Zootaxa 3918 (4): 492–502
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3918.4.2
http://zoobank.org/urn:lsid:zoobank.org:pub:D7C0E4F9-7BF3-4D1B-B754-75100551D3F8

Species of Thripinae (Thysanoptera) from bamboo in Malaysia, with one new species and six new records

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Abstract

Nine species of Thripinae that inhabit bamboo are recorded from Malaysia. *Clypeothrips idrisi* **sp.n**. is described as a second species in the genus, and *Trichromothrips bruncurrum* Reyes is considered a **syn.n.** of *Neocorynothrips asiaticus* Ramakrishna & Margabandhu. Six species are newly recorded from Malaysia: *N. asiaticus*, *Okajimaella tubercula*, *Simulothrips banpoti, Stenchaetothrips bambusicola, S. bambusae* and *S. spinalis*. Seven species of *Stenchaetothrips* are now known from Malaysia. Illustrations and descriptions of each species are provided.

Key words: Poaceae, bamboo, new species, *Clypeothrips*, *Neocorynothrips*, *Okajimaella*, *Simulothrips*, *Stenchaetothrips*

Introduction

Bamboo is a common term that is applied to the species of more than 40 genera of plants in the family Poaceae, the same plant family as grasses and cereal crops such as rice, maize, wheat, oats, and barley. Bamboo is thus not a single botanical group, but represents a series of relatively unrelated, large woody grasses found widely throughout the tropics. Some species of Thysanoptera that are found on bamboo exhibit high specificity to these plants, although entomologists commonly do not identify the genus or species of "bamboo" from which they collect insects. A number of Thripinae and Phlaeothripinae are quite commonly collected from bamboo plants, including species of *Stenchaetothrips, Trichromothrips* and *Podothrips*, but these thrips genera are also found on other Poaceae. However, the five Asian Thripidae genera, *Clypeothrips, Simulothrips, Paithrips, Okajimaella,* and *Takethrips,* also one Phlaeothripidae genus, *Veerabahuthrips*, are recorded exclusively from bamboo plants (Nonaka & Jangvitaya 1993, 1994; Masumoto & Okajima 2012). Five of these genera seem likely to represent a single lineage within the Thripinae that has radiated on Asian bamboo plants of several genera.

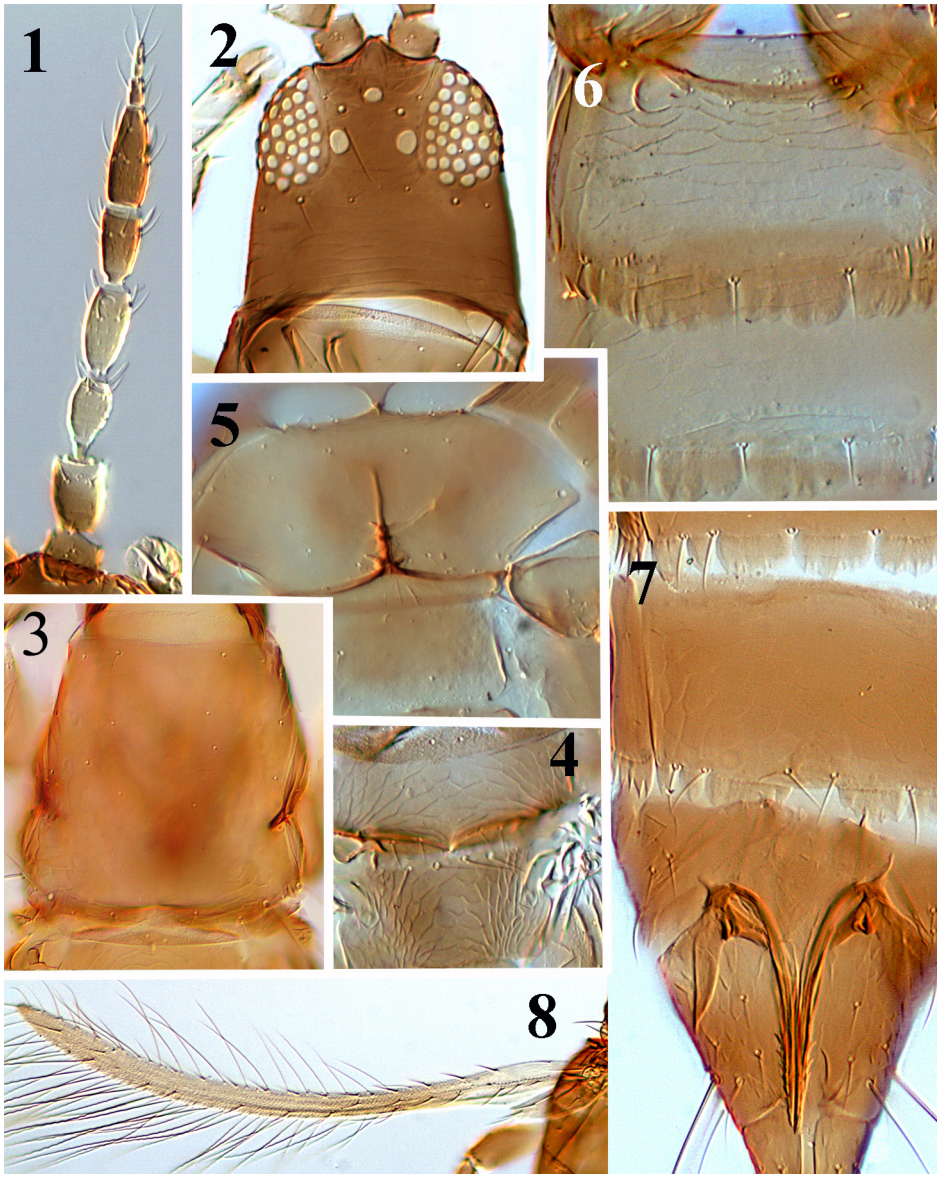
Unrelated Thysanoptera species that are associated with grass leaves often have bicoloured bodies, such as *Anaphothrips sudanensis*, *Podothrips bicolor,* and *Trichromothrips dorsalis*. However, the Asian Thysanoptera that are specific to bamboo plants exhibit an unusual range of structural features. For example, *Clypeothrips* species have an unusually short and weak ovipositor, several species in other genera bear an additional spur on the fore tibia, and some species of *Veerabahuthrips* have grotesquely modified fore femora. There is little information on the biology of these species, although these structural features raise testable hypotheses. The ovipositor of *Clypeothrips* species appears to be too weak to cut into leaf tissues and insert an egg, as is normal among Thripidae species. Presumably the eggs of *Clypeothrips* species are deposited superficially or in a groove on the plant. The armed fore legs suggest that these species might be predatory, or alternatively the armature may be important in sexual combat. Preliminary field observations on *Veerabahuthrips simplex* by the first author suggested that the sharp femoral teeth are used to grip a leaf vein in windy conditions. However, further observations in captivity are needed to understand the behaviour and life history of these thrips.

All of the genera of bamboo-associated thrips that are considered here can be identified by using the key to Thripinae genera from South East Asia (Mound & Ng 2009), together with the key to species of *Thrips* and related genera from Japan (Masumoto & Okajima 2013). Here we record nine species of Thripinae that have been

 Accepted by A. Cavalleri: 15 Jan. 2015; published: 13 Feb. 2015

collected from various bamboo species in Peninsular Malaysia, and add a further seven species to the list of Thripidae recorded from this country (Mound & Azidah 2009). Illustrations and descriptions of each of these species are also provided. Nomenclatural details are available from ThripsWiki (2014).

***Clypeothrips idrisi* Ng & Mound sp.n.**
(Figs 1–8)



FIGURES 1–8. ***Clypeothrips idrisi* sp.n.** (1) Antenna; (2) Head; (3) Pronotum; (4) Mesonotum and metanotum; (5) Mesosternum and metasternum; (6) Abdominal sternites II–III; (7) Abdominal sternites VI–X; (8) Fore wing.

Female macroptera. Body brown. Legs brown, fore tibia largely pale, middle and hind tibiae pale at apex, tarsi yellow; fore wings uniformly shaded; antennal segments I and VI–VIII brown, III–IV yellow, also apical half of II and basal third of V. Head about as long as wide, with two pairs of ocellar setae; pair II minute about 0.15 times as long as III, arising in line with fore ocellus and laterally near margin of compound eyes; pair III arising just outside margins of ocellar triangle (Fig. 2); three pairs of postocular setae, pair II at least 3.0 times as long as pairs I and III. Antennae 8-segmented (Fig. 1); segment I with a single dorso-apical median seta, III–IV with forked sense cone, VI about 1.5 times as long as segment V. Pronotum trapezoidal as long as wide, surface smooth with few weak lines near posterior and lateral margins, about 24 discal setae; 2 pairs of posteroangular setae (Fig. 3); 2 pairs of

minute posteromarginal setae. Mesonotal anterior median campaniform sensilla present, submedian pair absent; median and submedian setae arising at posterior margin. Metanotum irregularly reticulate medially, longitudinal striate laterally (Fig. 4); campaniform sensilla absent; median setae and submedian setae sub-equal, arising at anterior margin. Mesofurca with spinula, metafurca without; meso and metasterna each with 4–6 minute setae (Fig. 5). Fore wing strongly curved, second vein with about 7–9 setae; first vein with 2 setae near apex, 7–8 near base; clavus with 4 veinal and 1 discal setae. Tergites II–VIII with 6–8 transverse lines laterally scarcely extending mesad of campaniform sensilla and setae S1, posterior margins with toothed craspedum. Sternite II with smooth surface (Fig. 6), without thorn-like tubercles, with 2 pairs of posteromarginal setae; sternites II–VII with lobed craspedum, III–VII with 3 pairs of posteromarginal setae. Ovipositor serrate and short, but reaching anterior margin of segment X (Fig. 7).

Measurements (holotype female in microns). Body length 1350. Head, length 152; width across cheeks 148; ocellar setae - II 6, III 32; postocellar setae I–III: 7, 22, 7; Pronotum, length 178; width 189; posteroangular setae - inner 48, outer 50. Fore wing, length 647. Antennal segments I–VIII length (width): 23(27), 33(25), 36 (20), 42(20), 32(20), 46(20), 11(7), 17(5).

Male. Unknown

Material studied. Holotype female, **Malaysia**, Selangor, Kajang. *Bambusa* sp., 7.i.2014 (NG, Y.F.), in CISUKM.

Paratypes: 6 females collected with holotype; from same plant and collector, 2 females, 15.xi.2013, 1 female, 15.xii.2013 in CISUKM; 1 female from same plant, 8.xi.2013, in ANIC.

Etymology. The **s**pecies is named after the Professor Dr Idris Abdul Ghani from Faculty of Science and Technology, Universiti Kebangsaan Malaysia and he is the current president of Entomology Society Malaysia (ENTOMA).

Comments. This new species is easily distinguished from the only other known member of the genus, *C. tibialis*, because the second abdominal sternite of that species bears many thorn-like tubercles whereas it is smooth in this new species.

Neocorynothrips asiaticus Ramakrishna & Margabandhu, 1939: 22

(Figs 9–15)

Trichromothrips bruncurrum Reyes, 1994: 299. **Syn.n.**

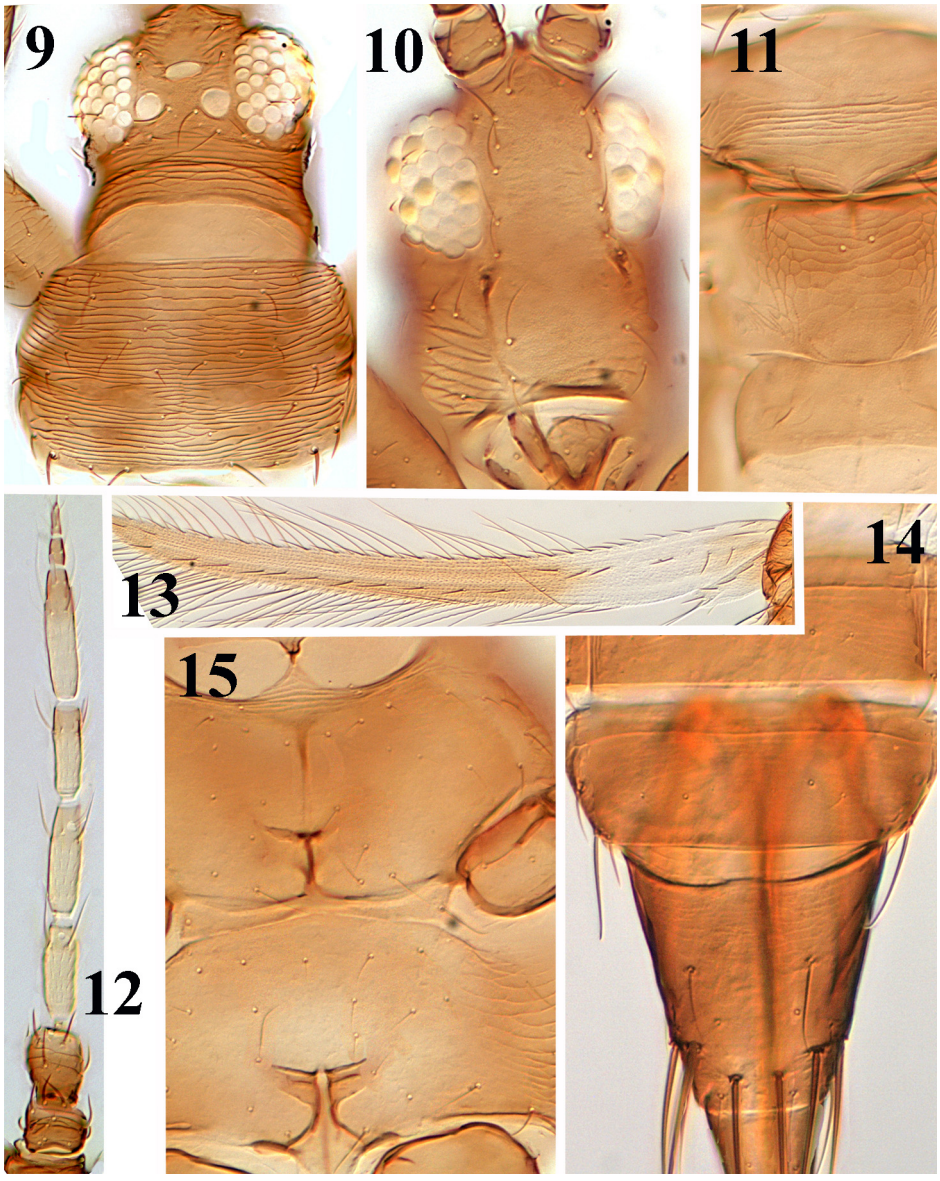
The genus *Neocorynothrips* comprises a single species, and was re-diagnosed and included by Bhatti (2000) in a key to the *Trichromothrips* group. Bhatti transferred *bruncurrum* Reyes to *Neocorynothrips*, and in the absence of the type specimens indicated two possible differences from *asiaticus*, based on Reyes's original description. Two of the five original males of *bruncurrum*, including the holotype, have now been compared to a series of both sexes of *asiaticus* from Malaysia identified from the details given by Bhatti (2000). No reason could be found for considering these specimens as representing different species. Contrary to the original description of *bruncurrum*, antennal segment VI of the holotype is not "grayish brown" but is merely lightly shaded in less than the apical half. Moreover, the fore wing is 750 microns long with the basal hyaline area 250 microns long.

Female macroptera. Body brown. Legs shaded; fore wings pale on clavus and basal third, weakly shaded distally; antennal segments I–II brown, III–VIII yellow, VI sometimes with light shading apically. Head projecting in front of eyes and slightly wider than long, cheeks strongly constricted behind eyes, with 6–7 pairs of setae between compound eyes ventrally (Fig. 10); ocellar setae pair I wide apart in front of pair II, pair III arising between posterior ocelli (Fig. 9); postocular setae slender, subequal, in a single row. Antennae 8-segmented, segments I–II as wide as long, III–VI at least 2.5 times as long as wide; segment I with two dorsal apical median setae, III–IV each with forked sense cone. Pronotum with strong transverse lines and about 16 discal setae; posteroangular setae with one pair of major setae (Fig. 9); posterior margin with 2 pairs of setae, first pair always longer. Mesonotal anterior campaniform sensilla absent, median setae arising at posterior margin. Metanotum transversely striate-reticulate medially, longitudinally reticulate laterally; campaniform sensilla absent; median pair of setae behind anterior margin (Fig. 11). Meso and metafurca without spinula; meso and metasterna each with 15–20 fine setae. Fore wing second vein with about 14 setae; first vein with two groups of setae on basal half (3–4

and 4–5), with 2 setae near apex; clavus with 4 veinal and 1 discal setae. Tergites I–VIII with sculpture medially anterior and laterally; VIII without posteromarginal comb, and without paired ctenidia or lateral microtrichia; X much shorter than IX without longitudinal split. Sternites with weak transverse reticulation, no discal setae, VII with setae arising close to margin.

Male macroptera. Body paler than female. Tergite IX posterior margin with horn-like paired drepanae extending almost as long segment X; sternites III–VIII each with at least 50 small pore plates; sternal posteromarginal setae arise close to margin.

Material studied. **Malaysia**, Terengganu, Kerteh, 38 females 15 males *Dendrocalamus asper* (Poaceae), 4.iii.2014 (Syarifah, Z.), in CISUKM and ANIC. **Philippines**, Luzon, Camarines Sur, holotype male of *bruncurrum* and one paratype male, from *Ficus* leaves, 5.vi.1987 (Reyes), in ANIC.



FIGURES 9–15. ***Neocorynothrips asiaticus*.** (9) Head and pronotum; (10) Head ventral view; (11) Mesonotum and metanotum; (12) Antenna; (13) Fore wing; (14) Abdominal tergites VII–X; (15) Mesosternum and metasternum.

Okajimaella tubercula Nonaka & Jangvitaya, 1994

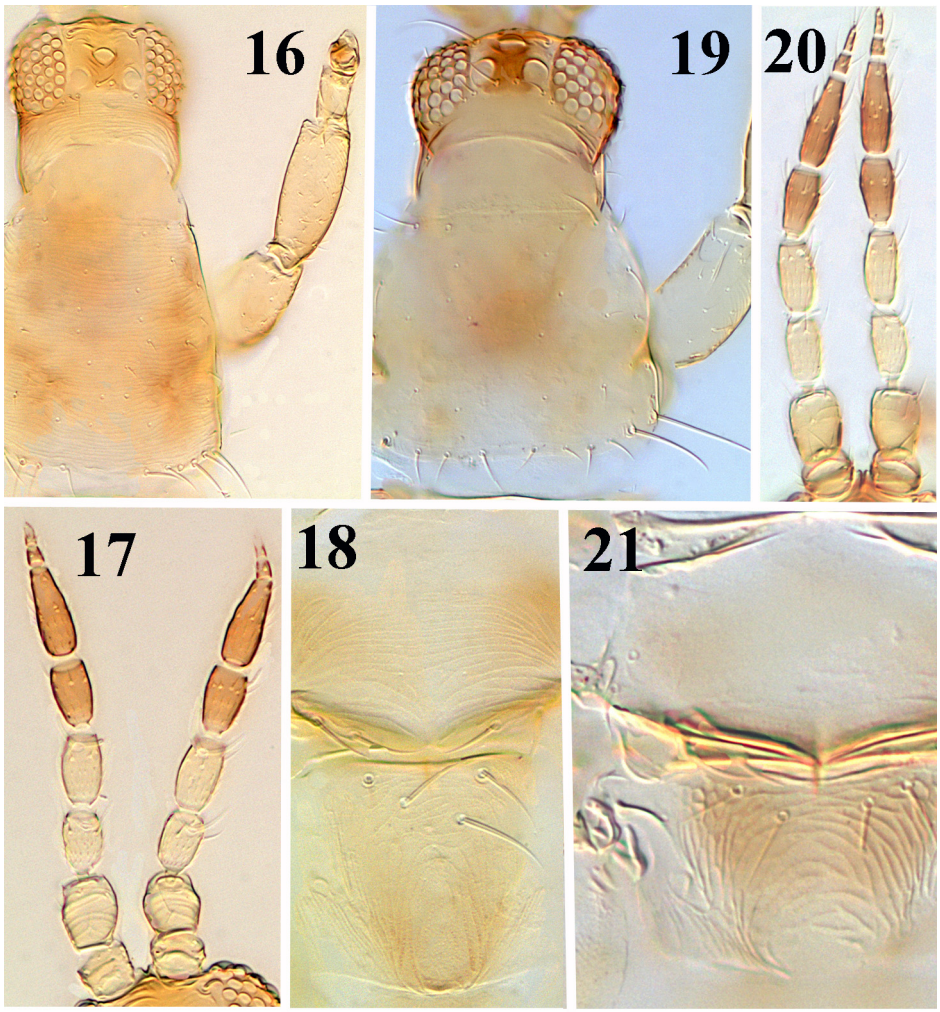
(Figs 19–21)

Female macroptera. Body and legs largely yellow, abdomen darkening to posterior, head with vertex and ocellar

region brown (Fig. 19); fore wing slightly shaded at middle; antennal segment I brown, II variably pale to brown, III–IV uniformly yellow, V–VII brown, sometimes V basal half pale (Fig. 20). Head about as long as wide; ocellar setae II longest, arising near margin of compound eyes in front fore ocellus, pair III arising on tangent between posterior margins of hind ocelli (Fig. 19). Pronotum as wide as long, with 2 pairs of long posteroangular setae, posterior margin with 3 pairs of setae, inner pair longest. Fore tibia with prominent spur on inner apical margin. Mesonotum without median campaniform sensilla. Metanotum with median setae arising behind anterior margin (Fig. 21). Tergite VIII without posteromarginal comb of microtrichia. Sternites with 3 pairs of posteromaginal setae, V–VI with a few small circular pore plates.

Material studied, **Malaysia**, Selangor, Kajang. 6 females from *Bambusa* sp., 15.xi.2013 (Ng, Y.F.), 2 females from the same plant, 7.i.2014 (Ng, Y.F.), in CISUKM and ANIC.

Comments. Three species are described in this genus, one from Vietnam, and two from Thailand including *tubercula***.** This latter species is here newly recorded from Malaysia.



FIGURES 16–21. ***Simulothrips banpoti.*** (16) Head and pronotum; (17) Antenna; (18) Mesonotum and metanotum. ***Okajimaella tubercula*** (19) Head and pronotum; (20) Antenna; (21) Mesonotum and metanotum.

Simulothrips banpoti **Nonaka & Jangvitaya, 1994**
(Figs 16–18)

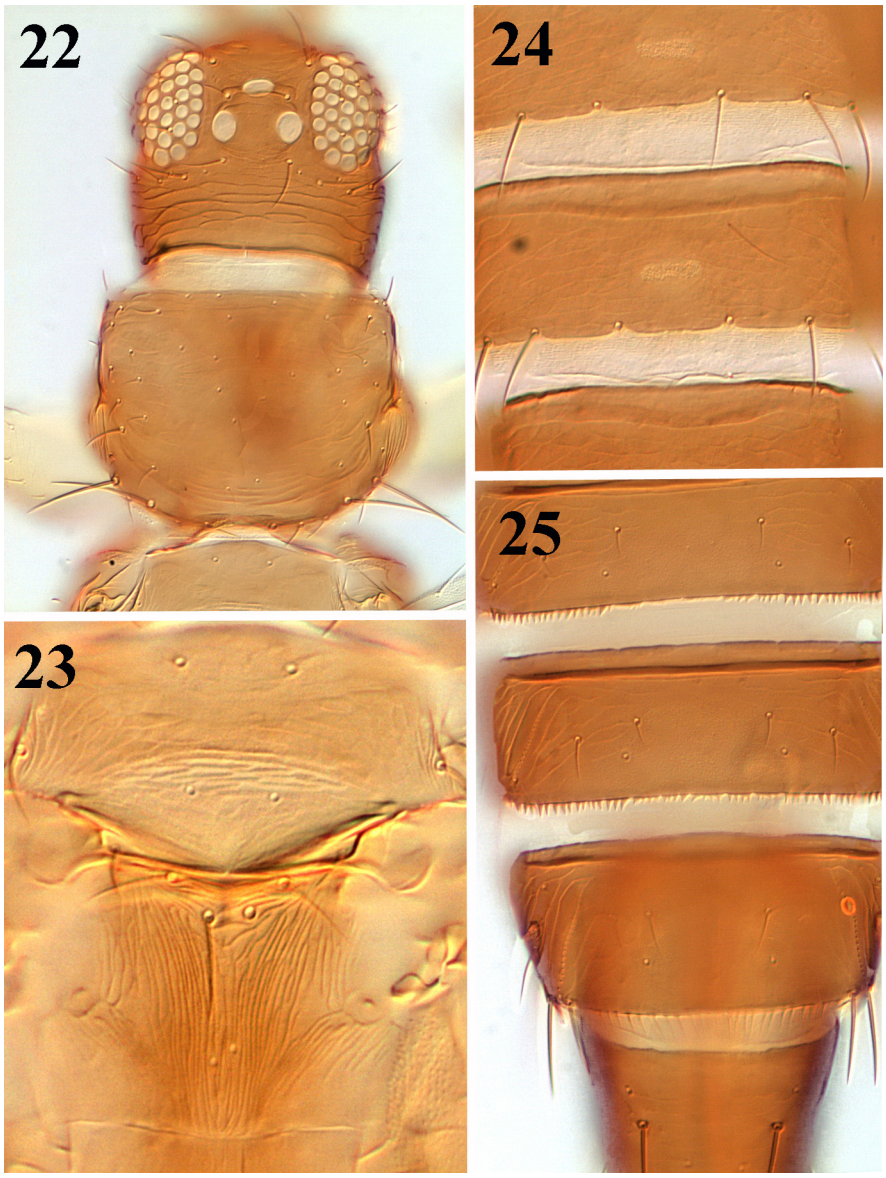
Female macroptera. Body and legs largely yellow, ocellar area shaded, pronotum with shaded area sub-laterally; fore wing pale; antennal segments I–IV yellow, V–VIII brown (Fig. 17). Head about as long as wide, posterior area transversely striate; ocellar setae pair II longest, arising anterior to fore ocellus, pair III arising on tangent between posterior margins of hind ocelli (Fig. 16). Pronotum trapezoidal and with distinct transverse lines, as long as basal

width; posteroangular and posteromarginal setae subequal (Fig 16). Fore tibia without apical spur on inner margin. Mesonotum without median campaniform sensilla. Metanotum with median setae arising far behind anterior margin (Fig. 18). Abdominal tergite VIII without posteromarginal comb of microtrichia.

Material studied. **Malaysia**, Selangor, Kajang. 1 female from *Bambusa* sp., 8.xii.2013 (Ng, Y.F.), 3 females from the same plant, 7.i.2014 (Ng, Y.F.), in CISUKM and ANIC.

Comments. This is the sole species in the genus *Simulothrips*. Previously it was known only from Thailand, and is here newly recorded from Malaysia. The genera *Simulothrips, Paithrips* and *Okajimaella* are closely related. They share many characters that suggest that they represent, together with *Takethrips* and *Yoshinothrips* known only from Thailand, a single radiation on Asian bamboo plants. The genus *Simulothrip*s is currently distinguished by its pronotum that is trapezoidal, bearing many fine transverse striae, and with the posteromarginal setae S2, S5 and S6 subequal in length.

Stenchaetothrips bambusicola **Mound, 2011**
(Figs 22–25)



FIGURES 22–25. ***Stenchaetothrips bambusicola.*** (22) Head and pronotum; (23) Mesonotum and metanotum; (24) Abdominal sternites V–VII; (25) Abdominal tergites VI–XI.

Female macroptera. Body brown; legs pale; antennal segment I brown, II pale on apical half, III yellow, IV–VI slightly shaded in apical half, VII–VIII light brown; fore wing uniformly shaded, paler at fourth basal. Head about as long as wide; ocellar setae II much longer than setae III; post-ocular setae I and III, V and VI long, II and IV minute (Fig. 22). Pronotum with 22–24 discal setae, with weak, widely spaced transverse striations; 2 pairs of long postero-angular setae, 3 pairs of postero-marginal setae (Fig. 22). Mesonotum with anterior campaniform sensilla, median setae arising in middle. Metanotum with closely spaced striations, campaniform sensilla present, median setae arising behind anterior margin (Fig. 23). Meso- and metafurca each without a spinula;

Abdominal tergites V–VIII with paired ctenidia; tergites I–VII posterior margin laterally with a few weakly dentate microtrichia, extending medially on tergite VII; tergite VIII with complete comb of slender microtrichia (Fig. 25); submedian and median setae on VIII sub-equal and short, not extending beyond posterior margin; two pairs of campaniform sensilla on IX. Sternites smooth, posterior margins without dentate craspedum, with 3 pairs of posteromarginal setae; median posteromarginal setae on segment VII arising in front of posterior margin; V–VI with a small transverse pore plate medially (Fig. 24).

Material studied. **Malaysia**, Terengganu, Kerteh, 1 female from *Schizostachyum zollongeri* (Poaceae), 4.iii.2014 (Syarifah, Z.), in CISUKM.

Comments. Previously known only from northern Australia, near Darwin, this is the first record outside the continent of Australia (Mound 2011). It can be identified by the presence in females of a small transverse pore plate on each of abdominal sternites V–VI. The body is uniformly brown and the metanotum bears a pair of campaniform sensilla. Mound (2011) described *bambusicola* based on samples from *Bambusa arnhemica*, and the species was compared with information given by Bhatti (1982) concerning two closely similar species, *divisae* and *bambusae*.

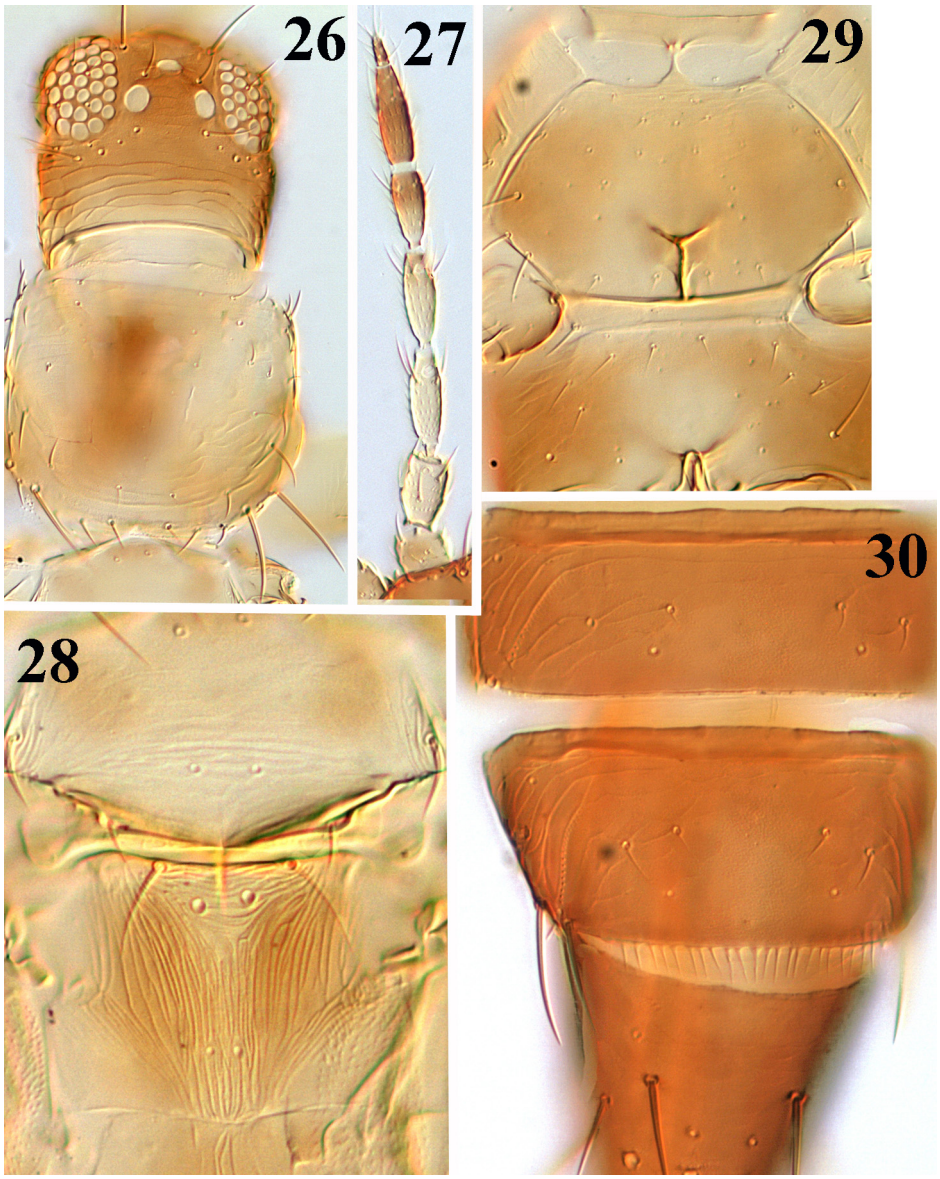
***Stenchaetothrips bambusae* (Shumsher, 1946)**
(Figs 26–30)

Female macroptera. Body bicoloured; head shaded, dorsal posterior margin pale, thoracic segments pale; abdominal segments I–II pale, segments III–X gradually darker; legs pale; antennal segment I variable pale to lightly shaded, II–IV yellow, IV sometimes slightly shaded at extreme apex, V light brown on distal half, VI–VII uniformly brown (Fig. 27); fore wing gradually shaded towards apex. Head about as long as wide; ocellar setae II at least 1.5 times as long as setae III; post-ocular setae I and III (longest), V and VI long, II and IV minute (Fig. 26). Pronotum with 20–22 discal setae, and weak, widely spaced transverse striations; 2 pairs of long posteroangular setae, 3 pairs of posteromarginal setae. Mesonotum with anterior campaniform sensilla. Metanotum with closely spaced striations, campaniform sensilla present, median setae arising behind anterior margin (Fig. 28). Meso- and metafurca each without a spinula; metasternum with about about 10–12 discal setae (Fig. 29). Abdominal tergites V–VIII with paired ctenidia; I–VII posterior margin laterally with a few weakly dentate microtrichia; tergite VIII with complete comb (Fig. 30); submedian and median setae on VIII sub-equal and short, not extending beyond posterior margin; IX with 2 pairs of campaniform sensilla. Sternites smooth, posterior margins without dentate craspedum, with 3 pairs of relatively long posteromarginal setae, median posteromarginal setae on segment VII arising in front.

Male macroptera. Colour of body, legs and antennae similar to female; tergites I–VIII posterior margin laterally with 2–3 weakly dentate microtrichia; tergite VIII without comb of microtrichia; sternites III–VII with oval pore plates, pore plates reaching submedian posteromarginal setae.

Material studied. **Malaysia**, Selangor, Kajang, 3 females from *Bambusa* sp., 8.xi.2012, 4 females, 2 males, 15.xi.2013, one female, 2 males, 15.xii.2013 (NG, Y.F.), in CISUKM and ANIC.

Comments. This species was interpreted by Bhatti (1982) as lacking laterally directed teeth on the posterior margin of the abdominal tergites, although specimens identified as *bambusae* by Ananthakrishnan and now in the collection of the Natural History Museum, London, have two or three translucent teeth near the lateral margin of the tergites (Mound 2011). The specimens listed above as a new record of *bambusae* from Malaysia similarly have minute microtrichia-like teeth laterally on segments I–VII in both sexes.



FIGURES 26–30. ***Stenchaetothrips bambusae.*** (26) Head and pronotum; (27) Antenna; (28) Mesonotum and metanotum; (29) Mesosternum and metasternum; (30) Abdominal tergites VII–IX.

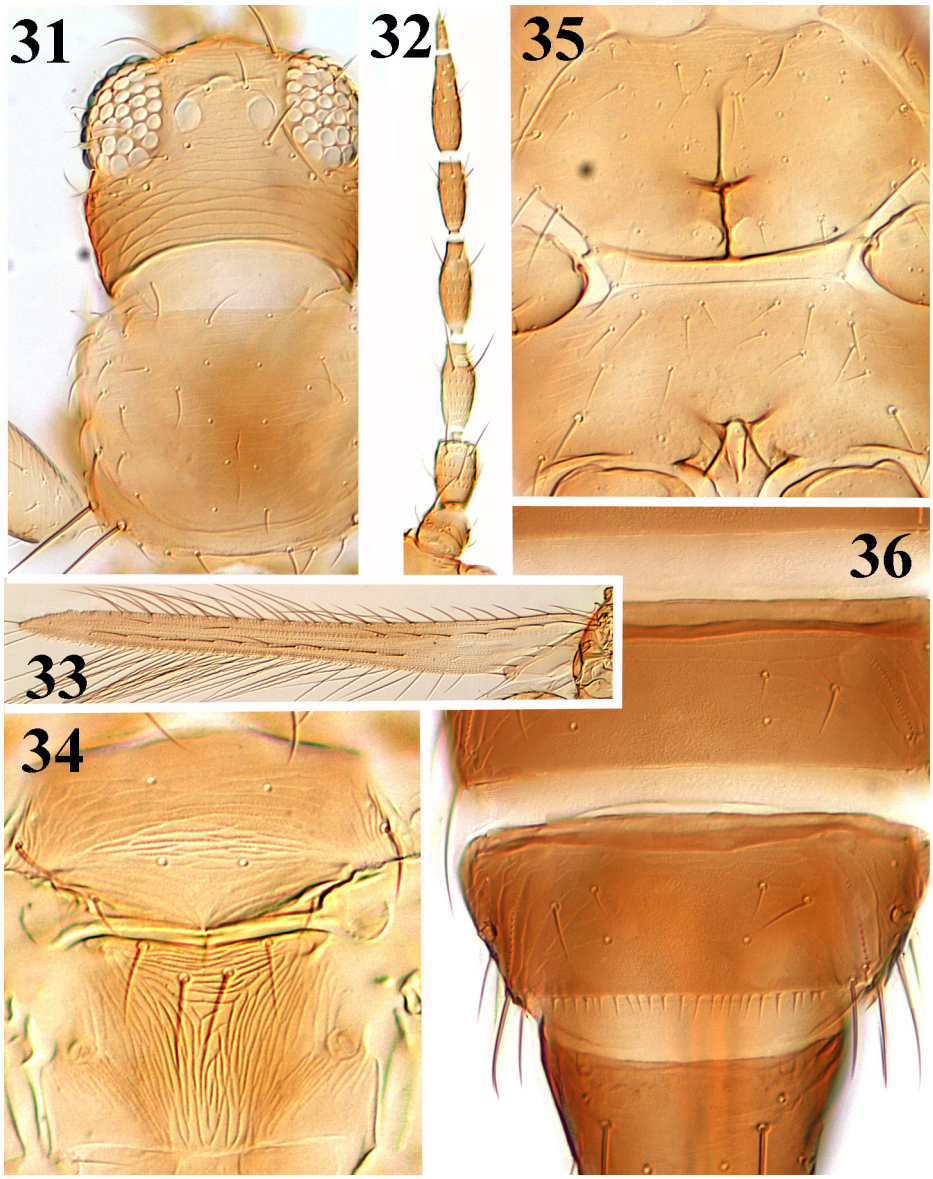
Stenchaetothrips spinalis **Reyes, 1994**

(Figs 31–36)

Female macroptera. Body light brown to brown; head, thorax usually paler than more uniformly brown abdominal segments; femora light brown; tibiae pale; legs pale; antennal segments brown, but III slightly paler; fore wing uniformly shaded (Fig. 33). Head, about as long as wide; ocellar setae II longer than III; post-ocellar setae III longest (Fig. 31). Pronotum with 20–22 discal setae, surface smooth with weak transverse striations on anterior and posterior margins; with 2 pairs of long and subequal posteroangular setae, 2–3 pairs of posteromarginal setae. Mesonotum with anterior campaniform sensilla, with median setae arising at middle, far from posterior margin. Metanotum with closely spaced striations, campaniform sensilla absent, median setae arising behind anterior margin (Fig. 34). Mesofurca with spinula, metafurca without (Fig. 35); metasternum with about 18–20 discal setae. Abdominal tergites V–VIII with paired ctenidia; I–VII posterior margin without well-developed dentate microtrichia; tergite VIII with complete comb (Fig. 36); submedian and median setae on VIII sub-equal and short not extending beyond posterior margin; IX with 2 pairs of campaniform sensilla. Sternites with weak transverse striations, posterior margins without dentate craspedum, with 3 pairs of relatively long posteromarginal setae, median posteromarginal setae on segment VII arising in front.

Material studied. **Malaysia**, Selangor, Kajang. one female from *Bambusa* sp., 8.xi.2013 (NG, Y.F.); Terengganu, Kerteh, one female from *Dendrocalamus asper* (Poaceae), 4.iii.2014 (Syarifah, Z.), one female from *Gigantochloa albociliata* (Poaceae), 4.iii.2014 (Syarifah, Z.), in CISUKM and ANIC. **Philippines**, Luzon, Sipit Saburan, holotype female and 1 paratype female, on *Bambusa* sp., 20.vi.1987 (Reyes), in ANIC.

Comments. This species was described from The Philippines on 12 females collected with the holotype listed above, and is here newly recorded from Malaysia. The females are particularly similar in colour to *S. biformis*, the rice thrips, but have a mesothoracic spinula, and tergite IX bears two pairs of campaniform sensilla. The original description refers to a "few, weak, dentate microtrichia laterally" on the posterior margins of tergites VI and VII. Three such dentate microtrichia are clearly present on tergite VI (but not VII) of the paratype, however they are represented by insignificant craspedal lobes on both VI or VII in the holotype. As indicated by Mound (2011), there remains a possibility that *spinalis* is the same species as *tenebricus* from southern India, but the three original specimens of the latter species are not available. The three species of *Stenchaetothrips* treated above, that are here newly recorded from Peninsular Malaysia, bring the total members of this genus known from this country to seven (Ng & Mound 2012).



FIGURES 31–36. ***Stenchaetothrips spinalis.*** (31) Head and pronotum; (32) Antenna; (33) Fore wing; (34) Mesonotum and metanotum; (35) Mesosternum and metasternum; (36) Abdominal tergites VI–IX.

Thrips parvispinus Karny, 1922

This polyphagous thrips is widespread in Peninsular Malaysia, and large numbers have been collected on a wide range of flowers, but especially from *Chrysanthemum* in Cameron Highlands, Pahang. A few specimens are here recorded from a bamboo species, and although adults can sometimes be collected from Poaceae there is no evidence that this thrips breeds on these plants.

Material studied. **Malaysia**, Terengganu, Kerteh, 3 females from *Schizostachyum zollingeri* (Poaceae), 24.ii.2014 (Syarifah, Z.), in CISUKM.

Trichromothrips dorsalis Masumoto & Okajima, 2011

Female macroptera. Body bicoloured; head brown, pronotum brown laterally but median area white; abdominal segments III–VII yellow laterally with brown median area, VIII–IX uniformly brown, X light brown; all legs pale; antennal segments I–II brown, III–IV light brown apically, V pale, VI–VII light brown, VIII pale; fore wing uniformly brown. Head about as long as wide; ocellar setae III longer than side of ocellar triangle, arising close together in line with anterior margin of posterior ocelli; 5 pairs of subequal post-ocular setae. Pronotum smooth on median area, laterally with irregular transverse lines; with 2 pairs of long posteroangular setae, inner pair slightly longer; 2 pairs of subequal posteromarginal setae. Mesonotum sculpture smooth, without anterior campaniform sensilla; median setae arising medially, far from posterior margin Metanotum smooth, campaniform sensilla absent, median setae arising at anterior margin. Mesofurca with spinula, metafurca without. Abdominal tergite VIII posterior margin without comb of microtrichia.

Material studied. **Malaysia**, Terengganu, Kerteh, 2 females from *Dendrocalamus asper*, 4.iii.2014 (Syarifah, Z.), in CISUKM and ANIC.

Comments. This species was described from Thailand and recorded from Vietnam, with one female reported from bamboo in West Malaysia, Tapah (Masumoto & Okajima 2011).

Acknowledgements and depositaries

This research was partially funded by the Universiti Kebangsaan Malaysia research grant (DPP-2014-086) and MOSTI grant (06-01-02-SF0896). We are grateful to three anonymous referees for their invaluable comments. Depositories: ANIC—Australian National Insect Collection, Canberra. CISUKM—Centre for Insect Systematics, Universiti Kebangsaan Malaysia, Bangi.

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