



Title	Thoracaphis and some related new genera of Japan (Aphididae, Homoptera)
Author(s)	Takahashi, Ryoichi
Citation	Insecta matsumurana, 22(1-2), 7-14
Issue Date	1958-10
Doc URL	http://hdl.handle.net/2115/9628
Type	bulletin (article)
File Information	22(1-2)_p7-14.pdf



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THORACAPHIS AND SOME RELATED NEW GENERA OF JAPAN

(Aphididae, Homoptera)

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The genus *Thoracaphis* VAN DER GOOT is represented in Japan by a single species, *T. linderæ* SHINJI, and the remaining Japanese species hitherto assigned to the genus should be removed to other genera. In this paper a redescription is given of the species briefly described by SHINJI and 4 of the related genera are dealt with.

These aphids were probably connected with *Distylium* or its related plants in the past era, and the food plants now known seem to be intermediate hosts, on which only parthenogenetic generations are repeated.

The writer is indebted to Dr. D. HILLE RIS LAMBERS for his examination of some of the material, and to Dr. M. INOUE for his help concerning literature. The writer is also grateful to Messrs. T. TACHIKAWA, S. TAKAGI and M. YAMAMOTO for specimens contributed to this study.

Thoracaphis linderæ SHINJI.

Zool. Mag. Tokyo, XXXVIII, p. 359 (1926); Monogr. Japanese Aphids, p. 1126 (1941).

Apterous viviparous female: Black, dark yellowish brown in cleared specimens. Body subcircular, depressed, sclerotized. Dorsum with small subcircular, oval or polygonal papillae densely scattered over cephalothorax and on basal half of anterior part (tergites I-VII) of abdomen; these papillae much broader than long, rounded at apex, broader than spaces among them; 3 pairs of submedian depressed markings distinct, not blackish; a pair of longitudinal submedian clusters of minute translucent pores on anterior part of cephalothorax, each cluster with about 5 pores; 3 pairs of minute submedian setae on thorax; long setae as shown in the accompanying figure, frontal 4 of which are arising from submarginal area of venter and the mesal 2 are much shorter and thinner. Abdomen short, fused with thorax, but with faint lateral traces of division at base, the anterior part (tergites I-VII) with 5 faint traces of segmentation on median area, angulated and abruptly converging posteriorly on lateral margins, with 6 lateral submarginal setae on each side, the anterior one of which is very long and as large as submarginal ones of cephalothorax, but the remaining 5 minute, fine, hardly visible in some individuals. Eyes of 3 facets, marginal. Antennae submarginal, on venter, shorter than distance between themselves, reaching level

of eye, nearly as long as hind tibia, much shorter than submarginal setae, 3-segmented; segment II nearly as long as wide, not well defined from III; segment III gradually tapering, with a subapical sensorium and an apical seta. Cornicles very small. Cauda pale, short, constricted basally, almost straight at hind margin, with some long setae. Anal plate pale, divided, with some very long setae on each lobe. Genital plate pale, much larger than anal plate, with about 25 long setae along hind margin. Rostrum short, distal segment a little longer than segment III, much longer than tarsus, tapering, about 1.7 times as long as wide; segment V not distinct. Legs concealed under body or a little exposed, tibiae with about 3 subapical setae, one of which is stouter; hind tibiae nearly as long as femur; tarsi well developed, 2-segmented, with normal setae, apical upper and

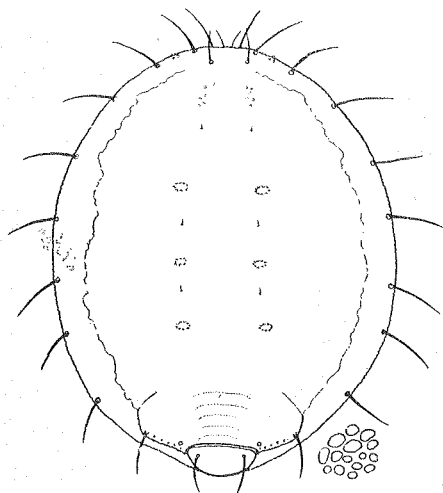


Fig. 1. *Thoracaphis linderiae* SHINJI.

Apterous viviparous female and its dorsal papillae.

middle setae subequal in size, middle upper and apical lower setae wanting in fore and middle tarsi and sometimes in hind tarsi; claws well developed, ungual setae absent. Body 1.8-2 mm. in length.

Food plants: *Benzoin umbellatum*, *Parabenzoin praecox*, *P. trilobum*.

Many apterous forms were taken at Kobe (24. VI. 1956, M. YAMAMOTO), Mt. Takao near Tokyo (2. VI. 1957, S. TAKAGI), and Hikosan, Kyushu (9. V. 1957, S. TAKAGI).

Allothoracaphis n. g.

Apterous viviparous female: Body ovate, depressed, flattened, not strongly

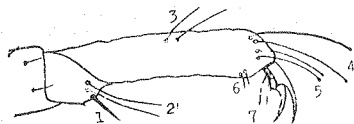


Fig. 2. Chaetotaxy of well developed tarsus of *Thoracaphis* and related genera (diagrammatic).

- (1) Median seta of basal segment (wanting in hind tarsus).
- (2) Lateral setae.
- (3) Middle upper setae.
- (4) Apical upper setae.
- (5) Apical middle setae.
- (6) Apical lower setae.
- (7) Ungual or empodial setae.

sclerotized, with 20 submarginal setae on cephalothorax, 6 of which are between eyes. Abdomen much reduced in size, separated from, but sunken into cephalothorax, the anterior part (tergites I-VII) without submarginal setae; 8th tergite with 4 setae. Dorsum with irregular mosaic-like structures, minutely dentate at margin. Eyes submarginal, with 3 facets. Antennae small, ventral, longer than wide, 3-segmented. Cornicles wanting. Cauda broader than long, constricted basally. Anal plate deeply bilobed. Legs very short, concealed under body, tarsi well developed, 2-segmented, with well developed claws. Marginal area of venter defined.

Genotype: *Thoracaphis piyananensis* TAKAHASHI.

Closely related to *Thoracaphis* VAN DER GOOT, but differs in the absence of cornicles, the abdomen without lateral submarginal setae on the anterior part, and in the presence of irregular mosaic-like structures on the dorsum.

Allothoracaphis piyananensis TAKAHASHI.

Thoracaphis piyananensis TAKAHASHI, Stylops, IV, p. 87 (1935).

Apterous viviparous female: Pale yellow or pale yellowish brown. Dorsum with a narrow median ridge. Antennae much shorter than distance between them, reaching level of eye, segment III nearly as long as hind tarsus, about twice or a little over twice as long as wide, rounded at tip. Cauda and anal plate pale. Genital plate pale, with about 13 setae at broadly rounded hind margin. Rostrum very short, but much longer than wide, stout, blunt at apex, segment V not distinct. Fore tibiae shorter than femur, middle tibiae as long as femur, hind tibiae slightly longer than femur, about thrice as long as tarsus; tarsi with 2 setae on basal segment, and long capitate apical upper and middle setae.

Food plant: *Quercus glauca*, on the lower side of leaf, along the rib.

Very common near Osaka throughout the year, and collected also at Asakawa near Tokyo, Wakayama, Okayama, Beppu and Kagoshima. Hitherto recorded from *Quercus morii* in the mountainous region in Formosa. The alate form is not known.

Dermaphis n. g.

Apterous viviparous female: Body ovate, convex, not depressed, strongly

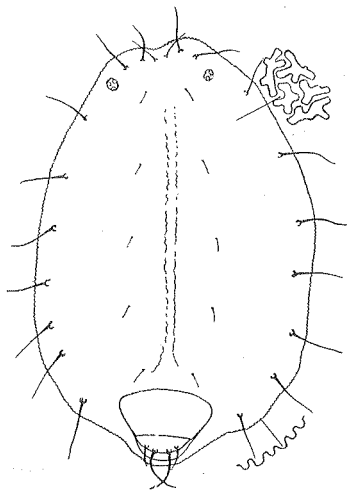


Fig. 3. *Allothoracaphis piyananensis* TAKAHASHI.

Apterous viviparous female.

sclerotized, with 20 marginal setae on cephalothorax, 6 of which are between eyes. Abdomen much reduced in size, separated from cephalothorax, without lateral submarginal setae on anterior part, 8th tergite with 4 setae. Dorsum with irregular mosaic-like structures, which are protuberant and rounded apically. Eyes marginal, with 3 facets. Antennae small, ventral, longer than wide, 3-segmented. Cauda broader than long, constricted basally. Anal plate deeply bilobed. Cornicles wanting. Legs very short, hind legs a little exposed or concealed; tarsi rudimentary, not segmented, without claws and setae. Ventral marginal area not defined.

Genotype: *Dermaphis japonensis* n. sp.

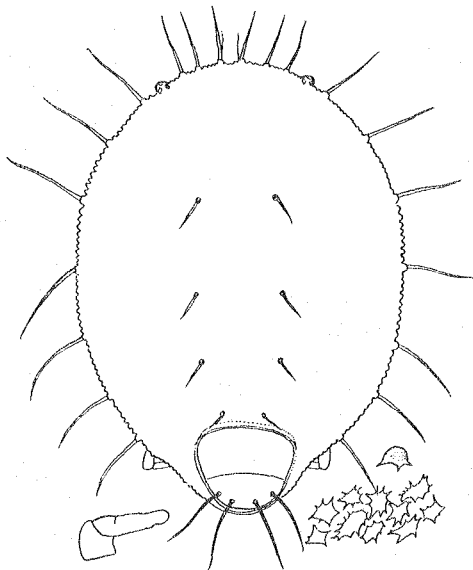


Fig. 4. *Dermaphis japonensis* n. sp.

Apterous viviparous female and its antenna
and dosal mosaic-like structures.

Closely related to *Thoracaphis* VAN DER GOOT, differing, however, in the absence of cornicles, the reduced legs with rudimentary tarsi, and in the abdomen without lateral submarginal setae. Differs from *Allothoracaphis* TAKAH. in the body not depressed, the dorsal mosaic-like structures much protuberant and rounded apically, the rudimentary tarsi, and in the ventral marginal area not defined.

Dermaphis japonensis n. sp.

Thoracaphis takahashii TAKAHASHI (in part), Lingnan Sc. Jl., Canton, XIV,

p. 139 (1935).

Thoracaphis takahashii SHINJI (not STRAND), Monogr. Japanese Aphids, p. 1133 (1941).

Apterous viviparous female: Black, a little covered with a grayish white powder, legs black. Body about 1.3 times as long as wide, densely with protuberant mosaic-like structures over dorsum of cephalothorax. Marginal setae very long, stout; 4 pairs of similar, but shorter dorsal setae on median area of cephalothorax; a pair of slender setae at front. Abdomen more strongly sclerotized, corrugated and without distinct mosaic-like structures on anterior part (tergites I-VII). Eyes distinctly protuberant. Antennae indistinctly 3-segmented. Fore and middle tibiae shorter than femora, hind tibiae longer than femur, about 6 times as long as wide; tarsi reduced in size, but longer than wide, distinctly narrower than tibia, without claws and setae; hind legs entirely concealed under body or a little exposed. Cauda pale, with about 7 long setae. Anal plate pale, with about 5 setae on each lobe. Body 1.1-1.8 mm. in length.

Food plant: *Quercus glauca*, on the branch.

Holotype collected at Tokyo (2. VIII. 1950 R. TAKAHASHI), many paratypes taken at Matsuyama (30. IV. 1957, T. TACHIKAWA), and near Osaka (XI. 1956, V. 1957, R. TAKAHASHI).

This species resembles *Thoracaphis takahashii* STRAND from Formosa, but can be distinguished by the larger marginal setae and by the absence of submarginal setae on the anterior part of abdomen. The apterous females are common throughout the year, but the alate form has not been discovered.

Reticulaphis n. g.

Apterous viviparous female: Body ovate or elliptical, depressed, flattened, strongly sclerotized. Cephalothorax reticulated, without papillae, with 20 long setae on marginal area, 6 of which are between eyes. Abdomen small, separated from cephalothorax, with 6 minute submarginal setae on each side of anterior part (tergites I-VII), 8th tergite with at least a pair of setae. Antennae short, ventral, 2- or 3-segmented. Eyes submarginal, with 2 or 3 facets. Cornicles absent. Cauda much broader than long, constricted basally. Anal plate deeply bilobed. Legs short, hind legs a little exposed; tarsi rudimentary, not segmented, claws rudimentary or atrophied. Ventral marginal area or pleural region defined.

Genotype: *Reticulaphis shiiae* n. sp.

Different from *Thoracaphis* VAN DER GOOT in the dorsum reticulated, lacking papillae, the absence of cornicles, and in the rudimentary tarsi.

Thoracaphis fici TAKAHASHI is to be included here.

Reticulaphis shiiae n. sp.

Apterous viviparous female: Black, legs black. Ovate, about 1.4 times as long as wide. Cephalothorax distinctly reticulated with pale thin lines, with a pair of rounded low tubercles and 3 transverse ridges on median area; 5 pairs of minute setae, a pair of which is nearly between eyes; setae on marginal area

long, stout, pointed, not even at margin, almost colourless, a little curved, a frontal pair of these setae at margin. Dorsum minutely dentate at margin. Abdomen reticulated on anterior part (tergites I-VII); 8th tergite with a pair of long setae. Eyes submarginal, with 2 facets. Antennae much shorter than space between them, nearly as long as fore femur, not reaching level of eye,

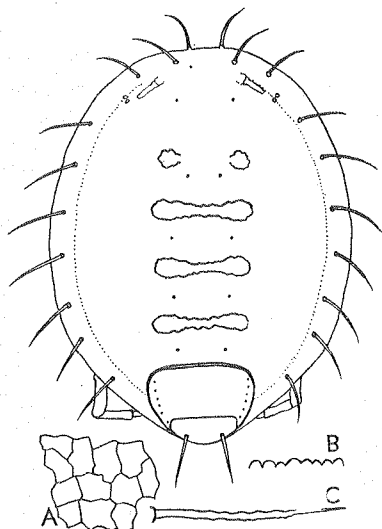


Fig. 5. *Reticulaphis shiiae* n. sp. Apterous viviparous female. (A) Dorsal reticulations. (B) Marginal dentations. (C) Submarginal seta.

indistinctly 3-segmented; segment III 4 times as long as wide, rounded at tip. Cauda and anal plate pale, normal. Legs short, hind legs a little exposed; tibiae shorter than femur, in fore and middle pairs, hind tibiae somewhat longer than femur, shorter than submarginal dorsal setae, nearly 4 times as long as wide, a little expanded apically, without setae; tarsi much narrower than tibia, longer than wide, not segmented. Ventral marginal area defined. Body 0.7-0.9 mm. in length.

Food plant: *Shiia cuspidata*, on the leaf.

Holotype and 2 paratypes were collected at Tokyo (16. VIII. 1949, R. TAKAHASHI).

Closely related to *Thoracaphis fici* TAKAHASHI, but different chiefly in the dorsal setae flagellate and pointed, the antennae a little longer, and in the presence of a pair of setae at the front margin.

Reticulaphis fici foveolatae TAKAHASHI.

Thoracaphis fici TAKAHASHI, var. *foveolatae* TAKAHASHI, Stylops, IV, p. 89 (1935).

Apterous viviparous female: Black, very strongly sclerotized, without wax. Body elliptical, about 1.7 or 1.8 times as long as wide. Cephalothorax with 3 transverse furrows, and 5 pairs of minute setae; submarginal setae flattened, not even at margin, pale, some of these setae a little frayed at tip. Abdomen reticulated on anterior part (tergites I-VII), 8th tergite with 4 setae which are a little smaller than submarginal setae on cephalothorax. Eyes of 2 or 3 facets. Antennae very short, rather stout, segment III twice as long as wide, rounded at tip, with a rudimentary sensorium. Hind tibiae black, expanded at tip; tarsi longer than wide, not segmented, with 2 long fine capitate setae at tip in hind pair, claws rudimentary. A thin translucent line present between dorsum and pleural area. Pleural region with numerous very minute pores which are distinct

in well cleared specimens. Body about 0.5 mm. in length.

Food plant: *Ficus foveolata*, on the foliage.

Collected at Shimonoseki (25. IX. 1949), Enoshima (30. VIII. 1949), Shirahama, Wakayama Prefecture (12. VII. 1955), and Kawachi-Nagano near Osaka (28. IV. 1957) by the writer. Previously known from Formosa. The alate form is not known.

Different from *Thoracaphis mirabilis* TAKAHASHI, which is a member of this genus, chiefly in the absence of large flattened dorsal setae between the eyes.

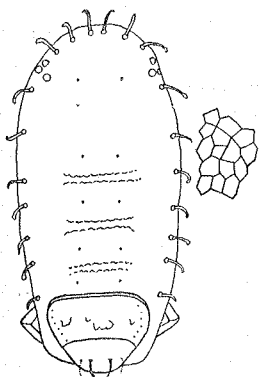


Fig. 6. *Reticulaphis fici foveolatae* TAKAHASHI.

Apterous viviparous female and its dorsal reticulations.

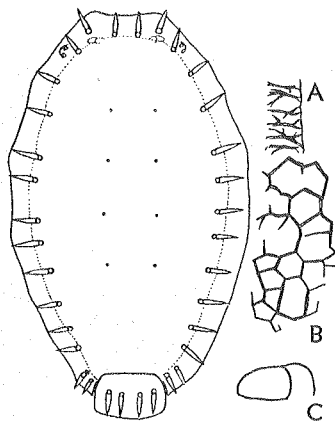


Fig. 7. *Parathoracaphis setigera* TAKAHASHI.

Apterous viviparous female.
(A) Markings on marginal area.
(B) Dorsal reticulations. (C) Antenna.

Parathoracaphis n. g.

Apterous viviparous female: Body rather narrow, flattened, depressed, sclerotized, with stout spine-like setae in a row on submarginal area of dorsum. Anterior part of abdomen entirely fused with cephalothorax, with no trace of division, but 8th tergite separated, with 4 setae. Dorsum reticulated, without papillae. Eyes submarginal, with 3 facets. Antennae very small, on venter, 2-segmented. Cornicles wanting. Cauda small, wider than long, constricted basally. Anal plate deeply bilobed. Legs much reduced in size, concealed under body; tarsi small, but 2-segmented, longer than wide, with small claws. Marginal area of venter defined.

Genotype: *Thoracaphis setigera* TAKAHASHI.

Different from *Thoracaphis* VAN DER GOOT in the anterior part of abdomen entirely consolidated with the cephalothorax, the dorsum wanting papillae, but with spine-like setae on the submarginal area, and in the absence of cornicles.

Thoracaphis kayashimai TAKAHASHI from Malaya and *T. elongata* TAKAHASHI from Thailand are to be assigned to this new genus.

Parathoracaphis setigera TAKAHASHI.

Thoracaphis setigerus TAKAHASHI, Philippine Jl. Sc., XLVIII, p. 72 (1932).

Apterous viviparous female: Black, without wax, strongly sclerotized. Dorsum with 4 pairs of very minute setae on median area of thorax, reticulated, but branched linear markings present on marginal area; 8th tergite broadly rounded at hind margin, reticulated on basal small part, somewhat striate on posterior half except on marginal area. Antennae small, stout, smooth; segment II larger than I, longer than wide, as long as, but stouter than, tarsus. Fore legs reaching antenna, middle legs not reaching hind coxa, hind legs directed posteriorly, but not reaching 8th tergite; tibiae somewhat longer than femur, hind tibiae about 2.5 times as long as tarsus; tarsi distinctly longer than wide, 2-segmented, with claws reduced in size and long fine setae. Body about 0.7 mm. in length.

Food plants: *Quercus glauca*, *Q. myrsinaefolia*, always on the lower sides of foliage.

Collected at Osaka, Amano-Hashidate, Shimonoseki, Fukuoka, Beppu, and Sata, Kagoshima Prefecture. Very common, often occurring in abundance, near Osaka. The apterous forms are found throughout the year, but the alate form has not been detected. Hitherto known from Formosa.