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Title	SOME PANCHAETOTHIRIPINAE FROM NEPAL, MALAYSIA AND THE PHILIPPINES [THYSANOPTERA : TEREBRANTIA : THIRIPIDAE]
Author(s)	Kudo, Iwao
Citation	Insecta matsumurana. New series : journal of the Faculty of Agriculture Hokkaido University, series entomology., 52, 81-103
Issue Date	1995-12
Doc URL	<a href="https://hdl.handle.net/2115/9875">https://hdl.handle.net/2115/9875</a>
Type	departmental bulletin paper
File Information	52_p81-103.pdf



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

By IWAO KUDÔ

Research Trips for Agricultural and Forest Insects in the Subcontinent of India,  
Scientific Report No. 50.

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

*Abstract*

KUDÔ, I. 1995. Some Panchaethripinae from Nepal, Malaysia and the Philippines [Thysanoptera : Terebrantia : Thripidae]. *Ins. matsum. n. s.* 52 : 81-103, 1 tab., 9 figs.

*Helionothrips longisensibilis* and *Oneilliella pallidizonata* n. spp. are described from Semenanjung Malaysia. The males of three species, *Astrothrips chisinliaensis*, *Copidothrips octarticulatus* and *Panchaethrips 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 Panchaethripinae 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 Panchaethripinae 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 Kudô (1984).

## DESCRIPTIONS AND RECORDS

### *Anisopilothrips venustulus*

*Heliethrips venustulus* Priesner 1923 : 89-91.

*Anisopilothrips venustulus*, Stannard and Mitri 1962 : 187 ; Wilson 1975 : 32-33 ; Kudô 1980 : 345 ; Mound and Walker 1987 : 79 ; Kudô 1992c : 471-474.

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.

Specimens examined. Semenanjung Malaysia — Kedah : Kuala Munda : Gurun, 1 ♀ (*Canthium* sp., Rubiaceae), XI.10.1991 ; Pulau Pinang : Bukit Cendana, 1 ♀ (*Calophyllum canum*, Guttiferae), XI.18.1991 ; Selangor : Kepong, 3 ♀ (*Gomphandra quadrifida*, Icacinaceae), 3 ♀ (*Microdesmis casearifolia*, Euphorbiaceae), XI.1.1991. Sarawak — Kuching : Reservoir Park, 1 ♀ (*Ficus benjamina*, Moraceae), X.5.1991.

### *Astrothrips chisinliaensis*

Chen 1980 : 174-175 ; Chen 1981 : 118-119.

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:  $A_3-A_6$  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.  $T_9L/T_{10}L$  0.76-0.83.  $B_1-B_3$  on  $T_9$  0.53-0.66, 0.47-0.56 and 0.39-0.72 as long as  $T_9$  respectively.  $B_1$  on  $T_{10}$  0.58-0.76 as long as  $T_{10}$ . 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 ;  $B_1$  on  $T_{10}$  as long as  $T_{10}$  (Fig. 1.5) ;  $S_6$  and  $S_7$  with

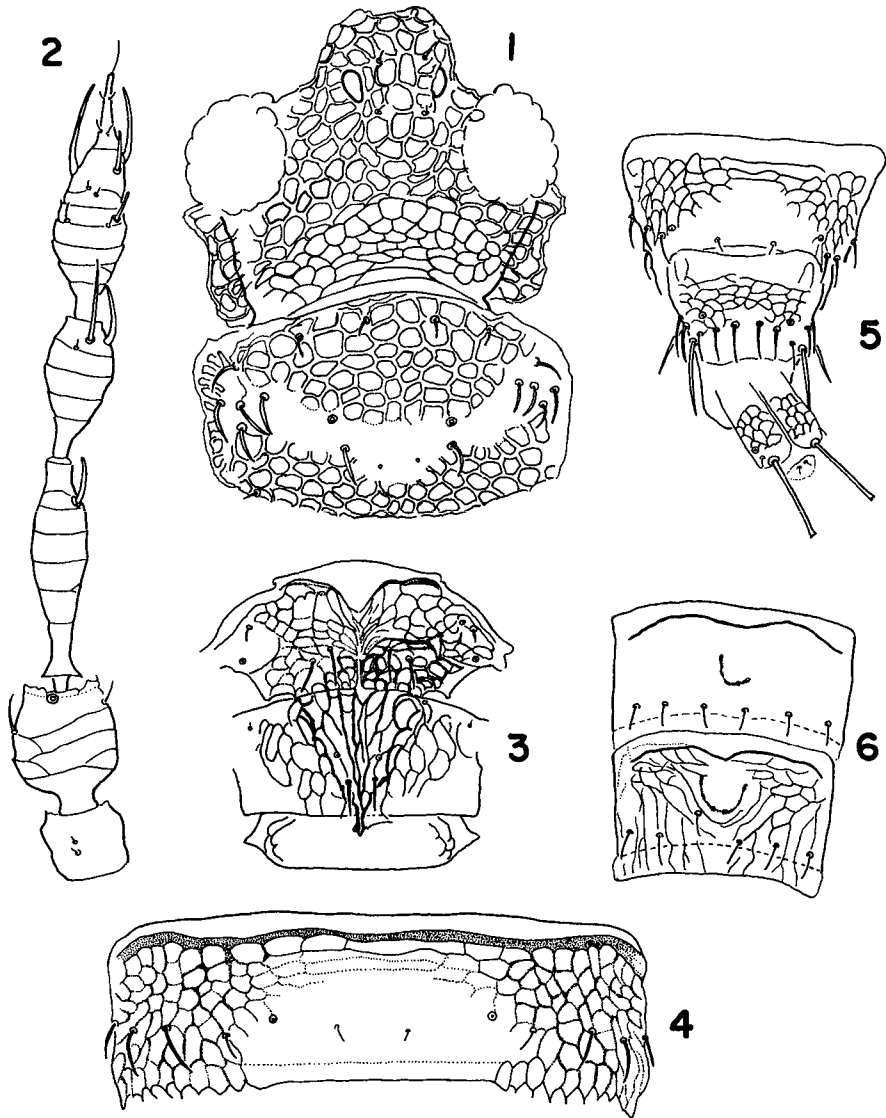


Fig. 1. *Astrothrips chisinliaoensis*. 1, ♀, head and pronotum. 2, ♀, right antenna. 3, ♀, meso- and metanotum. 4, ♀, T<sub>5</sub>. 5, ♂, T<sub>8</sub>-T<sub>10</sub>. 6, ♂, S<sub>6</sub> and S<sub>7</sub>.

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<sub>10</sub>. 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  $A_4$  with an additional sense cone reaching or surpassing the apex of simple primary cone (Fig. 1.2). Besides the expanded setae on  $T_{10}$  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*.

Specimens examined. Semenanjung Malaysia — Kedah: Kuala Munda: Gurun, 4 ♀ 1 ♂ (*Carallia brachiata*, Rhizophoraceae), 1 ♀ (*Canthium* sp., Rubiaceae), XI.10.1991. Taiwan: Puli, 1 ♀ (*Rhus* sp., Anacardiaceae), 1 ♀ (dry grass), III.7.1974.

#### *Astrothrips globiceps*

*Heliothrips globiceps* Karny 1913, Arch. Naturgesch. 79: 125.

*Astrothrips globiceps*, Karny 1923: 331; Stannard and Mitri 1962: 195-197; Wilson 1975: 49-50; Kudô 1980: 345-346; Reyes 1994: 139-140.

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.

Specimens examined. Semenanjung Malaysia — Perlis: Anak Chelong: Hutan Bintang, 2 ♀ (*Calopogonium mucunoides*, Leguminosae), XI.14.1991; Kedah: Kuala Munda: Gurun, 1 ♀ (grass), XI.10.1991; Selangor: Kuala Lumpur: Kepong, 1 ♀ (*Hyptis capitata*, Labiatae), VIII.7.1990, 1 ♀ (*Microdesmis casearifolia*, Euphorbiaceae), XI.1.1991, 1 ♀ (*Pleocnemia irregularis*, Dryopteridaceae), X.30.1991, 1 ♀ 1 ♂ (*Angiopteris evecta*, Marattiaceae), X.31.1991. The Philippines — Palawan: Brooke's Point: Maasin, 1 ♀ (*Lantana camara*, Verbenaceae), VIII.24.1993; Batarasa: Tagwayan, 1 ♀ (*Centrosema plumieri*, Leguminosae), VIII.18.1993; Mindoro: Calapan: Suqui, 1 ♀ (*Dysoxylum decandrum*, Meliaceae), VIII.12.1994.

#### *Astrothrips lantana*

Bhatti 1967: 8; Bhatti 1968a: 162-165; Wilson 1975: 50-51.

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.

Specimens examined. Nepal — Bagmati: Ramche (1,800 m), 2 ♀ (*Quercus* sp.), X.18.1973, Dhunche (2,000 m), 1 ♀ (unidentified evergreen tree), X.19.1973.

#### *Astrothrips tumiceps*

Karny 1923: 331-334; Wilson 1975: 55-56; Reyes 1994: 140-142.

*Brevithrips tumiceps*, Bhatti 1967: 8; Bhatti 1968a: 174-179.

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  $A_3$  and  $A_4$  with sense cones forked in the male and simple in the female.

Specimens examined. The Philippines — Palawan : Batarasa : Tagwayan, 1 ♀ (*Mallotus glandulosus*, Euphorbiaceae), 2 ♀ (*Centrosema plumieri*, Leguminosae), VIII.18.1993; Brooke's Point : Maasin, 1 ♀ (*Lantana camara*, Verbenaceae), VIII.24.1993; Mindoro : Calapan : Suqui, 9 ♀ (*Dysoxylum decandrum*, Meliaceae), VIII.12.1994.

*Caliothrips graminicola*

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

*Caliothrips graminicola*, Faure 1957 : 79-88; Wilson 1975 : 77-78.

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

Specimens examined. Nepal — Bagmati : Katmandu Valley : Kakani (2,000 m), 3 ♀ (grass), VIII.30.1983.

*Copidothrips octarticulatus*

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

*Copidothrips octarticulatus*, Bhatti 1990 : 222; Kudô 1992c : 478-479.

*Copidothrips formosus* Hood 1954 : 188-191; Mound 1970 : 52; Wilson 1975 : 100-101; Reyes 1994 : 146-147.

*Mesostenothrips kraussi* Stannard and Mitri 1962 : 211-213.

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.

Specimens examined. Semenanjung Malaysia — Perlis : Anak Chelong : Hutan Bintang, 2 ♀ 1 ♂ (*Calopogonium mucunoides*, Leguminosae), XI.14.1991. The Philippines — Palawan : Puerto Princesa : Canigaran Beach, 7 ♀ (*Asystacea gigantea*, Avantaceae), VIII.15.1993.

*Elixothrips brevisetis*

*Trypactothrips brevisetis* Bagnall 1919 : 257.

*Elixothrips brevisetis*, Stannard and Mitri 1962 : 203-205; Wilson 1975 : 111-112; Okajima 1979 : 8-10; Kudô 1980 : 349; Reyes 1994 : 148-149.

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  $S_6$  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  $S_8$  mostly U-shaped, medially separated but rarely completely (see Kudô 1980 : Fig. 9).

Specimens examined. Semenanjung Malaysia — Selangor : Kuala Lumpur : Kepong, 3 ♀ (*Pleocnemia irregularis*, Dryopteridaceae), VIII.5-23.1990, 25 ♀ (*An-*

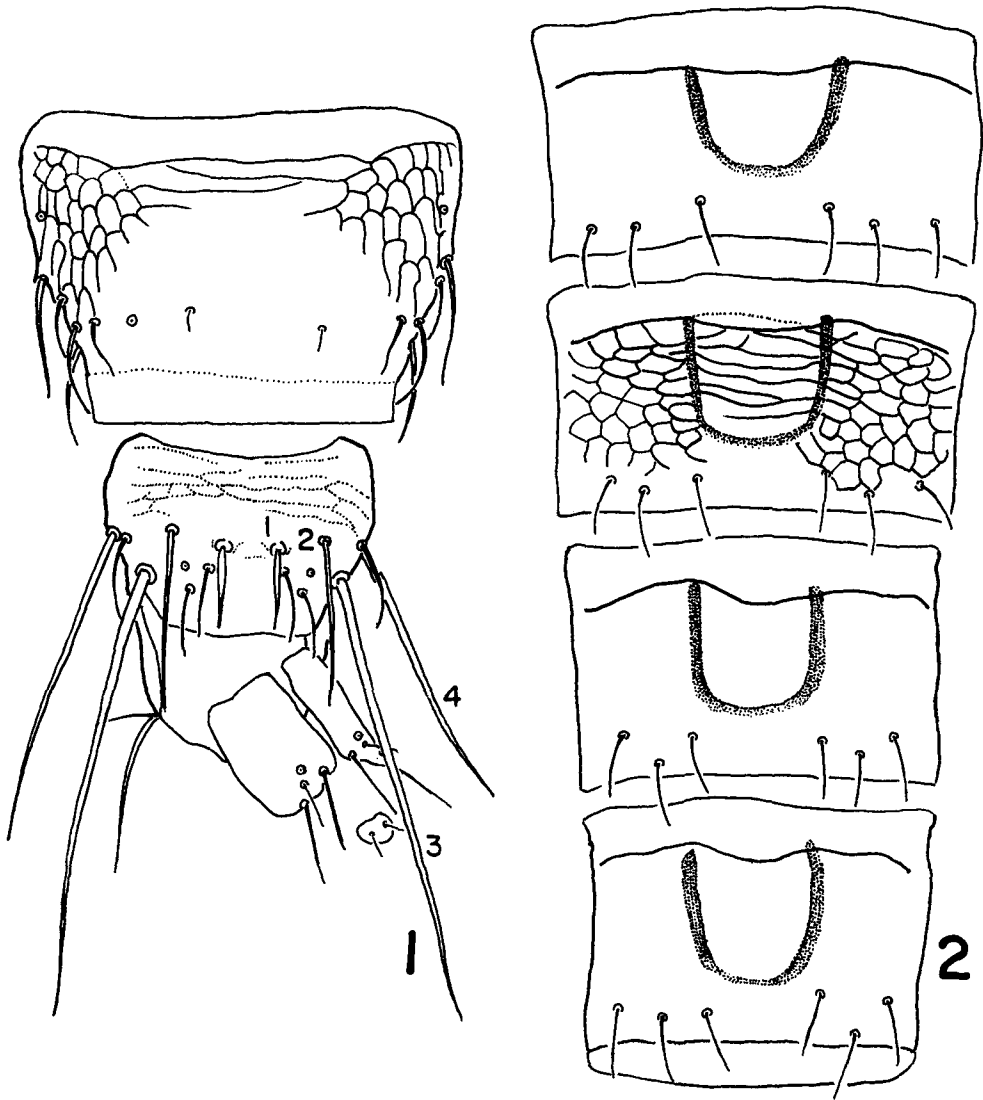


Fig. 2. *Copidothrips ocutarticulatus*, ♂. 1, T<sub>8</sub>-T<sub>10</sub>. 2, S<sub>4</sub>-S<sub>7</sub>.

*giopteris evecta*, Marattiaceae), X.31.1991; Pulau Pinang: Bukit Cendana, 1 ♀ (*Ixonanthes reticulata*, Linaceae), XI.16.1991, Bukit Bendera, 1 ♀ (grass), XI.19.1991. Sarawak — Kuching: Gunong Serapi, 1 ♀ (*Lophopetalum* sp., Celastraceae), IX.29.1991, Taman Negara Bako, 1 ♀ (*Melastoma malabathricum*, Melastomataceae), X.8.1991. The Philippines — Luzon: Los Baños: Mt. Makiling (200-650 m), 1 ♀ (*Malolotus multiglandulosus*, Euphorbiaceae) and 2 ♀ (*Lagerstremia speciosa*, Lythraceae), VIII.4.1993, 4 ♀ (*Angiopteris* sp.) and 2 ♀ (*Acalypha* sp., Euphorbiaceae), VIII.30.1994; Balanga: Mt. Samat, 2 ♀ (*Lantana camara*, Verbenaceae), VIII.18.1994; Mindoro: Mt. Halcon, 6 ♀ 7 ♂ (*Angiopteris* sp.), VIII.14.1994; Palawan: Batarasa:

Tagwayan, 5 ♀ (*M. multiglandulosus*), VIII.18.1993 ; Brooke's Point : Maasin, 2 ♀ (*L. camara*), VIII.24.1993.

*Helionothrips aino*

*Heliothrips aino* Ishida 1931 : 34-36.

*Helionothrips aino*, Jacot-Guillarmod 1971, Ann. Cape Prov. Mus. (Nat. Hist.) 7 : 260 ; Wilson 1975 : 122-123 ; Kudô 1992b : 272-275.

*Helionothrips antennatus* Kurosawa 1968 : 15-16, 79-80 ; Wilson 1975 : 122.

*Helionothrips compressus* Hood 1954 : 192-193 ; Wang 1993 : 390.

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  $S_7$  and  $S_8$  with a little larger glandular area, and in some quantitative characters, particularly ovipositor L/pronotum L larger, and matascutellum W/L and  $B_2$  on  $T_9/T_9L$  smaller (Fig. 3). These differences are here regarded as geographic variations, because the Japanese form is also considerably variable in many quantitative characters (Kudô 1992b : 275). Closer studies are required on various populations in respective areas.

Specimens examined. Nepal — Bagmati : Rasuwa : Thare (1,900 m), 26 ♀ 30 ♂ (*Elsholtzia fruticosa*, Labiatae), IX.9.1983.

*Helionothrips annosus*

Wang 1993 : 391-392.

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*

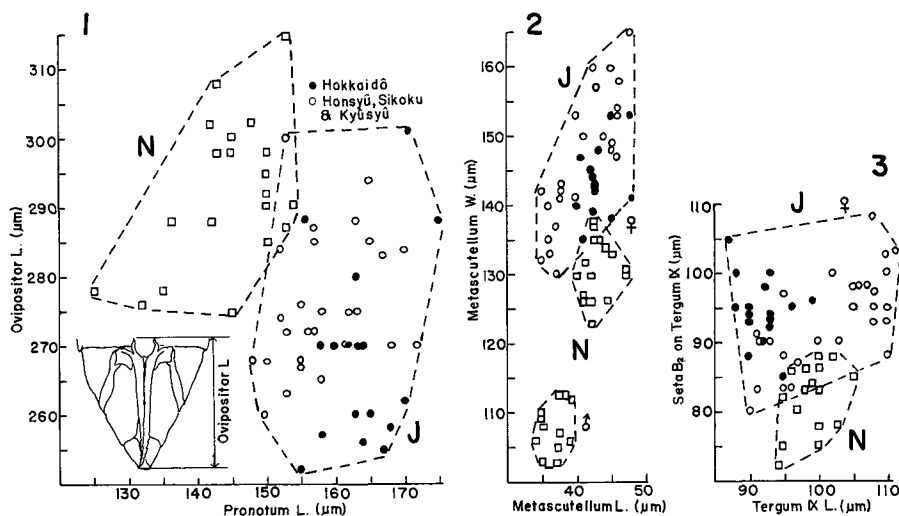


Fig. 3. Differences between the Japanese form (J) and the Nepalese form (N) of *Helionothrips aino* in three ratios. 1, ovipositor length per pronotum length. 3, metascutellum width per metascutellum length. 2, seta  $B_2$  length on  $T_9$ , per  $T_9$  medial length.

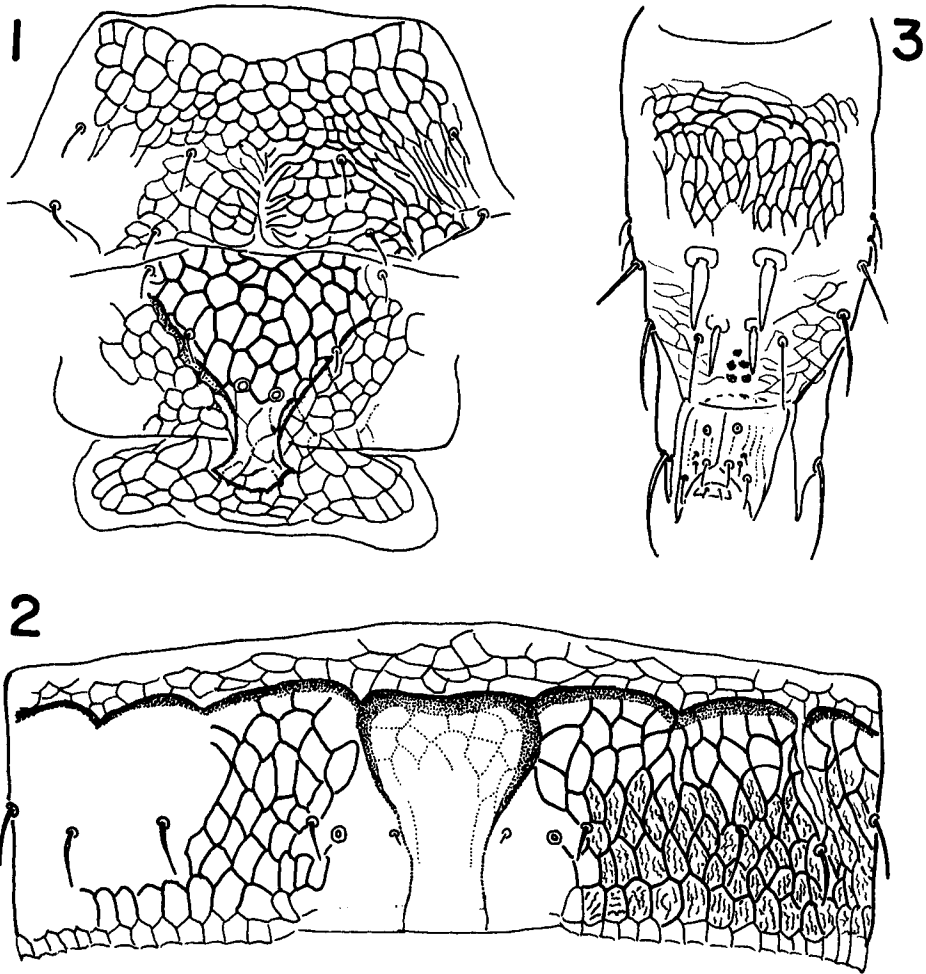


Fig. 4. *Helionothrips annosus*. 1, ♀, meso- and metanotum. 2, ♀, T<sub>5</sub>. 3, ♂, T<sub>9</sub> and T<sub>10</sub>.

and *Litsea* spp., Lauraceae. The eye has no dark facets. The metascutum (Fig. 4. 1) has a raised triangle of sculpture 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 T<sub>9</sub> (Fig. 4.3) has two pairs of thick setae.

This species is very distinct in having a complete comb of microtrichia on T<sub>8</sub> 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 S<sub>3</sub> to S<sub>8</sub>.

Specimens examined. Semenanjung Malaysia — Selangor : Templer Park, 23 ♀ 12♂ (*Cinnamomum iners*, Lauraceae), VIII.27.1990. Sarawak — Kuching : Reservoir Park, 5♀ 2♂ (*C. iners*), X.5.1991 ; Bahagian Samarahan : Serian : Ranchan, 1

♀ (dead plant), IX.30.1991. The Philippines — Luzon : Bataan : Bagac, 5 ♀ 6 ♂ (*Litsea* sp., Lauraceae), VIII.22.1994.

*Helionothrips cephalicus*

Hood 1954 : 191-192 ; Wilson 1975 : 126-127 ; Kudô 1992b : 281-283.

This grass-living species, so far known from Japan, Taiwan and Hongkong, is newly recorded from Nepal and Semenanjung Malaysia. It differs from the congeners 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.

Specimens examined. Nepal — Janakpur : Suri Dhoban (1,100 m), 5 ♀ (grass), VIII.29.1983. Semenanjung Malaysia — Kedah : Jitra : Bukit Wang, 2 ♀ (grass), XI.12.1991 ; Pulau Pinang : Bukit Bendera, 5 ♀ (grass), XI.19.1991.

*Helionothrips longisensibilis* n.sp.

Diagnosis. Sense cones extremely long, forked sense cones on  $A_3$  and  $A_4$  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  $T_9$  with 2 pairs of stout setae subequal in length, without wartlets on posteromedian area ;  $S_7$  and  $S_8$  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.  $A_1$  pale brown,  $A_2$  brown,  $A_3$ -basal half of  $A_6$  and all of  $A_8$  pale, apical half of  $A_6$  and all of  $A_7$  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  $\pm$  SD =  $1.82 \pm 0.17$ ,  $n=11$ ) ; OOD/IOD 1.58-1.90 ( $1.71 \pm 0.12$ , 11) ; eye without dark facets. Antenna (Fig. 5.2) 2.5-2.9 times as long as head ;  $A_3$  L/W 2.17-2.64 ( $2.30 \pm 0.16$ , 11), subequal to  $A_4$  in length, 1.24-1.49 ( $1.35 \pm 0.08$ , 11) times as long as  $A_5$ , constricted apex wider than the apex of  $A_4$  and subequal in length, forked sense cone extremely long, surpassing apex of  $A_5$ , 2.35-2.77 ( $2.58 \pm 0.14$ , 10) times as long as  $A_3$  ;  $A_4$  L/W 2.17-2.55 ( $2.34 \pm 0.11$ , 12), 1.26-1.40 ( $1.34 \pm 0.04$ , 12) times as long as  $A_5$ , forked cone surpassing apex of  $A_8$ , 2.50-2.89 ( $2.68 \pm 0.13$ , 10) times as long as  $A_4$  ;  $A_5$  L/W 1.95-2.41 ( $2.21 \pm 0.13$ , 12) ;  $A_6$  L/W 1.24-1.50, inner sense cone 2.75-3.57 ( $3.06 \pm 0.23$ , 11) times as long as  $A_6$ , reaching far beyond apex of  $A_8$  ;  $A_8$ L/ $A_7$ L 2.75-4.00 ; apical seta on  $A_8$  2.3-3.0 times as long as  $A_8$ .

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 ( $4.14 \pm 0.23$ , 12). Fore wing (Fig. 5.4) with a cluster of dark and enlarged microtrichia at fork of veins ; with 24-29 ( $25.6 \pm 1.4$ , 13) anterior and 63-68 ( $65.1 \pm 1.9$ , 12) posterior FH ; with 23-28 ( $26.1 \pm 1.6$ , 13) setae on costa, 8-9 on fore vein and 5-6 on hind vein. Hind wing with 69-81 ( $76.3 \pm 3.0$ , 12) FH.

Abdomen with wrinkles in almost all of lateral reticules on  $T_2$ - $T_8$  (Fig. 5.6) ;  $T_1$  (Fig. 5.5) completely and  $T_2$  almost completely reticulate ; antecostal lines on  $T_3$ - $T_8$  divided into broad arches, but not issuing caudad into scallop areas ;  $T_8$  with comb

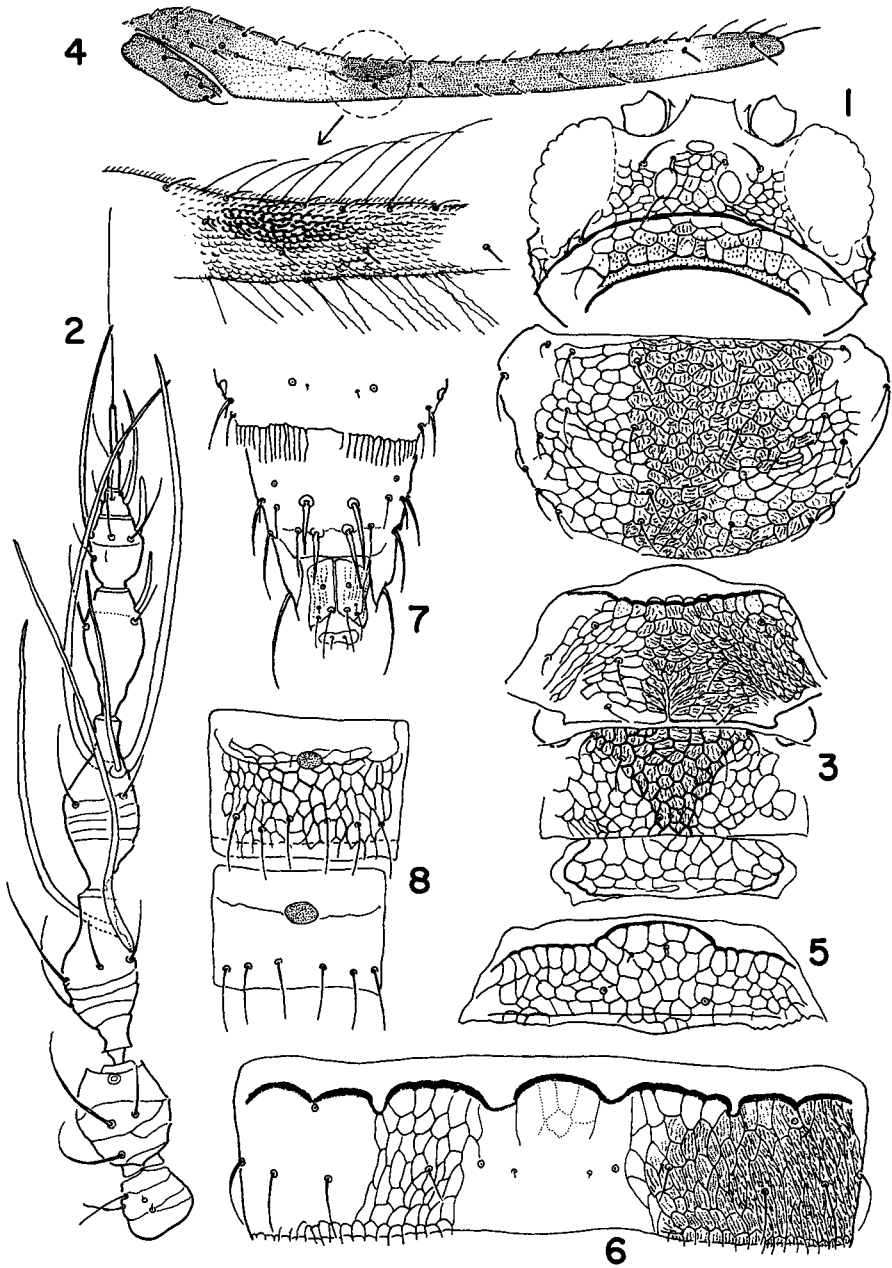


Fig. 5. *Helionothrips longisensibilis*. 1, ♀, head and pronotum. 2, ♀, right antenna. 3, ♀, meso- and metanotum. 4, ♀, fore wing. 5, ♀, T<sub>1</sub>. 6, ♀, T<sub>5</sub>. 7, ♂, T<sub>8</sub>-T<sub>10</sub>. 8, ♂, S<sub>7</sub> and S<sub>8</sub>.

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;  $T_9L/T_{10}L$  1.75-1.95 ( $1.88 \pm 0.07$ , 11);  $B_1$  on  $T_9$  0.68-0.86 ( $0.77 \pm 0.05$ , 11),  $B_2$  0.75-0.89 ( $0.80 \pm 0.04$ , 11) and  $B_3$  0.53-0.60 ( $0.56 \pm 0.02$ , 11) as long as  $T_9$  respectively;  $B_1$  on  $T_{10}$  1.10-1.37 ( $1.23 \pm 0.09$ , 11) times and  $B_2$  1.00-1.21 times as long as  $T_{10}$  respectively; ovipositor long, 2.17-2.35 ( $2.26 \pm 0.06$ , 10) times as long as pronotum.

Measurements ( $\mu m$ ). Body L 1.1-1.2 mm. Head L 90-100, W 176-192; pronotum L 98-108;  $T_9L$  70-80;  $T_{10}L$  37-42;  $B_1$  on  $T_9$  50-64,  $B_2$  54-65,  $B_3$  40-44;  $B_1$  on  $T_{10}$  44-54,  $B_2$  40-46; ovipositor L 228-248. Antenna 246-266 in total L; L(W) of antennal segments as follows:  $A_1$  20-22 (22-24),  $A_2$  32-36 (28-29),  $A_3$  52-58 (22-25),  $A_4$  50-56 (22-24),  $A_5$  37-43 (17-19),  $A_6$  21-24 (16-17),  $A_7$  6-8 (8-10),  $A_8$  22-25 (4-5); forked sense cone on  $A_3$  122-150, that on  $A_4$  140-156, inner cone on  $A_6$  62-75.

Male. Colored as in female.  $A_3$ - $A_6$  L/W 2.17-2.41, 2.14-2.27, 2.06-2.38 and 1.13-1.25 respectively; forked sense cone on  $A_3$  2.00-2.28 times, that on  $A_4$  2.38-2.46 times and inner cone on  $A_6$  2.94-3.60 times as long as respective segments. Metacutellum 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.  $T_9$  (Fig. 5.7) with 2 pairs of stout setae subequal in length, anterior setae (32-34  $\mu m$ ) 0.48-0.56 and the posterior (29-33  $\mu m$ ) 0.45-0.51 as long as  $T_9$  respectively; without chitinous wartlets on posteromedian area. Sterna clearly polygonally reticulate;  $S_7$  and  $S_8$  (Fig. 5.8) with small to medium-sized oval glandular area, that on  $S_7$  smaller. Body L 0.9-1.0 mm.

Specimens examined. Semenanjung Malaysia — Johor: Kota Tinggi: Desaru, holotype ♀, 11 ♀ and 4 ♂ (*Neolitsea zeylanica*, Lauraceae), VIII.19.1990.

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

#### *Helionothrips parvus*

Bhatti 1968b: 36-39; Wilson 1975: 135-136.

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/HOW 2.00-3.33, OOD/IOD 2.25-2.80.  $A_3$ - $A_6$  L/W 2.36-2.71, 1.82-2.09, 1.65-1.79 and 1.37-1.58 respectively; forked sense cone on  $A_3$  0.65-0.79, that on  $A_4$  1.16-1.29 times and inner cone on  $A_6$  1.93-2.31 times as long as respective segments. Metacutellum W/L 2.78-3.03 ( $2.88 \pm 0.09$ , 11). Fore wing with 23-29 ( $25.7 \pm 2.1$ , 13) anterior and 48-58 ( $52.1 \pm 2.8$ , 10) posterior FH; with 22-27 ( $23.6 \pm 1.4$ , 13) setae on costa, 7-9 ( $7.8 \pm 0.7$ , 15) on fore vein and 4-6 ( $4.5 \pm 0.7$ , 13) on hind vein. Hind wing with 62-69 FH.  $T_9L/T_{10}L$  1.54-1.77 ( $1.66 \pm 0.06$ , 11).  $B_1$  on  $T_9$  0.74-0.81 ( $0.77 \pm 0.02$ , 11),  $B_2$  0.73-0.85 ( $0.79 \pm 0.04$ , 11) and  $B_3$  0.50-0.58 ( $0.55 \pm 0.03$ , 11) as long as  $T_9$  respectively.  $B_1$  on  $T_{10}$  0.93-1.12 ( $1.06 \pm 0.05$ , 11) times and  $B_2$  0.92-1.05 times as long as  $T_{10}$  respectively. Ovipositor 1.96-2.19 ( $2.09 \pm 0.10$ , 11) times as long as pronotum.

Specimens examined. Nepal — Bagmati: Katmandu Valley: Godavari (1,700 m), 7 ♀ (grass), VIII.14.1983; Balaju (1,500 m), 3 ♀ (grass), VII.23.1983; Rasuwa: Dhunche (2,200 m), 2 ♀ (grass), IX.10.1983.

*Heliothrips haemorrhoidalis*

*Thrips haemorrhoidalis* Bouché 1833, Naturg. Schädl. Nützl. Gart.-Ins. : 42.

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

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

Specimens examined. Nepal—Katmandu Valley: Kakani (2,000 m), 1 ♀ (grass), VIII.30.1983; Bagmati: Ramche (1,800 m), 3 ♀ (*Quercus* sp., Fagaceae), X.18.1983. Semenanjung Malaysia—Kedah: Kuala Munda: Gunong Jerai (700 m), 3 ♀ (*Strychnos* sp., Loganiaceae), XI.8.1991; Pahang: Kuala Rompin: Hutan Mencali, 3 ♀ (*Pentaphylax euryoides*, Pentaphylaceae), VIII.17.1990; Selangor: Kepong, 4 ♀ (*Ficus uniglandulosa*, Moraceae), VIII.7.1990. Sarawak—Kuching: Gunong Serapi, 8 ♀ (*Alstonia angustiloba*, Apocynaceae), IX.29.1991; Taman Negara Bako, 6 ♀ (*Pongamia pinnata*, Leguminosae), X.15.1991. The Philippines—Luzon: Los Baños: Mt. Makiling, 1 ♀ (*Celtis luzonica*, Ulmaceae), VIII.4.1993; Palawan: Puerto Princesa: White Beach, 1 ♀ (*Garcinia tetrandra*, Guttiferae), VIII.14.1993.

*Oneilliella pallidizonata* n. sp.

Diagnosis. Abdominal segment II pale. Legs yellow except for basal two-thirds of mid femur dark brown.  $A_1$ - $A_5$  pale yellow. Fore wing with submedian and apical pale patches along with a subbasal pale area.  $T_2$ - $T_8$  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,  $A_6$  brown,  $A_7$  and  $A_8$  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;  $A_3$  longest, L/W 3.11-3.53, constricted apex much shorter than median swollen part, and shorter and wider than the apex of  $A_4$ ;  $A_4$  L/W 2.35-2.53, simple sense cone surpassing apex of forked cone and 1.28-1.39 times as long as  $A_4$ ;  $A_5$  L/W 2.10-2.56;  $A_6$  pedicellate, L/W 1.88-2.06, inner sense cone surpassing apex of  $A_8$  and 2.00-2.31 times as long as  $A_6$ ;  $A_7$  L/W 1.60-1.86;  $A_8$  L/W 6.2-8.0;  $A_8$ L/ $A_7$ L 2.3-3.2; apical seta on  $A_8$  1.63-1.86 times as long as  $A_8$ ;  $A_4$  with 2-3 dorsal and 3 ventral rows of microtrichia,  $A_5$  with 3-4 rows,  $A_6$  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

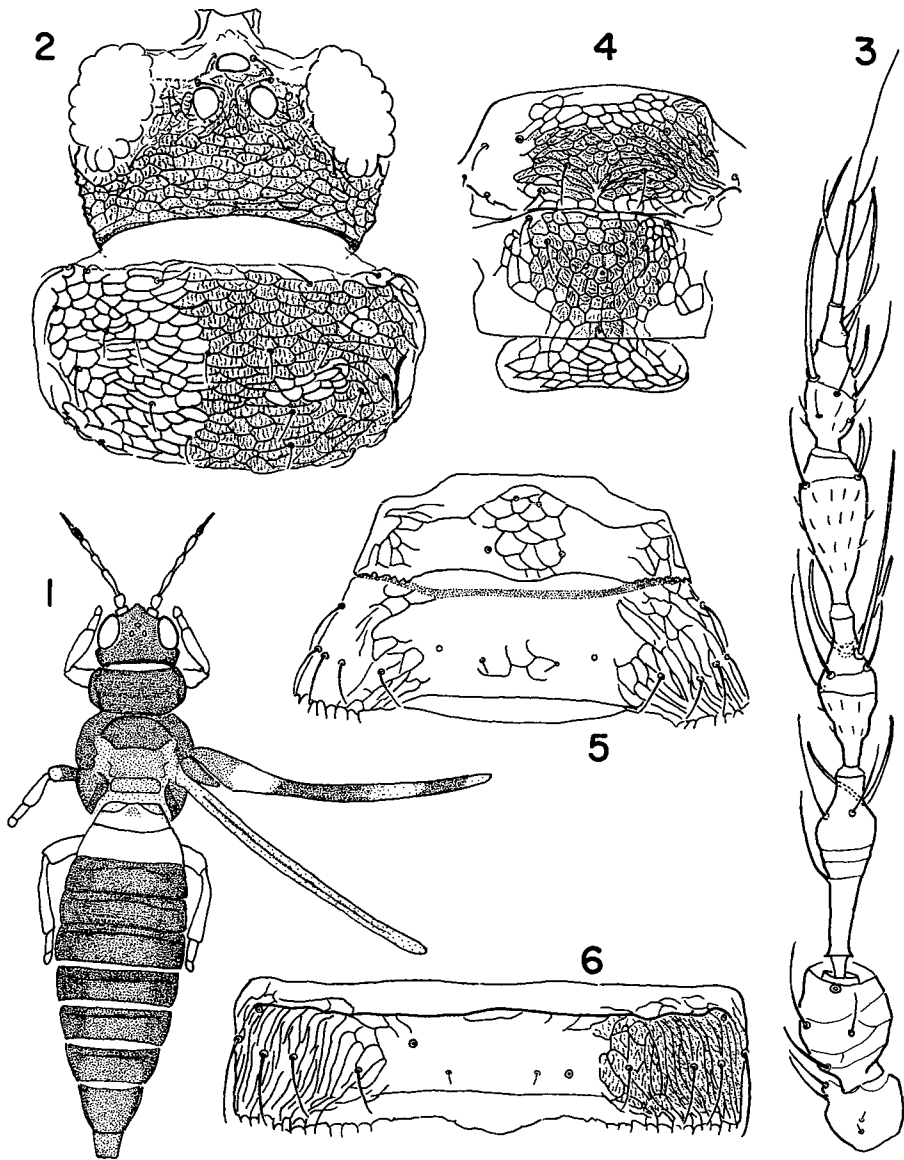


Fig. 6. *Oneilliella pallidizonata*, ♀. 1, total view showing color pattern. 2, head and pronotum. 2, right antenna. 4, meso- and metanotum. 5, T<sub>1</sub> and T<sub>2</sub>. 6, T<sub>5</sub>.

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<sub>1</sub> (Fig. 6.5) with about 13 reticules, with weak wrinkles in some posterior reticules ; T<sub>2</sub> with some incomplete reticules between B<sub>1</sub>, with longitudinal reticules on sides, without internal wrinkles ;

T<sub>3</sub>-T<sub>8</sub> (Fig. 6.6) longitudinally striate on sides, with numerous weak internal wrinkles; T<sub>8</sub> with comb of long microtrichia interrupted at median third of posterior margin; T<sub>9</sub> with weakly transverse and broken striae; T<sub>10</sub> with a few weak striae; T<sub>9</sub>L/T<sub>10</sub>L 1.57-1.76; B<sub>1</sub>-B<sub>3</sub> on T<sub>9</sub> 0.73-0.78, 0.95-1.02 and 0.68-0.75 as long as T<sub>9</sub> respectively; B<sub>1</sub> and B<sub>2</sub> on T<sub>10</sub> subequal, 0.93-1.02 as long as T<sub>10</sub>. Sterna with transverse and partly anastomosing striae, with B<sub>3</sub> anterior to B<sub>1</sub> and B<sub>2</sub>; S<sub>7</sub> with 2 pairs of small setae between B<sub>1</sub> and B<sub>2</sub> at posterior margin; ovipositor 2.32-2.50

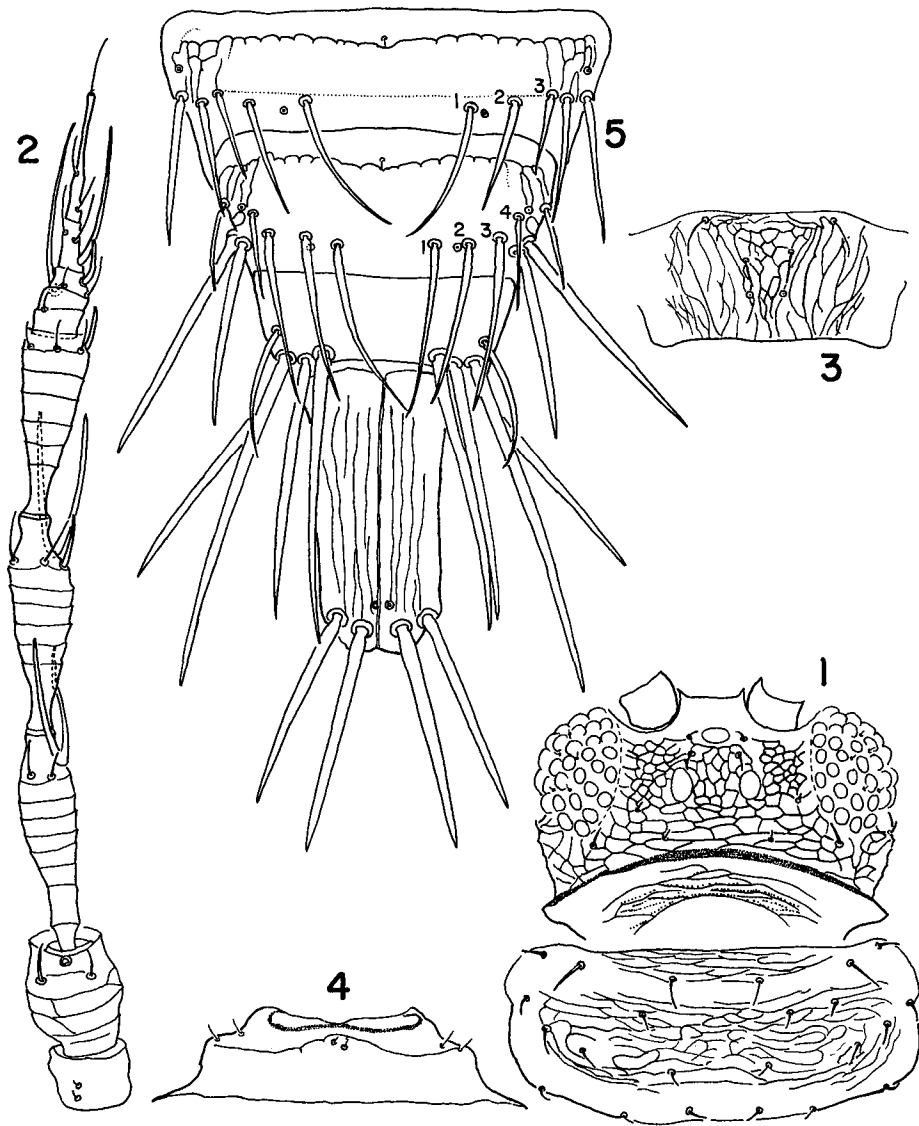


Fig. 7. *Panchaethrips holtmanni*, ♀. 1, head and pronotum. 2, right antenna. 3, metascutum. 4, T<sub>1</sub>. 5, T<sub>7</sub>-T<sub>10</sub>.

times as long as pronotum.

Male. Unknown.

Specimens examined. Semenanjung Malaysia — Pahang : Kuantan : Tasik Cini, holotype ♀ and 6 ♀ (*Selaginella* sp., Selaginellaceae), VIII.13.1990.

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  $A_3$  and median half of  $A_4$  are brown, the fore wing has a subbasal pale patch only, the  $T_2$  is completely covered with polygonal reticules, and the  $T_3$  to  $T_8$  are smooth on posteromedian half.

*Panchaethrips holtmanni*

Wilson 1975 : 186-188 ; zur Straseen 1992 : 119.

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  $A_3$  and  $A_4$ , those about 0.6-0.7 as long as respective segments;  $A_3$ - $A_6$  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.  $T_1$  (Fig. 7.4) with a pair of median setae nearly contiguous.  $B_3$  on  $T_7$  (Fig. 7.5) 0.68-0.80 as long as  $B_2$ ;  $B_4$  on  $T_8$  0.53-0.62 as long as  $B_3$ ;  $T_{10}L/T_9L$  3.24-3.37;  $B_1$  on  $T_9$  3.56-3.76 times,  $B_2$  3.15-3.18 times and  $B_3$  4.15-4.16 times as long as  $T_9$  respectively;  $B_1$  on  $T_{10}$  0.78-0.88 and  $B_2$  0.73-0.79 as long as  $T_{10}$  respectively. Ovipositor 3.36-3.76 times as long as pronotum.

Measurements ( $\mu\text{m}$ ). 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;  $T_9$  L 50-54,  $T_{10}$  L 162-182;  $B_1$  on  $T_9$  188-192,  $B_2$  159-170,  $B_3$  208-224;  $B_1$  on  $T_{10}$  140-144,  $B_2$  122-132; ovipositor L 278-282. L(W) of antennal segments:  $A_3$  64-66 (17-18),  $A_4$  57-64 (17-18),  $A_5$  51-54 (18-20),  $A_6$  20-21 (14-15),  $A_7$  13-14 (6-8),  $A_8$  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  $A_3$  and  $A_4$ ; metascutal campaniform sensilla widely separated; larger setae  $B_3$  on  $T_7$  and  $B_4$  on  $T_8$ , and shorter setae on  $T_9$  and  $T_{10}$ . 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.

Specimens examined. Semenanjung Malaysia — Selangor : Kuala Lumpur : Kepong, 1 ♀ (*Vitex gamosepala*, Verbenaceae), X.30.1991. Sarawak — Bahagian Samarahan : Serian : Ranchan, 1 ♀ (*Sterculia* sp., Sterculiaceae), IX.30.1991.

*Panchaetothrips kikiri*

Kudô 1992a : 117-119.

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  $T_{10}$  in the holotype but absent in the Nepalese specimen, and 2) antecostal lines on  $T_3$ - $T_8$  with some posteriorly directed notches, especially on  $T_7$  and  $T_8$  as shown in Fig. 3.6, Kudô 1992a.

This species is similar to the Philippine *P. stephani* in the long forked sense cones on  $A_3$  and  $A_4$ , 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  $B_3$  on  $T_7$  and  $B_4$  on  $T_8$ , and antecostal lines on  $T_3$ - $T_8$  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  $T_1$  very closely placed, their alveoli being almost contiguous against widely separated by about 4-10 times the alveolus diameter. 5)  $B_1$  on  $T_2$  shorter than half the length of  $B_2$  against longer than half the length of  $B_2$ . 6)  $B_1$ - $B_3$  on  $T_9$  longer, being 4.6-5.1 times, 5.5-5.7 times and 5.6-5.8 times as long as  $T_9$  respectively against 3.9-4.4 times, 4.0-4.4 times and 4.7-5.2 times as long as  $T_9$  respectively.

Specimens examined. Japan — Kagosima : Sata : Ôdomari, holotype ♀ (dry leaf), X.8.1978. Nepal — Narayani : Chitwan National Park, 1 ♀ (dead plant) VII. 24.1983.

*Panchaetothrips stephani*

Reyes 1994 : 160-162.

This Philippine species differs from *P. holtmanni* in its large size, widely separated median setae on the  $T_1$ , 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  $A_3$  reaching the base of simple cone on  $A_4$ , that on  $A_4$  reaching the base to middle of  $A_6$ ;  $A_3$ - $A_6$  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  $T_3$ - $T_8$  with some weak and posteriorly directed notches. Median minute setae on  $T_1$  (Fig. 8.3) more widely separated by 4-10 times their alveolus diameter;  $B_1$  on  $T_2$  0.61-0.78 as long

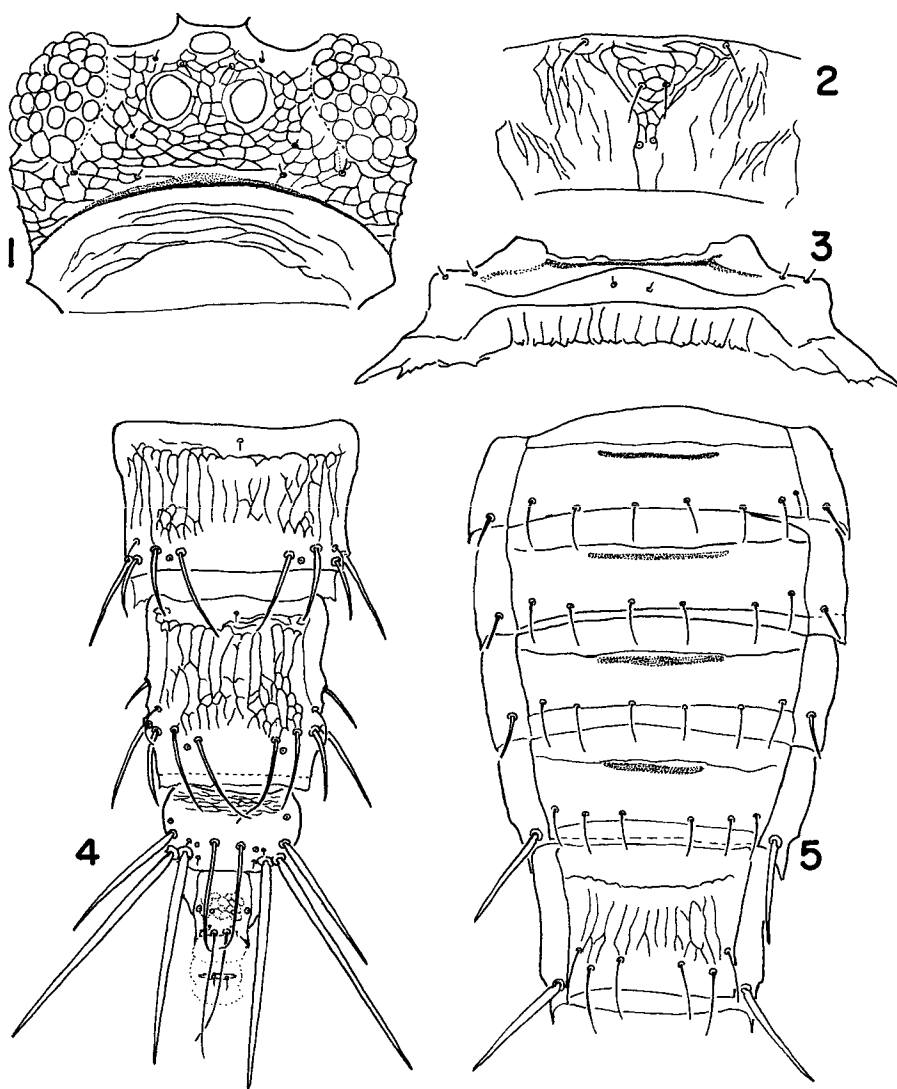


Fig. 8. *Panchaethrips stephani*. 1, ♀, head. 2, ♀, metascutum. 3, ♀, T<sub>1</sub>. 4, ♂, T<sub>7</sub>-T<sub>10</sub>. 5, ♂, S<sub>4</sub>-S<sub>8</sub>.

as B<sub>2</sub>; B<sub>3</sub> on T<sub>7</sub> 0.44-0.65 as long as B<sub>2</sub>; B<sub>4</sub> on T<sub>8</sub> 0.35-0.42 as long as B<sub>3</sub>; T<sub>10</sub>L/T<sub>9</sub> L 3.56-4.21; B<sub>1</sub> on T<sub>9</sub> 3.88-4.41 times, B<sub>2</sub> 4.03-4.41 times and B<sub>3</sub> 4.69-5.18 times as long as T<sub>9</sub> respectively; B<sub>1</sub> and B<sub>2</sub> on T<sub>10</sub> subequal, 0.85-1.03 times as long as T<sub>10</sub>; 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. T<sub>7</sub> and T<sub>8</sub> (Fig. 8.4) medially with longitudinal striae, reticules in part; B<sub>1</sub> on T<sub>9</sub> 1.30-1.34 times, B<sub>2</sub> 2.63-3.13 times, B<sub>3</sub> 1.80-2.03 times and B<sub>4</sub> 3.12-3.30 times as long as T<sub>9</sub> respectively; T<sub>10</sub>

reticulate, undivided longitudinally, with a pair of long apical setae (114–130  $\mu\text{m}$ ).  $S_3$ – $S_6$  (Fig. 8.5) with a transverse and linear glandular area. Body L 1.4–1.6 mm.

Specimens examined. The Philippines — Mindoro : Puerto Galera : Villaflor, 1 ♀ (*Scaevola seriaca*, Goodeniaceae), VIII.13.1994 ; Palawan : Puerto Princesa : Katduang, 8 ♀ 3 ♂ (*Clerodendrum* sp., Verbenaceae), VIII.13.1993.

#### *Phibalothrips peringueyi*

*Reticulothrips peringueyi* Faure 1925 : 145–150.

*Phibalothrips peringueyi*, Jacot-Guillarmod 1937 : 10 ; Wilson 1875 : 197–198 ; Kudô 1980 : 350–351 ; Kudô 1992a : 120–122 ; Reyes 1994 : 163–164.

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.

Specimens examined. Nepal — Janakpur : Malepu (1,000 m), 2 ♀ 4 ♂ (grass) and Suri Dhoban (1,100 m), 6 ♀ (grass), VIII.29.1983. Semenanjung Malaysia — Kedah : Jitra : Bukit Wang, 3 ♀ (*Selaginella* sp., Selaginellaceae), XI.12.1991 ; Pahang : Kuantan, 2 ♀ (grass), VIII.15.1990 ; Pulau Pinang : Telok Bahan, 2 ♀ 5 ♂ (*Ischaemum muticum*, Gramineae), XI.20.1991 ; Selangor : Kepong, 1 ♀ (*Sonerila heterostemon*, Melastomataceae), XI.1.1991 ; Johor : Kota Tinggi : Desaru, 4 ♀ 1 ♂ (grass), VIII.18.1990. Sarawak — Kuching : Matang, 2 ♀ (*Ischaemum* sp.), X.21.1991. The Philippines — Palawan : Puerto Princesa : White Beach, 1 ♀ 2 ♂ (grass), VIII.14.1993.

#### *Phibalothrips rugosus*

Kudô 1980 : 351–353.

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

Specimen examined. Sarawak — Kuching : Matang, 1 ♀ (*Pternandra* sp., Melastomataceae), X. 21.1991

#### *Retithrips javanicus*

Karny 1923 : 364–367 ; Wilson 1975 : 213–214 ; Kudô 1980 : 353 ; Reyes 1994 : 165–166.

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.

Specimens examined. The Philippines — Luzon : Manila : Quezon, 6 ♀ 4 ♂ (*Terminalia catappa*, Combretaceae), VIII. 29. 1993.

#### *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  $T_9$  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 A<sub>3</sub> and A<sub>4</sub> with stalked base short and indistinct ; T<sub>1</sub> 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 A<sub>3</sub> and A<sub>4</sub> with stalked base short and indistinct ; T<sub>1</sub> completely reticulate.

*R. miemsae* : Head and thorax brown, metanotum, abdomen and all legs yellow ; fore wing with scale brown ; sense cones on A<sub>3</sub> and A<sub>4</sub> with stalked base long and distinct ; T<sub>1</sub> largely smooth.

Specimens examined. Semenanjung Malaysia — Pulau Pinang : Bukit Cendana, 2 ♀ 1 ♂ (*Ixonanthes reticulata*, Linaceae), XI.16.1991. China — Yunnan : Jinghong, 1 ♀ 1 ♂ paratypes (*Hibiscus syriacus*, Malvaceae), VI.11.1987, in Zhang collection, South China Agricultural University.

#### *Rhipiphorothrips pulchellus*

Morgan 1913 : 17-19 ; Wilson 1975 : 226-227 ; Reyes 1994 : 167-168.

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.

Specimens examined. Semenanjung Malaysia — Kedah : Kuala Munda : Gurun, 12 ♀ 6 ♂ (*Eugenia* sp., Myrtaceae), XI.10.1991 ; Pulau Pinang : Bukit Cendana, 1 ♀ 2 ♂ (*Eugenia filiformis*), XI.16.1991. Sarawak — Kuching : Taman Negara Bako, 2 ♀ (*Glochidion hypoleucum*, Euphorbiaceae), 1 ♀ (*Ardisia* sp., Myrsinaceae), X.14-15.1991. The Philippines — Luzon : Los Baños : Mt. Makiling, 11 ♀ 4 ♂ (*Lagerstroemia speciosa*, Lythraceae), VIII.4.1993 ; Bataan : Balanga, 5 ♀ 3 ♂ (*Ficus* sp., Moraceae), VIII.19.1994.

#### *Selenothrips rubrocinctus*

*Physapus rubrocinctus* Giard 1901 : 263-265.

*Selenothrips rubrocinctus*, Hood 1913 : 150 ; Wilson 1975 : 230-234 ; Kudō 1992a : 122-124 ; Reyes 1994 : 169-171.

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.

Species	Areas											General distribution
	J	TA	SC	N	BU	TH	P	M	BO	I		
<i>Heliono. ponkikiri</i>	J											Endemic
<i>Heliono. linderæ</i>	J	TA										Restricted
<i>Heliono. mube</i>	J	TA										Restricted
<i>Heliono. communis</i>		TA										Endemic
<i>Heliono. unitatus</i>		TA										Endemic
<i>Rhipiphoro. africanus</i>		TA										African
<i>Monilo. kempî</i>	J	TA										Afro-Indian
<i>Calio. fasciatus</i>			SC									Nearctic
<i>Heliono. brunneipennis</i>			SC									Singhalese
<i>Heliono. errans</i>		TA	SC									African
<i>Astro. lantana</i>				N								Indian
<i>Heliono. parvus</i>				N								Indian
<i>Panchaeto. kikiri</i>	J			N								Restricted
<i>Heliono. aino</i>	J	TA	SC	N								Sino-Japanese
<i>Astro. strasseni</i>			SC		BU							Restricted
<i>Opimo. tubulatus</i>						TH						Endemic
<i>Panchaeto. indicus</i>			SC			TH						Indian
<i>Calio. graminicola</i>				N		TH						Indian
<i>Heliono. guttatus</i>							P					Endemic
<i>Hemingia glandula</i>							P					Endemic
<i>Panchaeto. stephani</i>							P					Endemic
<i>Heliono. kadaliphilus</i>							P					Indian
<i>Astro. aucubæ</i>	J		SC				P					Japanese
<i>Astro. aureolus</i>								M				Endemic
<i>Galeo. seticornis</i>								M				Endemic
<i>Heliono. longisensibilis</i>								M				Endemic
<i>Heliono. minutus</i>								M				Endemic
<i>Oneilliella pallidizonata</i>								M				Endemic
<i>Astro. chisinliaensis</i>		TA						M				Restricted
<i>Rhipiphoro. concoloratus</i>			SC					M				Restricted
<i>Astro. globiceps</i>							P	M				Indo-Pacific
<i>Copido. octarticulatus</i>	J	TA					P	M				Pacific Is.
<i>Heliono. cephalicus</i>	J	TA	SC	N				M				E. Oriental
<i>Phibalo. rugosus</i>								M	BO			Malaysian
<i>Anisoptilo. venustulus</i>	J		SC					M	BO			Tropical Is.
<i>Heliono. annosus</i>		TA					P	M	BO			Malaysian
<i>Phibalo. peringueyi</i>	J	TA	SC	N		TH	P	M	BO			Afro-Oriental
<i>Aorato. tenuis</i>										I		Endemic
<i>Reti. javanicus</i>					BU		P					I Restricted
<i>Panchaeto. holtmanni</i>								M	BO			I Malaysian
<i>Rhipiphoro. cruentatus</i>		TA	SC									I Indian
<i>Astro. tumiceps</i>					BU	TH	P					I Oriental
<i>Calio. striatopterus</i>							P					I Indo-Austr.
<i>Elixo. brevisetis</i>	J	TA	SC				P	M	BO			I Pacific Is.
<i>Rhipiphoro. pulchellus</i>		TA	SC		BU	TH	P	M	BO			I Oriental
<i>Helio. haemorrhoidalis</i>	J	TA	SC	N	BU	TH	P	M	BO			I Pantropical
<i>Seleno. rubrocinctus</i>	J	TA	SC	N	BU	TH	P	M	BO			I Pantropical
No. of species	14	18	16	9	6	8	16	19	9	10		

J: Japan, TA: Taiwan, SC: Southern China, N: Nepal, BU: Burma, TH: Thailand, P: The Philippines, M: Malaya and Singapore, BO: Borneo, I: Indonesia, or Java, Sumatra and adjacent islands.

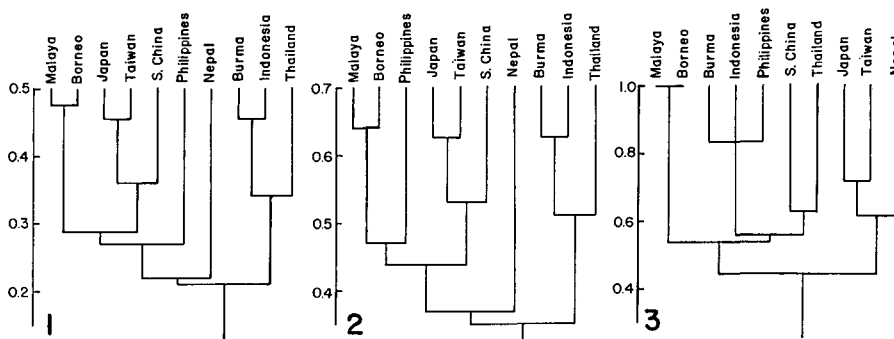


Fig. 9. Dendrograms showing faunal similarity indices for 10 areas. 1, Jaccard's Coefficient. 2, Sørensen's Coefficient. 3, Nomura-Simpson's Coefficient.

Specimens examined. Nepal—Janakpur: Dolaka (1,500 m), 2 ♀ 1 ♂ (*Lyonia ovalifolia*, Ericaceae), VIII. 9. 1983. Semenanjung Malaysia—Pahang: Kuantan, 1 ♀ (dry vine), VIII.13.1990; Selangor: Kepong, 4 ♀ (*Codiaeum variegatum*, Euphorbiaceae), VIII.4.1990; Kuala Lumpur: Bukit Nanas, 8 ♀ (*Ochanostachys amentacea*, Olaceae), IX.26.1991. Sarawak—Bahagian Samarahan: Serian: Ranchan, 9 ♀ (*Sterculia* sp., Sterculiaceae), IX.30.1991; Kuching, 22 ♀ (*Terminalia catappa*, Combretaceae), X.1.1991. The Philippines—Luzon: Manila: Quezon, 8 ♀ (*T. catappa*), VIII.29.1993; Bataan: Balanga, 20 ♀ 10 ♂ (*Ficus* sp., Moraceae), VIII.19.1994; Palawan: Puerto Princesa: 6 ♀ (*Aglaia laevigata*, Meliaceae), 4 ♀ 1 ♂ (*Garcinia tetrandia*, Guttiferaceae), VIII.14-15.1993; Brooke's Point, 18 ♀ 3 ♂ (*T. catappa*), VIII.20.1993.

#### GEOGRAPHIC DISTRIBUTION

As two species have been described in the present study, 47 species in the Panchaethropinae 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

I would like to express my deep gratitude to the following members of the projects for their kindly helping me in various ways during my surveys: Mr. J. Kumar, Dr. K.C. Sharma, Mr. N.R. Sharma and Dr. V.K. Thapa in Nepal; Mr. Aban Abdul Hamid, Dr. Khoo Soo Ghee, Mr. K.M. Kochummen, Mr. Azmi Mahyudin and the late Dr. Tho Yow Pong in Malaysia; Dr. V.J. Calilung, Mr. Edison A. Cosico, Mr. Orly Eusebio, Dr. E.S. Fernando, Dr. W.S. Gruezo and Mr. I.L. Lit, Dr. C.P. Reyes in the Philippines; Dr. F. Komai, Dr. T. Kumata, Dr. M. Suwa and Dr. S. Takagi in Japan. In particular, sincere thanks are due to Prof. Zhang Weique, South China Agricultural University, for loaning the paratypes of *R. concoloratus*.

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