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Sericothripine Thrips of Japan (Thysanoptera, Thripidae)

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Abstract The genera of Sericothripini are revised. The tribe comprises five genera and four subgenera: *Corcithrips*, *Elbuthrips*, *Faureana*, *Hydatothrips* s. str., *H.* (*Neohydatothrips*), *H.* (*Kazinothrips*), *H.* (*Onihothrips*), *H.* (*Zonothrips*), and *Sericothrips*. The subgenus *Pyrothrips* is synonymous with *Hydatothrips*. Six new species are described from Japan: *Hydatothrips* (*H.*) *ekasi*, *H.* (*Kazinothrips*) *reticulatus*; *H.* (*Neohydatothrips*) *mitubautugi*, *H.* (*N.*) *ponyaunpe*, *H.* (*N.*) *elaeagni*, and *Sericothrips* *marginalis*.

Key words: Thysanoptera; taxonomy; Thripidae; genera of Sericothripini; Japanese species.

The tribe Sericothripini has traditionally been characterized by the abdomen covered with dense rows of microtrichia, at least on the sides (PRIESNER, 1957). It was divided into two subtribes based on the number of major setae on the abdominal tergum IX, namely Sericothripina having five pairs or more and Scirtothripina having four pairs. PRIESNER (1957) placed two genera *Sericothrips* HALIDAY and *Zonothrips* PRIESNER in Sericothripina, and eight genera in Scirtothripina. Without adopting these two subtribes STANNARD (1968) added three more genera to the tribe. JACOT-GUILLARMOD (1971) followed PRIESNER in his catalogue of the world Thysanoptera, added four more genera to Sericothripina, while excluded the genera by STANNARD from Sericothripini and placed these in Thripini. BHATTI (1973) tentatively revised the tribe Sericothripini in eight genera and two subgenera: *Corcithrips* BHATTI, *Elbuthrips* BHATTI, *Faureana* BHATTI, *Hydatothrips* KARNY s. str., *H.* (*Pyrothrips*) BHATTI, *Kazinothrips* BHATTI, *Neohydatothrips* JOHN s. str., *N.* (*Onihothrips*) BHATTI, *Sericothrips*, and *Zonothrips*.

These ten taxa are separated by the following characters (BHATTI, 1973).

- 1) Number of antennal segments 7 or 8.
- 2) Number of setae on abdominal sterna 3 or 4 pairs.
- 3) Dorsal subbasal seta on antennal segment II present (+) or absent (–).
- 4) Mouth cone very long (+) or moderately long (–).
- 5) Prospinasternum distinct (+) or reduced (–).
- 6) Setae on abdominal sterna II–VI inserted posteromarginally (+) or far ahead of the margin (–).
- 7) Metanotal scutum and scutellum at least partly separated (+) or completely fused (–).
- 8) Always macropterous (+) or usually brachypterous (–).

- 9) Metasternal V-shaped apodeme present (+) or absent (-).
- 10) Median pair of setae on abdominal terga II-VII placed similarly and of similar size (+) or not (-).
- 11) Abdominal terga I-V each covered with uniform microtrichia completely (+) or incompletely (-).
- 12) Posteromarginal comb of microtrichia on abdominal terga I-VI complete (+) or distinctly reduced or absent medially (-).
- 13) Median campaniform sensillae on abdominal terga II-VII present (+) or partly (\pm) or completely absent (-).
- 14) Head and pronotum sculptured (+) or mostly unsculptured (-).
- 15) Seta B₃ on abdominal terga II-VII posteromarginal (+) or submarginal (\pm) or far ahead of margin (-).

As shown in Table 1, character No.15 is not relevant for generic value, because it considerably varies within the same genus. The subgenus *Pyrothrips* was erected for the reception of *boerhaaviae* SESHADRI et ANANTHAKRISHNAN, as differing from *Hydatothrips* in all abdominal tergal setae in front of the posterior margin, the tegula with two minute setae on surface, and the broad and stout paramere not dilated apically. The last character state is shared by *H. ekasi* which lacks two former ones. Because the tegular setae are sometimes reduced within *boerhaaviae*, it is merely specific value. *Pyrothrips* is here treated as synonymous with *Hydatothrips*. *Hydatothrips*, *Neohydatothrips*, *N. (Onihothrips)*, *Kazinothrips*, and *Zonothrips* are essentially very similar, separated only by one character one another, and can be regarded as subgenera of the genus *Hydatothrips*. Thus, Sericothripini by BHATTI comprise the five genera, *Corcithrips*, *Elbuthrips*, *Faureana*, *Hydatothrips*, and *Sericothrips*.

BHATTI (1973) transferred the members of Scirtothripina to the tribe Thripini, suggesting that the presence of microtrichia rows on the abdomen is not diagnostic of Sericothripini. Because this character is represented in members of Heterothripidae and Aeolothripidae, too, and in some of typical Thripini species like

Table 1. Synopsis of the differences among 10 taxa in Sericothripini.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Corcithrips</i>	8	3	+	-	-	-	+	+	+	-	-	-	\pm	+	-
<i>Elbuthrips</i>	8	3	-	+	-	-	+	+	-	-	-	-	+	+	\pm
<i>Sericothrips</i>	8	3	-	-	+	+	-	-	-	+	+	+	+	+	+-
<i>Hydatothrips</i>	8	3	-	-	+	+	+	+	+	-	-	-	+	+	+
<i>H. (Pyrothrips)</i>	8	3	-	-	+	+	+	+	+	-	-	-	+	+	-
<i>Neohydatothrips</i>	8	3	-	-	+	+	+	+	-	-	-	-	+	+	+
<i>N. (Onihothrips)</i>	8	4	-	-	+	+	+	+	-	-	-	-	+	+	-
<i>Kazinothrips</i>	7	3	-	-	+	+	+	+	-	-	-	-	+-	+	+-
<i>Zonothrips</i>	7	3	-	-	+	+	+	+	+	-	-	-	+	+	+
<i>Faureana</i>	7	3	-	+	+	+	+	+	-	-	-	-	-	-	\pm

Thrips tabaci. Moreover BHATTI (1989) raised Sericothripini to the subfamily rank together with Dendrothripini. I agree with his former opinion, and recognize the five genera in Sericothripini as mentioned above. However I do not adopt his treatment at the subfamily rank.

The abbreviations used in the following descriptions are as in my previous papers (KUDÔ, 1984, 1985). The type specimens are preserved in my collection.

Sericothripini

Maxillary palpus 3-segmented; dorsal cervical sclerite present. Median mesosternal plate marked out from the rest of sternum; prothoracic furcasternum entire. Fore wing with a regular series of setae on fore vein; hind veinal setae absent or restricted to one to four near the wing tip; posterior FH wavy. Legs densely covered with annular rows of microtrichia; tarsi 2-segmented. T_2 – T_7 and S_2 – S_6 (– S_8 of males) with sublateral callosities on antecostal line; S_7 of females with a prominent broad anteriorly directed apodeme sublaterally on each side; T_9 with 5 or more pairs of major setae along posterior margin.

Key to genera of Sericothripini

1. Primary setae on S_2 – S_6 placed far ahead of posterior margin 2
- Primary setae on S_2 – S_6 inserted posteromarginally 3
2. Metasternum with V-shaped apodeme. A_2 with dorsal subbasal seta. Mouth cone moderately long *Corcithrips*
- Metasternum without V-shaped apodeme. A_2 without dorsal subbasal seta. Mouth cone very long *Elbuthrips*
3. Head and pronotum mostly unsculptured. T_2 – T_5 without median CPS. Mouth cone very long *Faureana*
- Head and pronotum distinctly sculptured. T_2 – T_5 with median CPS. Mouth cone moderately long 4
4. T_1 – T_5 (Fig. 1.4) each covered completely with uniform microtrichia. T_2 – T_7 with B_1 placed similarly and of similar size. Metanotal scutum and scutellum completely fused (Fig. 1.1). T_1 – T_6 with complete comb of microtrichia at posterior margin. Usually brachypterous ... *Sericothrips*
- T_1 – T_5 (Fig. 2.4) without microtrichia at middle. T_2 – T_7 with B_1 not placed similarly nor of similar size. Metanotal scutum and scutellum at least partly separated (Fig. 5.1). T_1 – T_6 with comb of microtrichia interrupted medially or at least distinctly reduced. Always macropterous *Hydatothrips*

Sericothrips HALIDAY

Sericothrips HALIDAY, 1836, Ent. Mag., 3: 444; BHATTI, 1973, Orient. Ins., 7: 436–437.
Rhytidothrips KARNY, 1910, Mitt. naturw. Ver. Univ. Wien., 8: 49.

Head wider than long; with 2 pairs of AOS; eye large and bulged; ocelli present; occipital apodeme cutting off a wide crescentic occiput; mouth cone moderately long, typically conical; maxillary palpus 3-segmented. Antenna 8-segmented; A_2 without dorsal subbasal seta; A_3 and A_4 with forked sense cone; major sense cones on A_5 – A_7 without distinctly elongate base; A_2 – A_6 with microtrichia rows.

Pronotum sculptured; with a well defined blotch area; furcasternum entire; prospinasternum narrow. Mesoscutum without anterior CPS, with median setae far ahead of posterior margin; metanotum without CPS, undivided into scutum and scutellum; metasternum without V-shaped apodeme. Usually brachypterous.

T_1 – T_8 completely covered with uniform microtrichia throughout a tergum; T_1 – T_8 with flange and complete comb of microtrichia along posterior margin; B_1 on T_2 – T_7 similarly placed and of similar size as strong as B_2 ; T_1 – T_7 with median CPS; lateroterga not separated from terga. Setae on S_2 – S_6 placed at posterior margin, on S_7 in front of the margin.

Sericothrips is distinguished from the congeners by T_1 – T_8 uniformly covered with microtrichia and with a complete comb, metanotum undivided, and by B_1 on T_1 – T_8 being of uniform size and similarly placed.

Sericothrips tabulifer PRIESNER

Sericothrips tabulifer PRIESNER, 1935, Philip. J. Sci., 57: 351–353.

No specimen was available for the present study. It was described based on one female collected on *Glochidion* (?) in Okinawa (Iriomote).

Sericothrips marginalis n. sp.

♀ (brachypterous). Head, pronotal blotch area, strongly sclerotized areas of pterothorax and abdominal segments VII–X dark brown; posterior half of metathorax and abdominal segments I–II brown, segments III–VI brownish yellow, III darker. Coxae and hind femur dark brown; fore and mid femora brown, fore femur sometimes yellow apically; tibiae and tarsi brown. A_1 and A_2 pale brown to yellow but basal half of A_1 dark; A_3 brown, A_4 – A_8 dark brown.

Head (Fig. 1.1) W/L 1.76–2.19; striate on ocellar region and occipital area; AOS, IOS and POS B_1 subequally developed; IOD/HOW 3.38–4.67; OOD/IOD 1.29–1.70. Antenna (Fig. 1.2) 3.1–4.1 as long as head; A_3 longest, L/W 3.14–3.50; A_4 L/W 2.60–2.95; A_5 L/W 2.30–2.58; A_6 L/W 2.89–3.38, subequal to A_4 in length; A_7 L/W 1.13–1.25; A_8 L/W 2.33–2.67; A_3 – A_6 respectively with 5, 5, 6,

8 setae.

Pronotum (Fig. 1.1) W/L 1.51–1.74; with transversely anastomosing striae, which more closely spaced in blotch than outside it; anterior apodeme of blotch concave medially; median blotch L 0.46–0.55 as long as pronotum; with 32–36 setae in all; the proportions of setae to pronotum L, AAS 0.16–0.22 (0.18 ± 0.02 , $n=9$), AMS B₁ 0.16–0.27, AMS B₂ 0.10–0.23, PMS B₁ 0.24–0.33, PMS B₂ 0.25–0.36. Mesoscutum with transversely anastomosing striae, lacking internal wrinkles; tegula without microtrichia. Metanotum (Fig. 1.1) with transversely anastomosing striae, lacking internal wrinkles; microtrichia present on striae on posterior quarter; B₁ situated at 0.53–0.79 (0.63 ± 0.08 , $n=14$) times of their L far from anterior margin of metanotum. Mesosternum with 30–35 setae; metasternum with 15–18 setae (including 2 minute ones at anteroangles, the same in the following).

T₁ with a pair of setae; T₂ and T₃ with 5 pairs, B₃ marginal; T₄–T₇ with 6 pairs, B₃ and B₆ marginal (Fig. 1.4); T₉ and T₁₀ without microtrichia; T₉L/T₁₀L 1.01–1.09; anterior B₁–B₃ on T₉ each 0.61–0.77, 0.55–0.77 and 0.57–0.79 as long as T₉; posterior B₁–B₄ on T₉ each 0.84–0.97, 0.92–1.13, 0.42–0.67 and 1.08–1.29 as long as T₉; B₁–B₂ on T₁₀ each 0.97–1.07 and 0.94–1.18 as long as T₁₀; ovipositor 1.82–2.01 as long as pronotum. S₂–S₆ completely covered with microtrichia except anteromedian part; S₇ with microtrichia laterad of part between B₁ and B₂; S₂ with 2 pairs of setae.

Measurements (μm). Body L 1.1–1.3 mm. Head L 80–100, W 168–176; pronotum L 130–140, W 210–226; blotch median L 65–76, lateral L 85–96, W 166–178; AAS 22–26, AMS B₁ 22–36, AMS B₂ 14–30, PMS B₁ 34–46, PMS B₂ 34–48; metascutum B₁ 34–42; T₉ L 70–76; T₁₀ L 66–78; anterior B₁–B₃ on T₉ each 46–56, 40–54, 40–56; posterior B₁–B₄ on T₉ each 62–70, 68–82, 31–48, 79–90; B₁–B₂ on T₁₀ each 68–74, 66–78; ovipositor L 248–274. Antenna 307–324 in total L; L (W) of antennal segments: A₃ 66–70 (20–21), A₄ 52–58 (19–21), A₅ 46–50 (19–20), A₆ 52–57 (16–18), A₇ 9–10 (8), A₈ 14–16 (6).

♀ (macropterous). Fore wing pale on basal two-sevenths but slightly shaded at extreme base, the rest grayish brown; scale dark; with 25–28 anterior and 60 posterior FH; costa with 23–24 setae, these at middle of wing 1.00 as long as wing W; fore vein with 12–13 setae, hind vein with 1 at apex. Hind wing with 70–73 FH.

♂ (brachypterous). Colored almost as in females; fore femur yellowish brown tinged with dark at outer margin. Prospinasternum reduced; B₃ on T₂–T₈ placed marginally but B₆ far ahead of posterior margin; S₄–S₇ (Fig. 1.5) with transverse glandular area. Genitalia (Fig. 1.6): aedeagus slightly longer than paramere, sharply pointed apically; paramere blunt apically, base with 1 long seta and 4 short setae. Body L 0.9–1.0 mm.

Specimens examined. Holotype ♀ (*Kummerovia striata*), Shizuoka, Nihondaira, VII 13 1979. Paratypes. Chiba: 1 ♀ (*Miscanthus sinensis*), Amatsu-

kominato, Kiyosumi, VIII 31, 1977. Shizuoka: 20 ♀ 4 ♂, collected with the holotype, 18 ♀ 1 ♂ and 14 ♀ 7 ♂, same data except VII 13 and IX 22 1980. Kyoto: 4 ♀ 4 ♂ (*M. sinensis*), Kameoka, Hozukyo, X 11 1975. Miyazaki: 1 ♂ (grass), Nichinan, Udo, X 26 1977. All specimens brachypterous except for 1 ♀.

Host plants. Gramineae: *Miscanthus sinensis* ANDERSS. Leguminosae: *Kummerovia striata* SCHINDLER.

Distribution. Honshu: Chiba, Shizuoka, Kyoto. Kyushu: Miyazaki.

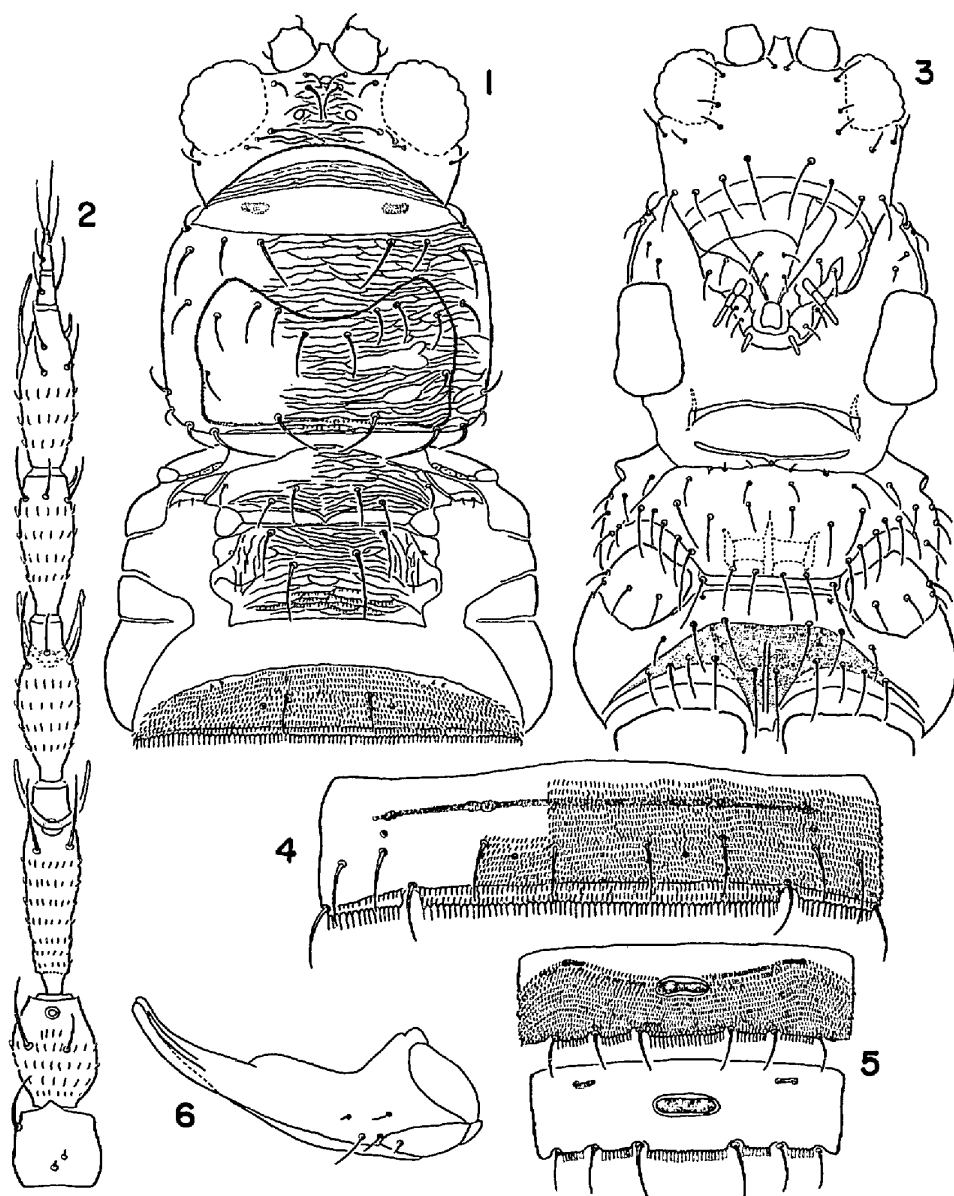


Fig. 1. *Sericothrips marginalis*. — 1, ♀, head, thorax and T₁; 2, ♀, antenna; 3, ♀, head and thorax, ventral; 4, ♀, T₃; 5, ♂, S₅ and S₆; 6, ♂, genitalia, lateral.

Remarks. This species is quite similar to *S. kaszabi* PELIKÁN from Mongolia. After some hesitation I gave it the specific rank by the following differences: metanotum with many microtrichia on the posterior part (few ones in

Table 2. Mean and S.D. of quantitative characters in females of *Sericothrips marginalis* and two *Hydatothrips* species.

Character	<i>S. marginalis</i>		<i>H. abdominalis</i>		<i>H. ekasi</i>	
	Mean±S.D.	n	Mean±S.D.	n	Mean±S.D.	n
1. Head W/L	1.99±0.13	10	2.10±0.17	10	2.02±0.12	10
2. IOD/HOW	3.79±0.35	10	3.42±0.21	10	3.84±0.41	10
3. OOD/IOD	1.55±0.13	10	1.28±0.07	10	1.21±0.09	10
4. A ₃ L/W	3.39±0.11	10	3.76±0.21	11	3.47±0.17	11
5. A ₄ L/W	2.76±0.13	10	3.60±0.19	11	3.19±0.12	11
6. A ₅ L/W	2.47±0.09	10	3.15±0.21	11	2.70±0.06	11
7. A ₆ L/W	3.23±0.15	10	3.93±0.17	11	3.51±0.24	11
8. A ₇ L/W	1.21±0.06	10	2.02±0.18	11	1.69±0.06	11
9. A ₈ L/W	2.48±0.13	10	3.51±0.11	11	3.57±0.20	11
10. Pronotum W/L	1.60±0.06	11	1.80±0.07	11	1.79±0.04	10
11. Pronotal blotch median L/Pronotum L	0.51±0.02	11	0.49±0.03	11	0.49±0.02	10
12. Pronotal blotch lateral L/median L	1.34±0.07	11	1.41±0.06	11	1.37±0.06	10
13. Pronotal blotch W/median L	2.48±0.10	11	2.85±0.09	11	2.79±0.15	10
14. AMS B ₁ /Pronotum L	0.23±0.04	11	0.22±0.02	11	0.22±0.04	12
15. AMS B ₂ /Pronotum L	0.16±0.04	10	0.18±0.01	11	0.20±0.02	11
16. PMS B ₁ /Pronotum L	0.28±0.03	9	0.18±0.02	10	0.20±0.02	10
17. PMS B ₂ /Pronotum L	0.29±0.03	10	0.23±0.02	10	0.27±0.02	10
18. No. of pronotal setae	33.4±1.4	10	32.3±2.2	11	31.7±2.0	11
19. No. of mesosternal setae	32.7±1.5	10	36.0±2.7	10	34.2±1.9	12
20. No. of metasternal setae	16.4±1.1	10	20.2±1.8	11	19.8±0.8	12
21. Fore wing L/W	—		21.11±0.81	12	20.51±0.66	11
22. Median costal seta L/Wing W	—		1.02±0.07	12	1.26±0.09	11
23. No. of costal setae on fore wing	—		30.2±1.8	20	26.0±1.4	21
24. No. of fore veinal setae on fore wing	—		30.3±2.5	21	24.5±1.9	21
25. No. of anterior FH on fore wing	—		36.3±2.6	18	28.6±1.4	20
26. No. of posterior FH on fore wing	—		74.4±4.8	15	58.9±2.7	19
27. No. of FH on hind wing	—		82.5±5.8	17	66.2±3.8	20
28. T ₉ L/T ₁₀ L	1.06±0.02	11	1.18±0.04	11	1.18±0.05	12
29. T ₉ anterior B ₁ /T ₉ L	0.69±0.05	10	0.68±0.04	11	0.65±0.02	12
30. T ₉ anterior B ₂ /T ₉ L	0.65±0.07	10	0.61±0.04	11	0.60±0.04	12
31. T ₉ anterior B ₃ /T ₉ L	0.70±0.07	10	0.67±0.02	11	0.66±0.03	12
32. T ₉ posterior B ₁ /T ₉ L	0.92±0.05	11	0.90±0.05	11	0.85±0.05	12
33. T ₉ posterior B ₂ /T ₉ L	1.01±0.08	11	0.71±0.04	11	0.68±0.04	12
34. T ₉ posterior B ₃ /T ₉ L	0.57±0.07	11	0.88±0.05	11	0.87±0.03	12
35. T ₉ posterior B ₄ /T ₉ L	1.15±0.06	11	0.67±0.03	11	0.66±0.06	12
36. T ₁₀ B ₁ /T ₁₀ L	1.04±0.03	10	1.07±0.06	11	1.03±0.06	12
37. T ₁₀ B ₂ /T ₁₀ L	1.07±0.08	10	1.11±0.05	11	1.04±0.08	13
38. Ovipositor L/Pronotum L	1.92±0.05	11	2.36±0.10	11	2.41±0.12	11

kaszabi), posterior setae on T_9/T_9L larger and $T_9L/T_{10}L$ smaller.

Hydatothrips KARNY

Hydatothrips KARNY, 1913, Wiss. Ergeb. Deutsch. Zentral-Africa-Exped. 1907–1908, Zool., 4: 281.

Head much wider than long; with transversely anastomosing striae; with 2 pairs of AOS; ocelli present; mouth cone moderately long to long; maxillary palpus 3-segmented. A_2 without dorsal subbasal seta; A_3 and A_4 with forked sense cone; A_2-A_6 with microtrichia rows.

Pronotum distinctly sculptured; mesoscutum without CPS, with both median setae far ahead of posterior margin; metascutum without CPS, separated completely or partly from scutellum. Fore wing uniformly covered with microtrichia; fore vein regularly set with setae, hind vein with or without setae; posterior FH wavy; scale with 4 anal setae and 1 discal seta.

T_1-T_5 medially lacking microtrichia; B_1 on T_2-T_7 neither similarly placed nor of similar size, those on T_2-T_4 closer together than from B_2 , with the length gradually increasing toward posterior segments; T_2-T_5 with median CPS; T_{10} entire; lateroterga not separated from terga; primary setae on S_2-S_6 placed at posterior margin, on S_7 in front of the margin.

Hydatothrips is related to *Faureana* by T_1-T_5 not completely covered with microtrichia and primary setae on S_2-S_6 situated posteromarginally, but differs in distinctly sculptured head and pronotum, and T_2-T_5 with median CPS. It is divided into five subgenera by a combination of number of antennal segments, metasternal structure and number of sternal setae. The three subgenera are known from Japan.

Key to Subgenera of *Hydatothrips*

1. Abdominal sterna with 4 pairs of setae *Onihothrips*
— Abdominal sterna with 3 pairs of setae 2
2. Antenna 7-segmented 3
— Antenna 8-segmented 4
3. Metasternum with V-shaped apodeme *Zonothrips*
— Metasternum without V-shaped apodeme *Kazinothrips*
4. Metasternum with V-shaped apodeme *Hydatothrips*
— Metasternum without V-shaped apodeme *Neohydatothrips*

Hydatothrips KARNY s. str.

Hydatothrips KARNY, 1913, Wiss. Ergeb. Deutsch. Zentral-Africa-Exped. 1907–1908, Zool., 4: 281;

BHATTI, 1973, Orient. Ins., 7: 412–414.

Hydatothrips sgen. *Pyrothrips* BHATTI, 1973, Orient. Ins., 7: 413, 424.

Occipital apodeme cutting off a wide crescentic occiput, situated along dorsal series of POS. Antenna 8-segmented; A_3 – A_6 respectively with 5, 5, 6, 8 setae. Pronotum with well defined blotch; tegula covered with microtrichia; metasternum with strong V-shaped apodeme at middle (Fig. 2.3). T_4 – T_6 with B_3 postero-marginal except for *boerhaaviae*; sterna with 3 pairs of setae.

Key to Japanese species

1. Abdominal segment V alone yellow. T_4 – T_6 (Fig. 2.4) with 4–5 setae laterad of B_3 . S_2 – S_6 (Fig. 2.5) completely covered with microtrichia. Males with glandular area on S_6 and S_7 (Fig. 2.6) *abdominalis* (KUROSAWA)
- Abdominal segments IV and V yellow. T_4 – T_6 with 3 setae laterad of B_3 . S_2 – S_6 (Fig. 3.6) lacking microtrichia medially. Males with glandular area on S_5 – S_7 (Fig. 3.7) *ekasi* n. sp.

Hydatothrips (H.) abdominalis (KUROSAWA) n. comb.

Sericothrips abdominalis KUROSAWA, 1937, Kontyû, Tokyo, 11: 115–117.

♀. Predominantly brown to dark brown; occiput, pronotum except blotch, and membranous areas paler; abdominal segment V yellow, usually brownish medially; segment X usually paler than VII–IX. Femora dark brown but fore femur yellowish at extreme apex; tibiae and tarsi yellow. Fore wing brown, with pale subbasal band. A_1 – A_3 yellow, A_1 and apex of A_3 often faintly brownish; A_4 – A_8 dark brown, basal fifth of A_4 and extreme base of A_5 yellowish.

Head (Fig. 2.1) W/L 1.91–2.38; ocellar region with transversely anastomosing striae and wrinkles among striae; occiput transversely reticulate, with wrinkles in reticles on anteromedian half; IOD/HOW 3.09–3.70; OOD/IOD 1.18–1.38; mouth cone long. Antenna (Fig. 2.2) 3.9–4.6 as long as head; A_3 longest, L/W 3.50–4.06; A_4 L/W 3.22–3.83; A_5 L/W 2.71–3.47; A_6 L/W 3.60–4.14, shorter than A_4 ; A_7 L/W 1.82–2.40; A_8 L/W 3.33–3.75; major sense cones on A_5 – A_7 arising from elongate base.

Pronotum (Fig. 2.1) W/L 1.71–1.89; transversely reticulate, often with some dots in the reticles; blotch well developed, with transversely anastomosing striae and many distinct dots between striae; anterior apodeme of blotch concave medially, median L 0.45–0.54 as long as pronotum; with 29–35 setae; AMS B_1 0.20–0.27, AMS B_2 0.17–0.20, PMS B_1 0.15–0.22 and PMS B_2 0.20–0.28 as long as pronotum, respectively. Mesoscutum (Fig. 2.1) with closely spaced, transverse broken striae, bearing distinct wrinkles between the striae; tegula with microtrichia; metascutum transversely striate on anteromedian third, rather reticulate on posteromedian fourth, longitudinally striate on the rest, median half with wrinkles among striae; metepisternum reticulate, with wrinkles in reticles; mesosternum

(Fig. 2.3) with 33–41 setae, metasternum with 18–23. Fore wing L/W 19.47–22.61; with 31–40 anterior and 67–84 posterior FH; costa with 29–34 setae, median seta 0.95–1.17 as long as wing W; fore vein with 25–35 setae, hind vein without setae. Hind wing with 73–93 FH.

T₂ and T₃ with microtrichia medially in front of B₁; T₄–T₆ (Fig. 2.4) with microtrichia except for anterior and posterior median third; T₇ and T₈ with almost complete cover of microtrichia; T₁₀ with some microtrichia rows at middle; T₂–T₆ with comb of long and sharp microtrichia on sides, vestigial ones (ca. 2 μ m long) at

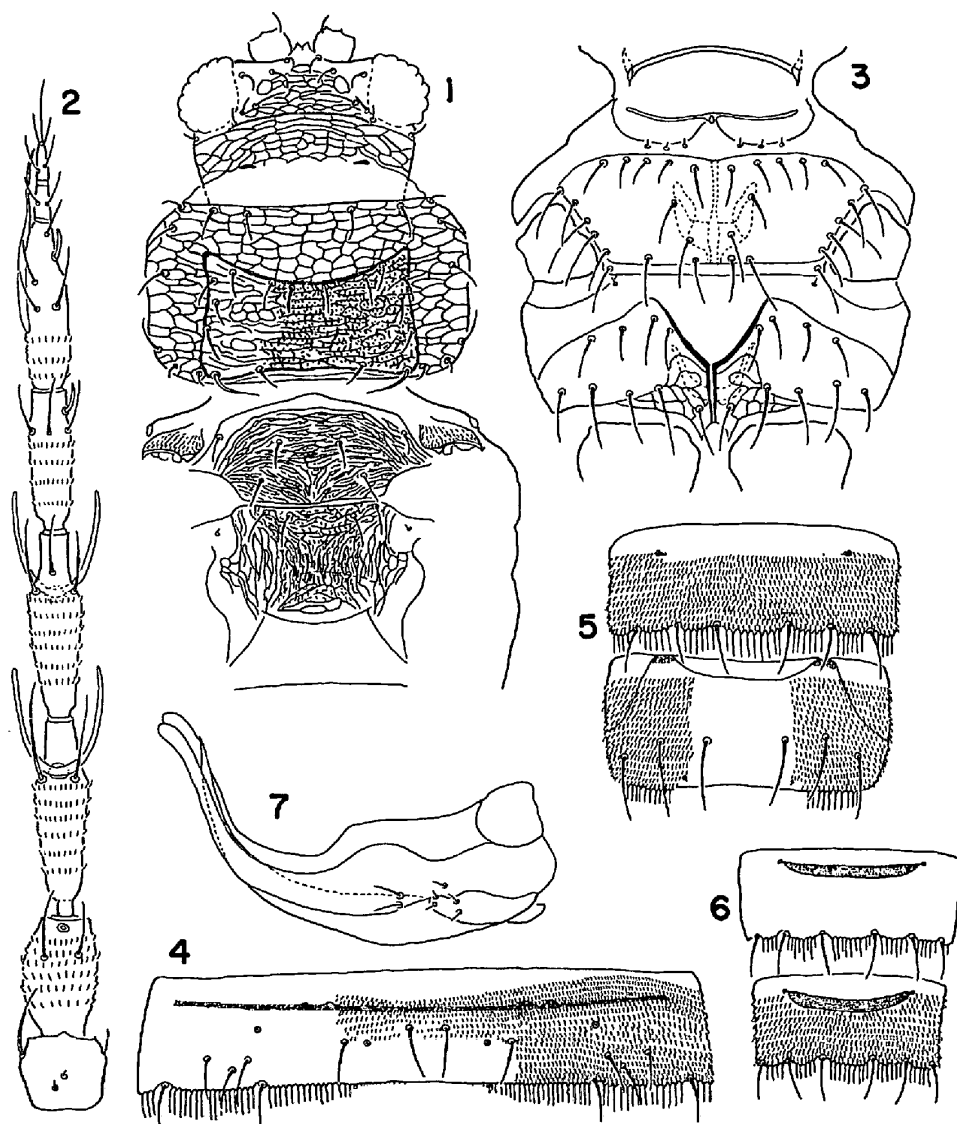


Fig. 2. *Hydatothrips (H.) abdominalis*. — 1, ♀, head and thorax, dorsal; 2, ♀, antenna; 3, ♀, meso- and metasternum; 4, ♀, T₄; 5, ♀, S₆ and S₇; 6, ♂, S₆ and S₇; 7, ♂, genitalia, lateral.

middle; T_7 and T_8 with complete comb, though median part of T_7 with shorter microtrichia. Setal formula being: T_1 1, T_2 and T_3 2+1 m+2-4, T_4 - T_6 2+1 m+3-4+1 m, T_7 2+1 m+3+1 m. $T_9L/T_{10}L$ 1.14-1.25; anterior B_1 - B_3 on T_9 each 0.61-0.72, 0.54-0.68 and 0.63-0.71 as long as T_9 ; posterior B_1 - B_4 on T_9 each 0.80-1.00, 0.67-0.81, 0.79-0.92 and 0.62-0.72 as long as T_9 ; B_1 - B_2 on T_{10} 1.00-1.16 and 1.03-1.20 as long as T_{10} ; ovipositor 2.25-2.58 as long as pronotum. S_2 - S_6 completely covered with microtrichia except anterior margin, possessing complete comb on posterior margin; S_7 (Fig. 2.5) without microtrichia between B_1 .

Measurements (μ m). Body L 1.2-1.3 mm. Head L 68-86, W 156-172; pronotum L 110-124, W 192-220; AMS B_1 22-30, AMS B_2 20-24, PMS B_1 18-26, PMS B_2 24-35; pronotal blotch median L 50-60, lateral L 74-88, W 140-170; fore wing L 740-853, W 36-40; median costal seta 36-42; T_9 L 72-80; T_{10} L 60-68; anterior B_1 - B_3 on T_9 each 46-54, 42-50, 49-54; posterior B_1 - B_4 on T_9 each 63-70, 52-60, 62-70, 48-54; B_1 - B_2 on T_{10} each 64-72, 66-76; ovipositor L 256-296. Antenna 314-343 in total L; L (W) of antennal segments: A_3 66-76 (18-20), A_4 58-69 (18-19), A_5 46-54 (15-17), A_6 54-62 (14-16), A_7 10-12 (5-6), A_8 14-16 (4-5).

♂. Colored as in females. T_7 with comb interrupted medially as in anterior segments; T_8 with complete comb; T_{10} with microtrichia on posterior half; S_6 and S_7 (Fig. 2.6) with narrowly transverse glandular area; aedeagus (Fig. 2.7) sharply pointed apically; paramere long and strongly turned upword, rounded apically, base with 3 short, 2 short and 2 long setae from base to apex. Body L 1.0-1.1 mm.

Specimens examined. Hokkaido: 6 ♀ 2 ♂ (*Glycine max*), Sapporo, Moiwa, VIII 6 1975; 2 ♂ (*Lespedeza bicolor*), Sapporo, Tsukisappu, VIII 16 1978; 1 ♀ 1 ♂ (*Pueraria lobata*), Shakotan, Bikuni, VIII 9 1978; 1 ♀ (*P. lobata*), Mori, Himekawa, VIII 21 1977. Akita: 4 ♀ 4 ♂ (*Miscanthus sinensis*), Akita, Nibetsu, VIII 28 1976. Iwate: 2 ♀ (*G. max*), Tono, Monomiyama, VIII 21 1975. Miyagi: 1 ♂ (*M. sinensis*), Matsushima, IX 17 1978; 1 ♀ (*Staphylea bumalda*), Akiu, Futakuchi (800 m), IX 18 1978. Yamagata: 5 ♀ 1 ♂ (*G. max*), Tsuruoka, Yutagawa, VIII 27 1976. Fukushima: 2 ♀ (*P. lobata*), Inawashiro, Ottate (1,000 m), VIII 25 1975; 1 ♀ (*Morus bombycis*), Tajima, VIII 27 1977. Tochigi: 8 ♀ (*M. bombycis*), Fujiwara, Kawaji (800 m), VIII 28 1977. Ibaraki: 2 ♀ 2 ♂ (*Quercus glauca*), Mito, Kairakuen, X 1 1976. Gumma: 1 ♀ 1 ♂ (*L. bicolor*), Haruna, Harunasan (1,000 m), VIII 23 1976. Saitama: 1 ♀ 1 ♂ (grass), Arakawa, Shiroku (800 m), VIII 29 1977. Chiba: 1 ♀ 1 ♂ (*Castanopsis cuspidata*), Amatsukominato, Kiyosumi, VIII 31 1977. Tokyo: 3 ♀ (*Cocculus trilobus*), Hachioji, Takaosan, VIII 13 1978. Kanagawa: 3 ♀ 1 ♂ (*G. max*), Hatano, Koboyama, VIII 14 1978. Niigata: 2 ♀ (*P. lobata*), Kanose, VIII 26 1977; 1 ♂ (*P. lobata*), Yahiko, VIII 25 1977. Toyama: 2 ♀ (*Amphicarpea edgeworthii*), Kamiichi, Oiwa (700 m), IX 19 1976. Yamanashi: 1 ♀ 1 ♂ (grass), Sutama, Masutomi (1,400 m), VII 24 1971; 1 ♀ (grass), VIII 2 1974, 1 ♂ (*Betula ermanii*), VII 27

1976, Mt. Kimpu (2,590 m, alpine zone). Nagano: 3 ♀ (*L. bicolor*), Shinano, Nojiri (1,000 m), VIII 26 1978; 8 ♀ (*A. edgeworthii*), Togakushi, Okusha (1,300 m), VIII 25 1978; 5 ♀ (*Quercus serrata*), Komagane, Suganodai (1,000 m), VII 28 1977. Gifu: 1 ♀ (*Arundinaria* sp.), Takayama, Yamaguchi. IX 26 1976. Shizuoka: 5 ♀ 2 ♂ (*Q. serrata*), Shizuoka, Umegashima (600 m), IX 20 1974; 2 ♀ 1 ♂ (*Kummerovia striata*), Shizuoka, Nihondaira, VII 13 1980. Tottori: 8 ♀ 3 ♂ (*C. trilobus*), Daisen, Daisenji (800 m), VIII 27 1978. Okayama: 1 ♀ (*P. lobata*), Takahashi, Gagyusan, VIII 29 1978. Yamaguchi: 1 ♀ (*C. cuspidata*), Nagato, Senzaki, X 17 1976. Tokushima: 1 ♀ (*Q. serrata*), Itchu, IX 24 1975; 2 ♀ 1 ♂ (*P. lobata*), Anan, Tsunomine, XI 5 1977. Ehime: 1 ♀ (*M. sinensis*), Misaki, IV 7 1976. Nagasaki: 1 ♀ (*Q. glauca*), Nagasaki, Inasayama, X 21 1977; 1 ♀ (*Ipomoea batata*), Nomozaki, Wakisaki, X 22 1977. Miyazaki: 1 ♀ 1 ♂ (*Actinidia arguta*), Nichinan, Udo, X 26 1977. Kagoshima: 2 ♀ 1 ♂ (*C. trilobus*), Sata, Odomari, X 8 1978.

Host plants. Actinidiaceae: *Actinidia rufa* (SIEB. et ZUCC.) PLANCH. Betulaceae: *Betula ermanii* CHAM. Fagaceae: *Castanopsis cuspidata* (THUNB.) SCHOTTKY, *Quercus glauca* THUNB., *Q. serrata* THUNB. Gramineae: *Arundinaria* MICHX., *Miscanthus sinensis* ANDERS., *Phyllostachys*. SIEB. et ZUCC., unidentified species. Leguminosae: *Amphicarpaea edgeworthii* BENTH., *Azukiangularis* (WILLD.) OHWI, *Glycine max* L., *Indigofera pseudotinctoria* MATSUM., *Kummerovia striata* (THUNB.) SCHINDLER, *Lespedeza bicolor* TURCZ., *Pueraria lobata* (WILLD.) OHWI, *Vicia cracca* L. Menispermaceae: *Cocculus trilobus* (THUNB.) DC. Moraceae: *Morus bombycis* L. Staphyleaceae: *Staphylea bumalda* (THUNB.) DC.

Distribution. Hokkaido: Ishikari, Shiribeshi, Oshima. Honshu: Akita, Iwate, Yamagata, Miyagi, Fukushima, Tochigi, Saitama, Gumma, Ibaraki, Chiba, Tokyo, Kanagawa, Niigata, Toyama, Yamanashi, Nagano, Shizuoka, Gifu, Osaka (KUROSAWA, 1968), Tottori, Okayama, Yamaguchi. Shikoku: Tokushima, Ehime. Kyushu: Fukuoka (KUROSAWA, 1968), Nagasaki, Miyazaki, Kagoshima. Palearctic: Korea.

Remarks. *H. abdominalis* is distinguished from *H. atactus* BHATTI, *H. adolfriderici* KARNY and *H. spadix* (HARTWIG) by abdominal segment V alone yellow. Most related species *H. liquidambar* CHEN was described in Taiwan, as differing from *H. abdominalis* in fore wing with 1–2 setae on hind vein and intermediate terga with a weak comb on posterior margin at middle. A single female of *H. liquidambar* collected by myself was available for study. The microtrichia of comb at median twelfth in *H. liquidambar* are about 3–8 μm , compared to 1–4 μm at about median fourth in *H. abdominalis*.

Hydatothrips (H.) ekasi n. sp.

♀. Generally brown; pronotal blotch, strongly sclerotized parts of

pterothorax and abdominal segments VII–IX dark; abdominal segments IV and V yellowish. Coxae dark brown; femora brown, fore femur yellowish except brown outer margin; tibiae and tarsi yellow. Fore wing brown to grayish brown, with subbasal pale area; scale dark but paler at extreme apex. A_1 – A_3 yellow, A_3 darker; A_4 yellow basally and brown apically; A_5 – A_8 brown, A_5 often slightly yellowish basally.

Head (Fig. 3.1) W/L 1.77–2.15; with transversely anastomosing striae and wrinkles among striae; occipital apodeme placed along POS series; occiput transversely reticulate, smooth in reticles; IOD/HOW 3.10–4.50; OOD/IOD 1.06–1.39; mouth cone long. Antenna (Fig. 3.2) 3.9–4.4 as long as head; A_3 longest, L/W 3.16–3.71; A_4 L/W 3.00–3.45, mostly longer than A_6 ; A_5 L/W 2.63–2.81; A_6 L/W 3.25–4.00; A_7 L/W 1.64–1.82; A_8 L/W 3.25–4.00; major sense cones on A_5 – A_7 arising from elongate base.

Pronotum (Fig. 3.1) W/L 1.75–1.85; transversely reticulate, with scant dots in front of blotch; blotch well developed, with closely spaced, transversely anastomosing striae bearing numerous dots among striae; anterior apodeme of blotch slightly concave medially, median L 0.48–0.53 as long as pronotum; with 29–36 setae; AMS B_1 0.15–0.31, AMS B_2 0.17–0.24, PMS B_1 0.18–0.23, and PMS B_2 0.24–0.31 as long as pronotum, respectively. Mesoscutum with closely spaced, transversely anastomosing striae, bearing dots; metascutum (Fig. 3.1) longitudinally striate but transversely striate antero- and posteromedially, bearing wrinkles medially; tegula covered with microtrichia (Fig. 3.3); mesosternum with 30–37 setae, metasternum with 18–21. Fore wing (Fig. 3.4) L/W 19.62–22.23; with 26–31 anterior and 54–64 posterior FH; costa with 23–29 setae, median seta 1.11–1.41 as long as wing W; fore vein with 21–28 setae, hind vein without setae. Hind wing with 62–74 FH.

T_2 – T_5 with microtrichia in front of B_1 and B_2 ; T_6 – T_8 with microtrichia except posterior fourth to third of each tergum at middle; T_9 without microtrichia, T_{10} with them at middle; T_1 – T_6 without comb of microtrichia at middle, T_7 and T_8 with complete comb, it on T_7 medially made of shorter microtrichia. Setal formula being: T_1 1, T_2 and T_3 2 + 1 m + 2, T_4 – T_7 2 + 1 m + 2 + 1 m. T_9 L/ T_{10} L 1.10–1.26; anterior B_1 – B_3 on T_9 each 0.61–0.71, 0.55–0.68 and 0.60–0.70 as long as T_9 ; posterior B_1 – B_4 on T_9 each 0.75–0.91, 0.63–0.74, 0.81–0.91 and 0.58–0.76 as long as T_9 ; B_1 – B_2 on T_{10} each 0.91–1.12 and 0.91–1.17 as long as T_{10} ; ovipositor 2.23–2.59 as long as pronotum. S_2 – S_7 (Fig. 3.6) without microtrichia and comb between B_1 ; comb made of longer microtrichia than discal ones.

Measurements (μ m). Body L 1.0–1.2 mm. Head L 66–82, W 140–145; pronotum L 96–106, W 174–186; AMS B_1 16–32, AMS B_2 16–24, PMS B_3 18–22, PMS B_4 25–34; blotch median L 46–55, lateral L 62–72, W 132–148; fore wing L 645–699, W 30–35; T_9 L 68–73; T_{10} L 56–66; anterior B_1 – B_3 on T_9 each 43–48, 40–46, 43–50; posterior B_1 – B_4 on T_9 each 54–64, 44–52, 58–63, 42–52; B_1 – B_2 on T_{10} each 60–64, 57–70; ovipositor L 228–268. Antenna 290–300 in total L; L (W)

of antennal segments: A_3 60–65 (17–19), A_4 52–58 (17–18), A_5 42–45 (15–16), A_6 51–58 (13–16), A_7 9–10 (5–6), A_8 13–16 (4).

♂. Colored as in females but often paler. T_1 – T_7 with comb interrupted medially; T_{10} with microtrichia on posterior half; S_5 – S_7 (Fig. 3.7) with transversely elongate glandular area, its width 75–92 on S_5 , 90–105 on S_6 and 82–102 on S_7 ; aedeagus sharply pointed apically; paramere (Fig. 3.8) not strongly turned up-ward, not dilated apically, only blunt; base with 3 short setae, 1 long seta and 1 medium seta. Body L 0.9–1.0 mm.

Specimens examined. Holotype ♀ (*Indigofera pseudotinctoria*), Shizuoka,

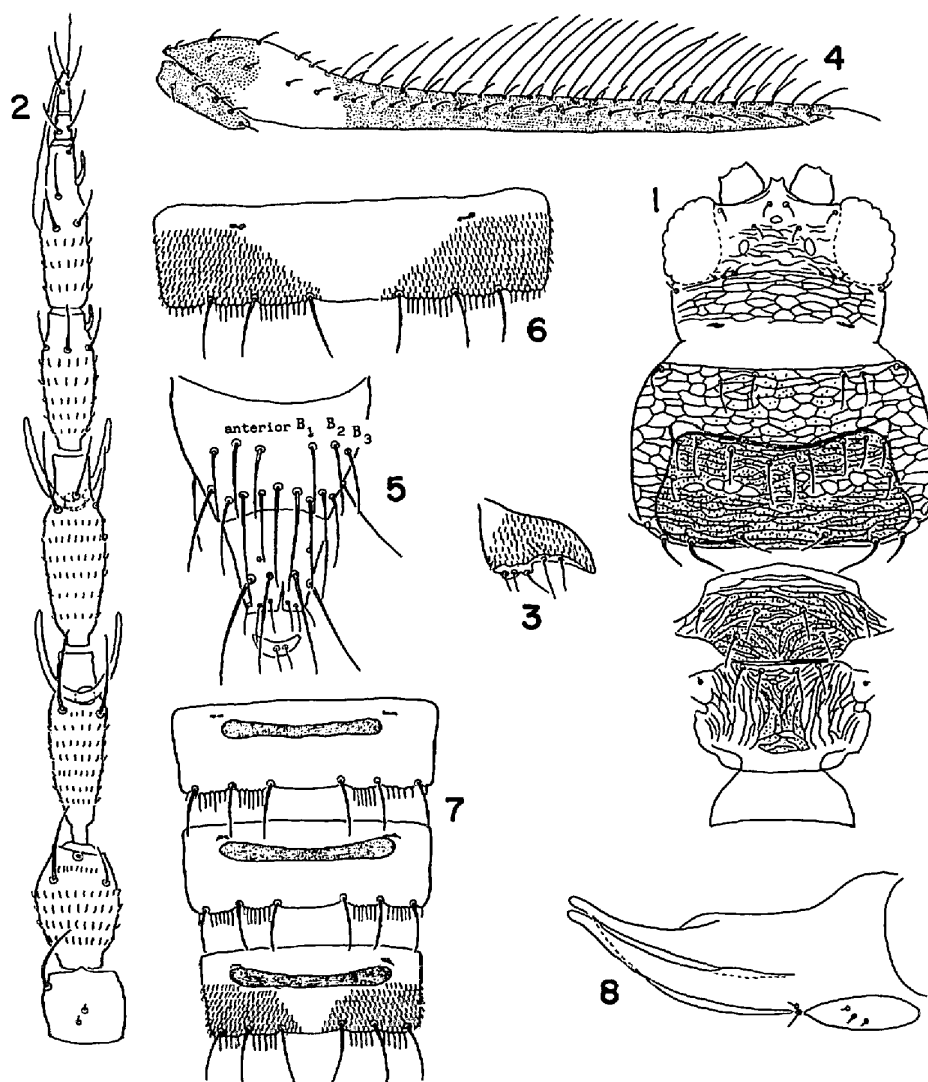


Fig. 3. *Hydatothrips (H.) ekasi*. — 1, ♀, head and thorax, dorsal; 2, ♀, antenna; 3, ♀, tegula; 4, ♀, fore wing; 5, ♀, T_9 and T_{10} ; 6, ♀, S_5 ; 7, ♂, S_5 – S_7 ; 8, ♂, genitalia, dorso-lateral.

Umegashima (600 m), VIII 12 1979. Paratypes. Kanagawa: 8 ♀ (*I. pseudotinctoria*), Hatano, Koboyama, VIII 14 1978. Shizuoka: 21 ♀ 9 ♂, same data as the holotype except IX 20 1974; 5 ♀, collected with the holotype and 30 ♀ 11 ♂ (*Kummerovia striata*), same data as the holotype.

Host plants. Leguminosae: *Indigofera pseudotinctoria* MATSUM., *Kummerovia striata* (THUNB.) SCHINDLER.

Distribution. Honshu; Kanagawa, Shizuoka.

Remarks. *H. ekasi* is similar to *H. proximus* BHATTI from Northern India in abdominal segments II–VI without comb at middle and pronotal blotch with wrinkles between the lines of sculpture. But it differs in T_{10} with microtrichia and S_5 – S_7 of males with a transversely elongate glandular area (shorter ones only on S_6 and S_7 in *proximus*). It differs from *H. ramaswamiahi* (PRIESNER) in longer costal setae, pronotal blotch with wrinkles, and reticles around blotch made of dark lines of sculpture. The specific name “ekasi” means the old man, the great man or the chief in the Ainu language.

Hydatothrips sgen. *Kazinothrips* BHATTI

Kazinothrips BHATTI, 1973, Orient. Ins., 7: 432.

Occipital apodeme running along or close to POS series or not distinct. Antenna 7-segmented. Pronotum with or without blotch; metasternum without V-shaped apodeme. Abdominal sterna with 3 pairs of setae.

Three species are present in this subgenus including a new species to be described below.

Hydatothrips (*K.*) *reticulatus* n. sp.

♀. Dark brown, membranous areas of pterothorax and abdominal segments I–VII paler; legs dark brown, tarsi gray; fore wing dark brown, with sub-basal pale band, scale dark. A_1 brown; A_2 pale yellow; A_3 and A_4 pale grayish brown; A_5 grayish brown; A_6 and A_7 dark brown.

Head (Fig. 4.1) W/L 2.20; polygonally reticulate; ocellar region slightly elevated and eye so strongly bulged that vertex concave between eye and ocellar region; occipital apodeme not defined; IOD/HOW 2.20; OOD/IOD 1.64. Antenna (Fig. 4.2) ca. 4.2 as long as head; segments not correctly measured; A_3 L/W 2.9, longer than A_4 and A_5 ; A_4 L/W 2.4; A_5 L/W 2.5; A_6 longest, L/W 3.5; A_7 L/W 4.2, ca. 0.5 as long as A_6 ; major sense cones on A_5 – A_7 arising from short base; A_3 – A_5 each with 4, 4, 6 setae.

Pronotum (Fig. 4.1) W/L 1.54; with 32 setae; polygonally reticulate, without wrinkles; blotch bow-shaped, with closely spaced, transversely anastomosing striae, smooth between striae; blotch median L 0.15 as long as pronotum; pro-

spinasternum narrow but distinct. Mesoscutum (Fig. 4.1) with broken scallop-like striae, with wrinkles between striae, inner median setae distinctly anterior to outer ones; tegula with a few transversely anastomosing striae; metascutum reticulate, with numerous dots, median setae close to anterior margin; mesosternum with 38 setae, metasternum with 23. Fore wing (Fig. 4.3) L/W 17.87; with 30–34 anterior FH; costa with 29–31 setae, median seta 1.02–1.11 as long as wing W; fore vein with 22–25 setae, hind vein without setae. Hind wing with 88–92 FH.

T₁–T₅ medially lacking microtrichia except an inconspicuous patch of rudimentary microtrichia between and in front of B₁; T₆–T₈ medially with weak microtrichia except anterior and posterior third of each tergum at middle; T₁₀ with

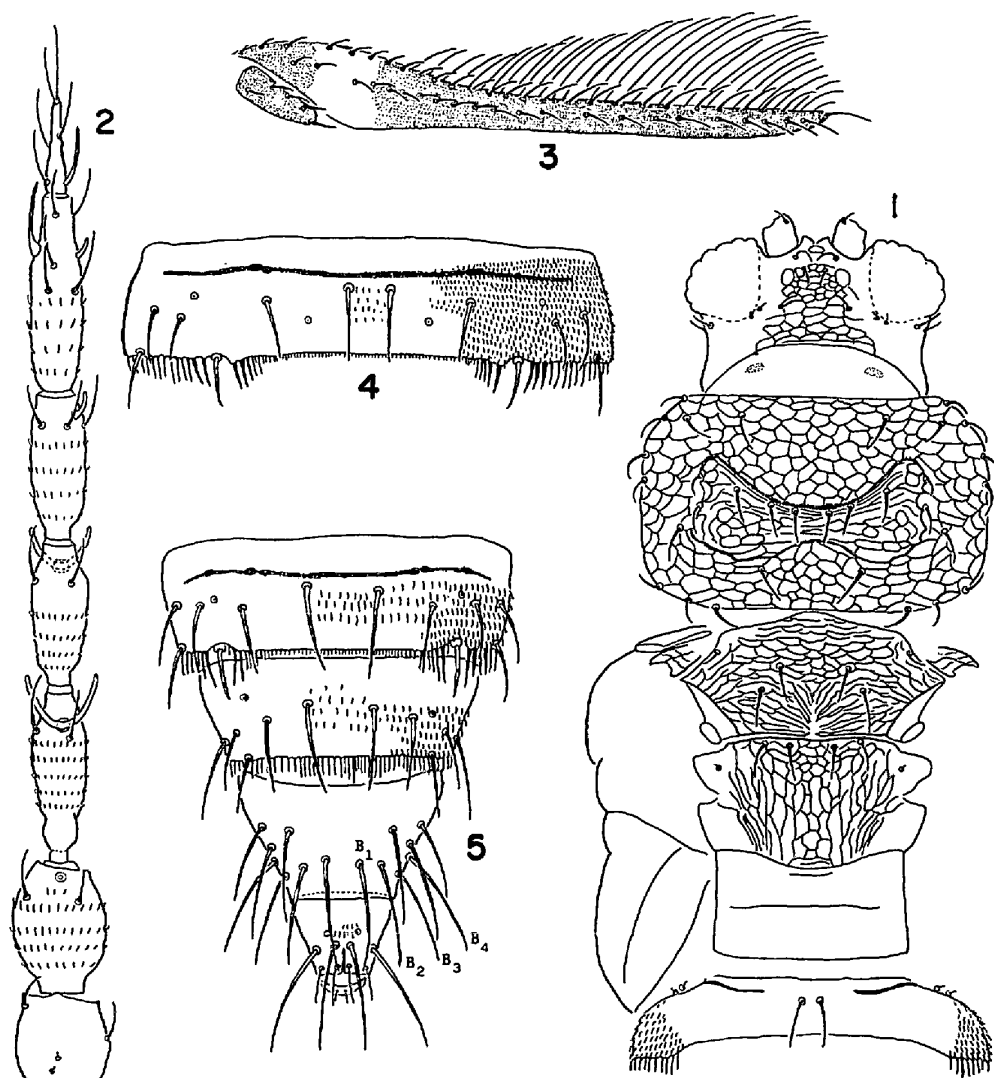


Fig. 4. *Hydatothrips (K.) reticulatus*, ♀. — 1, Head, thorax and T₁; 2, antenna; 3, fore wing; 4, T₄; 5, T₇–T₁₀.

weak microtrichia between and in front of CPS; T_1 – T_8 with complete comb on posterior margin, that on T_1 interrupted medially, on median part of T_2 – T_7 formed minute microtrichia, lateral comb made of long and stout ones (Fig. 4.4); T_1 and T_6 – T_9 (Fig. 4.5) without median CPS. Setal formula being: T_1 1, T_2 and T_3 2+1 m+2, T_4 – T_7 2+1 m+2+1 m. $T_9L/T_{10}L$ 1.35; anterior B_1 – B_3 on T_9 each 0.77, 0.97, and 0.71 as long as T_9 ; posterior B_1 – B_3 on T_9 each 1.07, 1.06 and 0.97 as long as T_9 ; B_1 – B_2 on T_{10} each 1.38 and 1.42 as long as T_{10} . Sterna without posteromarginal comb; S_7 with setae slightly ahead of posterior margin; ovipositor ca. 1.5 as long as pronotum.

Measurements (μ m). Body L 1.2 mm. Head L 70, W 154; pronotum L 135, W 208; fore wing L 840, W 70; T_9 L 70, T_{10} L 52; anterior B_1 – B_3 on T_9 each 54, 68, 50; posterior B_1 – B_3 on T_9 each 75, 74, 68; B_1 – B_2 on T_{10} each 72, 74; ovipositor L 202. Antenna not correctly measured, 285 in total L; L (W) of antennal segments: A_3 52 (18), A_4 43 (18), A_5 44 (18), A_6 56 (17), A_7 29 (7).

♂. Unknown.

Specimen examined. Holotype ♀ (?*Oplismenus*), Himeji, Shoshasan, X 10 1975.

Host plant. Uncertain.

Distribution. Honshu: Hyogo.

Remarks. *H. (K.) reticulatus* is distinct from the two congeners, *H. (K.) luridus* (ANANTHAKRISHNAN) and *H. (K.) osumundae* (CRAWFORD, J. C.) by the absence of occipital apodeme, major sense cones on A_5 – A_7 arising from short base, fore wing with only one pale band, abdominal terga with a distinct antecostal line, and by T_6 and T_7 without median CPS. Moreover it differs from *H. luridus* in pronotum with polygonal reticles lacking wrinkles (vs. transversely anastomosing striae bearing numerous wrinkles) and B_3 on intermediate terga posteromarginal (vs. in front of the margin), and from *H. osumundae* in uniformly dark color (vs. generally yellow) and a distinct pronotal blotch (vs. the blotch absent).

Hydatothrips sgen. *Neohydatothrips* JOHN

Neohydatothrips JOHN, 1929, Bull. Annls. Soc. ent. belg., 69: 33–34; BHATTI, 1973. Orient. Ins., 7: 434–436.

Occipital apodeme placed variably, often cutting off a wide crescentic occiput, sometimes a narrow occipital rim. Antenna 8-segmented; A_3 – A_6 respectively with 5, 5, 6, 8 setae. Pronotum usually with well defined blotch; metasternum with a transverse line along anterior margin, this line sometimes forms T-shaped apodeme. S_3 – S_7 with 3 pairs of setae.

Neohydatothrips is separated from *Onihothrips* by abdominal sterna with three pairs of setae instead of four pairs. *Sericothrips epipactis* KUROSAWA, 1941, from Northeastern China belongs to this subgenus.

Key to Japanese species

1. T₂-T₆ (Fig. 5.6) with posteromarginal flange bearing inconspicuous microtrichia at middle. S₄-S₇ of males (Fig. 5.8) with large, oval glandular area *gracilicornis* (WILLIAMS)
- T₂-T₆ (Fig. 6.3) without posteromarginal flange. S₄-S₆ of males without glandular area 2
2. T₄-T₆ (Fig. 7.4) with 4-7 setae laterad of B₃. Hind vein of fore wing with 2-3 apical setae. Abdominal sterna entirely covered with microtrichia *mitubautugi* n. sp.
- T₄-T₆ with 3 setae laterad of B₃. Hind vein of fore wing with 1 apical seta. Abdominal sterna medially lacking microtrichia 3
3. Pronotum except blotch (Fig. 8.1) with closely spaced, transversely anastomosing striae and scanty wrinkles among striae. T₂-T₇ without wrinkles among microtrichia. Abdominal sterna (Fig. 8.7) without microtrichia between B₂. Tegula without microtrichia *elaeagni* n. sp.
- Pronotum except blotch (Fig. 6.1) transversely reticulate, with numerous wrinkles. T₂-T₄ and T₇ (Fig. 6.3) interspersed with longitudinal wrinkles among dark, stout microtrichia. Abdominal sterna without microtrichia between B₁ only. Tegula with microtrichia *ponyaunpe* n. sp.

Hydatothrips (N.) gracilicornis (WILLIAMS) n. comb.

Sericothrips gracilicornis WILLIAMS, 1916, Entomologist, 49: 222.

♀. Generally dark brown; abdominal segments I-VI brown, IV and V slightly paler. Coxae and femora dark brown, fore femur paler at apical fourth; fore tibia brownish yellow, mid and hind tibiae brown; tarsi brownish yellow. Fore wing dark brown with subbasal pale band; scale dark. A₁ brown basally, yellow apically; A₂ and A₃ yellow, A₃ shaded at apical third; A₄-A₈ dark brown.

Head (Fig. 5.1) W/L 1.69-2.10; transversely striate; occipital apodeme close to POS series; occiput closely transversely striate; POS B₁ developed as IOS and AOS, much longer than POS B₂ and B₃; IOD/HOW 3.20-4.71; OOD/IOD 1.22-1.53; mouth cone long. Antenna (Fig. 5.2) 3.3-3.9 as long as head; A₃ longest, L/W 3.50-3.70; A₄ L/W 3.03-3.39, mostly longer than A₆; A₅ L/W 2.63-2.94; A₆ L/W 3.26-3.94; A₇ L/W 1.50-1.86; A₈ L/W 3.00-3.40; major sense cones on A₅-A₇ arising from short base.

Pronotum (Fig. 5.1) W/L 1.49-1.68; with transversely anastomosing striae, partly forming reticles, the striae closer together in blotch area; without wrinkles among striae; blotch developed, anterior apodeme concave medially; blotch median L 0.47-0.66 as long as pronotum; with 30-32 setae; AMS B₁ 0.19-0.25, AMS B₂ 0.14-0.20, PMS B₁ 0.18-0.27 and PMS B₂ 0.29-0.41 as long as pronotum,

respectively; prospinasternum distinct. Mesoscutum (Fig. 5.1) with broken, transverse striae, without wrinkles; tegula (Fig. 5.3) with a few transversely anastomosing striae; metascutum with transversely anastomosing striae on anterior and posterior parts, longitudinally anastomosing striae at middle, without wrinkles among striae; mesosternum (Fig. 5.4) with 31–40 setae; metasternum with 16–23 setae, without T-shaped apodeme. Fore wing L/W 16.45–19.15; with 21–26 anterior and 42–56 posterior FH; costa with 21–28 setae, median seta 1.05–1.40 as long as wing W; fore vein with 19–22 setae, hind vein with 1 apical seta but sometimes lacking it. Hind wing with 56–71 FH.

T₁ (Fig. 5.5) medially lacking microtrichia except a few rows around B₁; T₂ and T₃ medially with weak microtrichia in front of B₁ and usually between them; T₄–T₆ (Fig. 5.6) medially bearing microtrichia except anterior and posterior thirds of each tergum; T₇ and T₈ with an almost complete cover of microtrichia; T₉ and T₁₀ without microtrichia; T₂–T₈ with posteromarginal flange bearing rudimentary microtrichia; T₁–T₃ without comb at middle, that on T₄–T₆ made of minute microtrichia at middle, on T₇ and T₈ complete. Setal formula being: T₁ 1, T₂ and T₃ 2+1 m+2, T₄–T₇ 2+1 m+2+1 m. T₉L/T₁₀L 1.05–1.19; anterior B₁–B₃ on T₉ each 0.64–0.79, 0.60–0.77 and 0.77–0.92 as long as T₉; posterior B₁–B₄ on T₉ each 0.88–1.11, 0.67–0.84, 0.70–1.05 and 0.62–0.74 as long as T₉; B₁–B₂ on T₁₀ each 1.03–1.26 and 1.00–1.21 as long as T₁₀. S₂–S₇ (Fig. 5.7) with microtrichia laterad of B₁; S₂–S₆ with posteromarginal flange between B₃, with complete comb of long and fine microtrichia; S₇ without comb at middle and posteromarginal flange; ovipositor 1.77–1.94 as long as pronotum.

Measurements (μm). Body L 1.3–1.4 mm. Head L 88–104, W 172–189; pronotum L 134–154, W 214–234; AMS B₁ 26–36, AMS B₂ 20–30, PMS B₁ 27–40, PMS B₂ 41–60; blotch median L 66–88, lateral L 94–104, W 166–192; fore wing L 691–812, W 40–47; T₉ L 76–84, T₁₀ L 66–76; anterior B₁–B₃ on T₉ each 53–60, 50–62, 62–70; posterior B₁–B₄ on T₉ each 70–84, 52–66, 72–82, 50–59; B₁–B₂ on T₉ each 70–88, 72–86; ovipositor L 248–279. Antenna 324–346 in total L; L (W) of antennal segments: A₃ 68–74 (19–21), A₄ 57–64 (18–19), A₅ 48–52 (17–19), A₆ 54–63 (16–18), A₇ 11–13 (7–8), A₈ 15–18 (5–6).

♂. Colored almost as in females; abdominal segment VII paler than in females. S₂ and S₃ at middle without microtrichia except 1 or 2 rows along posterior margin; S₄–S₈ with microtrichia on posterior fourth to third at middle; S₄–S₇ (Fig. 5.8) with oval glandular area occupying fifth to sixth of each sternal W. Genitalia (Fig. 5.9): aedeagus sharply pointed apically; paramere not strongly turned upward, slightly expanded and rounded apically, probably with 1 long and 3 short setae at base. Body L 1.1–1.2 mm.

Specimens examined. Hokkaido: 2 ♀ (*Lathyrus japonicus*), Ishikari, Bannaguro, VI 16 1969; 8 ♀ 1 ♂ (*Vicia cracca*), Sapporo, Hokkaido Univ. Campus, VIII 19 1977; 1 ♂ (*V. cracca*), Eniwa, Shimamatsu, VIII 14 1977; 8 ♀ (*V. cracca*), Shakotan, Bikuni, VIII 19 1978; 15 ♀ 3 ♂ (*V. cracca*), Nanae, Mt.

Yokotsu (600 m), VIII 23 1977. Ibaraki: 2 ♀ 2 ♂ (grass), Oarai, X 2 1976.

Host plants. Leguminosae: *Lathyrus japonicus* WILLD., *Vicia cracca* L.

Distribution. Hokkaido: Ishikari, Shiribeshi, Oshima. Honshu: Ibaraki. Palearctic: England, Sweden, Finland, France, Italy, Switzerland, Austria, Germany, Poland, Hungary, Rumania, Czechoslovakia, Yugoslavia, USSR (Russia, Siberia), Balearic Is., Morocco, Turkey, Israel, Iran.

Remarks. *H. (N.) gracilicornis* is distinct from all congeners in abdominal segments with posteromarginal flanges bearing rudimentary microtrichia. It is apparently associated with *Vicia cracca*.

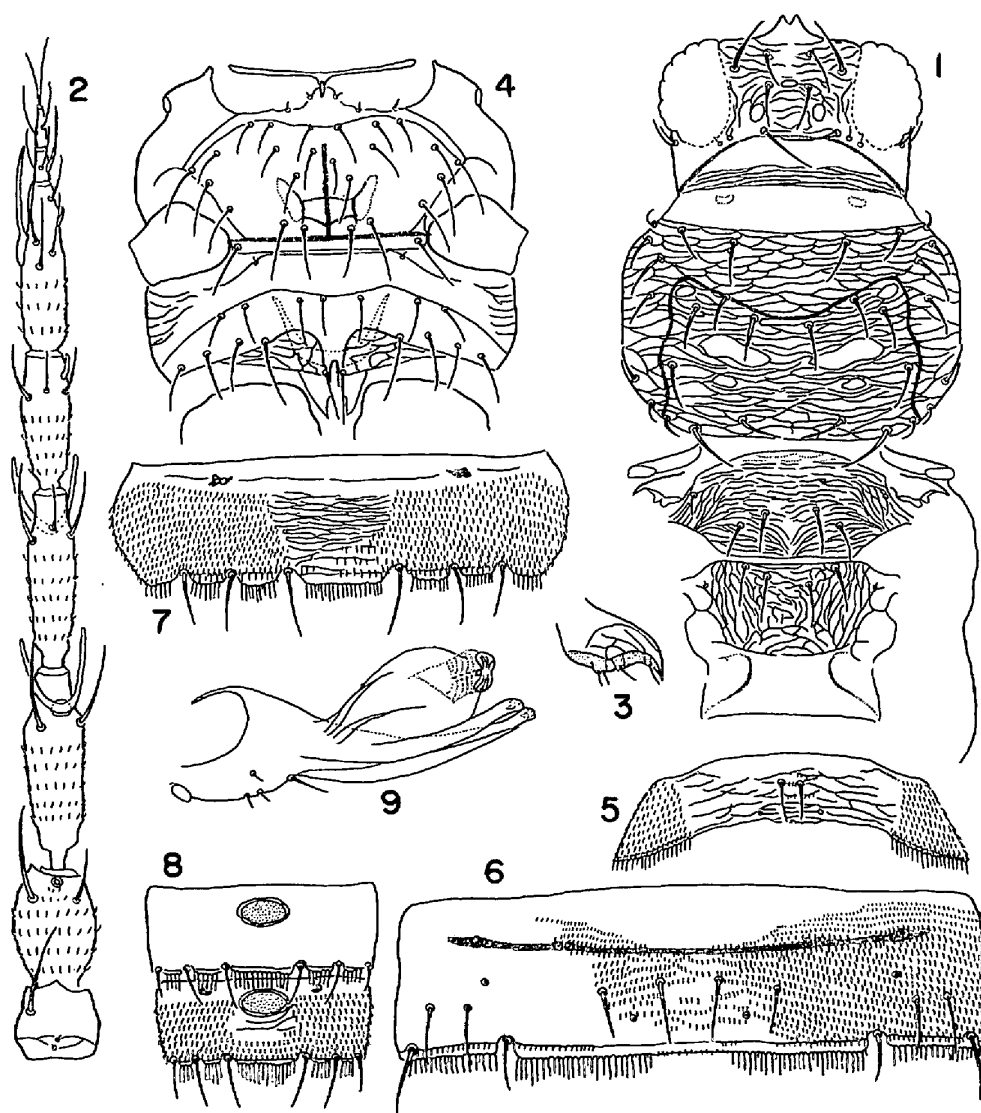


Fig. 5. *Hydatothrips (N.) gracilicornis*. — 1, ♀, head and thorax, dorsal; 2, ♀, antenna; 3, ♀, tegula; 4, ♀, meso- and metasternum; 5, ♀, T₁; 6, ♀, T₅; 7, ♀, S₅; 8, ♂, S₆ and S₇; 9, ♂, genitalia, dorsolateral.

Hydatothrips (N.) ponyaunpe n. sp.

♀. Generally dark brown; metathorax and abdominal segments I-IV slightly paler; segments V and VI pale brown; femora dark brown; fore tibia brown basally, yellow apically, mid and hind tibiae dark brown, usually slightly paler apically; tarsi yellow. Fore wing dark, with subbasal pale band; scale dark basally, pale apically; wing setae hyaline on pale area, dark on dark area. A_1 brown; A_2 yellow or pale grayish brown; A_3 and A_4 yellowish brown, darker apically, A_3 paler than A_4 ; A_5 - A_8 dark brown, A_5 paler basally. Sometimes entirely becoming darker.

Head (Fig. 6.1) W/L 1.95-2.35; with transversely anastomosing striae, with dots among striae; occiput with transversely anastomosing striae, without dots or wrinkles; occipital apodeme placed along POS series; IOD/HOW 3.60-4.88; OOD/IOD 1.05-1.24; mouth cone moderately long, broadly conical. Antenna (Fig. 6.2) 3.6-3.9 as long as head; A_3 longest, L/W 3.32-4.06; A_4 L/W 3.19-3.71, longer than A_6 ; A_5 L/W 2.69-3.13; A_6 L/W 3.18-3.60; A_7 L/W 1.54-1.83; A_8 L/W 2.60-3.75; major sense cones on A_5 - A_7 arising from elongate base.

Pronotum (Fig. 6.1) W/L 1.88-2.04; transversely reticulate in front of blotch; with transversely anastomosing striae in blotch; with numerous wrinkles; blotch developed, slightly narrowed medially; blotch median L 0.56-0.67 as long as pronotum; with 27-29 setae; AMS B_1 0.18-0.27, AMS B_2 0.11-0.16, PMS B_1 0.15-0.20, PMS B_2 0.40-0.48 as long as pronotum, respectively; PMS B_2 much longer than the other pronotal setae; prospinasternum reduced. Mesoscutum (Fig. 6.1) with transversely anastomosing striae, with dots, inner median setae far anterior to the outer ones; tegula covered with microtrichia; metascutum with transversely anastomosing striae on anterior and posterior middle, longitudinal striae on median half, with dots among striae; mesosternum with 34-42 setae, metasternum with 20-25. Fore wing L/W 19.81-21.95; with 35-40 anterior and 73-79 posterior FH; costa with 26-32 setae, median seta 1.00-1.25 as long as wing W; fore vein with 22-29 setae, hind vein with 1 (rarely 2) seta. Hind wing with 78-87 FH.

T_1 without microtrichia at middle; T_2 - T_4 (Fig. 6.3) with microtrichia in front of B_1 and B_2 ; T_5 and T_6 with microtrichia except posterior fourth to third of each tergum at middle; T_7 and T_8 almost covered with microtrichia; T_{10} with microtrichia at middle; T_2 - T_8 with almost complete comb, that on T_2 - T_6 , particularly on anterior terga made of much smaller microtrichia; lateral comb on T_1 - T_4 made of microtrichia much stouter than on T_5 and T_6 ; T_2 - T_4 and T_7 (Fig. 6.3) interspersed with longitudinal wrinkles among dark, stout microtrichia laterad of B_2 . Setal formula being: T_1 1, T_2 and T_3 2+1 m+2, T_4 - T_7 2+1 m+2+1 m. T_9 L/ T_{10} L 1.08-1.26; anterior B_1 - B_3 on T_9 each 0.58-0.76, 0.55-0.66 and 0.60-0.79 as long as T_9 ; posterior B_1 - B_4 on T_9 each 0.80-1.03, 0.63-0.86, 0.83-0.95 and 0.63-0.76 as long as T_9 ; B_1 - B_2 on T_{10} each 0.88-1.10 and 0.94-1.09 as long as

T_{10} . Sterna without microtrichia and comb between B_1 as shown in Fig. 6.4; ovipositor 2.19–2.49 as long as pronotum.

Measurements (μm). Body L 1.2–1.3 mm. Head L 70–92, W 171–182; pronotum L 102–116, W 208–222; blotch median L 58–74, lateral L 72–84, W 162–186; AMS B_1 20–30, AMS B_2 12–18, PMS B_1 16–22, PMS B_2 45–52; fore wing L 740–844, W 36–42; T_9 L 70–84; T_{10} L 62–73; anterior B_1 – B_3 on T_9 each 46–56, 44–50, 44–56; posterior B_1 – B_4 on T_9 each 63–76, 50–64, 64–74, 50–58; B_1 – B_2 on T_{10} each 60–72, 64–72; ovipositor L 240–274. Antenna 302–313 in total L; L (W) of antennal segments: A_3 63–68 (17–19), A_4 58–63 (17–18), A_5 44–50 (16–18), A_6 50–54 (15–16), A_7 10–11 (6), A_8 12–15 (4–5).

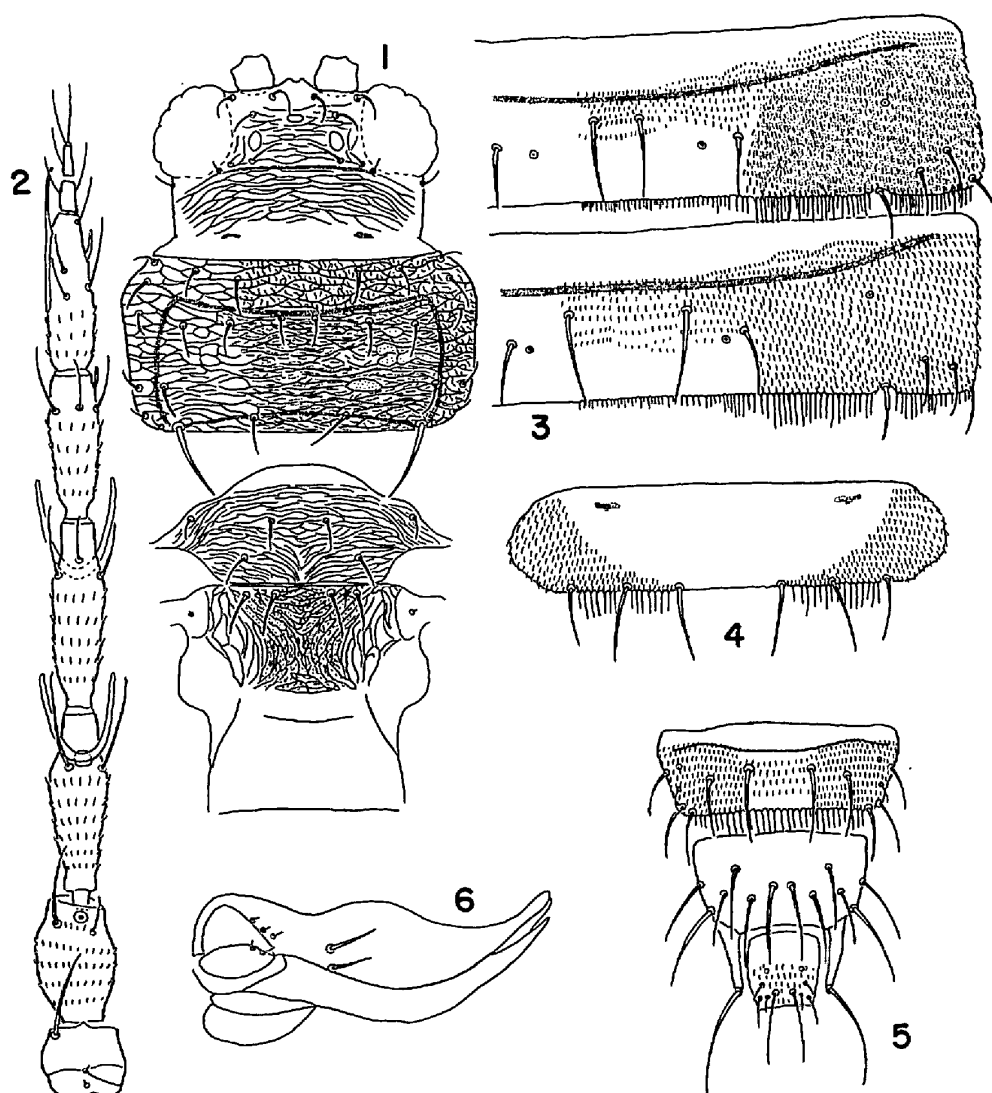


Fig. 6. *Hydatothrips (N.) ponyaunpe*. — 1, ♀, head and thorax, dorsal; 2, ♀, antenna; 3, ♀, part of T_4 and T_5 ; 4, ♀, S_5 ; 5, ♂, T_3 – T_{10} ; 6, ♂, genitalia, ventro-lateral.

♂. Colored as in females. T_8 (Fig. 6.5) without microtrichia in front of antecostal line and on posterior third at middle; T_{10} with microtrichia on posterior half; sterna without glandular area. Genitalia (Fig. 6.6): aedeagus sharply pointed

Table 3. Mean and S.D. of quantitative characters in females of four *Hydatothrips* species.
(Characters abbreviated as numerals, see Table 2.)

Character	<i>H. gracilicornis</i>		<i>H. ponyaunpe</i>		<i>H. mitubautugi</i>		<i>H. elaeagni</i>	
	Mean \pm S.D.	n	Mean \pm S.D.	n	Mean \pm S.D.	n	Mean \pm S.D.	n
1.	1.86 \pm 0.13	11	2.14 \pm 0.12	10	2.08 \pm 0.10	10	2.01 \pm 0.14	12
2.	3.86 \pm 0.55	11	4.21 \pm 0.44	11	3.54 \pm 0.56	10	2.91 \pm 0.22	13
3.	1.38 \pm 0.10	11	1.15 \pm 0.06	11	1.14 \pm 0.15	10	1.54 \pm 0.09	12
4.	3.59 \pm 0.07	10	3.72 \pm 0.20	11	2.97 \pm 0.13	10	2.99 \pm 0.10	10
5.	3.26 \pm 0.11	10	3.39 \pm 0.15	11	3.21 \pm 0.13	10	2.96 \pm 0.18	10
6.	2.76 \pm 0.11	10	2.81 \pm 0.13	11	2.67 \pm 0.14	10	2.58 \pm 0.13	10
7.	3.47 \pm 0.20	10	3.33 \pm 0.16	11	3.16 \pm 0.23	10	3.55 \pm 0.14	10
8.	1.65 \pm 0.11	10	1.73 \pm 0.10	11	1.68 \pm 0.13	10	1.52 \pm 0.10	10
9.	3.15 \pm 0.15	10	2.88 \pm 0.35	11	2.59 \pm 0.24	10	2.99 \pm 0.15	10
10.	1.59 \pm 0.06	11	1.97 \pm 0.06	11	1.64 \pm 0.05	10	1.61 \pm 0.04	12
11.	0.55 \pm 0.06	11	0.61 \pm 0.04	12	0.25 \pm 0.03	10	0.30 \pm 0.02	12
12.	1.26 \pm 0.11	11	1.18 \pm 0.08	11	2.40 \pm 0.29	10	2.07 \pm 0.15	12
13.	2.23 \pm 0.18	11	2.63 \pm 0.16	11	4.95 \pm 0.68	10	4.02 \pm 0.26	12
14.	0.21 \pm 0.02	10	0.20 \pm 0.03	9	0.25 \pm 0.03	10	0.19 \pm 0.02	11
15.	0.16 \pm 0.02	10	0.13 \pm 0.02	8	0.19 \pm 0.04	10	0.12 \pm 0.02	11
16.	0.25 \pm 0.03	9	0.18 \pm 0.02	8	0.28 \pm 0.02	10	0.18 \pm 0.01	10
17.	0.34 \pm 0.04	10	0.45 \pm 0.03	7	0.32 \pm 0.03	10	0.25 \pm 0.03	12
18.	31.2 \pm 0.8	10	27.8 \pm 0.6	11	30.9 \pm 1.6	10	29.9 \pm 1.4	12
19.	34.1 \pm 2.5	11	38.0 \pm 2.5	10	38.9 \pm 2.9	11	28.0 \pm 1.2	9
20.	19.4 \pm 2.0	11	22.8 \pm 1.5	12	26.4 \pm 2.0	11	17.8 \pm 0.7	13
21.	17.59 \pm 1.02	9	20.81 \pm 0.71	10	19.44 \pm 0.69	10	17.57 \pm 0.58	10
22.	1.23 \pm 0.09	10	1.09 \pm 0.09	10	1.12 \pm 0.05	10	0.86 \pm 0.08	10
23.	24.6 \pm 1.8	18	28.6 \pm 1.4	17	31.6 \pm 1.6	18	27.1 \pm 1.9	16
24.	20.7 \pm 1.0	18	24.6 \pm 2.1	17	25.9 \pm 2.1	19	17.0 \pm 1.5	16
25.	23.9 \pm 1.7	14	37.6 \pm 1.6	14	36.6 \pm 1.9	17	27.8 \pm 2.0	16
26.	52.0 \pm 5.5	6	75.8 \pm 2.3	10	75.9 \pm 3.8	13	60.4 \pm 2.1	11
27.	64.7 \pm 5.6	12	83.6 \pm 2.9	13	86.1 \pm 5.9	14	69.4 \pm 2.7	15
28.	1.12 \pm 0.04	10	1.14 \pm 0.06	12	1.03 \pm 0.04	10	1.16 \pm 0.03	11
29.	0.71 \pm 0.05	10	0.68 \pm 0.06	12	0.84 \pm 0.06	10	0.64 \pm 0.04	11
30.	0.68 \pm 0.05	10	0.62 \pm 0.04	12	0.87 \pm 0.07	10	0.66 \pm 0.08	11
31.	0.82 \pm 0.04	10	0.69 \pm 0.06	12	0.95 \pm 0.08	10	—	
32.	0.99 \pm 0.07	11	0.89 \pm 0.07	13	1.03 \pm 0.08	10	0.85 \pm 0.06	11
33.	0.76 \pm 0.06	10	0.75 \pm 0.07	12	0.87 \pm 0.07	10	0.64 \pm 0.03	11
34.	0.95 \pm 0.10	10	0.90 \pm 0.05	12	1.01 \pm 0.07	10	0.89 \pm 0.06	11
35.	0.70 \pm 0.04	10	0.70 \pm 0.04	12	0.87 \pm 0.07	10	0.58 \pm 0.06	10
36.	1.15 \pm 0.09	10	1.00 \pm 0.07	10	1.12 \pm 0.08	10	0.99 \pm 0.09	11
37.	1.13 \pm 0.07	10	1.01 \pm 0.05	10	1.15 \pm 0.06	10	1.04 \pm 0.09	10
38.	1.85 \pm 0.05	11	2.34 \pm 0.10	12	1.71 \pm 0.06	10	2.26 \pm 0.05	12

apically; paramere curved upward at about apical third, not pointed nor expanded apically, base with 5 minute, and 2 long and stout setae. Body L 1.0 mm.

Specimens examined. Holotype ♀ (*Magnolia obovata*), Shizuoka, Umegashima (600 m), X 10 1985. Paratypes. Hokkaido: 5 ♀ 1 ♂ (*M. obovata*), Tomakomai, Hokkaido Univ. Exp. Forest, VIII 17 1978. Aomori: 1 ♀ (*Betula ermanii*), Mt. Iwaki (1,400 m), VIII 29 1976. Miyagi: 3 ♀ (*Quercus serrata*), Matsushima, IX 17 1978; 1 ♂ (*Clerodendrum trichotomum*), Akiu, Futakuchi (600 m), IX 18 1978. Nagano: 1 ♀ 1 ♂ (*M. obovata*), Togakushi, Okusha (1,300 m), VIII 25 1978. Shizuoka: 8 ♀ 4 ♂, collected with the holotype; 16 ♀ 16 ♂, same data as the holotype except IX 26 1985. Tottori: 8 ♀ 4 ♂ (*M. obovata*), Daisen, Daisenji (800 m), VIII 28 1978.

Host plants. Fagaceae: *Quercus serrata* THUNB. Magnoliaceae: *Magnolia obovata* THUNB.

Distribution. Hokkaido: Iburi. Honshu: Aomori, Miyagi, Nagano, Shizuoka, Tottori.

Remarks. *H. (N.) ponyaunpe* is related to *H. (N.) abnormis* (KARNY) from Europe and *H. (N.) portoricensis* (MORGAN) from Brazil and Puerto Rico by occipital apodeme placed along POS series, pronotal sculpture made of widely spaced, transversely anastomosing striae, often forming reticles, developed pronotal blotch, and T_4 - T_6 with 3 setae laterad of B_2 . But it differs from the latter two in tegula covered with microtrichia, and microtrichia on T_2 - T_4 and T_7 interspersed with longitudinal wrinkles. Moreover it differs from *H. abnormis* in posterior margin of pronotal blotch not strongly arched medially and males without sternal glandular areas, and from *H. portoricensis* in abdominal segments V and VI yellow and fore wing with only a subbasal pale band. The specific name "ponyaunpe" is a familiar hero in the Ainu myths or legends.

Hydatothrips (N.) mitubautugi n. sp.

♀. Head, strongly sclerotized areas of thorax and abdominal segments VII-X dark brown, the rest brown; legs dark brown but fore tibia and all tarsi brown; fore wing dark brown, with a pale subbasal band. A_1 and A_2 brown, A_2 sometimes paler; A_3 pale gray with brown tint; A_4 - A_8 dark brown, A_4 paler at extreme base.

Head (Fig. 7.1) W/L 1.87-2.22; ocellar region with transversely anastomosing striae, partly reticles; occipital apodeme placed along POS series; occiput with longitudinal wrinkles on anterior third and transversely anastomosing striae on posterior two thirds; IOD/HOW 2.92-4.40; OOD/IOD 0.91-1.40; mouth cone moderately long. Antenna (Fig. 7.2) 3.4-4.0 as long as head; A_3 L/W 2.80-3.24, as long as A_4 ; A_4 L/W 3.06-3.44; A_5 L/W 2.47-2.94; A_6 L/W 2.91-3.63, shorter than A_3 and A_4 ; A_7 L/W 1.50-1.83; A_8 L/W 2.20-3.00; major sense cones on A_5 - A_7 arising from elongate base.

Pronotum (Fig. 7.1) W/L 1.55–1.70; reticulate in front of blotch; with transversely anastomosing striae in blotch, the striae being closer than the outside of blotch; with numerous wrinkles among striae; blotch developed, concave medially, faintly at anterior margin and deeply at posterior margin; blotch median L 0.19–0.29 as long as pronotum; with 28–34 setae; AMS B₁ 0.20–0.29, AMS B₂ 0.13–0.23, PMS B₁ 0.26–0.31, PMS B₂ 0.26–0.36 as long as pronotum, respectively; prospinasternum reduced to thin line. Mesoscutum (Fig. 7.1) with closely spaced, transversely broken striae, without wrinkles among striae; tegula with microtrichia; metascutum reticulate medially, longitudinally striate laterally, with wrinkles among striae; mesosternum (Fig. 7.3) with 35–45 setae; metasternum with 24–29. Fore wing L/W 18.10–20.10; with 33–42 anterior and 68–81 posterior FH; costa with 29–36 setae, median seta 1.05–1.21 as long as wing W; fore vein with 22–29 setae, hind vein with 2, rarely 3 apical setae. Hind wing with 70–94 FH.

T₁ without CPS and microtrichia at middle; T₂ and T₃ with weak microtrichia in front of B₁ and usually between B₁; T₄–T₆ (Fig. 7.4) with microtrichia except for anterior and posterior thirds of each tergum at middle; T₇ and T₈ with almost complete cover of microtrichia; T₁₀ with some rows of weak microtrichia; T₇ and T₈ with complete comb at posterior margin, that on median part of T₇ slightly shorter than on the sides. Setal formula being: T₁ 1, T₂ and T₃ 2+1 m+3–4, T₄–T₆ 2+1 m+3–6+1 m, T₇ 2+1 m+3+1 m. T₉L/T₁₀L 0.97–1.08; anterior B₁–B₃ on T₉ each 0.76–0.93, 0.79–1.00, and 0.85–1.07 as long as T₉; posterior B₁–B₄ on T₉ each 0.93–1.17, 0.79–1.03, 0.86–1.10 and 0.79–1.03 as long as T₉; B₁–B₂ on T₁₀ each 0.97–1.23 and 1.06–1.27 as long as T₁₀. Sterna entirely covered with microtrichia, with complete comb of long and fine microtrichia at posterior margin but on S₇ interrupted medially; S₇ with 3 pairs of setae usually in front of posterior margin but sometimes 1–2 setae marginal; ovipositor 1.63–1.81 as long as pronotum.

Measurements (μm). Body L 1.0–1.4 mm. Head L 72–90, W 149–188; pronotum L 114–140, W 188–234; blotch median L 20–40, lateral L 66–90, W 138–184; AMS B₁ 28–38, AMS B₂ 18–32, PMS B₁ 30–41, PMS B₂ 36–50; fore wing L 667–852, W 34–44; T₉ L 56–72; T₁₀ L 55–70; anterior B₁–B₃ on T₉ each 46–62, 54–60, 58–70; posterior B₁–B₄ on T₉ each 57–74, 49–62, 59–72, 52–62; B₁–B₂ on T₁₀ each 60–78, 60–80; ovipositor L 206–252. Antenna 280–335 in total L; L (W) of antennal segments: A₃ 56–68 (20–23), A₄ 55–66 (18–21), A₅ 42–50 (17–18), A₆ 48–58 (15–18), A₇ 9–12 (6–7), A₈ 11–14 (4–5).

♂. Colored almost as in females but abdomen darker. T₇ with comb interrupted medially; T₈ with complete comb; T₁₀ without microtrichia; S₇ (Fig. 7.6) alone with small circular glandular area; aedeagus sharply pointed; paramere not strongly upturned, slightly narrowed subapically and blunt apically, base with 5 minute and 2 long setae. Body L 1.0–1.1 mm.

Specimens examined. Holotype ♀ (*Staphylea bumalda*), Sapporo,

Tsukisappu, VIII 16 1978. Paratypes. Hokkaido: 1 ♀ 1 ♂ (*Larix kaempferi*), Sapporo, Moiwa, VIII 6 1975; 5 ♀, collected with holotype; 10 ♀ (*S. bumalda*), Nanae, Mt. Yokotsu (600 m), VIII 10 1975. Miyagi: 3 ♀ 1 ♂ (*S. bumalda*), Akiu, Futakuchi (600 m), IX 18 1978. Fukushima: 3 ♀ 1 ♂ (*S. bumalda*), 1 ♀ 2 ♂ (*Morus bombycis*), Tajima, VIII 27 1977. Tochigi: 1 ♀ 3 ♂ (*S. bumalda*), Fujiwara, Kawaji (800 m), VIII 28 1977. Yamanashi: 1 ♀ (*Betula ermanii*), Mt. Kimpu (2,590 m, alpine zone), VII 27 1976. Nagano: 12 ♀ 2 ♂ (*S. bumalda*), Komagane, Suginodai (1,000 m), VII 28 1977. Shizuoka: 4 ♀ 1 ♂ (*S. bumalda*), Shizuoka, Umegashima (700 m), VII 15 1972.

Host plant. Staphyleaceae: *Staphylea bumalda* (THUNB.) DC.

Distribution. Hokkaido: Ishikari, Oshima. Honshu: Miyagi, Fukushima, Tochigi, Yamanashi, Nagano, Shizuoka.

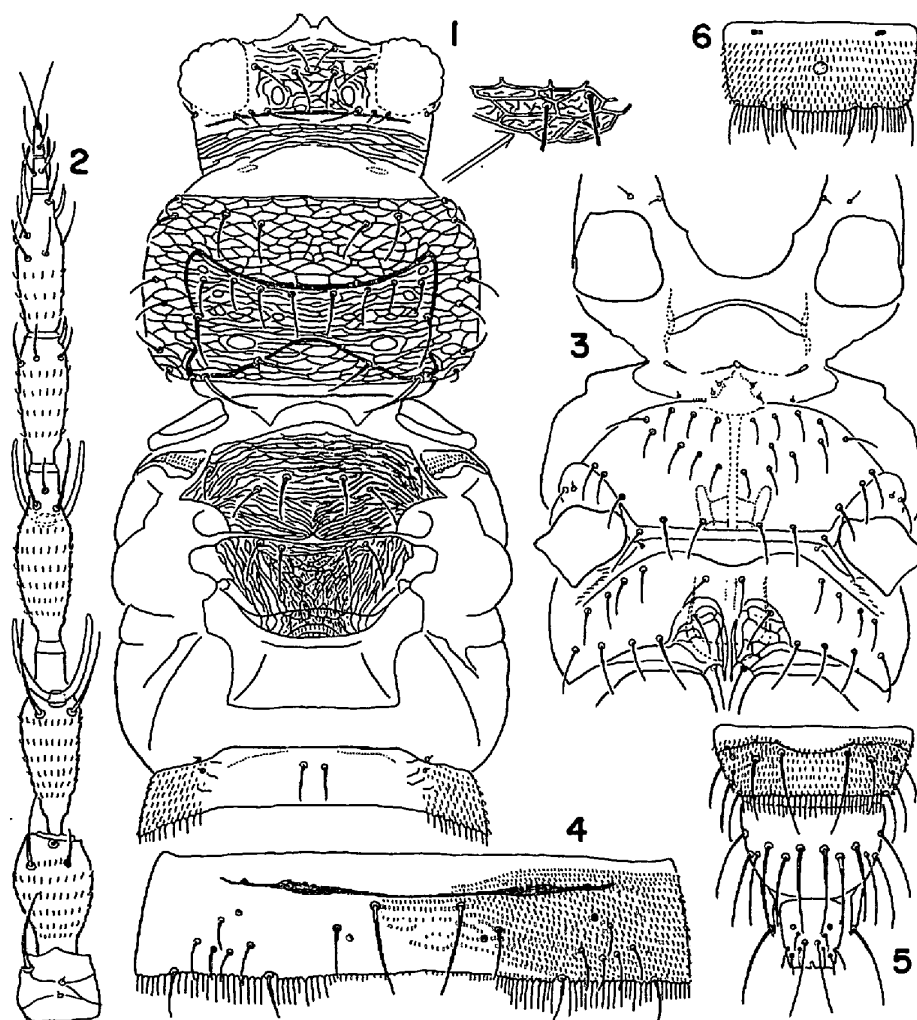


Fig. 7. *Hydatothrips* (N.) *mitubautugi*. — 1, ♀, head, thorax and T₁; 2, ♀, antenna; 3, ♀, thoracic sternum; 4, ♀, T₅; 5, ♂, T₈–T₁₀; 6, ♂, S₇.

Remarks. *H. (N.) mitubautugi* may come near *H. (N.) abnormis* but is easily separated by the tegula distinctly covered with microtrichia (vs. tegula with a few transversely anastomosing striae in *abnormis*), T_4 – T_6 with 3–6 setae laterad of B_3 (vs. 3 setae) and males with a glandular area on S_7 alone (vs. with it on S_4 – S_7). The specific name means the Japanese name of *Staphylea bumalda*.

***Hydatothrips (N.) elaeagni* n. sp.**

♀. Generally dark brown; head anterior of occiput, pronotal blotch, strongly sclerotized areas of pterothorax, T_2 and abdominal segments VII–IX dark; lines of sculpture around pronotal blotch and antecostal lines on T_2 – T_7 dark; abdominal segments I–VI and X brown; legs dark brown; fore tibia brownish yellow, tarsi yellow. Fore wing shaded from base to nearly apex of scale, then with a transparent cross area about the length of scale, followed by a shaded area up to apex, sometimes becoming paler on apical half; scale dark but pale apically. A_1 – A_4 pale yellow, A_1 and apex of A_4 slightly darker; A_5 – A_8 brown, A_5 paler basally.

Head (Fig. 8.1) W/L 1.77–2.17; with a few weak striae on ocellar region; occipital apodeme close to POS series; occiput with transversely anastomosing striae; IOD/HOW 2.50–3.11; OOD/IOD 1.44–1.75; mouth cone long. Antenna (Fig. 8.2) 3.4–4.0 as long as head; A_3 longest, L/W 2.87–3.16; A_4 L/W 2.62–3.18; A_5 L/W 2.35–2.75; A_6 L/W 3.47–3.89, mostly shorter than A_4 ; A_7 L/W 1.33–1.67; A_8 L/W 2.67–3.25; major sense cones on A_5 – A_7 arising from elongate base (Fig. 8.3).

Pronotum (Fig. 8.1) W/L 1.55–1.68; with transversely anastomosing striae, nearly uniformly and closely spaced throughout; with scanty wrinkles among striae in front of and behind blotch at middle; blotch developed, concave medially; blotch median L 0.27–0.34 as long as pronotum; with 28–33 setae; AMS B_1 0.16–0.22, AMS B_2 0.10–0.16, PMS B_1 0.16–0.20, PMS B_2 0.21–0.29 as long as pronotum, respectively; prospinasternum reduced. Mesoscutum (Fig. 8.1) with closely spaced, transversely anastomosing striae, without wrinkles among striae; tegula with a few striae (Fig. 8.4); metascutum with transversely anastomosing striae on anterior third and obliquely anastomosing striae on posterior two-thirds, without wrinkles. Mesosternum (Fig. 8.5) with 25–29 setae; metasternum with 17–19 setae, posteromedian membranous area unsculptured. Fore wing L/W 16.79–18.91; with 24–31 anterior and 57–64 posterior FH; costa with 23–29 setae, median seta 0.76–1.00 as long as wing W; fore vein with 14–19 setae, hind vein with 1. Hind wing with 63–73 FH.

T_1 almost lacking microtrichia medially; CPS on T_1 reduced; T_2 – T_6 (Fig. 8.6) with microtrichia in front of B_1 and B_2 ; T_7 and T_8 with microtrichia except anterior and posterior thirds of each tergum at middle; T_{10} without microtrichia; T_1 – T_6 without comb at middle; T_7 and T_8 with complete comb at posterior margin. Setal

formula being: T_1 1, T_2 and T_3 $2+1\text{ m}+2$, T_4 – T_7 $2+1\text{ m}+2+1\text{ m}$. $T_9L/T_{10}L$ 1.12–1.20; anterior B_1 – B_2 on T_9 each 0.60–0.71 and 0.58–0.85 as long as T_9 , anterior B_3 absent; posterior B_1 – B_4 on T_9 each 0.76–0.94, 0.59–0.72, 0.78–1.00 and 0.49–0.67 as long as T_9 ; B_1 – B_2 on T_{10} each 0.87–1.14 and 0.91–1.16 as long as T_{10} . S_2 – S_7 (Fig. 8.7) with microtrichia laterad of B_2 only, entirely smooth between B_2 , microtrichia on S_7 absent on posterior half between B_2 and B_3 ; comb absent between B_2 , lateral comb not developed more than discal microtrichia; ovipositor 2.17–2.34 as long as pronotum.

Measurements (μm). Body L 1.0–1.2 mm. Head L 72–88, W 148–158; pronotum L 110–120, W 180–192; blotch median L 31–40, lateral L 62–78, W 132–148; AMS B_1 18–24, AMS B_2 11–18, PMS B_1 18–23, PMS B_2 24–32; fore wing L 630–663, W 34–39; T_9 L 64–74; T_{10} L 56–64; anterior B_1 – B_2 on T_9 each 40–46,

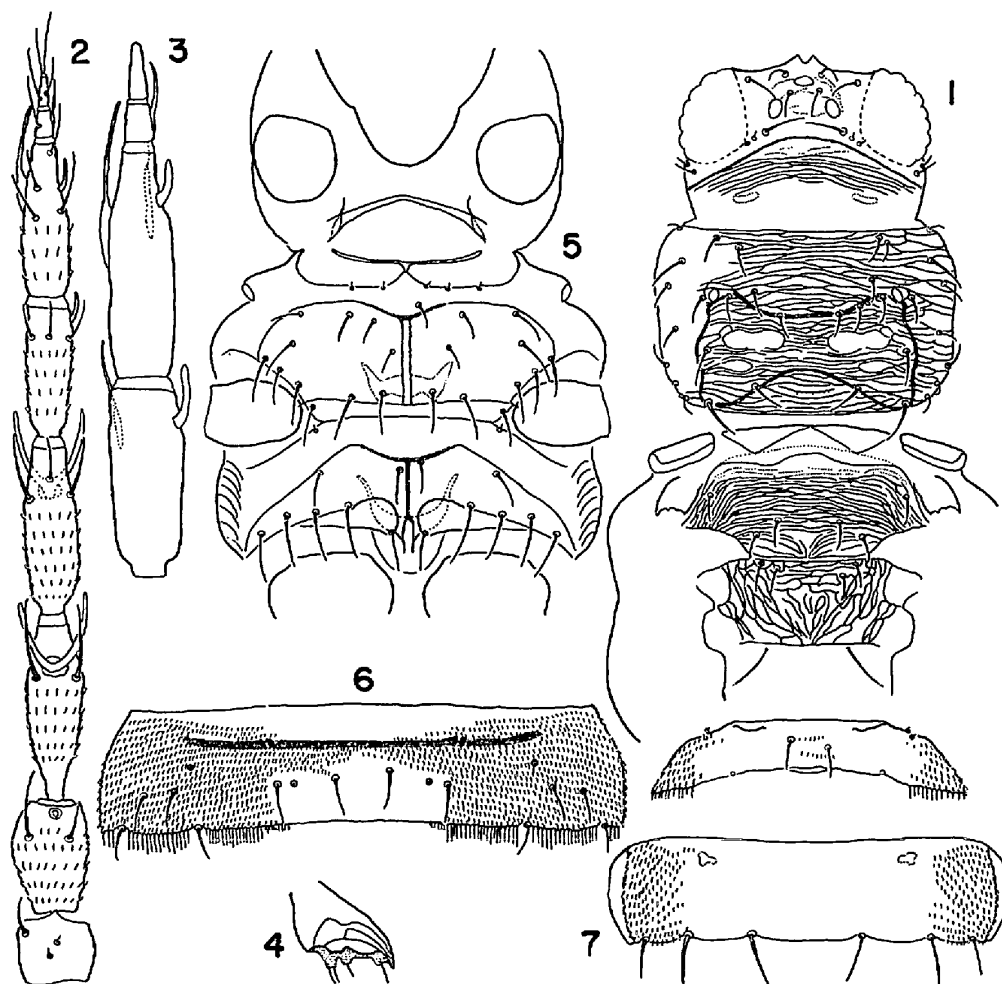


Fig. 8. *Hydatothrips* (*N.*) *elaegni* ♀. — 1, Head, thorax and T_1 ; 2, antenna; 3, A_5 – A_8 ; 4, tegula; 5, thoracic sternum; 6, T_4 ; 7, S_5 .

40–56; posterior B_1 – B_4 on T_9 each 56–63, 42–48, 56–64, 34–44; B_1 – B_2 on T_{10} each 52–64, 58–64; ovipositor L 255–270. Antenna 274–294 in total L; L (W) of antennal segments: A_3 54–60 (18–20), A_4 51–56 (17–19), A_5 39–44 (16–17), A_6 50–54 (14–15), A_7 8–10 (5–6), A_8 12–14 (4–5).

♂. Unknown.

Specimens examined. Holotype ♀ (*Elaeagnus umbellata*), Hokkaido, Mori, Mt. Komagatake (800 m), VIII 23 1977. Paratypes. 51 ♀ collected with the holotype.

Host plant. Elaeagnaceae: *Elaeagnus umbellata* THUNB.

Distribution. Hokkaido: Oshima.

Remarks. *H. (N.) elaeagni* may come near *H. (N.) abditus* (HARTWIG), *H. (N.) raniae* (BHATTI) and *H. (N.) tadzhicus* (PELIKÁN) in pronotum with transversely anastomosing striae and occipital apodeme close to POS series, but it differs from the latter in T_4 – T_6 with only 3 setae laterad of B_3 instead of 7–11 setae. It is also separated from *H. (N.) abnormis* by generally dark color instead of bicolored pronotum, and from *H. (N.) portoricensis* by fore wing with only one pale subbasal band instead of two pale areas.

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