grandicauda Takahashi et Moritsu
Macrosiphum petasitis Matsumura*

Petasites japonicus subsp. ***giganteus***
Acyrthosiphon solani (Kaltenbach)

Phaseolus mungo var. ***subtilobata***
Macrocaudus phaseoli Shinji*

Philadelphus satsumi
Acyrthosiphon solani (Kaltenbach)
Myzus philadelphi Takahashi

Philadelphus spp.
Myzus philadelphi Takahashi

Photinia glabra
Sinomegoura photiniae (Takahashi)

Physalis alkekengi
Myzus physaliae Shinji*

Phytolacca esculenta
Acyrthosiphon phytolaccae (Miyazaki)

Picea jezoensis
Elatobium momii (Shinji)*

Picris hieracioides var. ***glabrescens***
Dactynotus picridis (Fabricius)
Dactynotus sonchi (Linné)

Pieris japonica
Akkaia polygoni Takahashi
Sinomegoura citricola (van der Goot)

Pilea hamaoi
Myzus fatouae Shinji
Myzus pileae Takahashi

Pisum spp.
Acyrthosiphon pisum (Harris)

Plantago camtschatica
Nectarosiphon obako Shinji*

Plantago spp.
Dysaphis plantaginea (Passerini)

Platanus acerifolia
Macrosiphum akebiae Shinji

Platycodon grandiflorum
Dactynotus kikioensis (Shinji)*
Dactynotus neocampanulae Takahashi

Plectranthus inflexus
Cryptaphis menthae Takahashi
Myzus plectranthi Shinji*
Myzus siegesbeckiae Takahashi

Plectranthus longitubus
Cryptaphis menthae Takahashi
Anuraphis floris Monzen*

Plectranthus trichocarpus
Myzus siegesbecikae Takahashi

Plectranthus spp.
Myzus isodonis (Takahashi)
Myzus siegesbeckiae Takahashi

Poa acroleuca
Macrosiphum akebiae Shinji

Poaceae
Macrosiphum yasumatsui Moritsu

Polygonatum falcatum
Acyrthosiphon magnoliae (Essig et Kuwana)
Acyrthosiphon solani (Kaltenbach)

Polygonum cuspidatum
Macchiatiella itadori (Shinji)

Polygonum fagopyrum
Macchiatiella itadori (Shinji)

Polygonum longisetum
Capitophorus javanicus Hille Ris Lambers
Trichosiphonaphis polygoni (van der Goot)
Trichosiphonaphis polygonifoliae (Shinji)

Polygonum multiflorum
Myzus persicae (Sulzer)

Polygonum perfoliatum
Trichosiphonaphis ishimikawae (Shinji)

Polygonum persicaria

Capitophorus javanicus Hille Ris Lambers
Myzus persicae (Sulzer)

Polygonum sachalinense
Macchiatiella itadori (Shinji)

Polygonum senticosum
Capitophorus javanicus Hille Ris Lambers

Polygonum thunbergii
Akkaia polygoni Takahashi
Akkaia odaiensis Takahashi
Akkaia taiwana Takahashi*
Myzus kawatabiensis, sp. n.
Trichosiphonaphis polygoniformosana (Takahashi)
Trichosiphonaphis cornuta, sp. n.
Trichosiphonaphis tade (Shinji)

Polygonum tinctorium
Capitophorus javanicus Hille Ris Lambers

Polygonum viscosum
Myzus polygoniyonai Shinji*

Polygonum viviparum
Tricaudatus tuberculatus Hille Ris Lambers et Basu

Polygonum weyrichii
Capitophorus eniwanus, sp. n.

Polygonum spp.
Akkaia polygoni Takahashi
Capitophorus javanicus Hille Ris Lambers
Myzosiphum ryukyuensis Tao*
Trichosiphonaphis polygoniformosana (Takahashi)

Polypodiaceae
Macromyzus woodwardiae (Takahashi)
Macromyzus polypodicola (Takahashi)
Micromyzodium polypodii Takahashi

Poncirus trifoliata
Acyrthosiphon magnoliae (Essig et Kuwana)

Potentilla fruticosa
Myzaphis rosarum (Kaltenbach)

Potentilla spp.
Paramyzus longirostris, sp. n.

Prenanthes tanakae
Hyperomyzus carduellinus (Theobald)

Primula japonica
Acyrthosiphon solani (Kaltenbach)

Primula sinensis
Acyrthosiphon solani (Kaltenbach)

Prunus armeniaca var. ***ansu***
Myzus mumecola (Matsumura)*

Prunus buergeriana
Myzus inuzakurae Shinji

Prunus grayana
Acyrthosiphon solani (Kaltenbach)

Prunus jamasakura
Tuberocephalus sakurae (Matsumura)

Prunus maximowiczii
Tuberocephalus sakurae (Matsumura)

Prunus mume
Brachycaudus helichrysi (Kaltenbach)
Myzus cerasi (Fabricius)
Myzus mumecola (Matsumura)
Myzus persicae (Sulzer)
Phorodon japonensis Takahashi

Prunus persica
Myzus varians Davidson
Tuberocephalus momonis (Matsumura)

Prunus salicina
Brachycaudus helichrysi (Kaltenbach)
Myzus varians Davidson*
Phorodon japonensis Takahashi

Prunus yedoensis
Acyrthosiphon magnoliae (Essig et Kuwana)
Myzus yamatonis, sp. n.

Prunus spp.
Acyrthosiphon solani (Kaltenbach)
Brachycaudus helichrysi (Kaltenbach)
Capitophorus prunifoliae Shinji*
Myzus cerasi (Fabricius)
Myzus mushaensis Takahashi
Myzus yamatonis, sp. n.
Tuberocephalus higansakurae (Monzen)
Tuberocephalus sakurae (Matsumura)
Tuberocephalus sasakii (Matsumura)

Pteridium aquilinum var. ***latiusculum***
Shinjia pteridifoliae (Shinji)

Pyrus spp.
Sappaphis pyri Matsumura

Quercus mongolica var. ***grosseserrata***
Macrosiphum kuricola Matsumura*

Ranunculus japonicus
Macrosiphum akebiae Shinji
Sappaphis ranunculi, sp. n.

Ranunculus spp.
Acyrthosiphon solani (Kaltenbach)
Myzus ranunculinus (Walker)

Raphanus sativus var. ***acanthiformis***
Brevicoryne brassicae (Linné)

Raphiolepis umbellata
Sinomegoura photiniae (Takahashi)

Rhamnus japonica
Macchiatiella itadori (Shinji)

Rhamnus purshiana
Macchiatiella itadori (Shinji)

Rheum undulatum
Dysaphis rumecicola (Hori)

Rhododendron reticulatum
Elatobium itoe (Takahashi)
Rhododendron spp.
Elatobium itoe (Takahashi)
Vesiculaphis caricis (Fullaway)
Vesiculaphis kongoensis Takahashi
Rhus trichocarpa
Juncomyzus niger, sp. n.
Juncomyzus rhois (Takahashi)
Rhus verniciflua
Juncomyzus rhois (Takahashi)
Ribes fasciculatum
Macrosiphum suguri Shinji*
Ribes grossularia
Cryptomyzus ribis (Linné)*
Ribes japonicum
Hyperomyzus lactucae (Linné)
Ribes sativum
Cryptomyzus ribis (Linné)*
Ribes sinanense
Myzus ribis Shinji*
Ribes spp.
Cryptomyzus ribis (Linné)
Macrosiphum suguri Shinji*
Rorippa indica
Acyrthosiphon magnoliae (Essig et Kuwana)
Lipaphis erysimi (Kaltenbach)
Myzus ascalonicus Doncaster
Myzus persicae (Sulzer)
Rosa multiflora
Macrosiphum ibarae Matsumura
Macrosiphum rubiphila Takahashi
Rosa rugosa
Acyrthosiphon porosus (Sanderson)
Chaetosiphon coreanus (Paik)
Longicaudus trirhodus (Walker)
Macrosiphum mordvilkoi Miyazaki
Myzus japonensis Miyazaki
Rosa spp.
Acyrthosiphon porosus (Sanderson)
Longicaudus trirhodus (Walker)
Macrosiphum ibarae Matsumura
Rubia akane
Macrosiphum rubifoliae Shinji*
Rubus hirsutus
Acyrthosiphon solani (Kaltenbach)
Matsumuraja rubifoliae (Takahashi)
Rubus idaeus var. ***aculeatissimus***
Amphorophora amurensis Mordvilko
Matsumuraja rubi (Matsumura)
Matsumuraja taisetsusana, sp. n.
Rubus palmatus
Matsumuraja nuditerga Hille Ris Lambers
Matsumuraja rubifoliae (Takahashi)
Matsumuraja rubiphila Takahashi
Rubus parvifolius
Macrosiphum akebiae Shinji
Rubus peltatus
Matsumuraja sorini Takahashi
Rubus rosaefolius var. ***maximowiczii***
Acyrthosiphon rubiformosanus (Takahashi)
Matsumuraja rubifoliae (Takahashi)
Rubus trifidus
Amphorophora ichigo Shinji*
Rubus spp.
Acyrthosiphon rubiformosanus (Takahashi)
Amphorophora amurensis (Mordvilko)
Macrosiphum rubiphila Takahashi
Matsumuraja nuditerga Hille Ris Lambers
Matsumuraja rubea Sorin*
Matsumuraja rubi (Matsumura)
Matsumuraja rubifoliae (Takahashi)
Matsumuraja rubiphila Takahashi
Rumex crispa
Dysaphis rumecicola (Hori)*
Rumex japonicus
Dysaphis rumecicola (Hori)
Myzus persicae (Sulzer)
Rumex spp.
Acyrthosiphon solani (Kaltenbach)
Dysaphis rumecicola (Hori)
Rumohra mutica
Macromyzus woodwardiae (Takahashi)
Salix babylonica
Cavariella salicicola (Matsumura)
Salix eriocarpa
Acyrthosiphon magnoliae (Essig et Kuwana)
Cavariella salicicola (Matsumura)
Salix integra
Cavariella aegopodii (Scopoli)
Salix kinuyanagi
Cavariella nipponica Takahashi
Salix koriyanagi
Cavariella konoi Takahashi
Salix miyabeana
Cavariella salicicola (Matsumura)
Salix rorida
Cavariella konoi Takahashi
Salix sachalinensis
Aspidophorodon salicis, sp. n.
Cavariella nipponica Takahashi
Salix sieboldiana
Cavariella nipponica Takahashi
Salix subfragilis

Cavariella salicicola (Matsumura)

Salix spp.
Cavariella aegopodii (Scopoli)
Cavariella araliae Takahashi
Cavariella japonica (Essig et Kuwana)
Cavariella konoi Takahashi
Cavariella nipponica Takahashi
Cavariella salicicola (Matsumura)
Cavariella takahashii Hille Ris Lambers*

Salvia nipponica
Myzus yamatonis, sp. n.

Sambucus sieboldiana
Acyrthosiphon magnoliae (Essig et Kuwana)

Sanguisorba officinalis
Acaudus sanguisorbae Shinji*

Sapium japonicum
Acyrthosiphon magnoliae (Essig et Kuwana)

Saussurea spp.
Dactynotus saussureae Takahashi

Saxifraga spp.
Myzus asamensis Takahashi**

Semiaquilegia adoxoides
Acyrthosiphon solani (Kaltenbach)

Senecio vulgaris
Brachycaudus helichrysi (Kaltenbach)

Senecio spp.
Acyrthosiphon solani (Kaltenbach)
Brachycaudus helichrysi (Kaltenbach)

Siegesbeckia glabrescens
Myzus siegesbeckiae Takahashi**

Siegesbeckia pubescens
Myzus siegesbeckicola Strand

Smilax china
Impatientinum impatiens (Shinji)
Macrosiphum smilacifoliae Takahashi

Solanum tuberosum
Acyrthosiphon solani (Kaltenbach)
Macrosiphum euphorbiae (Thomas)
Myzus persicae (Sulzer)

Solidago virga-aurea var. ***asiatica***
Dactynotus amamianus (Takahashi)
Dactynotus lactucicola (Strand)

Solidago virga-aurea var. ***gigantea***
Dactynotus amamianus (Takahashi)
Dactynotus lactucicola (Strand)

Sonchus brachyotis
Anuraphis cardui Shinji*
Dactynotus sonchi (Linné)

Sonchus oleraceus
Dactynotus formosanus (Takahashi)
Hyperomyzus carduellinus (Theobald)
Hyperomyzus lactucae (Linné)

Sonchus spp.
Dactynotus formosanus (Takahashi)

Sorbaria sorbifolia var. ***stellipila***
Unisitobion sorbi (Matsumura)

Sorbus commixta
Sorbaphis chaetosiphon Shaposhnikov

Spinacia oleracea
Myzus persicae (Sulzer)

Spuriopimpinella calycina
Semiaphis heraclei (Takahashi)

Stachyurus praecox
Jacksonia japonica (Takahashi)

Staphylea bumalda
Indomegoura indica (van der Goot)
Indomegoura nigrotibiae (Tao)

Stauntonia hexaphylla
Macrosiphum akebiae Shinji

Stellaria aquatica
Macrosiphum akebiae Shinji

Stellaria spp.
Acyrthosiphon solani (Kaltenbach)
Myzus ascalonicus Doncaster
Myzus stellariae Takahashi

Stephanandra tanakae
Acyrthosiphon magnoliae (Essig et Kuwana)

Syringa emodi
Acyrthosiphon syringae (Matsumura)

Syringa reticulata
Acyrthosiphon syringae (Matsumura)

Syringa reticulata var. ***mandschurica***
Macrosiphum malvicola Matsumura*

Syringa vulgaris
Acyrthosiphon syringae (Matsumura)

Taraxacum officinale
Dactynotus taraxaci (Kaltenbach)

Taraxacum spp.
Acyrthosiphon solani (Kaltenbach)
Dactynotus taraxaci (Kaltenbach)

Tetrapanax papyriferus
Cavariella araliae Takahashi
Cavariella nigrocaudata Takahashi

Thalictrum aquilegifolium
Longicaudus trirhodus (Walker)

Thalictrum minus
Longicaudus trirhodus (Walker)

Thalictrum spp.
Acyrthosiphon solani (Kaltenbach)
Longicaudus trirhodus (Walker)

Tilia japonica
Rhopalosiphoninus tiliae (Matsumura)

Tilia maximowicziana
Rhopalosiphoninus tiliae (Matsumura)

Torilis japonica
Semiaphis heraclei (Takahashi)
Trachycarpus fortunei
Sinomegoura citricola (van der Goot)*
Trifolium pratense
Acyrthosiphon kondoi Shinji
Acyrthosiphon pisum (Harris)
Acyrthosiphon solani (Kaltenbach)
Macrosiphum akebiae Shinji
Nearctaphis bakeri (Cowen)
Trifolium repens
Acyrthosiphon kondoi Shinji
Acyrthosiphon pisum (Harris)
Trifolium spp.
Acyrthosiphon kondoi Shinji
Triticum aestivum
Macrosiphum akebiae Shinji
Trochodendron aralioides
Elatobium trochodendri Takahashi
Tulipa gesneriana
Acyrthosiphon solani (Kaltenbach)
Dysaphis tulipae (Boyer de Fonscolombe)
Macrosiphum akebiae Shinji
Macrosiphum euphorbiae (Thomas)
Myzus persicae (Sulzer)
Umbelliferae
Elatobium taisetsusanum, sp. n.
Urtica platyphylla
Acyrthosiphon carnosus (Buckton)
Acyrthosiphon solani (Kaltenbach)
Myzus dycei Carver
Urtica thunbergiana
Myzus dycei Carver
Vaccinium japonicum
Acyrthosiphon vaccinii (Hille Ris Lambers)
Veratrum maackii var. ***japonicum***
Acyrthosiphon solani (Kaltenbach)
Veratrum spp.
Hyadaphis veratri Shinji*
Veronica sibirica
Acyrthosiphon solani (Kaltenbach)
Viburnum awabuki
Sinomegoura citricola (van der Goot)
Viburnum dilatatum
Shinjia pteridifoliae (Shinji)
Viburnum erosum
Shinjia pteridifoliae (Shinji)
Viburnum japonicum
Shinjia pteridifoliae (Shinji)*
Viburnum opulus var. ***calvescens***
Acyrthosiphon solani (Kaltenbach)
Viburnum spp.
Phorodon viburni Matsumura*
Vicia angustifolia var. ***segetalis***
Acyrthosiphon pisum (Harris)
Megoura japonica (Matsumura)
Vicia cracca
Megoura japonica (Matsumura)*
Vicia faba
Amphorophora vicicola Shinji*
Megoura japonica (Matsumura)
Vicia unijuga
Megoura japonica (Matsumura)
Viola spp.
Myzus ascalonicus Doncaster
Weigela coraeensis
Micromyzus diervillae (Matsumura)
Weigela hortensis
Acyrthosiphon solani (Kaltenbach)
Micromyzus diervillae (Matsumura)
Rhopalosiphoninus celtifoliae Shinji
Weigela japonica
Micromyzus diervillae (Matsumura)*
Youngia japonica
Dactynotus formosanus (Takahashi)
Myzus lactucicola Takahashi
Zanthoxylum ailanthoides
Myzus xanthomelii Shinji*

Literature

Aizenberg, E. E. 1935. New genera and new species of Aphididae. Bull. Stat. Biol. Bolchevo Livraison 78: 151–160 (in Russian).

Baker, A. C. 1920. Generic classification of the hemipterous family Aphididae. Bull. U. S. Dept. Agric. Washington 826: 1–109.

Blanchard, E. E. 1944. Descriptiones y anotaciones de aphidoideos argentinos. Act. Zool. Lilloana 2: 15–62.

Bodenheimer, F. S. *et E. Swirski* 1957. *The Aphidoidea of the Middle East. 378 pp.*

Börner, C. 1930. Beiträge zur einem neuen System der Blattläuse. 1. Mitteilung. Arch. Klass. Phyl. Ent. 1: 115–194.

———— 1931. Mitteilungen über Blattläuse. Anz. Schädlingsk. 7: 8–11 & 128–130.

———— 1933. Kleine Mitteilungen über Blattläuse. 4 pp.
———— 1939. Neue Gattungen und Arten der mitteleuropäischen Aphidenfauna. Arb. Phys. Angew. Ent. 6(1): 75–83.
———— 1950. Neue europäische Blattlausarten. 19 pp.
———— 1952. Die Blattläuse Mitteleuropas. Namen, Synonyme, Wirtspflanzen, Generationszyklen. Schr. Thuring. LandArbGemeinsch. Heilpflanzenk. Weimar 4: 1–488.
Boyer de Fonscolombe, M. 1841. Descriptions des pucerons qui se trouvent aux environs d'Aix. Ann. Soc. Ent. France 10: 157–198.
Buckton, G. B. 1876–1879. Monograph of the British Aphides. Vol. I, 190 pp. (1876); Vol. II, 193 pp. (1879).
Calilung, V. J. 1967. A faunistic study of Philippine aphids (Aphididae, Homoptera). Philippine Agriculturist 51: 93–170.
Carver, M. 1961. A new species of *Myzus* Passerini (Homoptera: Aphididae) from Australia. Proc. R. Ent. Soc. London 30 (5–6): 69–71.
Cockerell, T. D. A. 1901. A new plant-louse injuring strawberry plants in Arizona. Canad. Ent. 33: 101.
Coquerel, C. 1859. Note sur quelques insects de Madagascar et de Bourbon. Ann. Soc. Ent. France (3) 7: 259–260.
Cottier, W. 1953. Aphids of New Zealand. Bull. N. Z. Dept. Sci. Industr. Res., Wellington 106: xi + 382 pp.
Cowen, J. H. 1895. Preliminary list of Hemiptera of Colorado, Aphididae. Agr. Exp. St., Colorado State Agr. Coll. Bull. 3 (Tech. Ser. 1): 115–124.
Das, B. 1918. The Aphididae of Lahore. Mem. Indian Mus. 6(4): 135–274.
Davidson, W. M. 1912. Aphid notes from California. J. Econ. Ent. 5: 404–413.
Davis, J. J. 1914. New or little known species of Aphididae. Canad. Ent. 46: 226–236.
Doncaster, J. P. 1946. The shallot aphis, *Myzus ascalonicus* sp. n. Proc. R. Ent. Soc. London (B) 15: 27–31.
———— 1961. Francis Walker's aphids. 165 pp.
Eastop, V. F. 1955. Two new species and two new subgenera of *Micromyzus* v. d. G. from East Africa (Hem., Aphididae). Ent. Mon. Mag. 91: 203–206.
———— 1958. A study of the Aphididae of East Africa. 126 pp.
———— 1961. A study of the Aphididae of West Africa. 93 pp.
———— 1966. A taxonomic study of Australian Aphidoidea (Homoptera). Australian J. Zool. 14: 399–592.
Essig, E. O. 1936. California Aphididae. New cloudy-veined species. Pan. Pac. Ent. 11: 156–162.
Essig, E. O. et S. I. Kuwana 1918. Some Japanese Aphididae. Proc. California Acad. Sci. 4th ser. 8: 35–112.
Fabricius, J. C. 1775. Systema Entomologiae. 832 pp.
Forbes, J. W. 1884. The strawberry plant-lice. Illinois State Ent. Rept. 13: 98–104.
Fullaway, D. T. 1910. Synopsis of Hawaiian Aphidae. Hawaii Agr. Exp. St. Rept. (1909): 20–46.
Ghosh, A. K. 1969. New aphids (Insecta: Homoptera) from north Bengal, India. Proc. Zool. Soc., Calcutta 22: 121–127.
Ghosh, A. K. et D. N. Raychaudhuri 1968. Aphids (Insecta: Hemiptera) of Sikkim. Proc. Zool. Soc., Calcutta 21: 179–195.
Gillette, G. P. 1908. New species of Colorado Aphididae, with notes upon their life-habits. Canad. Ent. 40: 17–20 & 61–68.
Gillette, G. P. et M. A. Palmer 1932–1934. The Aphidae of Colorado. Part II, Ann. Ent. Soc. America 25: 369–496 (1932); part III, ibid. 27: 133–255 (1934).
Goot, P. van der 1912. Über einige noch nicht oder nur unvollstandig beschriebenen Blattlausarten's Gravenhage. Tijdschr. Ent. 55: 58–96.

———— 1913. Zur Systematik der Aphiden. Tijdschr. Ent. 56: 69–155.
———— 1915. Beiträge zur Kenntnis der holländischen Blattläuse. viii + 600 pp.
———— 1916. On some undescribed aphides from the collection of the Indian Museum. Rec. Indian Mus. 12: 1–4.
———— 1917 a. Notes on some Indian aphides. Rec. Indian Mus. 13: 175–183.
———— 1917 b. Zur Kenntnis der Blattläuse Javas. Contr. faun. Indes Néerl. 1(3): 1–301.
Guercio, G. del 1894. Frammenti di osservazioni sulla storia naturale di un *Myzus* trovato sull *Elaeagnus* e sulla distinzione delle forme di *Myzus ribis* L. descritte fin qúi. Nat. Sicil. 13: 189–199.
———— 1909. Intorno ad un nuovo genere ed a tre note specie di afidi dei *Rhamnus*. Riv. Pat. Veg. 4: 1–5.
———— 1911 a. Intorno ad alcuni afidi della Penisola Iberica e di altre localita, raccolti dal Prof. J. S. Tavares. Redia 7: 296–333.
———— 1911 b. Intorno a due genera di afidi americani. Redia 7: 462–464.
———— 1913. Generi e specie nuove di afidi o nuovi per la fauna italiana. Redia 9: 169–196.
———— 1917. Contribuzione alla conoscenza degli afidi. Redia 12: 197–277.
———— 1921. Specie nuove e nuovi generi per l'afidofauna italica. Redia 14: 107–136.
Harris, M. 1776. Aphis Althaea. Exposit. Eng. Ins. p. 66.
Heinze, K. 1960–1961. Systematik der mitteleuropäischen Myzinae mit besonderer Berücksichtigung der im Deutschen Entomologischen Institut befindlichen Summlung Carl Börner (Homoptera: Aphidoidea–Aphididae). Beitr. Ent. 10: 744–842 (1960) & 11: 24–96 (1961).
Hille Ris Lambers, D. 1938–1953. Contribution to a monograph of the Aphididae of Europe. I, Temminckia 3: 1–44 (1938); II, ibid. 4: 1–134 (1939); III, ibid. 7: 179–319 (1947); IV, ibid. 8: 182–323 (1949); V, ibid. 9: 1–176 (1953).
———— 1948. On Palestine aphids, with descriptions of new subgenera and new species (Homoptera: Aphididae). Trans. R. Ent. Soc. London 99: 269–289.
———— 1952. New aphids from Sweden. Opusc. Ent. 17: 51–58.
———— 1965 a. On some Japanese Aphididae. Tijdschr. Ent. 108 (7): 189–203.
———— 1965 b. *Nippodysaphis* nom. nov. for *Neodysaphis* Hille Ris Lambers. Tijdschr. Ent. 108 (12): 389.
———— 1967. A new species of *Aulacorthum* Mordvilko (Homoptera: Aphididae) from Japan. Ent. Bericht. 27 (1, VII): 132–134.
———— 1969. Two new aphids from Switzerland (Aphididae, Homoptera). Mitt. Schweiz. Ent. Ges. 42 (4): 294–304.
———— 1970. The genus *Nearctaphis* Shaposhnikov, 1950. I. Koninkl. Nederl. Akademie van Wetenschappen, Amsterdam, Proc. ser. C 73 (1): 48–74.
Hille Ris Lambers, D. et A. N. Bsau 1966. Some new or little known genera, subgenera, species and subspecies of Aphididae from India (Homoptera: Aphididae). Ent. Bericht. 26 (1, I): 12–20 & 27–36.
Hille Ris Lambers, D. et J. P. Rogerson 1946. A new British aphid from *Prunus padus* L., *Myzus padellus* sp. n. Proc. R. Ent. Soc. London (B) 15 (9–10): 101–105.
Hori, M. 1926. Studies on *Macrosiphum matsumuraeanum* sp. n. Rept. Hokkaido Agr. Exp. St. 17: 51–83 (in Japanese).
———— 1927. Some new aphids from Hokkaido. Ins. Mats. 1 (4): 188–201.
———— 1929. Studies on the noteworthy species of plant-lice in Hokkaido. Rept. Hokkaido Agr. Exp. St. 23: 1–163 (in Japanese).
———— 1938. Aphids infesting *Lonicera Morrowii* Asa Gray in Hokkaido, with description of a new species (studies on Aphididae of the northern part of Japan II). Ins. Mats. 12 (4): 160–165.

Hottes, F. C. et T. H. Frison 1931. The plant lice, or Aphididae, of Illinois. Bull. Illinois Nat. Hist. Surv. 19: 121-447.
Inouye, M. 1939. On eight conifer aphids occurring in Hokkaido. Ins. Mats. 13(4): 132-142.
———— 1941. Beiträge zur Kenntnis der Koniferen-läuse, vorkommend in nordlichen teil Japans. Bull. Hokkaido Forest Exp. St. 33: 4-36.
Jacob, F. H. 1946. A new British species of *Myzaphis* associated with wild roses, *Myzaphis bucktoni* sp. n.; and a comparison with *M. rosarum* (Kaltenbach) (Hemiptera: Aphididae). Proc. R. Ent. Soc. London 15(9-10): 110-117.
Kaltenbach, J. H. 1843. Monographie der Familien der Pflanzenläuse (Phytophthieres). XLIII +223 pp.
———— 1846. Fünf neue Species aus der Familie der Pflanzenläuse. Stett. Ent. Zeit. 7: 169-175.
———— 1856-1862. Die deutschen Phytophagen aus der Klasse der Insekten. Verh. Naturh. Ver. Preuß. Rheinl. 13: 165-265 (1856) & 19: 1-106 (1862).
Kanakaraj David, S. 1958. A new genus and three new species of aphids form India. Indian J. Ent. 20(3): 175-180.
Knowlton, G. F. 1946. Aphids from Mt. Timpanogos, Utah. II. Great Basin Naturalist 7(1-4): 1-6.
Knowlton, G. F. et C. F. Smith 1936. Rose insects. Utah Acad. Sci. 13: 263-267.
Koch, C. L. 1855. Die Pflanzenläuse Aphiden. pp. 135-236.
Leonard, M. D. 1963. A list of aphids of New York. Proc. Rochester Acad. Sci. 10(6): 289-432.
Linné, C. 1758. Systema Naturae 10th ed. pp. 451-455.
———— 1761. Fauna Suecica, 2nd ed. pp. 258-264.
———— 1767. Systema Naturae 12th ed. pp. 733-739.
MacGillivray, M. E. 1958. A study of the genus *Masonaphis* Hille Ris Lambers, 1939 (Homoptera, Aphididae). Temminckia 10: 1-131.
———— 1959. Some aphids from Bermuda. Canad. Ent. 91(10): 638-641.
———— 1963. The yellow rose aphid, *Rhodobium porosum* (Sanderson) (Homoptera: Aphididae), on strawberry. Canad. Ent. 95(8): 892-896.
Mason, P. W. 1925. A revision of the insects of the aphid genus *Amphorophora*. Proc. U. S. Nat. Mus. 67(20): 1-92.
———— 1927. Fauna Sumatrensis. Suppl. Ent. 15: 86-90.
Matsumura, S. 1917. A list of the Aphididae of Japan, with description of new species and genera. J. Coll. Agr., Tohoku Imp. Univ. 7(6): 351-414.
———— 1918. New Aphididae of Japan. Trans. Sapporo Nat. Hist. Soc. 7(1): 1-22.
Miyazaki, M. 1966. Description of a new species of the genus *Dactynotus* Rafinesque from Japan and other notes (Homoptera: Aphididae). Ins. Mats. 29(1): 37-40.
———— 1968a. Two new species of the genus *Aulacorthum* Mordvilko from Japan (Homoptera: Aphididae). Ins. Mats. 30(2): 125-128.
———— 1968b. On three aphids of *Rosa rugosa* occurring in Japan with description of a new species. Kontyû 36(3): 274-284.
———— 1968c. A revision of the fern aphids of Japan with descriptions of three new species (Homoptera: Aphididae). Ins. Mats. 31(3): 13-24.
Monzen, K. 1927. New gall producing aphids at Morioka. Bull. Sci. Res. Alumni Assoc. Morioka Coll. Agr. Forest. 4: 1-24 (in Japanese).
———— 1929. Studies on some gall producing aphids and their galls. Saito Ho-on Kai Monogr. 1: 1-80.
———— 1934. Some contributions to the knowledge of the new and recorded species of the gall producing aphids. Bull. Sci. Res. Alumni Assoc. Morioka Coll. Agr. Forest. 9: 13-34.
Mordvilko, A. 1901. Zur Biologie und Morphologie der Pflanzenläuse. II. Horae Soc. Ent.

Ross. 33: 162–1012 (in Russian).
———— *1914–1919.* Faune de la Russie, Insecta: *Hemiptera. 1: 1–236 (1914); 2: 237–*508 (1919) (in Russian).
———— (in Filipjev, J. N.) 1928. Keys for the identification of Russian insects. (Aphidoidea: pp. 163–204, in Russian).
Moritsu, M. 1944. An unknown host-plant of the grain aphid, *Macrosiphum granarium* (Kirby). Mushi 16(2): 5–6.
———— 1945. Notes on strawberry aphids in Japan. Mushi 16(3): 7–10 (in Japanese).
———— 1946a. Notes on *Shinjia pteridifoliae* Shinji. Matsumushi 1(2): 94–96 (in Japanese).
———— 1946b. Notes on *Macrosiphum rosae ibarae* Matsumura and *M. rosae* (Linné). Mushi 17(2): 5–7 (in Japanese).
———— 1947. Four gall-forming aphids on cherry trees in Japan. Mushi 18(6): 39–48.
———— 1948. The genus *Megoura* Buckton in Japan, with a note on the variation of the external characters in *Megoura viciae japonica* (Matsumura). Mushi 18(13): 83–88.
———— 1949a. Descriptions of two new or a little known speciesof root-aphids from Japan. Ins. Mats. 17(1): 11–16.
———— 1949b. The genus *Macrosiphoniella* del Guercio in Japan. Mushi 19(11): 53–63.
———— 1950a. Notes on two *Elaeagnus*-aphids in Japan. Bull. Fac. Agr., Yamaguchi Univ. 1: 1–6.
———— 1950b. Notes on *Aulacorthum pelargonii* (Kaltenbach) and *A. solani* (Kaltenbach) (Aphididae). Bull. Fac. Agr., Yamaguchi Univ. 1: 7–10 (in Japanese).
———— 1952. The fern aphids in Japan. Bull. Fac. Agr., Yamaguchi Univ. 2: 26–28.
———— 1956. Notes on the galls of cherry aphids. Bull. Fac. Agr., Yamaguchi Univ. 7: 293–294.
———— 1957. The genus *Matsumuraja* Schumacher in Japan, with a description of the stem-mother of *M. rubifoliae* (Takahashi) (Hemiptera, Aphididae). Bull. Fac. Agr., Yamaguchi Univ. 8: 633–636.
———— 1958a. Aphididae of Mt. Hikosan, Kyushu. Mushi 31(10): 79–86.
———— 1958b. An unknown species of bulb aphid from Japan. Bull. Fac. Agr., Yamaguchi Univ. 9: 923–926.
Müller, F. P. et S. E. Schöll 1958. Some notes on the aphid fauna of South Africa. J. Ent. Soc. S. Africa 21: 382–414.
Narzikulov, M. N. 1957. New plant lice (Homoptera, Aphididae) from the mountain region of Tadjikistan. Ent. Obozr. 36(3): 671–694 (in Russian).
Nevsky, V. P. 1928. The plant-lice of Middle-Asia. I. Subtribe Macrosiphina. Ent. Mitteilungen 17(13): 182–199.
———— 1929. The plant-lice of Middle-Asia. III. Zool. Anz. 82: 197–228.
Oestrund, O. W. 1887. Synopsis of the Aphididae of Minnesota. Geol. Nat. Hist. Survey Minnesota, Bull. 4: 1–100.
———— 1922. A synoptical key to the Aphididae of Minnesota. State Ent. Minnesota, Rept. 19: 114–151.
Okamoto, H. et R. Takahashi 1927. Some Aphididae from Corea. Ins. Mats. 1(3): 130–148.
Ossiannilsson, F. 1954. Four new Swedish aphids (Hem. Hom.), with description of a new genus. Ent. Tidskr. 75(2–4): 117–127.
Paik, W. H. 1965. Aphids of Korea. 160 pp.
Palmer, M. A. 1952. Aphids of the Rocky Mountain region. Thomas Say Foundation 5: 1–452.
Passerini, G. 1860. Gli Afidi con un prospetto dei generi ed alcune specie nuove Italiane. Parma. 46 pp.
Rafinesque, C. S. 1818. Second memoir on the genus *Aphis*, containing the description of 24 new American species. Amer. Mon. Mag. 1818: 15–18.

Richards, W. R. 1963. The Myzaphidines of Canada (Homoptera: Aphididae). Canad. Ent. 95(7): 680–704.
Sanderson, E. D. 1901. Report of the Entomologist. Ann. Rept. Delaware Col. Agr. Expt. St. 12: 142–211.
Schaefers, G. A. 1960. A systematic study on the strawberry aphid complex (*Pentatrichopus* spp.). Ann. Ent. Soc. America 53(6): 783–792.
Schouteden, H. 1901. Le genre *Siphonophora* C. Koch. Ann. Soc. Ent. Belgique 45: 111–117.
Schrank, P. 1801. Fauna Bioca 2: 102–139.
Schumacher, F. 1921. Aphidologische Notizen. Zool. Anz. 53: 181–186.
Scopoli, J. A. 1763. Entomologica Californica exhibiens Insecta Carnioliae indigena et distributa in ordines, genera, species, varietates. Methodo Linnaeana Vindovonae 36+420 pp.
Shaposhnikov, G. Ch. 1950. Systematic relationships between genera of the subtribe Anuraphidea. Ent. Obozr. 31(1, 2): 213–228 (in Russian).
———— 1956. Phyllogentic basis of the classification of Anuraphidina, and their connection with plants. Trud. Zool. Inst. Acad. Nauk. SSSR 23: 215–320 (in Russian).
———— (in Bey-Bienko) 1964. Keys to insects of the European part of the U.S.S.R. Aphidinea. pp. 489–616 (in Russian).
Shinji, O. 1922. New genera and species of Japanese Aphididae. Zool. Mag. 34(406): 729–732 & 34(407): 787–800 (in Japanese).
———— 1923. New aphids from Saitama and Morioka. Zool. Mag. 35(417): 301–309 (in Japanese).
———— 1924. New aphids from Morioka. Zool. Mag. 36(431): 343–372 (in Japanese).
———— 1927. Studies on the germ cells of aphids with special reference to the evolutional significance of the chromosomes. Bull. Morioka Imp. Coll. Agr. Forest. 11: 1–121.
———— 1928a. Three new aphids from Morioka. Zool. Mag. 40(474): 153–155 (in Japanese).
———— 1928b. Supplementary notes on synonymy of aphids. Zool. Mag. 40(471): 55–57 (in Japanese).
———— 1929a. Four new genera of Aphididae from Morioka, Japan. Lansania 1(3): 39–48.
———— 1929b. Some more new genera of Aphidides. Lansania 1(7): 110–112.
———— 1930a. Notes on four new genera of Aphididae. Rept. Japan Assoc. Advance Sci. 5: 187–191 (in Japanese).
———— 1930b. On two species of Japanese Aphididae. Lansania 2(12): 26–29.
———— 1930c. A new record of Aphides for Japan. Lansania 2(13): 48.
———— 1930d. Another new genus of the family Aphididae. Lansania 2(15): 78–80.
———— 1930e. *Illinoia kerriae*, new sp. of the family Aphididae. Lansania 2(19): 137–140.
———— 1930f. *Myzus inuzakurae*, a new Aphidid. Lansania 2(19): 141–144.
———— 1930g. Some new aphidids from north eastern Japan. Lansania 2(20): 151–160.
———— 1932a. Secondary host plants of some Japanese aphids with special reference to the biology of *Anuraphis piricola* Okamoto & Takahashi and descriptions of 2 new aphid genera. Ôyô-Dôbutsugaku-Zasshi 4(3): 118–124 (in Japanese).
———— (in Uchida) 1932b. Nippon Kontyu Zukan 2241 pp.
———— 1933a. A key for distinguishing the Japanese *Macrosiphoniella* (Aphidids) with the descriptions of two new species. Kontyû 7(5, 6): 212–218 (in Japanese).
———— 1933b. Three new species of *Amphorophora*. Zool. Mag. 45(538): 347–351 (in Japanese).
———— 1933c. A list of the Japanese species of *Rhopalosiphoninus* with reference to their distribution. Zool. Mag. 45(538): 363–365 (in Japanese).
———— 1935a. A key for distinguishing the Japanese *Myzus* with description of a new species. Kontyû 9(5): 233–238 (in Japanese).
———— 1935b. A key for distinguishing the Japanese *Macrosiphum* with description of a new species. Kontyû 9(5): 239–243 (in Japanese).
———— 1935c. Notes on *Macrosiphum rosae* (L.) and *M. ibarae* Matsumura. Kontyû 9(5):

244-248 (in Japanese).
———— 1935d. A key for distinguishing the Japanese *Acyrthosiphon* with description of a new species. Kontyû 9(5): 249-253 (in Japanese).
———— 1935e. On the migration of a cherry aphid, *Phorodon sakurae* (Matsumura). Ôyô-Dôbutsugaku-Zasshi 7(6): 291-293 (in Japanese).
———— 1938. A new *Myzus* from north-eastern Japan. Zool. Mag. 50(2): 108-110.
———— 1939a. Two new species of Japanese Aphididae. Kontyû 13(1): 39-41.
———— 1939b. A new species of Japanese *Macrosiphum*. Kontyû Kenkyû 3(1): 1-3 (in Japanese).
———— 1939c. A list of Japanese *Amphorophora* with the descriptions of two new species. Kontyû Kenkyû 3(1): 12-17 (in Japanese).
———— 1941. Monograph of Japanese Aphididae. 1215 pp. (in Japanese).
———— 1942a. A new genera and species of Aphididae. Insect World 46(8): 228-230 (in Japanese).
———— 1942b. 3 new species of *Macrosiphum* from Tokyo. Insect World 46(9): 258-262 (in Japanese).
———— 1942c. On a new species of *Hyadaphis* from Japan. Insect World 46(10): 290-292 (in Japanese).
———— 1942d. A new species of *Macrosiphoniella* from Tokyo, Japan. Insect World 46(11): 322-324 (in Japanese).
———— 1943. A new *Myzus* from Karuizawa, Japan. Insect World 47(2): 34-35 (in Japanese).
———— 1944. Insect galls and gall insects. 580 pp. (in Japanese).
Shinji, O. et T. Kondo 1938. Aphididae of Manchoukuo with the description of two new species. Kontyû 12(2): 55-69.
Sorin, M. 1962. Notes on the aphid, *Shinjia pteridifoliae* Shinji. Kontyû 30(1): 21-26 (in Japanese).
———— 1967. A new species of *Staticobium* from the Loochoos. Kontyû 35(1): 14-16.
Strand, E. 1929. Zoological and palaeontological nomenclatorial notes. Act. Univ. Latviensis 20: 1-29.
Stroyan, H. L. G. 1954. A new subgenus and species of *Myzus* Passerini, 1860 (Hemiptera, Aphididae). Proc. R. Ent. Soc. London (B) 23: 10-16.
———— 1957. The British species of *Sappaphis* Matsumura. I. 59 pp.
———— 1963. The British species of *Dysaphis* Börner (*Sappaphis* auctt. nec Mats.). II. 119 pp.
———— 1969. Notes on some species of *Cavariella* del Guercio, 1911 (Homoptera: Aphidoidea). Proc. R. Ent. Soc. London (B) 38(1, 2): 7-19.
Suenaga, H. 1934, A new *Akkaia* (Aphididae) from Japan. Trans. Kagoshima Imp. Coll. Agr. Forest. 4(13): 11-13 (in Japanese).
Sulzer, J. H. 1776. Abgekürzte Geschichte der Insecten. Aphiden. 1: 98-105.
Takahashi, R. 1918. Notes on three species of Aphididae. Zool. Mag. 30(359): 368-376 (in Japanese).
———— 1919. On some subaquatic Aphididae, with description of one new genus and species. Insect World 23(12): 439-442 (in Japanese).
———— 1920a. Two new species of Aphididae from Japan. Canad. Ent. 52: 77-78.
———— 1920b. Notes on some aphids. Zool. Mag. 32(380): 194-199 (in Japanese).
———— 1921a. Japanese Aphididae I (published by the author). 30 pp. (in Japanese).
———— 1921-1931. Aphididae of Formosa. Part I, Agr. Exp. St., Govt. Formosa Rept. 20: 1-97 (1921b); part II, Dept. Agr., Govt. Res. Inst. Formosa Rept. 4: 1-173 (1923); part III, ibid. 10: 1-121 (1924); part IV, ibid. 16: 1-65 (1925a); part V, ibid. 22: 1-19 (1927); part VI, ibid. 53: 1-127 (1931).
———— 1922. Two new genera of Aphididae. Proc. Ent. Soc. Washington 24(7, 8): 204-206.

———— 1925b. Some Aphididae of Sumatra (Hemiptera). Deli Exp. St., Medan, Rept. 24: 1-6.
———— 1929. Notes on some Formosan Aphididae. II. Trans. Nat. Hist. Soc. Formosa 19(102): 247-259.
———— 1930a. Some Aphididae of Loochoo. Trans. Nat. Hist. Soc. Formosa 20(111): 317-327.
———— 1930b. List of the aphid genera proposed as new in recent years. Proc. Ent Soc. Washington 32(1): 1-24.
———— 1933. Addition to the aphid fauna of Formosa (Hemiptera), II. Philippine J. Sci. 52: 291-303.
———— 1934. Aphididae of the Oki islands. Fukuoka Hakubutsugaku Zasshi 1(3): 243-247 (in Japanese).
———— 1935. Addition to the aphid fauna of Formosa (Hemiptera), III. Philippine J. Sci. 56(4): 499-507.
———— 1936. Some Aphididae from South China and Hainan. I. Lingnan Sci. J. 15(4): 595-606.
———— 1937a. Addition to the aphid fauna of Formosa (Hemiptera), IV. Philippine J. Sci. 63: 1-19.
———— 1937b. Some Aphididae from South China and Hainan, II. Lingnan Sci. J. 16(2): 199-208.
———— 1937c. Some oriental Aphididae, 2. Konowia 16(1): 90-96.
———— 1938a. Two new species of Aphididae from South China. Trans. Nat. Hist. Soc. Formosa 28: 340-344.
———— 1938b. List of the aphid genera proposed in recent years (Hemiptera). Tenthredo 2(1): 1-18.
———— 1939a. Some Aphididae from Hokkaido. Ins. Mats. 13(4): 114-128.
———— 1939b. A new species of Aphididae from the Island of Loochoo. Biogeographica (Trans. Biogeogr. Soc. Japan) 3(2): 115-117.
———— 1941. Some Aphididae and Coccidae from Manchuria. Kontyû 15(1): 7-12.
———— 1959. On the aphid, *Matsumuraja rubifoliae* Takahashi (Aphididae, Homoptera). Trans. Shikoku Ent. Soc. 6(4): 55-58.
———— 1960a. Four new genera of Aphididae from Japan. Kontyû 28(4): 223-229.
———— 1960b. *Elatobium* of Japan (Aphididae, Homoptera). Akitu 9(2): 37-39.
———— 1961a. Some species of *Capitophorus* of Japan (Aphididae, Homoptera). Trans. Shikoku Ent. Soc. 7(1, 2): 1-4.
———— 1961b. A new genus and four new species of Aphididae from Japan. Ins. Mats. 24(2): 104-111.
———— 1961c. The aphid genus *Akkaia* of Japan (Homoptera). Pub. Ent. Lab., Coll. Agr., Univ. Osaka Pref. 7: 11-14.
———— 1961d. Three new genera of the subfamily Aphidinae from Japan (Aphididae, Homoptera). Bull. Univ. Osaka Pref. (B) 11: 1-10.
———— 1961e. *Cavariella* of Japan (Aphididae, Homoptera). Bull. Univ. Osaka Pref. (B) 12: 1-11.
———— 1962. Key to Japanese species of *Dactynotus*, with descriptions of four new species (Aphididae, Homoptera). Kontyû 30(2): 73-81.
———— 1963. *Eumyzus*, *Paramyzus*, *Macromyzus*, *Sitomyzus*, *Micromyzus* and *Micromyzodium* of Japan (Homoptera: Aphididae). Ins. Mats. 26(1): 55-63.
———— 1964. *Macrosiphum* of Japan (Aphididae). Kontyû 32(3): 353-359.
———— 1965a. *Myzus* of Japan (Aphididae). Mushi 38(9): 43-78.
———— 1965b. Some species of *Aulacorthum* of Japan (Aphididae: Homöptera). Ins. Mats. 27(2): 99-113.
———— 1965c. Some new and little-known Aphididae from Japan (Homoptera). Ins.

Mats. 28(1): 19-61.
Takahashi, R. et M. Moritsu 1963. Key to Japanese species of *Macrosiphoniella*, with descriptions of four species from Japan and Formosa (Aphididae, Homoptera). Mushi 37(1): 1-11.
Takahashi, R. et M. Sorin 1965. *Matsumuraja* of Japan (Aphididae, Homoptera). Bull. Univ. Osaka Pref. (B) 17: 51-57.
Tao, C. C. 1962. Revision of Chinese Aphinae. Plant Protect. Bull. Taiwan 4(3): 95-110.
———— 1963. Revision of Chinese Macrosiphinae (Aphidae, Homoptera). Plant Protect. Bull. Taiwan 5(3): 162-205.
———— 1964-1967. Monograph of Chinese aphids. Ann. Rept. Taiwan Mus. 7: 104-147 (1964a), 8: 36-74 (1965), 9: 1-28 (1966) & 10: 1-28 (1967) (in Chinese).
———— 1964b. Some new and unrecorded aphids from Ryukyu Islands. Quart. J. Taiwan Mus. 17(3, 4): 227-235.
Theobald, F. V. 1912. A new strawberry Aphis. Entomologist 45: 223-224.
———— 1915-1920. African Aphididae. Part II, Bull. Ent. Res. 6: 103-153 (1915); part IV, ibid. 11(1): 65-72 (1920).
———— 1922. An aphid genus and species new to Britain. Ent. Mon. Mag. 58: 137-138.
———— 1923a. Aphides on the yellow horned-poppy. Ent. Mon. Mag. 59: 102-106.
———— 1923b. A new genus and two new species of aphides from Ross-Shire. Scot. Nat. 1923: 19-20.
———— 1926-1929. The plant lice or Aphididae of Great Britain. Vol. I, ix + 372 pp. (1926); vol. II, 411 pp. (1927); vol. III, 364 pp. (1929).
Thomas, C. 1878. A list of the species of the tribe Aphidini, family Aphidae, found in the United States, which have been heretofore named, with descriptions of some new species. Illinois State Lab. Nat. Hist., Bull. 1(2): 3-16.
Tseng, S. et C. C. Tao 1936. A list of the Aphididae of China with descriptions of four new species. Ent. & Phytopath. 4(7-9): 120-176.
———— ———— 1938. New and unrecorded aphids of China. J. West China Border Res. Soc. 10: 195-224.
Uye, K. 1923. New species of Japanese Aphididae. Insect World 27(1): 3-5 (in Japanese).
———— 1924. New species of Aphididae and Pemphigidae. Insect World 28(12): 408-411 (in Japanese).
———— 1925. The morphology and the life history of *Vesiculaphis caricis* (Fullaway). Insect World 29(8): 254-260 (in Japanese).
Verma, K. D. 1966. A new aphid genus from north-western India (Homoptera: Aphididae). Indian J. Ent. 28(4): 507-509.
Walker, F. 1848. Description of aphides. Zoologist 6: 2217-2221 & 2246-2252.
———— 1849-1850. Descriptions of Aphides. Ann. Mag. Nat. Hist. 2nd ser. 4: 41-48 (1849a); ibid. 5: 14-28, 269-281 & 388-395 (1850a); ibid. 6: 41-48 & 118-122 (1850a).
———— 1849-1850. Descriptions of new British Aphides. Zoologist 7: appendix XXXI-XL & XLIII (1849b); ibid. 8: appendix CII-CIV (1850b).
———— 1852. List of the specimens of Homopterous insects in the collection of the British Museum, IV Aphidina. pp. 276-1065.
———— 1868. Notes on Aphides. Zoologists 2nd ser. 3: 1048-1053, 1118-1123, 1296-1301, & 1328-1335.
Wilson, H. F. 1908. The green aphis of the Chrysanthemum, *Aphis rufomaculata* n. sp. Ent. News 19: 261-262.
———— 1910. A key to the genera of the subfamily Aphidinae and notes on synonymy. Ann. Ent. Soc. America 3: 314-325.

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Errata

P. 13, line 21 from top, replace colon with semicolon; p. 31, line 5 from bottom, for "D*actynotus*" read "*Dactynotus*"; p. 32, line 8 from top, for "Swirsky" read "Swirski"; p. 43, line 16 from top, for "*Nectarosiphon mitsubautsugi*" read "*Nectarosiphum mitsubautsugii*"; p. 50, explanation of the figure, top, for "*brovipilosa*" read "*brevipilosa*"; p. 52, line 11 from top, for "*Acrohychia*" read "*Acronychia*"; p. 63, line 19 from top, for "examined." read "examined:"; p. 86, line 11 from bottom, for "*arclifolii*" read "*arclifoliae*"; p. 92, lines 1 and 2 from top, put "a" behind "from"; p. 99, bottom, for "*congoensis*" read "*kongoensis*"; p. 100, lines 1, 2 and 5 from top, for "*congoensis*" read "*kongoensis*"; p. 106, line 8 from top, for "leaves" read "the leaf"; p. 109, line 22 from top, for "vii" read "vi"; p. 111, explanation of the figure, bottom, put "6," before "mesosternal"; p. 114, between lines 8 and 9 from bottom, insert "Distribution: Japan."; p. 116, line 7 from bottom, eliminate a parenthesis before "=*Myzus*"; p. 118, line 4 from top, for "*Plantago*" read "*Ranunculus*"; p. 131, top, for "Tibia" read "Tibiae"; p. 136, line 15 from top, for "elswhere" read "elsewhere" and line 19 from top, eliminate "has"; p. 139, line 6 from top, eliminate comma behind "Nijôsan"; p. 162, line 22 from top, for "(ab-)domianl" read "(ab-)dominal" and line 14 from bottom, replace colon with semicolon; p. 163, line 16 from top, for "supplemnt" read "supplement"; p. 168, line 14 from top, for deformationts" read "deformations" and line 15 from bottom, for "*berbridis*" read "*berberidis*"; p. 178, line 19 from bottom, for "detailes" read "details"; p. 182, line 5 from bottom, for "*Oenaethe*" read "*Oenanthe*"; p. 190, line 3 from top, for "*atripricis*" read "*atriplicis*"; p. 193, line 2 from top, for "(ex *Prunus mume*)." read "(ex *Prunus mume*); "; p. 199, line 16 from top, for "pear" read "pears"; p. 222, line 13 from bottom, for "Bsau" read "Basu"; p. 223, line 4 from top, for "teil" read "Teil"; p. 224, line 16 from top, for "speciesof" read "species of"; p. 226, line 16 from bottom, for "1934," read "1934."; p. 233, between lines 20 and 21 from bottom, insert "Eomacrosiphon Hille Ris Lambers 37"; p. 234, line 17 from top, for "Pentatrichoups" read "Pentatrichopus"; p. 245, line 24 from bottom, for "79" read "**79**".