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SOME PANCHAETOTHRIPINAE FROM NEPAL, MALAYSIA AND THE PHILIPPINES
[THYSANOPTERA: TEREBRANTIA: THRIPIDAE]

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Systematic and Ecological Surveys on Some Plant-Parasitic Microarthropods in Southeast Asia, Scientific Report No. 22.

Abstract


Helionothrips longisensibilis and Oneilliella pallidizonata n. spp. are described from Semenan-jung Malaysia. The males of three species, Astrothrips chisiniaensis, Copidothrips octarticulatus and Panchaetothrips stephani, are described for the first time. New locality records are given for 17 species. Geographic distribution is noted for 47 species occurring in Japan, Southern China, Nepal and Southeast Asia.

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Contents. Introduction — Descriptions and records — Geographic distribution — Acknowledgements — References.

INTRODUCTION

The present paper is a report on the taxonomic study of the Panchaetothripinae collected by myself in connection with the projects Systematic and ecological surveys on some plant-parasitic microarthropods in Southeast Asia and Research trips for agricultural and forest insects in the Subcontinent of India. The Panchaetothripinae are mostly distributed in the tropics and subtropics, having many peculiar features. Although the present collection covers only about half the species of the subfamily known in Southeast Asia, the collected specimens are valuable because of insufficient information in this area.

About half the specimens of Malaysian species and those of Philippine species, including the holotypes of the new species, will be deposited in Entomology Section, Forest Research Institute of Malaysia (FRIM), Kepong, Selangor, Malaysia, and in Museum of Natural History, University of the Philippines at Los Baños (UPLB), Laguna, the Philippines, respectively. The host plants of Malaysian material, those of Philippine material and those of Nepalese material were identified by Mr. K.M. Kochummen, ex-Botanist, FRIM, by Dr. E.S. Fernando, UPLB, and at the Katmandu Herbarium, respectively. The abbreviations used below are as in Kudo (1984).

DESCRIPTIONS AND RECORDS

Anisopilothrips venustulus

*Heliothrips venustulus* Priesner 1923: 89-91.


This species, so far known mainly from the Pacific Islands in the tropics, is newly recorded from Sarawak. It is similar to *Elixothrips brevisetis* but differs in having peculiar paired areas of sculpture on abdominal segments III-VII.


Astrothrips chisinliaoensis


This species, so far known only from Taiwan with the female, is newly recorded from Semenanjung Malaysia. Some quantitative characters in the female are as follows: A3-A6 L/W 3.54-4.00, 2.00-2.25, 1.38-1.65 and 2.50-3.13 respectively. Metascutellum W/L 3.50-4.46. Fore wing with 28-30 anterior and 53-54 posterior FH; with 13-18 setae on costa, 10-14 on fore vein and 6-10 on hind vein. Hind wing with 68-70 FH. T₉L/T₁₀L 0.76-0.83. B₁-B₃ on T₉ 0.53-0.66, 0.47-0.56 and 0.39-0.72 as long as T₉ respectively. B₁ on T₁₀ 0.58-0.76 as long as T₁₀. Ovipositor 2.35-2.48 times as long as pronotum.

The male is recorded here for the first time: Abdomen lighter than head and thorax; metascutellum W/L 4.81; B₁ on T₁₀ as long as T₁₀ (Fig. 1.5); S₆ and S₇ with
Fig. 1. *Astrothrips chisinliaoensis*. 1, ♀, head and pronotum. 2, ♂, right antenna. 3, ♀, meso- and metanotum. 4, ♀, T_3. 5, ♂, T_6-T_{10}. 6, ♂, S_6 and S_7.

U-shaped glandular area (Fig. 1.6). Body L 0.9 mm.

The Malaysian specimens examined are slightly different from the Taiwanese ones in their smaller size and the abdominal terga (Fig. 14) more clearly polygonally reticulate by sharp striae, while in the Taiwanese specimens the terga are more longitudinally elongately reticulate posteriorly by dull striae.

*A. chisinliaoensis* differs from the congeners in having a pair of apically expanded setae on T_{10}. This species almost agrees with *A. aucubae* in the head with a strongly elevated ocellar hump (Fig. 1.1), the pronotum with raised sculpture on
posterolateral areas and without a transverse carina close to the posterior margin, and A4 with an additional sense cone reaching or surpassing the apex of simple primary cone (Fig. 1.2). Besides the expanded setae on T10 the following differences are noted: metascutum (Fig. 1.3) without a median longitudinal ridge of sculpture against with the ridge in A. aucubae and ovipositor 2.35-2.48 times as long as pronotum against 1.91-2.13 times in A. aucubae.


Astrothrips globiceps

_Heliothrips globiceps_ Karny 1913, Arch. Naturgesch. 79: 125.


This species is similar to _A. aucubae_, but differs in the pronotum with a transverse ridge of raised sculpture close to posterior margin, the metascutum with a median longitudinal ridge of sculpture indistinct, and the abdominal terga covered with more clearly polygonal reticules. This Oriental species probably feeds on the leaves of various plants.


Astrothrips lantana


This species, so far known only from Madya Pradesh, India, is newly recorded from Nepal. The Nepalese specimens have a weak median longitudinal ridge of sculpture on the metascutum. This species differs from _A. aucubae_ in the head with an ocellar hump small and the pronotum posterolaterally without raised sculpture.


Astrothrips tumiceps


This polyphagous species has so far been known from India, Burma, Java and the Philippines. It differs from the congeners in having the mesonotum deeply notched anteriorly, and the A3 and A4 with sense cones forked in the male and simple in the female.

**Caliothrips graminicola**

*Hercothrips graminicola* Bagnall and Cameron 1932: 417-419.

This grass·living species, widely distributed in India, Sri Lanka, Thailand, South Africa and Australia, is newly recorded from Nepal.


**Copidothrips octarticulatus**

*Heliothrips (Parthenothrips) octarticulata* Schmutz 1913: 993-994.


This species, so far known from Seychelles, Sri Lanka and some Pacific Islands, is recorded from the Asian continent for the first time. The eye has six dark facets.

The male is recorded here for the first time: Head and thorax brown, partly yellowish; abdomen generally orange yellow, brown on entire of segments I and II, anterior parts of III–VII, posterior parts of III–VI and X, and median part of IX. $T_9$ (Fig. 2.1) with a pair of median setae thick, $B_1$ 0.47, $B_2$ 0.87, $B_3$ 2.52 times and $B_4$ 1.84 times as long as $T_9$ respectively. $S_4$–$S_7$ (Fig. 2.2) each with a large, U-shaped glandular area. Body L 1.2 mm.


**Elixothrips brevisetis**

*Tryphactothrips brevisetis* Bagnall 1919: 257.

This species, mainly known from the Pacific Islands, is newly recorded from Sarawak. It is found on various plants but may breed on ferns, e.g., *Angiopteris evecta*, judging from the collection data in Kepong, Malaysia, and Mt. Makiling and Mt. Halcon, the Philippines. The eye has six dark facets. In the male specimens from Mt. Halcon, Mindoro, abdominal glandular areas show some variations: on $S_8$ mostly absent, when present small and circular; on $S_7$ usually U-shaped, medially separated, occasionally L-shaped, short transverse, or small and circular; and on $S_6$ mostly U-shaped, medially separated but rarely completely (see Kudo 1980: Fig. 9).

Specimens examined. Semenanjung Malaysia — Selangor: Kuala Lumpur: Kepong, 3♀ (Pleocnemia irregularis, Dryopteridaceae), VIII.5-23.1990, 25♀ (An-
Fig. 2. *Copidothrips ocutarticulatus*, ♂. 1, T₆-T₁₀. 2, S₄-S₇.


**Helionothrips aino**


This species, so far known from Saghalien, Korea, Japan, Taiwan and Southern China, is newly recorded from Nepal. The eye has six dark facets. The Nepalese specimens listed below slightly differ from the Japanese form in the mid and hind tibiae yellow in apical half, in male S7 and S₈ with a little larger glandular area, and in some quantitative characters, particularly ovipositor L/pronotum L larger, and matascutellum W/L and B₂ on T₉/T₉L smaller (Fig. 3). These differences are here regarded as geographic variations, because the Japanese form is also considerably variable in many quantitative characters (Kudo 1992b : 275). Closer studies are required on various populations in respective areas.


**Helionothrips annosus**


This species was described from five females and one male collected on *Litsea* sp., Lauraceae, by R. Takahashi in Taiwan in 1936, and is newly recorded from the Philippines, Semenanjung Malaysia and Sarawak. It feeds on *Cinnamomum iners*

Fig. 3. Differences between the Japanese form (J) and the Nepalese form (N) of *Helionothrips aino* in three ratios. 1, ovipositor length per pronotum length. 2, metascutellum width per metascutellum length. 3, seta B₂ length on T₉ per T₉ medial length.
and *Litsea* spp., Lauraceae. The eye has no dark facets. The metascutum (Fig. 4.1) has a raised triangle of sculpturing extending onto the metascutellum. The abdominal terga (Fig. 4.2) are reticulate nearly throughout and have wrinkles in reticules on posterior two-thirds of each tergum. Male *T₉* (Fig. 4.3) has two pairs of thick setae.

This species is very distinct in having a complete comb of microtrichia on *T₉* and slender abdominal segments *IX* and *X*. The Philippine *H. guttatus* Reyes (1994: 150-153) almost agrees with *H. annosus* in having the above characters, but the original description of *H. guttatus* states that the male has a transversely elongate glandular area on each of *S₂* to *S₄*.


**Helionothrips cephalicus**


This grass-living species, so far known from Japan, Taiwan and Hongkong, is newly recorded from Nepal and Semenanjung Malaysia. It differs from the congener in having a large abdominal segment IX and in the head and thorax with many prominent wrinkles in reticules. The eye has six dark facets.


**Helionothrips longisensibilis** n.sp.

Diagnosis. Sense cones extremely long, forked sense cones on A₃ and A₄ more than 2.0 times as long as respective segments. Head and thoracic nota with wrinkles in reticules. Fore wing fasciate, with a cluster of dark and enlarged microtrichia at fork of veins. In male T₉ with 2 pairs of stout setae subequal in length, without wartlets on posteromedian area; S₇ and S₈ with oval glandular area.

Female. Dark brown, extreme anterior margin of head paler. Fore leg brown, mid and hind legs dark brown, extreme apex of mid tibia and apical fourth of hind tibia pale; all tarsi pale. Fore wing (Fig. 5.4) dark brown, paler subbasally and pale subapically. A₁ pale brown, A₂ brown, A₃-basal half of A₅ and all of A₇ pale, apical half of A₈ and all of A₉ pale gray-brown.

Head (Fig. 5.1) W/L 1.8-2.1, with weak wrinkles in reticules; IOD/HOW 1.43-2.00 (mean±SD=1.82±0.17, n=11); OOD/IOD 1.58-1.90 (1.71±0.12, 11); eye without dark facets. Antenna (Fig. 5.2) 2.5-2.9 times as long as head; A₃ L/W 2.17-2.64 (2.30±0.16, 11), subequal to A₄ in length, 1.24-1.49 (1.35±0.08, 11) times as long as A₅, constricted apex wider than the apex of A₆ and subequal in length, forked sense cone extremely long, surpassing apex of A₆; A₄ L/W 2.17-2.55 (2.34±0.11, 12), 1.26-1.40 (1.34±0.04, 12) times as long as A₅, forked cone surpassing apex of A₆, 2.50-2.89 (2.68±0.13, 10) times as long as A₆; A₅ L/W 1.95-2.41 (2.21±0.13, 12); A₆ L/W 1.24-1.50, inner sense cone 2.75-3.57 (3.06±0.23, 11) times as long as A₆, reaching far beyond apex of A₆; A₇L/A₇L 2.75-4.00; apical seta on A₈ 2.3-3.0 times as long as A₈.

Pronotum (Fig. 5.1) covered by polygonal reticules of uniform size, with weak wrinkles in reticules. Mesonotum and metanotal triangle of sculpture (Fig. 5.3) with internal wrinkles; metascutum with campaniform sensilla placed on posterior sixth to third; metascutellum entirely reticulate, transversely elongate, W/L 3.81-4.67 (4.14±0.23, 12). Fore wing (Fig. 5.4) with a cluster of dark and enlarged microtrichia at fork of veins; with 24-29 (25.6±1.4, 13) anterior and 63-68 (65.1±1.9, 12) posterior FH; with 23-28 (26.1±1.6, 13) setae on costa, 8-9 on fore vein and 5-6 on hind vein. Hind wing with 69-81 (76.3±3.0, 12) FH.

Abdomen with wrinkles in almost all of lateral reticules on T₂-T₅ (Fig. 5.6); T₆ (Fig. 5.5) completely and T₇ almost completely reticulate; antecostal lines on T₄-T₅ divided into broad arches, but not issuing caudad into scallop areas; T₈ with comb.
Fig. 5. *Helionothrips longisensibilis*. 1, ♀, head and pronotum. 2, ♀, right antenna. 3, ♀, meso- and metanotum. 4, ♀, fore wing. 5, ♀, T₃. 6, ♀, T₅. 7, ♂, T₈-T₁₀. 8, ♂, S₇ and S₈.
interrupted medially by the distance of combined intervals of 5-7 microtrichia; segments IX and X short and broad, ca 1.8 times and 1.6 times as wide as long respectively; T₉/L/T₁₀L 1.75–1.95 (1.88±0.07, 11); B₁ on T₉ 0.68–0.86 (0.77±0.05, 11), B₂ 0.75–0.89 (0.80±0.04, 11) and B₉ 0.53–0.60 (0.56±0.02, 11) as long as T₉ respectively; B₁ on T₁₀ 1.10–1.37 (1.23±0.09, 11) times and B₂ 1.00–1.21 times as long as T₁₀ respectively; ovipositor long, 2.17–2.35 (2.26±0.06, 10) times as long as pronotum.


Male. Colored as in female. A₃–A₅ L/W 2.17–2.41, 2.14–2.27, 2.06–2.38 and 1.13–1.25 respectively; forked sense cone on A₁ 2.00–2.28 times, that on A₄ 2.38–2.46 times and inner cone on A₅ 2.94–3.60 times as long as respective segments. Metascutellum W/L 3.92–4.36. Fore wing with 21–23 anterior and 53–57 posterior FH; with 20–22 setae on costa, 7 on fore vein and 5 on hind vein. Hind wing with 58–63 FH. T₉ (Fig. 5.7) with 2 pairs of stout setae subequal in length, anterior setae (32–34 μm) 0.48–0.56 and the posterior (29–33 μm) 0.45–0.51 as long as T₉ respectively; without chitinous wartlets on posteromedian area. Sterna clearly polygonally reticulate; S₇ and S₈ (Fig. 5.8) with small to medium-sized oval glandular area, that on S₇ smaller. Body L 0.9–1.0 mm.


Remarks. This species is very distinct from other congeners by extremely elongate sense cones on the antenna and other characters given above.

**Helionothrips parvus**


This grass-living species, so far known only from Uttar Pradesh, India, is newly recorded from Nepal. Some quantitative characters in the female are as follows: IOD/IOD 2.00–3.33, OOD/IOD 2.25–2.80. A₃–A₅ L/W 2.36–2.71, 1.82–2.09, 1.65–1.79 and 1.37–1.58 respectively; forked sense cone on A₁ 0.65–0.79, that on A₄ 1.16–1.29 times and inner cone on A₅ 1.93–2.31 times as long as respective segments. Metascutellum W/L 2.78–3.03 (2.88±0.09, 11). Fore wing with 23–29 (25.7±2.1, 13) anterior and 48–58 (52.1±2.8, 10) posterior FH; with 22–27 (23.6±1.4, 13) setae on costa, 7–9 (7.8±0.7, 15) on fore vein and 4–6 (4.5±0.7, 13) on hind vein. Hind wing with 62–69 FH. T₉L/T₁₀L 1.54–1.77 (1.66±0.06, 11). B₁ on T₉ 0.74–0.81 (0.77±0.02, 11), B₂ 0.73–0.85 (0.79±0.04, 11) and B₉ 0.50–0.58 (0.55±0.03, 11) as long as T₉ respectively. B₁ on T₁₀ 0.93–1.12 (1.06±0.05, 11) times and B₂ 0.92–1.05 times as long as T₁₀ respectively. Ovipositor 1.96–2.19 (2.09±0.10, 11) times as long as pronotum.

Heliothrips haemorrhoidalis


Heliothrips haemorrhoidalis, Burmeister 1838, Handbuch der Entomologie 2: 412.

This widely distributed and highly polyphagous species is newly recorded from Nepal and Sarawak.


*Oneilliella pallidizonata* n. sp.

Diagnosis. Abdominal segment II pale. Legs yellow except for basal two-thirds of mid femur dark brown. A₁–A₄ pale yellow. Fore wing with submedian and apical pale patches along with a subbasal pale area. T₂-T₄ smooth on median half.

Female. Dark brown (Fig. 6.1); head yellowish anterior of fore ocellus and between antennal bases; abdominal segment I pale, brownish medially, II entirely pale; segments VIII–X paler. Antenna yellow, A₅ brown, A₇ and A₈ pale brown or gray. Legs yellow, coxae and basal two-thirds of mid femur dark brown. Fore wing brown, with three pale areas large and almost hyaline, submedian and apical pale areas slightly tinged with brown; wing setae white on pale areas, brown on dark areas.

Head (Fig. 6.2) W/L 1.57–1.70; polygonally reticulate, the reticules with weak longitudinal wrinkles except posteromedian ones with minute dots; hind ocelli large, IOD/HOW 1.14–1.33; OOD/IOD 3.13–3.50; eye without dark facets. Antenna (Fig. 6.3) 2.6–2.9 times as long as head; A₅ longest, L/W 3.11–3.53, constricted apex much shorter than median swollen part, and shorter and wider than the apex of A₄; A₄/L/W 2.35–2.53, simple sense cone surpassing apex of forked cone and 1.28–1.39 times as long as A₄; A₃ L/W 2.10–2.56; A₅ pedicellate, L/W 1.88–2.06, inner sense cone surpassing apex of A₅ and 2.00–2.31 times as long as A₅; A₇ L/W 1.60–1.86; A₈ L/W 6.2–8.0; A₉/L/Aₙ L 2.3–3.2; apical seta on A₈ 1.63–1.86 times as long as A₉; A₈ with 2–3 dorsal and 3 ventral rows of microtrichia, A₉ with 3–4 rows, A₁₀ with 1–2 dorsal and 2–3 ventral rows.

Pronotum (Fig. 6.2) polygonally reticulate, with weak longitudinal wrinkles in reticules, with about 15 reticules on longitudinal middle line and on transverse middle respectively; with 26–29 setae in all. Mesonotum with weak transverse wrinkles in reticules; metanotum (Fig. 6.4) entirely polygonally reticulate, scutum with weak longitudinal wrinkles in reticules, a pair of campaniform sensilla close together at middle; scutellum W/L 3.70–4.17, without internal wrinkles. Mesosternum with about 28 setae, metasternum with 12–14. Fore wing with 20–21 anterior
and 50–55 posterior FH; with 19–21 setae on costa, the seta at middle of wing 0.95–1.07 times as long as wing W at middle; with 7–8 basal and 2 apical setae on fore vein, and 5–8 on hind vein. Hind wing with 60–63 FH.

Abdominal terga unsculptured at about median half; $T_1$ (Fig. 6.5) with about 13 reticules, with weak wrinkles in some posterior reticules; $T_2$ with some incomplete reticules between $B_1$, with longitudinal reticules on sides, without internal wrinkles;
$T_3$-$T_8$ (Fig. 6.6) longitudinally striate on sides, with numerous weak internal wrinkles; $T_8$ with comb of long microtrichia interrupted at median third of posterior margin; $T_9$ with weakly transverse and broken striae; $T_{10}$ with a few weak striae; $T_9L/T_{10}L$ 1.57-1.76; $B_1$-$B_3$ on $T_9$ 0.73-0.78, 0.95-1.02 and 0.68-0.75 as long as $T_9$ respectively; $B_1$ and $B_2$ on $T_{10}$ subequal, 0.93-1.02 as long as $T_{10}$. Sterna with transverse and partly anastomosing striae, with $B_3$ anterior to $B_1$ and $B_2$; $S_7$ with 2 pairs of small setae between $B_1$ and $B_2$ at posterior margin; ovipositor 2.32-2.50

Fig. 7. *Panchaetothrips holtmanni*, ♀. 1, head and pronotum. 2, right antenna. 3, metascutum. 4, $T_1$. 5, $T_7$-$T_{10}$.
times as long as pronotum.

Male. Unknown.


Remarks. This is a second species of the genus, feeding on fern, and easily distinguishable from the Trinidadian O. williamsi by the characters given above. In O. williamsi, the body is entirely blackish brown including legs except for extreme apex of tibiae and tarsi pale, basal two-thirds of A₃ and median half of A₄ are brown, the fore wing has a subbasal pale patch only, the T₃ is completely covered with polygonal reticules, and the T₃ to T₅ are smooth on posteromedian half.

_Panclawetothrips holtmanni_


Some additional female characters are as follows: Head (Fig.7.1) entirely polygonally reticulate except on occipital collar; IOD/HOW 2.40-3.00, OOD/IOD 1.85-2.00; eye without dark facets. Antenna (Fig.7.2) with forked sense cones on A₃ and A₄, those about 0.6-0.7 as long as respective segments; A₃-A₄ L/W 3.76-3.77, 3.35-3.56, 2.70-2.83 and 1.40-1.43 respectively. Pronotum with 21-22 setae. Metascutum (Fig.7.3) with median setae and campaniform sensilla widely spaced; the setae situated nearly at anterior third and the setal alveoli separated by 4-5 times their diameter; the sensilla situated nearly at posterior third and separated by 3-4 times their own diameter; metascutellum W/L ca 2.5. Fore wing with 19-21 anterior and 52-58 posterior FH; with 15-16 setae on costa and 10 on fore vein. T₁ (Fig.7.4) with a pair of median setae nearly contiguous. B₃ on T₇ (Fig.7.5) 0.68-0.80 as long as B₂; B₄ on T₈ 0.53-0.62 as long as B₃; T₁₀L/T₉L 3.24-3.37; B₁ on T₉ 3.56-3.76 times, B₂ 3.15-3.18 times and B₃ 4.15-4.16 times as long as T₇ respectively; B₁ on T₁₀ 0.78-0.88 and B₂ 0.73-0.79 as long as T₁₀ respectively. Ovipositor 3.36-3.76 times as long as pronotum.

Measurements (μm). Body L 1.1-1.2 mm. Head L 108-110, W 172-174; pronotum L 72-84, W 200; fore wing L 595-610, longest costal seta 92-96; T₉ L 50-54, T₁₀ L 162-182; B₁ on T₈ 188-192, B₂ 159-170, B₃ 208-224; B₁ on T₁₀ 140-144, B₂ 122-132; ovipositor L 278-282. L(W) of antennal segments: A₃ 64-66 (17-18), A₄ 57-64 (17-18), A₅ 51-54 (18-20), A₆ 20-21 (14-15), A₇ 13-14 (6-8), A₈ 36-38 (4-5).

This species, so far known from New Guinea and the Krakatau Islands, is newly recorded from Sarawak and Semenanjung Malaysia. _P. holtmanni_ differs from _P. kikiri_ and _P. stephani_ in the following characters: larger IOD/HOW; smaller OOD/IOD; eye with small facets widely separated; shorter forked sense cones on A₃ and A₄; metascutal campaniform sensilla widely separated; larger setae B₃ on T₇ and B₄ on T₉, and shorter setae on T₆ and T₁₀. Although there is no seta nearly midway between each eye and hind ocellus in the three Indonesian specimens examined by zur Strassen (1992), in the two Malaysian specimens there is a minute seta as mentioned in the original description.

Panchaetothrips kikiri


This species was described from two females collected in Japan and Nepal. The eye has no dark facets. Two errors in the original description should be corrected as follows: 1) Indistinct campaniform sensilla probably present just in front of inner apical setae on T₁₀ in the holotype but absent in the Nepalese specimen, and 2) antecostal lines on T₃–T₈ with some posteriorly directed notches, especially on T₇ and T₈ as shown in Fig. 3.6, Kudó 1992a.

This species is similar to the Philippine P. stephani in the long forked sense cones on A₃ and A₄, the head with a small seta nearly midway between each eye and hind ocellus, IOS just placed within ocellar triangle, median metascutal setae nearly at anterior third, metascutal sensilla usually closely placed, smaller B₃ on T₇ and B₄ on T₈, and antecostal lines on T₃–T₈ with some posteriorly directed notches. Differences between the two species are as follows. 1) In P. kikiri, head with transversely elongate reticules on posterior half against entirely with polygonal reticules except on occipital collar in P. stephani. 2) Metascutal campaniform sensilla very close to the posterior margin against placed at posterior third of the scutum. 3) Metascutellum less than 2.1 times as wide as long against more than 2.6 times. 4) Median minute setae on T₁ very closely placed, their alveoli being almost contiguous against widely separated by about 4–10 times the alveolus diameter. 5) B₁ on T₂ shorter than half the length of B₂ against longer than half the length of B₂. 6) B₁–B₃ on T₈ longer, being 4.6–5.1 times, 5.5–5.7 times and 5.6–5.8 times as long as T₉ respectively against 3.9–4.4 times, 4.0–4.4 times and 4.7–5.2 times as long as T₉ respectively.


Panchaetothrips stephani


This Philippine species differs from P. holtmanni in its large size, widely separated median setae on the T₁, and the characters mentioned under the latter species. Some additional characters are as follows.

Female. Head (Fig. 8.1) entirely polygonally reticulate except on occipital collar; with a small seta nearly midway between each eye and hind ocellus; IOS placed within ocellar triangle; IOD/HOW 1.25–1.75; OOD/IOD 2.29–2.67; eye without dark facets. Forked sense cone on A₃ reaching the base of simple cone on A₄, that on A₄ reaching the base to middle of A₆; A₅–A₆ L/W 3.28–3.63, 3.65–4.00, 3.10–3.40 and 1.76–1.88 respectively. Pronotum with 21–27 setae. Metascutum (Fig. 8.2) with median setae at anterior third, and with campaniform sensilla at posterior third, usually separated by twice their own diameter but occasionally contiguous or more widely separated by 5–6 times the diameter; metascutellum W/L 2.67–3.26. Fore wing with 22–26 anterior and 68–80 posterior FH, with 16–19 setae on costa and 9–12 on fore vein. Hind wing with 84–90 FH. Antecostal lines on T₃–T₈ with some weak and posteriorly directed notches. Median minute setae on T₁ (Fig. 8.3) more widely separated by 4–10 times their alveolus diameter; B₁ on T₂ 0.61–0.78 as long
Fig. 8. Panchaetothrips stephani. 1, ♀, head. 2, ♀, metascutum. 3, ♀, T₁. 4, ♂, T₇—
T₁₀. 5, ♂, S₁−S₆.

as B₂; B₃ on T₇ 0.44–0.65 as long as B₂; B₄ on T₈ 0.35–0.42 as long as B₃; T₁₀L/T₉
L 3.56-4.21; B₁ on T₉ 3.88–4.41 times, B₂ 4.03–4.41 times and B₃ 4.69–5.18 times as
long as T₉ respectively; B₁ and B₂ on T₁₀ subequal, 0.85–1.03 times as long as T₁₀;
ovipositor 3.29–3.47 times as long as pronotum.

Male. Head and thorax brown, abdomen dull orange yellow. IOD/HOW 1.00–
1.22; OOD/IOD 2.82–3.00. Pronotum with 23–28 setae. T₇ and T₈ (Fig. 8.4) medi-
ally with longitudinal striae, reticules in part; B₁ on T₉ 1.30–1.34 times, B₂ 2.63–3.13
times, B₃ 1.80–2.03 times and B₄ 3.12–3.30 times as long as T₉ respectively; T₁₀
reticulate, undivided longitudinally, with a pair of long apical setae (114-130 μm). 
S₃-S₆ (Fig. 8.3) with a transverse and linear glandular area. Body L 1.4–1.6 mm.


*Phibalothrips peringueyi*


This grass-living species, so far known from South Africa, India, Sri Lanka, Thailand, Southern China, Java, the Philippines, Taiwan and Japan, is newly recorded from Nepal, Semenanjung Malaysia and Sarawak.


*Phibalothrips rugosus*


This species, so far known only from Kuala Lumpur, Semenanjung Malaysia, is newly recorded from Sarawak by a second female.


*Retithrips javanicus*


This species has so far been known from Burma, Java, the Krakatau Islands and the Philippines. It has been reported to be rare in the former three localities but is probably common in Luzon (Reyes 1994). This species is probably polyphagous.


*Rhipiphorothrips concoloratus*

Zhang and Tong 1993: 52–53.

This species, so far known only from Yunnan, China, is newly recorded from Semenanjung Malaysia. The Malaysian specimens were compared with a female and a male paratype. Although the original description stated that a pair of posterolateral setae on male T₅ are pointed apically, their tips are distinctly expanded. In the male paratype the setae look pointed because they are oriented laterally.
The eye has no dark facets.

*R. concoloratus* and the African *R. africanus* and *R. miemsae* are similar, being separated from one another only by minor differences as summarized below based on the descriptions and figures of the two African species (Jacot-Guillarmod 1937, Priesner 1939 and Wilson 1975).

*R. concoloratus*: Brown, abdomen slightly paler; fore wing with scale brown; fore and mid legs brown, hind leg yellow with apical half of tibia brownish; sense cones on A₃ and A₄ with stalked base short and indistinct; T₁ nearly completely sculptured but indistinctly at submiddle.

*R. africanus*: Dark brown; fore wing with scale pale; all tibiae yellow at apical third; sense cones on A₃ and A₄ with stalked base short and indistinct; T₁ completely reticulate.

*R. miemsae*: Head and thorax brown, metanotum, abdomen and all legs yellow; fore wing with scale brown; sense cones on A₃ and A₄ with stalked base long and distinct; T₁ largely smooth.


*Rhipiphorothrips pulchellus*


This polyphagous species, so far known from India, Sri Lanka, Burma, Thailand, Java, the Philippines, Taiwan and Southern China, is newly recorded from Semenanjung Malaysia and Sarawak. The eye has no dark facets.


*Selenothrips rubrocinctus*

*Physatus rubrocinctus* Giard 1901: 263-265.

This pantropical and polyphagous species is additionally recorded from Nepal and Sarawak. Males of this species are usually rare, showing ratio 0.14% to 2.33% (Wilson 1975), although reported to be occasionally abundant (Hood 1913). Reyes (1944) reported some higher ratios of males in the Philippines, e.g., 1 female and 5 males on *Psidium guajava* in Luzon and 8 females and 7 males on unidentified plant flowers in Mindanao. Also in my collection, males were rather abundant from the Philippines while absent from Malaysia as shown below. The sex ratio of this species may be variable in different areas as in *Thrips tabaci*, *Haplothrips gowdeyi* and others.
Table 1. Geographic distribution of Panchaetothripinae species in Japan, Nepal, Southern China, and Southeast Asia.

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| No. of species | 14 | 18 | 16 | 9 | 6 | 8 | 16 | 19 | 9 | 10 |


GEOGRAPHIC DISTRIBUTION

As two species have been described in the present study, 47 species in the Panchaetothripinae are now recorded from Nepal, Southern China, Southeast Asia and Japan. Table 1 presents a synopsis of the geographic distribution of each species excluding Hercinothrips femoralis which was collected in Japan only in glasshouses. It is still premature to discuss zoogeographic peculiarities due to lack of sufficient data in this area, in particular Burma, Thailand, Indochina and Indonesia, but some of them are noted. First, the Japanese fauna is very rich, represented by 14 species in 10 genera, especially in comparison with Europe, where no species occur in field. It is particularly remarkable that Helionothrips aino extends from Nepal to Southern China, and from Taiwan via the Japanese Archipelago to Saghalien, since the subfamily is principally tropical. Next, the Taiwanese fauna is also rich despite the small island, although some dubious or old records are included. This, however, probably suggests the paucity of collections in other areas of Asia.

To measure the faunal similarities between 10 areas, Jaccard’s Coefficient, Sørensen’s Coefficient and Nomura-Simpson’s Coefficient were used. These are formulated as follows—Jaccard’s: $c/(a+b-c)$, Sørensen’s: $2c/(a+b)$, Nomura-Simpson’s: $c/b$, where $a$ and $b$ are the total number of species in respective areas, $a \geq b$, and $c$ is the number of common species between them. Then results were
analyzed by cluster analysis using average-linkage method. Figure 9 shows three dendrograms based on the values of the three kinds of coefficient. The faunal similarities between the mentioned areas are different according to respective coefficients. In any case three groups are clearly recognized, namely Japan and Taiwan, Malaya and Borneo, and Burma and Indonesia. The former two are natural from their geographic positions, while the last may be caused from our poor knowledge.

ACKNOWLEDGEMENTS

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REFERENCES


