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Preliminary Notes on Thysanoptera in Sapporo and the Vicinity¹⁾

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(With 17 Text-figures and 1 Table)

In spite of their morphological peculiarities and economic importance, the studies on thrips or Thysanoptera have so far relatively been neglected in comparison with those on other insect groups. In Japan, too, no comprehensive work has so far been published except for the serial publications by Kurosawa (1929-1941), the final result of which was compiled in his recent synopsis (1968). Although this work gave the first framework to clarify the thysanopterous fauna of Japan, there are still numerous problems to be solved in taxonomic as well as in biologic and ecologic fields. This is especially true to the fauna of Hokkaido, because most previous studies have chiefly been made with the specimens from Honshu. For this reason, the present writer has carried out a preliminary survey of thrips inhabiting Sapporo and the vicinity, together with some biologic observations, especially on the flower preference as described bloom. The present paper deals with the taxonomic part of this survey, leaving the ecologic part in the next report.

Material and Methods

Most specimens were collected at Bannaguro near Ishikari and the campus of the Hokkaido University, partly also at other localities (Bankei, Maruyama, Tsukisappu, etc.). At collecting, each flower, or in case of composites and clovers, each head was separately packed in a polyethylene tube or bag, and the thrips were extracted in the laboratory. Sweeping on weeds and direct brushing from standing plants were also occasionally applied. Some specimens were discovered on soil. For identification of species and sex, the total slide preparations were made by using Neo-Shigalar medium. Concerning specially dark species, the specimens were left for several hours to one day in 10% caustic potash solution before preparation.

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Up to the present, sixteen species of thrips have been recorded from Hokkaido, thirteen of which were reported mainly by Kurosawa (1968). In the present paper, sixteen species are recorded from Sapporo and the vicinity. Among them three (*Sericothrips gracilicornis*, *Aptinothrips rufus* and *A. stylifera*) are new to Japan, and four (*Taeniothrips distalis*, *T. flavidulus*, *Thrips hawaiiensis* and *Th. nigropilosus*) are new to Hokkaido. Besides these species, three additional species were collected but they are not included in the present paper, because all are represented only by a single specimen and their accurate identification required further studies by using much more specimens. Most specimens recorded below were collected from various flowers. The plants marked with asterisk are those from which numerous specimens were collected and will be discussed in the next report. The specimens taken by sweeping or discovered on soil are shown by "Sweep", and "Soil", respectively. Unless particularly mentioned, the specimens were collected by the writer in 1969. Certain frequently cited localities are abbreviated as follows: Bannaguro (BN), the campus of the Hokkaido University (UC), the Botanical Garden of the Hokkaido University (BG).

Family Aeolothripidae

Aeolothrips Haliday

Aeolothrips fasciatus (Linné)

1761 *Thrips fasciata* Linné, Fauna Svecica: 266.

1926 *Aeolothrips fasciatus* Priesner, Thys. Europas: 105.

Host plants and Specimens examined: *Arabis japonica* (1♀, V-24, 2♀♀, VI-11, BN); *Viola grypoceras* (1♀ & 2♂♂, VI-2, BN); *Trifolium repens* (white clover, 1♀, VI-20, BN; 1♀, VII-21, UC); *Trifolium pratense* (red clover, 1♀ & 1♂, VI-20, 2♀♀, VII-4, 2♀♀ & 1♂, VII-18, 1 larva, VII-31, BN; 1♀ & 1♂, VI-27, UC); *Taraxacum officinale* (European dandelion, 2♂♂, V-24, BN; 3♀♀ & 1♂, V-30-'67, 2♀♀ & 1♂, VI-5-'67, Bankei); *Rosa rugosa**; *Vicia japonica* (3♀♀, VIII-27, 4 larvae, IX-10, BN); *Vicia cracca* var. *japonica* (1 larva, VII-31, BN); *Lathyrus maritimus**.

Family Thripidae

Chirothrips Haliday

Chirothrips manicatus Haliday

1836 *Thrips (Chirothrips) manicata* Haliday, Ent. Mag. 3: 444.

1926 *Chirothrips manicatus* Priesner, Thys. Europas: 138.

Most specimens were found on Graminae but a few were obtained on other plants as the following.

Host plants and Specimens examined: *Taraxacum officinale* (1♀, V-24, BN; 1♀, VI-9, Bankei); *Arabis japonica* (2♀♀, VI-11, BN); *Plantago lanceolata* (1♀, VI-20, BN); *Rosa rugosa* (1♀, VII-18, BN); *Trifolium pratense* (1♀, VI-20, BN; 2♀♀, VII-30, UC; 3♀♀, IX-13, Tsukisappu, S. Mawatari leg.); *Phleum pratense**; *Polypogon monspeliensis* (23♀♀, VII-27, BN); *Miscanthus sinensis* (50♀♀ & 132♂♂, IX-10, BN).

***Sericothrips* Haliday**
***Sericothrips gracilicornis* Williams**

(Figs. 1-5)

1916 *Sericothrips gracilicornis* Williams, The Entomologist 49: 222.

Female (Macropterous): Head and prothorax dark brown. Pterothorax a little lighter. Abdominal segments I to VI brown; segments VII to X dark brown. All coxae dark brown; femora dark brown, tip of fore femora a little lighter; fore tibiae brown, mid and hind tibiae a little darker, except tips; tarsi yellowish brown. Fore wings brown with cross band near base, hyaline about one-seventh of length at middle; hind wings nearly transparent with brown longitudinal vein. Antennae dark brown, first two segments, distinctly paler, and third, paler at base, becoming darker to apex.

Reticulation: Frons, area around ocelli and back of head with transverse striation. A thick, heavily chitinised dorsal band running near posterior lateral margin of head to level of hind margin of eyes. Prothorax covered with a number of transverse dark striations. Striations of abdominal tergites I to VIII, and legs lined with minute setae. Mid-dorsal posterior part of abdominal tergites free from striations and setae. Each abdominal tergite with stout transverse internal thickening near anterior margin.

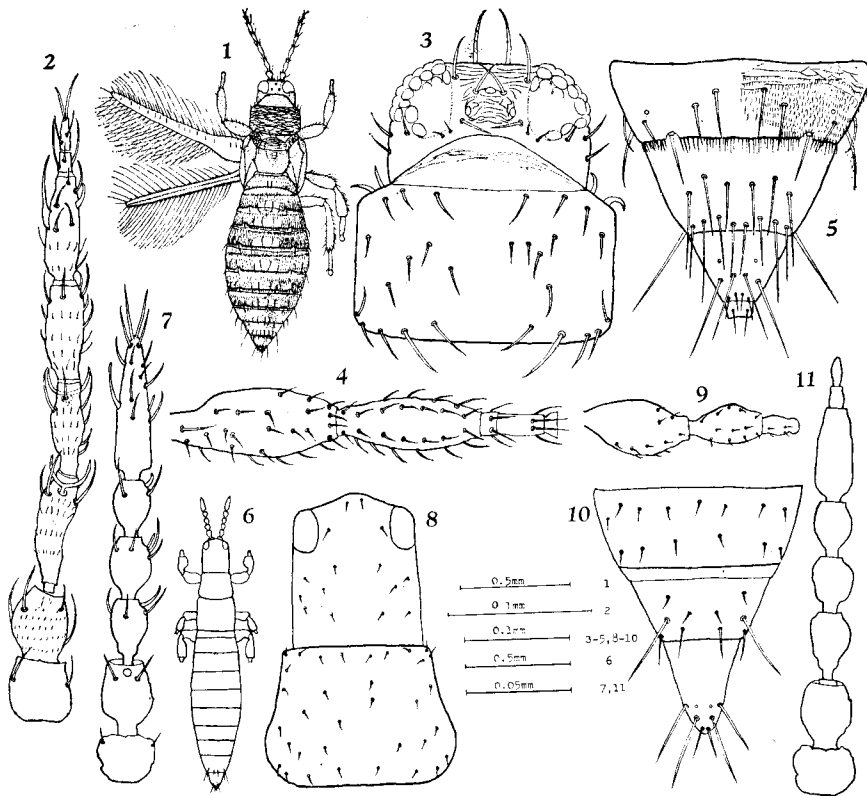
Head (Fig. 3) about 1.6 times as wide as long, and about as long as prothorax. Frons depressed in front of anterior ocelli. Eyes large, projecting slightly on frontal margin; length $72\ \mu$, width $58\ \mu$; distance between eyes $75\ \mu$, about 1.3 times as wide as eye; distance from eye to back of head $42\ \mu$, only a little more than half length of eye. Two stout spines on each side of frons in front of ocelli, one near mid line, length $39\ \mu$, the other near margin of eye, length $33\ \mu$; a stout spine just on each side of anterior ocellus, length $33\ \mu$; one long and two short spines near posterior dorsal angle of eye and three forwardly directed spines on cheeks. Mouth cone reaching end of prosternum. Maxillary palpi three-segmented, with length I, $19-22\ \mu$; II, $10-11\ \mu$; III, $18-21\ \mu$; labial palpi two-segmented, short.

Antennae (Fig. 2) eight-segmented, about 2.9 times as long as head. Segment I short and barrel-shaped; II longer but not so wide, tapering at each end but more distinctly at base; III long and slender, 3.5 times as long as wide, with a pedicel at base; IV shorter than III, about 3.0 times as long as wide; V about 2.6 times as long as wide, widest at middle; VI about as long as IV; VII and VIII short, VIII longer than VII. Forked trichomes dorsally on III and ventrally on IV, and much

shorter simple cones near apices of V and VI externally.

Prothorax (Fig. 3) about 2.3 times as wide as long, about as long as head, two-fifths wider than head. Two stout spines each on anterior and posterior angle of; two pairs on anterior margin; three pairs on posterior margin, longest second spines about 42μ . Pterothorax normal. Legs long and slender; especially fore tibiae short, hind tibiae long, and about 8 times as long as wide. Fore wings about 18 times as long as wide at middle, far wider at base. No trace of a hind vein on fore wings; fore vein represented by a row of spines, 3 at base, followed by 13-16 additional ones; 23 spines on costa.

Abdomen normal, hind margin of tergites II-VIII nearly laterally with fairly



Figs. 1-5. *Sericothrips gracilicornis*. 1. female, dorsal; 2. right antenna; 3. head and prothorax (reticulation of prothorax not shown); 4. right fore leg (reticulation and microsetae not shown); 5. abdominal segments VIII-X.

Figs. 6-10. *Aptinothrips rufus*. 6. female, dorsal; 7. right antenna; 8. head and prothorax; 9. right fore leg; 10. abdominal segments VIII-X. Fig. 11. *Aptinothrips stylifera*, right antenna.

stout spine inset. Along the whole of hind margin of I-VIII tergites each provided with fine comb, not interrupted medially. Hind margin of sternites II-VI furnished with alternate length of fine comb and six long slender inset spines. IX tergite with 14 stout long spines and X with two pairs of spines, as shown in Fig. 5.

Measurements (mm.): Total body length 1.3; head length 0.112-0.117, width 0.188-0.195; prothorax length 0.145-0.155, width 0.258-0.265; pterothorax length 0.260-0.270, width 0.320-0.325; abdomen across at widest part 0.410-0.435; fore wings length about 0.750, width at base 0.107 and at middle 0.041. Antennae 0.330-0.335 in total length, and,

Segment	I	II	III	IV	V	VI	VII	VIII
Length (μ)	25-27	40-42	70-72	55-60	47-49	54-60	11	16
Width (μ)	30-32	29-30	19-21	19-20	18-20	18-20	7	5

Fore femora length 0.150, width 0.066; fore tibiae length including tarsi 0.203, width 0.050; middle femora length 0.164, width 0.052; middle tibiae length including tarsi 0.219, width 0.041; hind femora length 0.218, width 0.050; hind tibiae length including tarsi 0.303, width 0.037. Length of spines; longest on IX abdominal segment about 75 μ ; on X segment 75 μ .

Host plants and Specimens examined: *Lathyrus maritimus* (1♀, VI-11, 1♀, VI-20, BN); *Vicia cracca* var. *japonica* (1♀, VII-18, 1♀, VII-31, BN); Sweep (1♀, VI-11, BN).

Remarks: These five specimens differ from the original description of *S. gracilicornis* in relative length of maxillary palpi 11:5:10 instead of 7:5:6, and number of spines on the outer half of vein 13-16 instead of 16-20, and arrangement of spines on prothorax is also slightly different. But, they are otherwise so similar to the description and figure by Williams, that are tentatively identified with *S. gracilicornis*.

This is the first record of the species from Japan.

This species is incorporated to the key by Kurosawa (1968, p. 20) as follows:

- Body dark brown, abdominal segments V and X yellow; antennal segments I to III yellow, IV to VIII brown, except base of IV and V with light; spines of fore wings, 31 on costa, 33 on fore vein *abdominalis*
 Body dark brown; antennal segments I and II yellow, III to VIII brown, except base of III with yellowish; spines of fore wings, 23 on costa, 13-16 on fore vein *gracilicornis*

***Anaphothrips* Uzel**
***Anaphothrips obscurus* (Müller)**

1776 *Thrips obscurus* Müller, Zool. Dam. Proditorom.: 96.

1895 *Anaphothrips virgo* Uzel, Mon. Ord. Thys.: 148.

1926 *A. obscurus* Priesner, Thys. Europas: 183-187.

This species has so far been recorded from Japan (Hokkaido, Honshu), Europe, North America, Africa, Hawaii, Australia on various Graminae plants.

Host plants and Specimens examined: *Taraxacum officinale* (1♀, micropterous, VIII-14-'67, Urahoro in east Hokkaido); Soil (3♀♀, macropterous, II-18-'68, UC); Sweep (1♀, micropterous, & 5♀♀, macropterous, VI-11, BN); *Plantago lanceolata* (1♀, macropterous, VI-20, BN); *Medicago sativa* (1♀, micropterous, VII-30, UC).

Aptinothrips Haliday

- 1838 *Aptinothrips* Haliday, Ent. Mag.: 445.
 1895 A. Uzel, Mon. Ord. Thys.: 151.
 1926 A. Priesner, Thys. Europas: 156.
 1949 A. Morison, London Nat. suppl. 59: 51.

Body usually small and very slender, bright-coloured. Head longer than wide. Eyes small. Ocelli and wings absent. Spines on body relatively short, especially pronotum without any strong spines. Antennae eight-segmented (style two-segmented) or six-segmented (without style). Pterothorax narrow. Legs short and thick.

This is the first record of the genus from Japan.

This genus is put into Thripinae by Morison and into Chirothripinae by Priesner. Although the present writer is not yet sufficiently qualified to discuss its real affinity, he regards *Aptinothrips* provisionally as a member of Thripinae and close to *Anaphothrips*. On the other hand, Kurosawa (1968) regarded *Anaphothrips* as a member of Sericothripinae, so that, *Aptinothrips* had also to be incorporated into the same subfamily, provided his system should be followed. However, the present writer would like to recognize both genera as belonging to Thripinae, as shown by the following key supplementary to that by Kurosawa (1968, p. 21):

1. (4) Ocelli present but may be represented merely by spots of pigment; wings present or reduced.
2. (3) Antennae apparently nine-segmented owing to false partition across VI segment; prothorax without any strong spines *Anaphothrips*
3. (2) Antennae eight-segmented; postero-angle of prothorax with four long spines *Chaetanaphothrips*
4. (1) Ocelli absent; wings absent; body usually very narrow *Aptinothrips*

Aptinothrips rufus (Gmelin)

(Figs. 6-10)

- 1788 *Thrips rufa* Gmelin, Caroli a Linné, Syst. Nat.: 2224.
 1926 *Aptinothrips rufus* Priesner, Thys. Europas: 156-161.

Female: Body yellow or pale yellow. Tip of abdomen and mouth cone brown. Eyes dark to blackish red. Antennae yellow, VI segment brown at end.

Head (Fig. 8) longer than wide; anterior margin of vertex projecting between eyes. Cheeks slightly swollen. Eyes small, with length about one-third of head;

distance between eyes 57μ , about 2.3 times as wide as eye. Ocelli absent. Antennae (Fig. 7) six-segmented without style; I short, wide and rounded, with distal margin sloping inwards; II longer, widest at middle and rounded at base above short pedicel; III slender with double pedicels; IV and V slightly rounded; VI coniform and longest.

Prothorax (Fig. 8) slender, a little wider than head, without any strong spines. Pterothorax a little wider, short. Wings completely absent. Legs very short and wide. Abdomen straight; tip of IX and X segment clearly hyaline spines.

Measurements (mm.): Total body length 1.0-1.1; head length 0.130, width 0.120; head length including projecting vertex 0.145; prothorax length 0.135, width at widest part 0.185; pterothorax width 0.195; abdomen width at widest part 0.235; spines length on IX abdominal segment about 0.075-0.080; on X segment 0.050-0.055. Antennae about 0.210 in total length, and,

Segment	I	II	III	IV	V	VI
Length (μ)	20-22	30-35	30	27-30	25	68-70
Width (μ)	30	25	20	20-22	20	19-20

Host plants and Specimens examined: *Plantago lanceolata* (1♀, VI-20, BN); Soil (1♀, IV-23, BN); Sweep (5♀♀, VI-9, BN.)

This is the first record of the species from Japan. This species is so far known in England, Europe, North America, India, and Hawaii on various grasses.

Aptinothrips stylifera Trybom

(Fig. 11)

1894 *Aptinothrips stylifera* Trybom, Ent. Tidskr. 15: 41.

1895 *A. rufa* Uzel, Mon. Ord. Thys.: 153.

1926 *A. rufus* f. *stylifera* Priesner, Thys. Europas: 158.

Female: General form and structures as *rufus*. Body colour yellow. Antennae yellow; IV and V darker; VI brownish, becoming darker to apex; VII and VIII brown. Antennae (Fig. 11) eight-segmented; VI segment shorter than in *rufus*; style two-segmented, VIII slightly longer than VII.

Measurements (mm.): Total body length 1.1; Antennae 0.205 in total length, and,

Segment	I	II	III	IV	V	VI	VII	VIII
Length (μ)	20	30	30	25	25	42	10	12
Width (μ)	32	25	20	20	20	20	7	5

Spines length on IX abdominal segment 0.075; on X segment 0.060.

Host plants and Specimens examined: Soil (1♀, IV-23, BN); Sweep (1♀, VI-9, BN).

This is the first record of the species from Japan.

Key to species

- Antennae six-segmented (without style) *rufus*
 Antennae eight-segmented (style two-segmented) *stylifera*

***Taeniothrips* Serville**
***Taeniothrips* ref. *distalis* Karny**
(Figs. 12-17)

Female (Macropterous): Body dark to blackish brown. Femora dark brown; fore tibiae yellowish, shaded brown along outer and inner margins, mid and hind tibiae dark brown; tarsi yellow. Fore wings dark brown with a white cross band near base, hyaline about one-eighth of length at middle. Antennal segments I and II dark brown, III and extreme base of IV clear yellow, outer half of IV and V to VIII dark brown except for a pale ring near base of V. All spines on body and wings dark brown.

Head (Fig. 14) about 1.3 times as wide as long; slightly notched behind eyes. Eyes just half as long as head; distance between eyes same to width of eyes. Ocelli situated as shown in Fig. 14, interocellar spines very long, longer than eyes; a row of postocellar spines behind eye with length about 10-15 μ . Maxillary palpi three-segmented with length, I, 25 μ ; II, 15 μ ; III, 22 μ . Antennae eight-segmented, about 2.6 times as long as head, shape of segments as shown in Fig. 12 & 13; segment III longest, about 3.0 times as long as wide; IV slightly shorter than or equal to III, about 2.6 times as long as wide; V still shorter, about twice as long as wide; VI a little shorter than III, about 3.0 times as long as wide; VII and VIII short, VIII longer and narrower than VII; sense cone long and slender, III with a forked cone on dorsum, IV with a similar one ventrally, VI internally with a large one.

Prothorax (Fig. 14) about 1.2 times as long as head, two-fifths wider than head; four pairs spines along posterior margin, inner ones longest, 38 μ in length. Pterothorax about twice as wide as prothorax, metanotal plate with 4 long spines along anterior margin, inner stout pair 80 μ , outer pair 55 μ long. Fore wings about 14 times as long as width at middle; hind wings with a median long vein; spines as follows, costa 24-26, fore vein 16-17 & 2 (or 3), hind vein 15-16.

Abdomen elongate, cylindrical but tapering after VIII segment; along posterior margin of IX and X segments with very long spines, as shown in Fig. 17. Comb along posterior margin of VIII segment weak on sides and absent at middle.

Measurements (mm.): Total body length 1.5-1.8; head length 0.150, width 0.190; prothorax length 0.175-0.185, width 0.250-0.265; pterothorax width 0.360-0.375; abdomen 0.425 across at widest part; fore wings length about 0.870-0.900, width about 0.065 at middle. Antennae about 0.380 in total length, and,

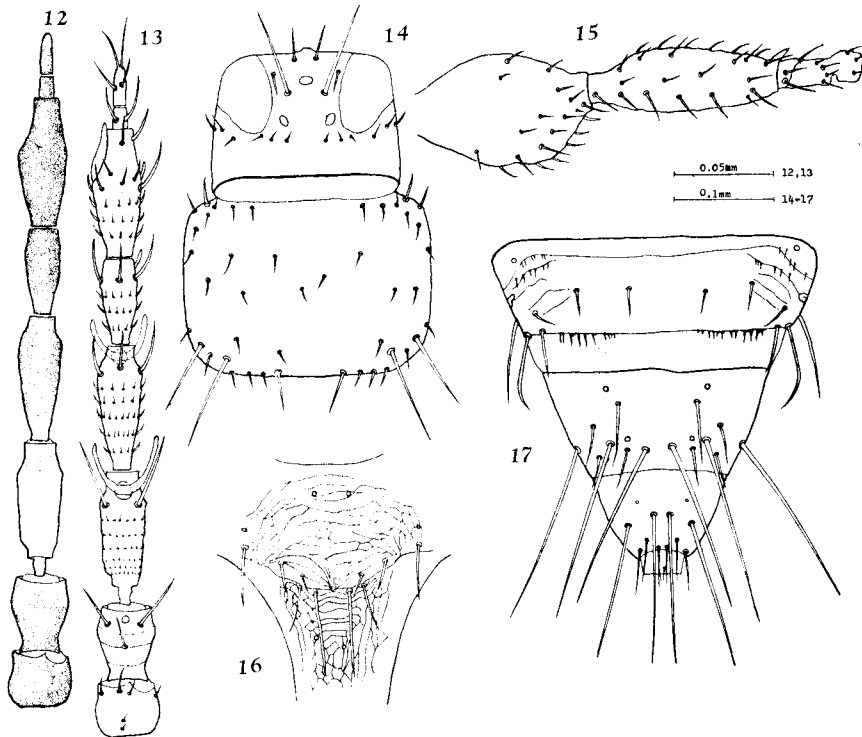
Segment	I	II	III	IV	V	VI	VII	VIII
Length (μ)	30	38	68-73	65-70	42-45	68	10-13	20-23
Width (μ)	35	30	24	25	21	23	9	8

Length of spines; intercellulars 0.080-0.085; antero-angulars of prothorax 0.034; outer postero-angulars of prothorax 0.080-0.085, inner 0.095-0.100; longest on IX abdominal segment 0.180-0.195; on X segment 0.150-0.170.

Host plants and Specimens examined: *Trifolium pratense** (7♀♀, VII-4, BN);

Vicia cracca var. *japonica**

Remarks: *Taeniothrips distalis* Karny is closely related to *T. formosae* Moulton. They are distinguished from one another by colouration of the antennal segments III, IV and V. According to Moulton (1928), "*T. formosae* is closely related to *T. distalis* Karny but may be distinguished by the longer antennae,



Figs. 12-17. *Taeniothrips* ref. *distalis*. 12 and 13. right antenna; 14. head and prothorax; 15. right fore leg; 16. mesonotum and metanotum; 17. abdominal segments VIII-X.

especially segments three and six, the nearly straight cheeks but converging towards posterior, the head being widest across at eyes, the basal portion of fourth antennal segment light yellowish, the darker and more noticeably enlarged fore femora, the darker wings, with only an indistinct light brown area near tip of fore wing, instead of clear whitish cross band." According to the description of these two species, there is little difference in proportion of antennal segment. Although the specimens collected by the writer agree with *formosae* in the colouration of antennae, there are some other differences in some characteristics. On the other hand, the present specimens are closely related to *distalis* in some characteristics,

especially concerning the distribution. *T. distalis* is widely distributed from South-east Asia to Honshu, while *formosae* is known from Formosa but not recorded from Kyushu to Honshu. Both *distalis* and *formosae* are so far not recorded from Hokkaido. Although the present specimens nearly completely agree with the description of *formosae*, the writer tentatively identified them with *T. distalis* based upon the distribution. Further comparative studies are required, because both *distalis* and the present specimens are variable in several characteristics. Some characters in *distalis*, *formosae* and present specimens described above are synoptically shown as follows:

	<i>formosae</i>	<i>distalis</i>	the specimens recorded
Interocellar spine length	54	?	80
Antenna length	375	390	380
Length of antennal segments III to VI	72, 66, 45, 66	72, 74, 45, 62	70, 67, 43, 68
Colour of antennae	III and base of IV yellow	uniformly dark brown	III and base of IV yellow
Spines of wings	costa 23 fore vein 16 & 2 hind vein 15	costa 31-32 fore vein 18 & 2 hind vein 17-18	costa 24-26 fore vein 16 & 2 hind vein 15
Longest spine on IX and X abdominal segments	165	192	195

Taeniothrips flavidulus Bagnall

1923 *Physothrips flavidulus* Bagnall, Ann. Mag. Nat. Hist. (9) 12: 628.

Female (Macropterous): Body yellow to orange yellow. Antennae yellow; III with brown at apex; two-thirds of IV at apex, half of V and VI-VIII brown. Rarely VII and VIII segments not separated clearly. Antennae 0.280-0.295 mm. in total length, and,

Segment	I	II	III	IV	V	VI	VII	VIII
Length (μ)	22-25	37-40	55-58	55-58	37-42	53-57	7	8-9
Width (μ)	27	25-30	20-23	20-23	18-20	18-22	8	7

Outer postero-angular spines of prothorax 0.075-0.077 (mm.), inner 0.080-0.082. Lateral spines on IX abdominal segment 0.098-0.105, mid-dorsal spines 0.075-0.080; on X segment 0.098-0.105.

Host plants and Specimens examined: *Anemone Raddeana* (3♀♀, IV-26, UC; 3♀♀, IV-29, BG); *Rhododendron brachycarpum* (1♀, VI-25, BG); *Philadelphus satsumi* (3♀♀, VI-30, BG); *Heracleum dulce* (3♀♀, VI-19-67, Maruyama; 2♀♀, VI-27, UC); *Rosa rugosa* (1♂, VII-18, BN); *Rosa* spp. (21♀♀ & 9♂♂, VII-25, BG); *Cardiocrinum Glehni* (12♀♀ & 11♂♂, VII-25, BG); *Vicia cracca* var. *japonica* (2♀♀, VII-18, BN);

*Lathyrus maritimus**; *Medicago sativa* (3♂♂, VII-30, UC); *Trifolium pratense* (4♀♀ & 1♂ VII-16, Bankei); *Trifolium repens* (1♀ & 1♂, VII-21, UC); *Cirsium* spp. (3♀♀ & 2♂♂, VII-21, UC); 63♀♀ & 18♂♂, VIII-22, Bankei; 13♀♀ & 4♂♂, VII-22-'67, Akkeshi in east Hokkaido); *Erigeron annuus* (3♀♀ & 4♂♂, VII-25, BG); *Rudbeckia laciniata* (3♀♀, VIII-3-'67, UC); *Taraxacum officinale**; *Robinia pseudo-acacia* (1♀, VI-29, UC).

Remarks: The postero-angular spines of the prothorax of the specimens examined are clearly longer than in the description by Kurosawa, with the length nearly comparable to that in *Thrips nigropilosus* and *Th. flavus*. But the specimens are different from *Th. nigropilosus* in length of antennal segments, and from *Th. flavus* in relative proportion of head and prothorax. Probably they may represent an extreme of the variation range of *Taeniothrips flavidulus*.

Although Kurosawa and Bagnall recorded this species only from *Eriobotrya japonica*, *Citrus Aurantium* subsp. *nobilis* var. *Unshiu* and *Clematis* sp., many host plants were recorded in the present survey as shown above.

This is the first record of the species from Hokkaido.

Frankliniella Karny
Frankliniella tenuicornis (Uzel)

1895 *Physothrips tenuicornis* Uzel, Mon. Ord. Thys.: 99.

1939 *Frankliniella tenuicornis* Kurosawa, Volumen Jubilare Prof. S. Yoshida: 591-593.

Host plants and Specimens examined: Sweep (1♀, IX-10, BN).

This species is known from Japan (Hokkaido, Honshu), Siberia, Manchuria, New Britain, Europe and North America.

Frankliniella intonsa (Trybom)

1895 *Thrips intonsa* Trybom, Entom. Tidskr. 14: 188.

1928 *Frankliniella formosae* Moulton, Annot. Zool. Japon. 11: 291.

1939 *Frankliniella formosae* Kurosawa, Volumen Jubilare Prof. S. Yoshida: 595-597.

Host plants and Specimens examined: *Anemone Raddeana**; *Anemone flaccida* (2♀♀, V-16, UC; 3♀♀, V-12, 5♀♀, V-17, BG); *Ranunculus repens* (15♀♀, VI-25, 8♀♀, VI-28, UC); *Gagea lueta**; *Corydalis ambigua* (2♀♀, V-3, UC); *Tulipa Gesneriana* (2♀♀, V-12, BG; 2♀♀, V-13, 3♀♀, V-18, UC); *Forthia suspensa* (1♀, V-10, UC); *Narcissus Tazetta* var. *chinensis* (6♀♀, V-12, 3♀♀, V-13, BG); *Arabis japonica* (3♀♀, V-24, 2♀♀, VI-2, 10♀♀, VI-11, BN); *Brassica campestris* subsp. *Napus* (53♀♀ & 2♂♂, VII-30, UC); *Potentilla fruticosa* (3♀♀, VI-30, BG); *Iris ensata* var. *hortensis* (12♀♀ & 3♂♂, VI-30, BG); *Cardiocrinum Glehni* (2♀♀, VII-25, BG); *Calystegia japonica* (8♀♀ & 5♂♂, VIII-5, Sakaemachi); *Rudbeckia laciniata* (3♀♀, VII-21, 8♀♀ & 1♂, VIII-3, UC); *Cirsium* spp. (3♀♀, VII-21, UC; 8♀♀ & 3♂♂, VIII-22, Bankei); *Erigeron annuus* (2♀♀ & 1♂, VII-30, 4♀♀ & 1♂, VIII-3, UC); *Hieracium umbellatum* (3♀♀, VII-4, 2♀♀, VII-18, BN); *Lilium lancifolium* (24♀♀

& 9♂♂, VII-25-'67, in Sapporo city); *Medicago sativa* (178♀♀ & 41♂♂, VII-30, UC); *Trifolium pratense**; *Trifolium repens**; *Rosa rugosa**; *Taraxacum officinale**; *Vicia cracca* var. *japonica**; *Lathyrus maritimus**.

Frankliniella intonsa is widely distributed from Europe to Pacific coast of Eastern Asia, recorded from numerous host plants. This species is also a dominant species in the area surveyed.

***Thrips* Linné**
***Thrips hawaiiensis* (Morgan)**

1913 *Euthrips hawaiiensis* Morgan, Proc. U.S. Nat. Mus. 46: 3

Host plants and Specimens examined: *Taraxacum officinale* (1♀, VI-9, Bankei; 1♀, VI-28, UC); *Rosa rugosa* (1♀, VII-4, BN); *Trifolium pratense* (2♀♀, VII-16, BN); *Cirsium* spp. (14♀♀, VII-16, 2♀♀, VIII-22, Bankei; 54♀♀, VII-21, UC).

Although this species are so far known from various host plants, the writer could obtain it only from *Cirsium* spp. The intermarginal setae of the abdominal sternites are 8 to 11.

This species is new to Hokkaido.

***Thrips tabaci* Lindeman**

1888 *Thrips tabaci* Lindeman, Die Schädl. Insekten d. Tabak in Bessarabien 15: 61-75.

Host plants and Specimens examined: *Arabis japonica* (3♀♀, VI-2, 6♀♀, VI-11, BN); *Vicia cracca* var. *japonica* (1♀, VII-15, UC); *Rosa rugosa* (1♀, VI-20, BN); *Brassica campestris* subsp. *Napus* (3♀♀, VII-30, UC); *Lathyrus maritimus* (1♀, VI-11, 2♀♀, VII-4, 2♀♀, VIII-27, BN); *Trifolium pratense* (10♀♀, VI-27, 8♀♀, VII-30, UC; 1♀, VI-20, 3♀♀, VII-4, 1♀, VII-18, 1♀, VII-31, 1♀, VIII-10, BN); *Taraxacum officinale* (1♀, VI-11, Sakaemachi, 2♀♀, X-12, 1♀, X-24, UC); *Erigeron annuus* (2♀♀, VII-25, BG; 2♀♀, VII-30, UC).

Thrips tabaci is widely known in the world from various host plants, but in the present survey it was obtained only from the plants mentioned above. *Vicia cracca* var. *japonica* and *Rosa rugosa* are seemingly not the proper host plants, because only one specimen of them was obtained from each of them, nevertheless very many flowers were examined.

***Thrips nigropilosus* Uzel**

1895 *Thrips nigropilosus* Uzel, Mon. Ord. Thys.: 198.

Female (Macropterous): Body yellow. Antennae brown; segment I pale yellow; II paler; base of III, IV and V yellowish brown. Head 1.6 times as wide as long. Mouth cone long and slender. Maxillary palpi long, length I, 20μ; II, 11μ, III, 25μ. Antennae 0.260 in total length, and,

Segment	I	II	III	IV	V	VI	VII
Length (μ)	25	35	48	42	36	50	20

Outer postero-angular spines of prothorax 0.065, inner 0.070. Lateral spines on IX abdominal segment 0.115, mid-dorsal spines 0.105; on X 0.100.

Female (Micropterous): Head, prothorax and antennae darker than macropterous, and anterior margin of abdominal tergites with brownish.

Male (Micropterous): General form and structures as in female. Spines shorter than female. Postero-angular spines of prothorax 0.047. Antennae 0.235 in total length, and,

Segment	I	II	III	IV	V	VI	VII
Length (μ)	23	30	40	35	32	45	19

Host plants and Specimens examined: *Trifolium pratense* (1♀, macropterous, VI-27, UC); *Taraxacum officinale* (2♀♀, micropterous, X-12, 4♀♀ & 1♂, all micropterous, X-24, UC).

This species is new to Hokkaido.

Family Phloeothripidae

Haplothrips Serville

Haplothrips chinensis Priesner

1933 *Haplothrips chinensis* Priesner, Rec. Ind. Mus. 35: 359.

Host plants and Specimens examined: *Viola grypceras* (3♀♀, V-24, BN); *Arabis japonica* (1♀, V-24, BN); *Arabis* sp. (7♀♀ & 5♂♂, VI-9, Bankei); *Forsythia suspensa* (1♀, V-10, UC); *Narcissus Tazetta* var. *chinensis* (5♀♀, V-12, 1♀, V-13, BG); *Rhododendron brachycarpum* (2♀♀ & 1♂, VI-25, BG); *Brassica campestris* subsp. *Napus* (1♀, VI-17, Soranuma, H. Fukuda leg.); *Rosa rugosa**; *Trifolium pratense**; *Trifolium repens**; *Vicia japonica**; *Vicia cracca* var. *japonica**; *Lathyrus maritimus**; *Taraxacum officinale**.

This species is known from Japan (Hokkaido, Honshu, Shikoku, Kyushu), Formosa, China and Korea.

Haplothrips aculeatus (Fabricius)

1803 *Thrips aculeatus* Fabricius, Systema Rhyngotorum: 312.

1899 *Phloeothrips oryzae* Matsumura, Annot. Zool. Japon. 3: 1-4.

Host plants and Specimens examined: *Taraxacum officinale* (1♀, VI-9, Bankei); *Trifolium repens* (1♀, VII-18, BN); *Trifolium pratense* (2♀♀, VII-4, 1♂, VIII-10, BN); *Plantago lanceolata* (4♀♀ & 1♂, VI-20, BN); *Phleum pratense* (1♀, VI-19, UC); Sweep (1♀, VIII-5, UC, 1♂, IX-10, BN).

This species is widely distributed in the northern hemisphere and mainly known from Graminae and many other plants. In the present survey, however, only a few specimens were obtained, because no intensive collecting was made with Graminae.

Haplothrips niger (Osborn)1883 *Phloeothrips nigra* Osborn, Canad. Ent. 15: 154.

Host plants and Specimens examined: *Taraxacum officinale* (2♀♀, VI-28, UC); *Rhododendron brachycarpum* (1♀, VI-25, BG); *Brassica campestris* subsp. *Napus* (1♀, VI-17, Soranumadake, H. Fukuda leg.); *Lathyrus maritimus* (1♀, VII-4, BN) *Rosa rugosa* (1 pupa, VII-4, 1♀, VII-31, BN); *Vicia cracca* var. *japonica* and *Vicia japonica* (2♀♀, VII-18, 3 pupae, VIII-27, 1 prepupa & 2 pupae, IX-10, BN); *Plantago lanceolata* (59♀♀, VI-17, BN); *Trifolium pratense**; *Trifolium repens*.*

Kurosawa recorded this species only from clover at Kotoni in Sapporo in 1950. In the present survey, too, it was abundant on clover but not on other plants.

Adding to seven species newly discovered by the present survey, 23 species of Thysanoptera have so far been recorded from Hokkaido. As the present survey

Table. 1 Distribution pattern of thysanopterous species found in Hokkaido

Species	Region ¹⁾	Hokkaido	Japan	Pa	Ne	Or	Au	Nt	Et
1 <i>Aeolothrips conjunctus</i>		*							
2 <i>Liothrips glycinicola</i>		?							
3 <i>Ecacanthothrips piceae</i>		*							
4 <i>Taeniothrips glycines</i>		**	**						
5 <i>Docessissophothrips frontalis</i>		*	*						
6 <i>Sericothrips gracilicornis</i>		*		**					
7 <i>Haplothrips subterraneus</i>		*	*	*					
8 <i>Haplothrips niger</i>		**		**	**				
9 <i>Chirothrips manicatus</i>		**	**	**	**				
10 <i>Taeniothrips distalis</i>		**	**			**			
11 <i>Taeniothrips flavidulus</i>		**	*			*			
12 <i>Frankliniella intonsa</i>		**	**	**		**			
13 <i>Haplothrips chinensis</i>		**	**	*		*			
14 <i>Aptinothrips stylifera</i>		*		**	**	*			
15 <i>Frankliniella tenuicornis</i>		*	**	**	**	*			
16 <i>Liothrips vaneeckei</i>		*(?)	**	**	**	*			
17 <i>Haplothrips aculeatus</i>		**	**	**	**	**			
18 <i>Thrips hawaiiensis</i>		**	**	*		**	*		
19 <i>Aeolothrips fasciatus</i>		**	**	**	**		*		
20 <i>Anaphothrips obscurus</i>		**	**	**	**		**		
21 <i>Thrips nigropilosus</i>		**	**	**	**		*		
22 <i>Aptinothrips rufus</i>		*		**	**	*	*		
23 <i>Thrips tabaci</i>		**	**	**	**	**	**	**	**
Total		23	16	16	11	11	6	1	1

1) Pa (Palaeartic), Ne (Nearctic), Or (Oriental), Au (Australian including Hawaiian), Nt (Neotropical), Et (Ethiopian).

** : Ubiquitous.

* : Rare or localized.

? : Dubious records.

was confined to Sapporo and the adjoining areas, it is assumed that much more species would be discovered through systematic collecting in other districts. Leaving further clarification for the future, a provisional sketch of the faunal make-up in Hokkaido was given in Table 1 based upon the previous records.

The species tabulated exhibit the following distribution patterns: Holarctic-Oriental 4 spp., Holarctic-Australian, Endemic to Hokkaido, each 3, Holarctic, Palaearctic, Palaearctic-Oriental, Oriental, Endemic to Japan, each 2, Palaearctic-Oriental-Australian, Holarctic-Oriental-Australian, cosmopolitan each 1. Among these species, some species included in the patterns Holarctic-Australian-Oriental, Holarctic-Oriental, Holarctic-Australian, Palaearctic-Oriental-Australian, might be proved by further studies, cosmopolitan or nearly, so either caused by the extension of the range through human influence or not. Among three species endemic to Hokkaido, *Liothrips glycinicola* and *Ecacanthothrips piceae* were not collected since their original descriptions, and the type specimen of *L. glycinicola* was lost.

Within the limit of the present knowledge, therefore, the thysanopterous fauna of Hokkaido is, as in many other insect groups, mostly composed of widespread species, chiefly of Holarctic elements, with an admixture of certain Oriental elements.

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