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The Palaeotropical genus *Craspedothrips*, with new species from Africa and Malaysia (Thysanoptera, Thripinae)

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Abstract

An identification key is provided to 10 species recognised in the genus *Craspedothrips*, including three new species, *C. malaysiae* from Malaysia, and *C. nyanzai*, *C. poecilus*, and *C. reticulatus* from East Africa. *Plesiopsothrips zurstrasseni* Bournier et al. is considered a new synonym of *C. hargreavesi*, and *Plesiopsothrips carvalhoi* Bournier a new synonym of *C. xanthocerus*. One oriental species, *C. antennalis* Karny, is newly recorded from Australia. Little is known of the biology of most species, but *C. antennatus* and *C. xanthocerus* are both recorded in association with *Hemileia vastatrix* on the leaves of *Coffea* species (Rubiaceae) in Africa, *C. minor* is recorded from flowers of *Cassia* (Fabaceae), and *C. antennalis* is recorded from plants of the family Apocynaceae.

Key words: *Craspedothrips*, new species, Africa, Malaysia

Introduction

Adults of the genus *Craspedothrips* have been collected widely across the Old World tropics between Africa and northern Australia, but usually in low numbers. In species of this genus for which both sexes are known the antennae are sexually dimorphic, with segments IV–VI of males elongate and bearing large numbers of long setae (Figs 11, 29). The sexual dimorphism is so great that males and females in this genus usually cannot be recognised as belonging to the same species on the basis of shared structural features. Sexually dimorphic antennae occur in a few other Thripinae, and this presumably reflects some aspect of behaviour, such as the male aggregations to which females are attracted for mating as described for *Pezothrips kellyanus* (Webster et al. 2006). Unfortunately, almost nothing is known of the biology of most *Craspedothrips* species. With the exception of *C. minor* the larvae are unknown, and no information is available as to whether they develop in flowers or on leaves. Two exceptions are the African species *C. antennatus* and *C. xanthocerus*, both of which have been collected at several localities on the leaves of coffee in association with the rust fungus, *Hemileia vastatrix*. Moreover, plant quarantine services in Japan frequently intercept *C. minor* on *Acacia* or *Cassia siamea* [Fabaceae] with flowers imported from Thailand (Masumoto 2009; Masumoto et al. 2003).

Bhatti (1995) provided bibliographic details for the species of *Craspedothrips*, but identification of most of these has been impossible. In particular, the Oriental species *antennalis* has remained known only from the damaged female lectotype, and the identity of two African species described by Bournier was unclear. The objective of this paper is to provide an identification key to members of the genus, to establish two new synonyms, and to describe four new species - one from Southeast Asia and three from East Africa. Previously established synonyms and full nomenclatural details are available in Mound (2012).

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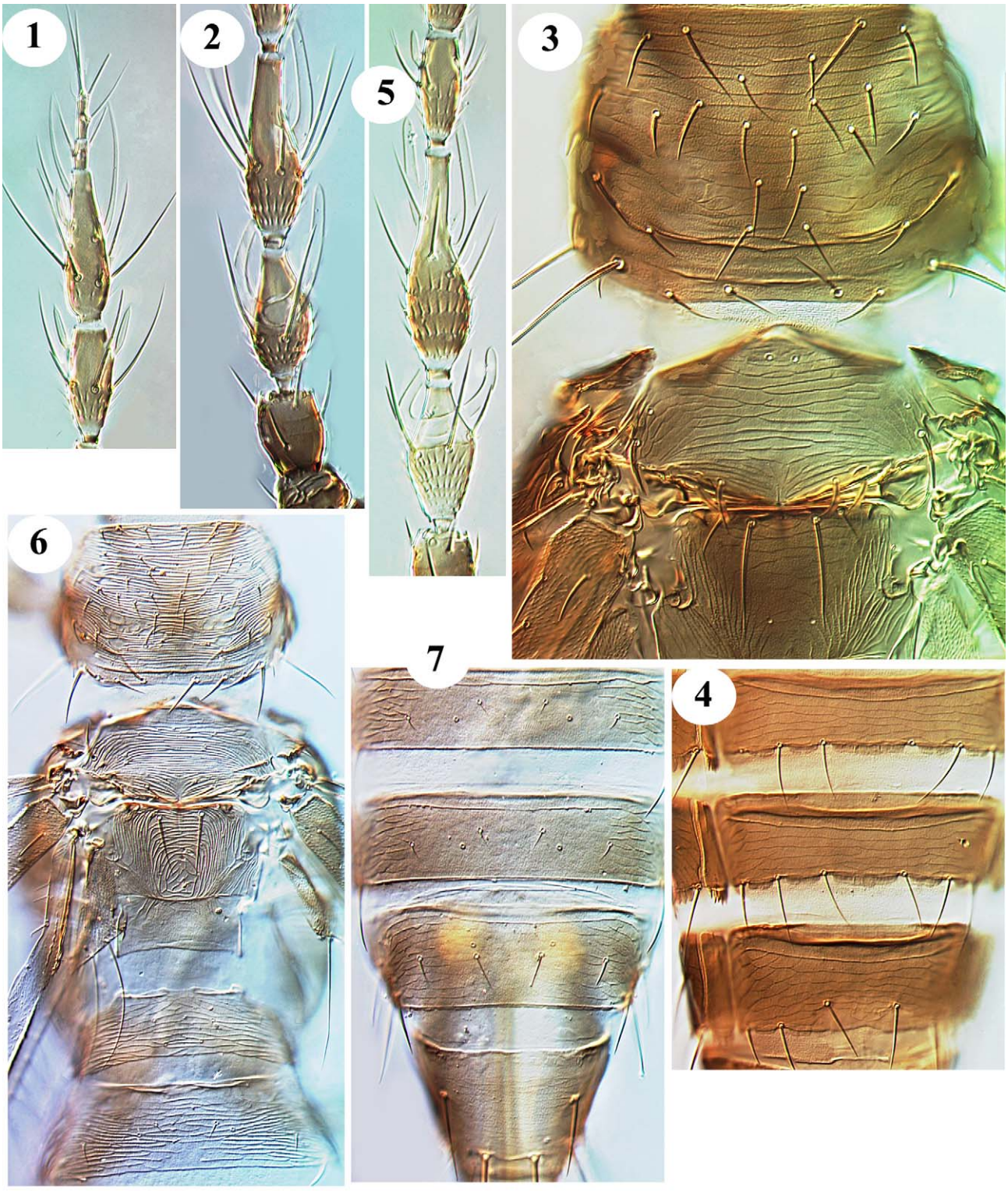

FIGURES 1–7. *Craspedothrips* species. *C. antennalis* 1–4: **(1)** antennal segments V–VIII; **(2)** antennal segments I–IV; **(3)** pro-, meso- and meta-nota; **(4)** sternites V–VII. *C. antennatus* 5–7: **(5)** antennal segments III–V; **(6)** pro, meso & metanota, and tergites I–II; **(7)** tergites VI–IX.

Acknowledgements and depositaries

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Depositaries: ANIC—Australian National Insect Collection, Canberra; BMNH—Natural History Museum, London; LETUA—Laboratory of Entomology, Tokyo University of Agriculture; MHN—Museum d'Histoire Naturelle, Paris; NMK—Department of Invertebrate Zoology, National Museums of Kenya, Nairobi; SMF—Forschungsinstitut Senckenberg, Frankfurt; USNM—United States National Museum, Washington.

Craspedothrips zur Strassen

Craspedothrips zur Strassen, 1966: 444. Type species *Physothrips hargreavesi* Karny, by monotypy.
Craspedothrips (*Antenothrips*) Bhatti, 1995: 76. Type species *Physothrips antennatus* Bagnall by original designation.

This genus was erected for a single species that is known to be widespread across Africa. Subsequently, a second species, described originally from India, was transferred into the genus (Mound 1968), and Bhatti (1978) redefined *Craspedothips* to include three further previously described species, two African and one Asian, and later (Bhatti 1995) included another two African species.

The genus is considered to be related to *Pezothrips* and *Ceratothripoides* within the *Megalurothrips* genus-group (Mound & Palmer 1981), particularly because of the presence of a pair of dorso-apical setae on the first antennal segment. However, in contrast to *Megalurothrips* species, no species of *Craspedothrips* has a group of microtrichia in irregular rows anterolateral to each spiracle, and there is no posteromarginal comb on tergite VIII. In contrast, most species of *Craspedothrips* have a distinct ctenidium-like row of microtrichia anterior to each spiracle on tergite VIII (Fig. 17), these being particularly well-developed in *hargreavesi*, but absent in *antennalis* and *xanthocerus*, and variably weak in the other species. Moreover, Neotropical species currently placed in *Retanathrips* Mound & Nickle (2009) are also related, and future studies, preferably incorporating molecular data, will need to consider the possibility that a single pantropical lineage is involved.

Also related are the Oriental genera, *Aroidothrips* and *Filipinothrips*, in which the species have paired dorso-apical setae on antennal segment I, three sensoria on segment V, an irregular group of microtrichia near the spiracles on tergite VIII, and sexually dimorphic antennae. *Mycterothrips* species similarly share the character state of antennal segment I, and many species in that genus exhibit sexual dimorphism in the antennae (Masumoto & Okajima 2006). Species of the grass-associated genus, *Plesiothrips*, also exhibit these two states, but males of *Plesiothrips* species have a pair of drepanae on tergite IX, similar to those of *Trichromothrips* species, and these two genera are possibly less closely related to *Craspedothrips*. Relationships among these genera of Thripinae remain far from clear.

The subgenus *Antennothrips* was erected for two African species in which females differ from the other members of the genus in lacking craspeda on the posterior margins of the tergites (Figs 7, 32) and sternites, and a third species with this condition is described below (Fig. 25). Males are not known for these three species, and males are known for only two species in the nominate genus. The males of one have no craspeda on the tergites or sternites, but the males of the other have craspeda on the tergites but not the sternites; the presence or absence of craspeda is thus probably not a good indicator of relationships in this group of species. One of the two species assigned originally to *Antennothrips* is unusual in lacking ocellar setae pair I (Fig. 30). This condition is also shared by one species currently placed in *Craspedothrips* but that is unique in the genus in having a comb of microtrichia on the posterior margin of the eighth tergite. Considering this structural diversity, and the fact that three new species of *Craspedothrips* were discovered during one short visit to Kenya (by S.O.), it seems likely that the diversity of African Thripinae remains poorly explored. The chaetotaxy of the fore wing is stable among species of *Craspedothrips*: first vein with 4 setae near base, then a short gap followed by a row of about 14–18 setae (rarely as few as 10), then a sub-apical gap followed by 2 setae; second vein with about 13–17 setae; clavus with 5 marginal and 1 discal setae.

Key to *Craspedothrips* species (females only)

1. Tergite VIII posterior margin with comb of microtrichia; ocellar setae pair I absent . . . . . *ghesquierei*
-. Tergites VIII with no posteromarginal comb of microtrichia; ocellar setae pair I present or absent 2
2. Tergites and sternites lacking craspeda on posterior margins (Figs 7, 32); ocellar setae pair I present or absent 3
-. Tergites and sternites with posteromarginal craspedum (Figs 18, 19); ocellar setae pair I present 5
3. Pronotum, median area of metascutum and anterior half of mesonotum almost without sculpture (Figs 30, 31); ocellar setae pair I absent . . . . . *xanthocerus*
-. Thoracic tergites covered with strong sculpture; ocellar setae pair I present (Fig. 16) 4
4. Pronotum, mesonotum and metascutum with closely spaced transverse striae (Fig. 6); abdominal tergites uniformly brown . . . . . *antennatus*
- . Pronotum with widely spaced transverse striae; metascutum largely reticulate (Fig. 14); tergites II–VII brown medially but yellow posterolaterally (Fig. 25) . . . . . *poecilus* **sp.n.**
5. Sternites IV–V with length of median craspedal lobes at least 3 times the diameter of the basal pores of marginal setae (Fig. 10); apical constriction of antennal segment III very short (Figs 12, 23) 6
-. Sternites IV–V with length of median craspedal lobes less than 2 times diameter of basal pores of sternal marginal setae (Figs 4, 19); antennal segment III with distinct neck-like apical constriction (Figs 2, 13) 7
6. Pronotal posteroangular setae (Fig. 8) and ocellar setae pair III at least 1.5 times as long as width of antennal segment II . . . . . *hargreavesii*
-. Pronotal posteroangular setae (Fig. 22) and ocellar setae pair III shorter than width of antennal segment II . . . . . *nyanzai* **sp.n.**
7. Ocellar setae III scarcely longer than longitudinal diameter of an ocellus (Fig. 16); sternite VII of female with marginal setae S1 and S2 both arising far anterior to margin(Fig. 19) . . . . . *malaysiae* **sp.n.**
-. Ocellar setae III longer than distance between posterior ocelli (Fig. 21); sternite VII with marginal setae S2 arising either at or anterior to margin 8
8. Abdominal tergite I with bold reticulation medially in both sexes (Fig. 27); female with marginal setae S1 and S2 on sternite VII both arising far anterior to margin (Fig. 28) . . . . . *reticulatus* **sp.n.**
-. Abdominal tergite I with reticulation weak and transverse; female with marginal setae S2 on sternite VII arising at margin (Fig. 4) 9
9. Antennal segments shorter (Fig. 20), III less than 50, IV less than 65 microns . . . . . *minor*
-. Antennal segments longer (Fig. 2), III more than 55, IV more than 75 microns . . . . . *antennalis*

Craspedothrips antennalis (Karny)

(Figs 2–4)

Physothrips antennalis Karny, 1915: 32

This species was described from two females collected in Java from a leaf roll gall on an unidentified Apocynaceae. One of these females (in SMF), designated Lectotype by Bhatti (1978: 165), has been studied. It is slide mounted with the abdomen rather crushed and dissociated from the laterally orientated head and thorax. The base of the only preserved fore wing is not visible. This lectotype has been compared with the females listed below from northern Australia, also with two from Bali. The females from Bali have on tergite IX two pairs of campaniform sensilla, whereas the lectotype and the females from Australia have only the posterior pair on this tergite. The sensoria on antennal segment III are slightly longer than this segment in the lectotype and also the females from Bali, but they are shorter and fatter, and slightly shorter than the segment in the specimens from Australia. In view of the widespread distributions of some other thrips species from northern Australia across Southeast Asia thrips (Mound & Tree 2011), it seems best to consider all these specimens as conspecific. The Australian specimens, also from Apocynaceae, have long teeth on the pleurotergites similar to those of the lectotype, but the hind tibiae vary within the series from almost clear yellow to light brown in the basal half. The females from Bali are smaller and paler with yellow tibiae.

Specimens studied. **INDONESIA**: **JAVA**, Moeriah mountains, Lectotype female from marginal leaf rolls on unidentified Apocynaceae, 28.ix.1912, in SMF; **BALI**, Tabanan, Pura Luhur, 2 females without host data, 11.viii.2006 (S. Okajima), in LETUA. **AUSTRALIA**, Queensland, Cairns, Crystal Creek, 7 females from *Parsonsia ichnocarpus* (Apocynaceae), 5.xi.2008, in ANIC.

Craspedothrips antennatus (Bagnall)
(Figs 5–7)

Physothrips antennatus Bagnall, 1914: 23

The female labelled as "Type" is in very poor condition due to deterioration of the blackened mountant, but two female syntypes on a second slide are in suitable condition for study (in BMNH). These females were collected in Uganda in association with a rust fungus on the leaves of coffee plants (Mound 1968). Females, but no males, have also been studied from the leaves of coffee plants from Kenya, Tanzania and Angola (in BMNH). The thrips appears to be associated with *Hemileia vastatrix* on the leaves of this crop, and a similar association is reported for *xanthocerus*. Clear illustrations of the head and thoracic tergites were given by Bhatti (1995), and the antenna is similar in structure and proportions to that of *antennalis* (Figs 2, 5). The head chaetotaxy is particularly unusual, ocellar setae pair I arise far forward on the head and are particularly minute. Ocellar setae pair III arise between the anterior margins of the posterior pair of ocelli, but pair II arise on the anterior margins of the triangle not close to the compound eyes.

Craspedothrips ghesquierei (Priesner)

Taeniothrips ghesquierei Priesner, 1937: 202

Although transferred to *Craspedothrips* by Mound (2010), this species is unique within this genus in having a comb of microtrichia on the posterior margin of the eighth abdominal tergite. It shares with the other members of the genus the presence on the first antennal segment of a pair of dorso-apical setae, and it shares with *xanthocerus* the absence of a pair of setae in front of the first ocellus. Known only from a single female collected in Congo Republic, this species is also related to *Ceratothripoides*, but it does not fit satisfactorily into any known genus.

Craspedothrips hargreavesi (Karny)
(Figs 8–12)

Physothrips hargreavesi Karny, 1925: 127
Plesiopsothrips zurstrasseni Bournier et al., 1976: 481. **syn.n**.

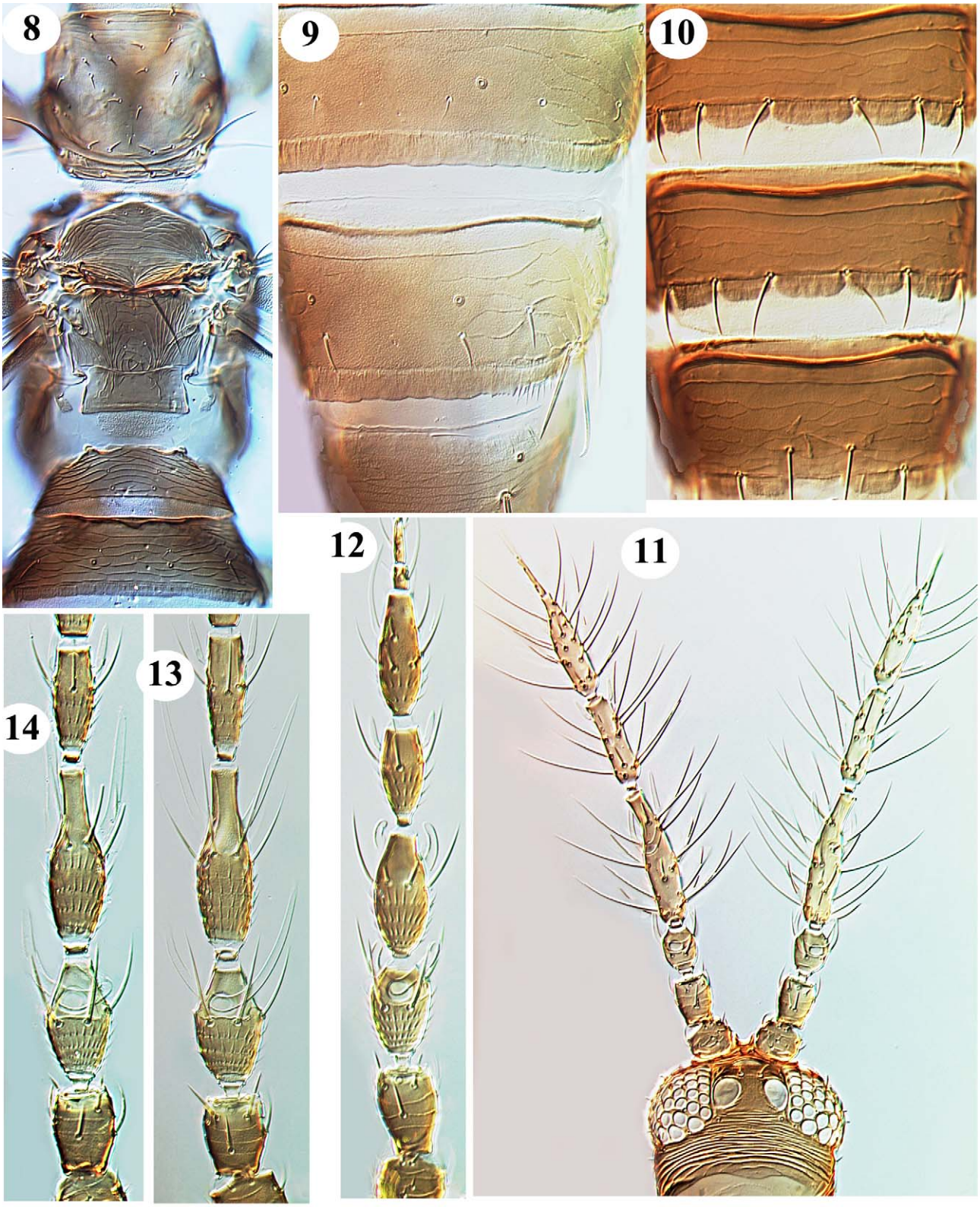
Placed into a monobasic genus by zur Strassen (1966), this species is widespread in Africa. Specimens have been studied from eastern Africa between Ethiopia, Sudan and South Africa, and from Nigeria and Ghana in West Africa, but despite this, nothing is known of its biology. The sternal craspedal lobes of females are distinctive for this species, being larger than in any other member of the genus apart from *nyanzai*. Despite this, males collected with the females of *hargreavesi*, and that are considered to be conspecific, have no sternal craspeda, and moreover, ocellar setae pair III are distinctly shorter in these males than in females. The holotype of *zurstrasseni* from Madagascar has been studied (from MHN) and compared to other specimens of this widespread African species. In the same museum there are males bearing manuscript names, but these males cannot be associated with any females, and their relationships remain doubtful.

Craspedothrips malaysiae sp.n.
(Figs 13–19)

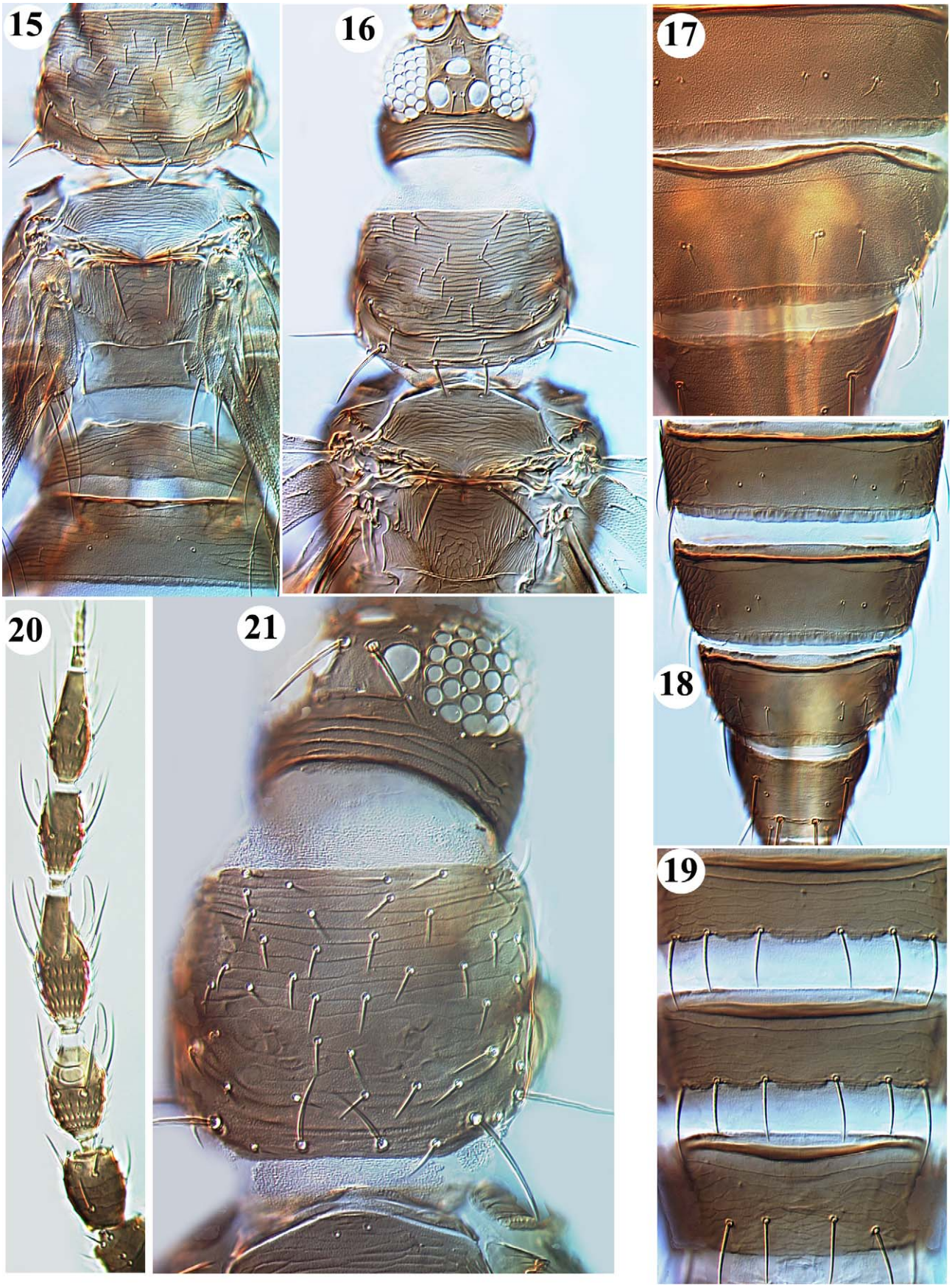
Female macroptera. Body brown, major setae dark brown; tibiae and tarsi yellow, femora light brown; fore wing including clavus deeply shaded; antennal segment III light brown with base and apex paler, IV brown with dark basal ring separated from most of this segment by narrow pale band.

Head wider than long, cheeks convex; ocellar setae pair I arise close together, II just anterior to ocellar triangle, III arise on tangent between anterior margins of posterior ocelli; postocular setae all small; ocellar triangle with no

sculpture, posterior part of vertex with 4 or 5 transverse striae; frons with 6 pairs of prominent setae; compound eyes with no pigmented facets; maxillary palps 3-segmented. Antennal segment I with paired dorso-apical setae; III–IV with very stout forked sensoria, apex of IV greatly elongate; lateral sensoria on V flattened; VI with 3 sensoria; VIII longer than VII.



FIGURES 8–14. *Craspedothrips* species. *C. hargreavesi* 8–12: **(8)** pro, meso and metanota, and tergites I–II; **(9)** tergites VII–IX; **(10)** sternites V–VII; **(11)** male head and antennae; **(12)** female antenna. *C. malaysiae* antennal segments I–V 13–14: **(13)** paratype from Bali; **(14)** holotype.



FIGURES 15–21. *Craspedothrips* species. *C. malaysiae* 15–19: **(15)** holotype - pro, meso and metanota, and tergites I–II; **(16)** paratype from Bali—head and thorax; **(17)** tergite VIII; **(18)** tergites VI–IX; **(19)** sternites V–VII. *C. minor* 20–21: **(20)** antenna; **(21)** head & pronotum.

Pronotum with many transverse lines and many discal setae, posterior submarginal area demarcated; 2 pairs of posteroangular setae, posterior margin with 3 (or 2) pairs of setae. Mesonotum transversely striate, anterior campaniform sensilla present, median setal pair close to posterior margin. Metanotum transversly striate on anterior half, reticulate on posterior; median setae stout, close to weaker lateral pair; campaniform sensilla present. Prosternal ferna slightly separated medially; mesothoracic sternopleural sutures complete; metapre-episternum band-like bearing one seta.

Abdominal tergite I transversely sculptured, without craspedum; II–VII with about 10 transverse line laterally, sculpture not extending mesad of discal setae S2 in IV–VII; II–VIII with broad craspedum on posterior margin, lateral margins of craspedum on VIII form variable number of microtrichia; posteroangular setae on III–VI arise mesad of posterior angle of tergites; VIII with ctenidium-like row of microtrichia terminating at spiracle; IX with one pair of campaniform sensilla, median dorsal setae stout; X short with weak split.

Sternites II–VI with narrow craspedum lobed between major setae; II with 2 pairs of minute setae on anterior margin and a third pair sometimes almost medially, and 2 pairs of posteromarginal setae; III–VII with 3 pairs of marginal setae, on VII S1 and S2 arise well in front of margin.

Measurements (holotype female in microns). Body length 1350. Head, length (tilted) 80; width 150; ocellar setae pair III 12. Pronotum, length 135; width 185; posteroangular setae—inner 50, outer 40; separation between pronotal striae medially 3–5. Fore wing length 700. Antennal segments III–VIII length, 55, 75, 50, 55, 15, 23.

Specimens studied. Holotype female, **SINGAPORE**, from unidentified red flowers, 25.ix.2007 (D.J.Tree, 498), in ANIC.

Paratypes: 3 females collected with holotype. **MALAYSIA**, **SABAH**, from *Medinilla amplectens* flowers (Melastomataceae), vii–ix, 1999 (J.Kanstrup), in ANIC. **INDONESIA**, **BALI**, Tabanan, Muncak Sari, Pura Luhur, at 755m, 4 females without host data, 2.ix.2006 (S. Okajima), in LETUA.

Comments. Only one antenna remains on the holotype, and there are no antennae left on the paratypes from Singapore, images are therefore included here also of paratypes from Bali. The sensorium on antennal segment III of these paratypes is more slender than that of the holotype (Figs 13, 14), moreover the pronotal posteroangular setae of these paratypes are longer than those on the holotype (Figs 15, 16), with the setae on the paratype from Sabah intermediate in length. The antennae of *malaysiae* are similar to those of *antennalis*, but ocellar setae pair III are short, only about as long as the distance between the posterior ocelli, the pronotal posteroangular setae are also shorter, and the transverse striae on the pronotum are more closely spaced. In contrast to most other members of the genus, including *antennalis*, on sternite VII setal pair S2 of *malaysiae* arise at least three times the width of their basal pores anterior to the sternal margin (Fig. 19).

***Craspedothrips minor* (Bagnall)**

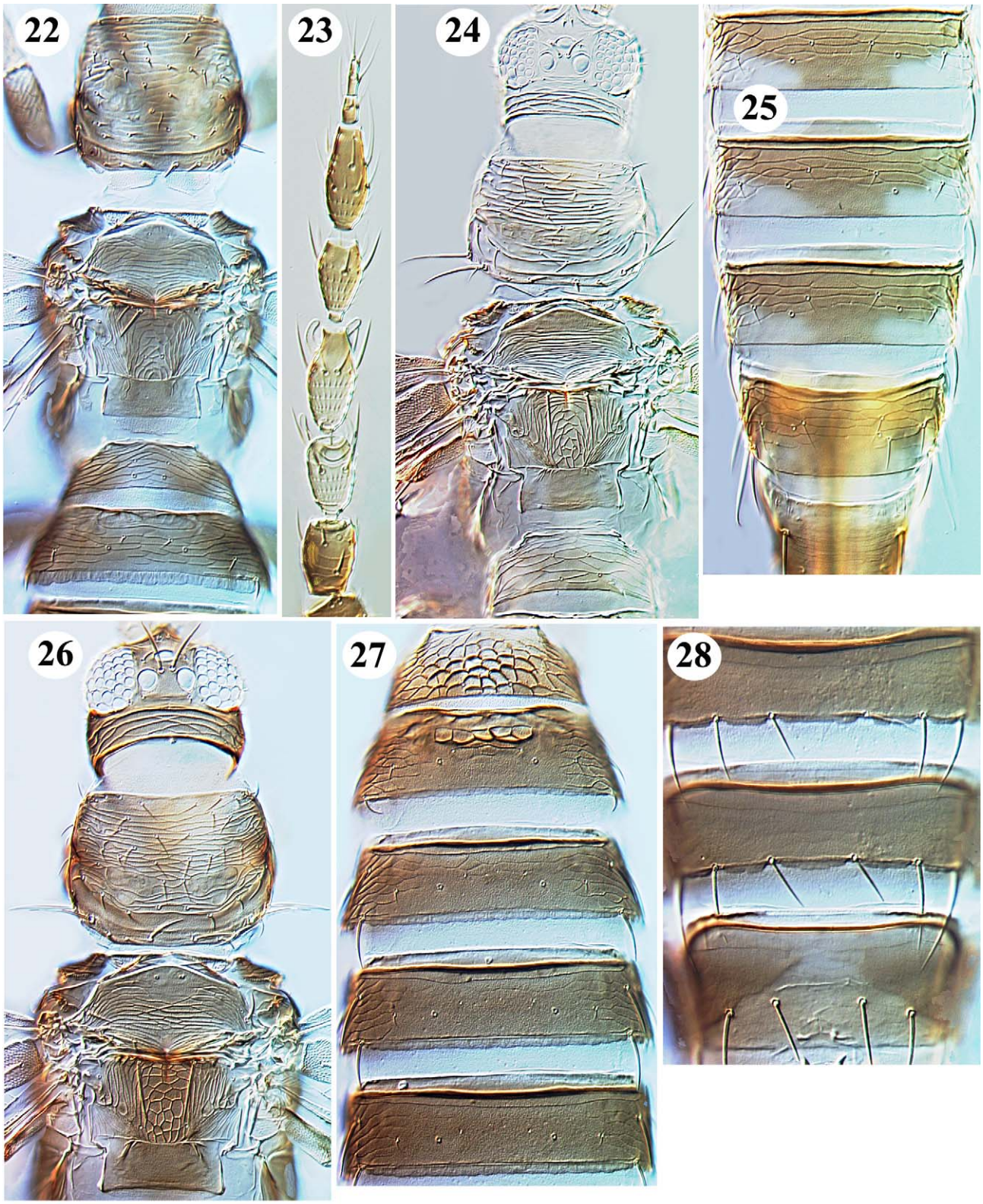
(Figs 20, 21)

Physothrips minor Bagnall, 1921: 393

Described from India and transferred to *Craspedothrips* by Mound (1968), four synonyms were indicated by Bhatti (1990) who recorded the species as widespread across India to Bangladesh, Indonesia and Taiwan. Specimens have also been seen from Thailand and Malaysia, and from northern Australia as well as eastern Australia near Sydney. Despite the frequency with which adults have been taken, the larval host-plant range remains unknown. Females and two larvae have been studied collected from *Cassia* at Delhi by J.S.Bhatti, and as noted above, adults are commonly taken on *Acacia* or *Cassia siamea* with flowers [Fabaceae] imported from Thailand by Japanese plant quarantine (Masumoto, 2009; Masumoto et al., 2003). The two larvae taken at Delhi are pale yellow, with long capitate setae on the thorax and abdomen, the body surface bears numerous transverse rows of small elongate tubercles, but the posterior margin of tergite VIII is without tubercles.

***Craspedothrips nyanzai* sp.n.**

(Figs 22, 23)



FIGURES 22–28. *Craspedothrips* species. *C. nyanzai* 22–23: **(22)** pro, meso and metanota, and tergites I–II; **(23)** antenna. *C. poecilus* 24–25: **(24)** pro, meso and metanota, and tergites I–II; **(25)** tergites V–IX. *C. reticulatus* 26–28: **(26)** head and thorax; **(27)** tergites I–V; **(28)** sternites V–VII.

Female macroptera. Body and legs brown, tarsi yellow; major setae dark brown; fore wing shaded slightly paler at base, clavus also paler distally; antennal segment III mainly yellow, IV yellow in basal half, V–VIII brown.

Head wider than long, cheeks straight, mouth cone extending between fore coxae (head tilted down in available specimens); ocellar setae pair I small, close together, II just anterior to ocellar triangle, III arise on tangent

between anterior margins of posterior ocelli; postocular setae all small; ocellar triangle with no sculpture; postocular part of vertex narrow with 3 or 4 transverse striae; frons with 6 pairs of prominent setae; compound eyes with no pigmented facets; maxillary palps 3-segmented. Antennal segment I with paired dorso-apical setae; III–IV with short and stout forked sensoria, apex of IV slightly elongate; lateral sensoria on V small and flattened; VI with 3 sensoria, external sensorium short; VIII long than VII.

Pronotum with irregular, widely spaced transverse striae, discal setae small, posterior submarginal area scarcely demarcated; 2 pairs of short postero-angular setae with inner pair stout, 3 pairs of postero-marginal setae. Mesonotum transversely striate, anterior campaniform sensilla present, median setal pair close to posterior margin. Metanotum irregularly reticulate; median setae short, not close to lateral pair; campaniform sensilla present. Prosternal ferna slightly separated medially; mesothoracic sternopleural sutures complete; metapre-episternum band-like bearing one small seta.

Abdominal tergites I–II and anterior half of III transversely sculptured, IV–VII with sculpture lines not extending to median setae and campaniform sensilla; I with no craspedum; II–VIII with broad band-like craspedum; VIII with ctenidium-like row of microtrichia terminating at spiracle; IX with two pairs of campaniform sensilla, median dorsal setae stout; X short with weak split.

Sternites II–VI with broad craspedum lobed between major setae, absent medially on VII; II with 3 pairs of minute setae near anterior margin; II with 2 pairs of posteromarginal setae, III–VII with 3 pairs, on VII S1 arises well in front of margin, S2 arises at margin.

Measurements (holotype female in microns). Body length 1220. Head, length 55; width 115; ocellar setae pair III 25. Pronotum, length 130; width 150; posteroangular setae – inner ?40, outer 50; separation between pronotal striae medially 7-10. Fore wing length 610. Antennal segments III–VIII length, 35, 45, 33, 45, 10, 18.

Specimens studied. Holotype female, **KENYA**, Nyanza District, Luanda, at 1140m, with no host data, 10.iii.2007 (S. Okajima), in NMK.

Paratypes, 8 females taken with holotype, in LETUA and NMK.

Comments. The head of each of the available specimens is tilted down, thus emphasising the length of the mouth cone such that this reaches just beyond the fore coxae. The species is closely related to *hargreavesi*, but has much shorter setae on the head and pronotum, and antennal segments III and IV have slightly less prolonged apices (Figs 12, 23).

Craspedothrips poecilus **sp.n.**

(Figs 24, 25)

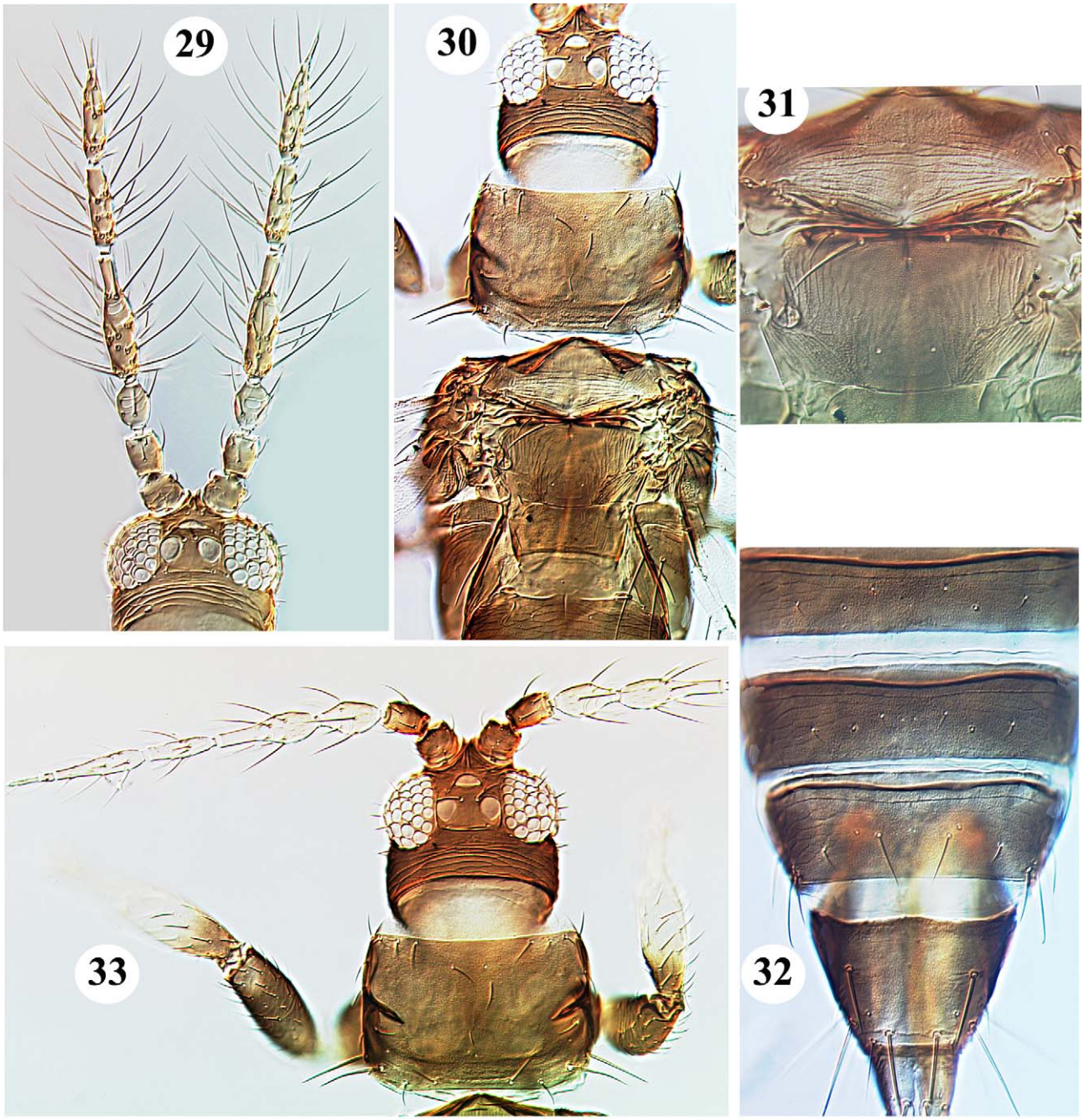
Female macroptera. Body bicoloured; head, pronotum and legs yellow, light brown anterolaterally on pterothorax also meso and metanota; abdominal tergites II–VIII light brown but sharply yellow postero-laterally, IX–X light brown; fore wing shaded including clavus but wing apex slightly paler; antennal segments I–II light brown, III almost yellow, IV brown with narrowed apex paler, V–VIII brown shading to light brown; major setae pale.

Head wider than long, cheeks straight; ocellar setae pair I small, arising close together, II just anterior to ocellar triangle lateral to first ocellus, III arise on tangent between anterior margins of posterior ocelli; postocular setae all small; ocellar triangle with no sculpture, posterior part of vertex with 5 or 6 transverse striae; frons with 6 pairs of prominent setae; compound eyes with no pigmented facets; maxillary palps 3-segmented. Antennal segment I with paired dorso-apical setae; II with no microtrichia, III–VI with microtrichia present; III–IV with apex elongate, greatly so on IV, both with long forked sensoria; inner and outer lateral sensoria on V flattened; VI with 3 sensoria; VIII longer than VII.

Pronotum with prominent striae forming transverse reticulation, posterior submarginal area demarcated; 2 pairs of postero-angular setae, 2 pairs of postero-marginal setae. Mesonotum transversely striate, anterior campaniform sensilla absent, median setal pair close to posterior margin. Metanotum irregularly reticulate, reticulation almost concentric on posterior; median setae close to lateral pair; campaniform sensilla present. Prosternal ferna slightly separated medially; mesothoracic sternopleural sutures complete; metapre-episternum band-like bearing one seta.

Abdominal tergites without craspedum; I transversely striate/reticulate, anterior half of II–VII with similar transverse lines medially and laterally; VIII with a few microtrichia in a short row terminating at spiracle; IX with

one pair of campaniform sensilla, median dorsal setae long and extending beyond posterior margin; X short with weak split.



FIGURES 29–33. *Craspedothrips* species. **(29)** *C. reticulatus* male head and antennae. *C. xanthocerus* 30–33: **(30)** head and thorax; **(31)** meso- and meta-nota; **(32)** tergites VI–X; **(33)** antenna, head and pronotum.

Sternites without craspedum, II with 3 pairs of minute setae near anterior margin and 2 pairs of posteromarginal setae; III–VII with 3 pairs of posteromarginal setae, on VII S1 and S2 arise well in front of margin.

Measurements (holotype female in microns). Body length 1350. Head, length 100; width 135; ocellar setae pair III 35. Pronotum, length 95; width 165; posteroangular setae—inner 55, outer 70; separation between pronotal striae medially 3–6. Fore wing length 820. Antennal segments III–VIII length, 52, 75, 50, 70, 12, 25.

Specimens studied. Holotype female, **KENYA**, Western District, Kakamega Forest, at 1620m, no host data, 4.iii.2007 (S. Okajima), in NMK. Paratypes, 1 female collected with holotype, in LETUA, 2 females with similar data except 3.iii.2007, in LETUA and NMK.

Comments. Collected quite close to the original site of *antennatus*, these two species are closely related. The new species is bicoloured, with the tergal sculpture particularly distinctive, the sculptured lines on the pronotum and metanotum much less closely spaced, and the major sensoria on the antennae more slender.

Craspedothrips reticulatus sp.n.

(Figs 26–29)

Female macroptera. Body brown, also mid and hind femora; mid and hind tibiae yellow, also fore legs; fore wing including clavus light brown; antennal segments I–II and IV–VIII brown, III yellow; major setae light brown.

Head wider than long, cheeks straight; ocellar setae pair I short, arising close together, II longer and lateral to first ocellus, III long on tangent between anterior margins of posterior ocelli; postocular setae all small; ocellar triangle with no sculpture, posterior part of vertex with 5 or 6 transverse striae; frons with 6 pairs of prominent setae; compound eyes with no pigmented facets; maxillary palps 3-segmented. Antennal segment I with paired dorso-apical setae; II with no microtrichia, III–VI with microtrichia present; III–IV with apex elongate, with stout forked sensoria; inner and outer lateral sensoria on V flattened; VI with 3 sensoria; VIII longer than VII.

Pronotum with prominent striae forming transverse reticulation, posterior submarginal area demarcated; 2 pairs of postero-angular setae, 3 pairs of postero-marginal setae. Mesonotum transversely reticulate, anterior campaniform sensilla present, median setal pair close to posterior margin. Metanotum with strong equiangular reticulation; median setae stout, close to lateral pair; campaniform sensilla present. Prosternal ferna slightly separated medially; mesothoracic sternopleural sutures complete; metapre-episternum band-like bearing one seta.

Abdominal tergite I without craspedum, with prominent equiangular reticulation, each reticle with curved anterior margin, tergite II with row of 5 similar reticles at anterior; tergites II–VIII with narrow band-like craspedum; V–VIII with no sculpture between median pair of setae, laterally with 5 or 6 weak transverse lines; VIII with lateral ctenidium-like structure weakly developed; IX with two pairs of campaniform sensilla, median dorsal setae long and extending to posterior margin; X short with no split.

Sternite II with 3 pairs of minute setae near anterior margin; II–VI with narrow craspedum lobed between marginal setal bases, VII with no craspedum; II with 2 pairs of marginal setae, III–VII with 3 pairs, on VII S1 and S2 arise far in front of margin.

Measurements (holotype female in microns). Body length 1500. Head, length 75; width 150; ocellar setae pair III 50. Pronotum, length 125; width 175; posteroangular setae—inner 75, outer 60; separation between pronotal striae medially 3–5. Fore wing length 800. Antennal segments III–VIII length, 55, 75, 48, 65, 10, 20.

Male: Similar to female but smaller and paler; pronotum less prominently sculptured; metanotal reticles less uniform, almost concentric on posterior half; tergite I similar to that of female, sculpture on II prominent but more irregular; tergites without craspeda, III–VIII with almost no sculpture; IX with no anterior campaniform sensilla, median dorsal setae short and stout; sternites without pore plates. Antennae with only 7 segments; segment III short and broad, IV–VI elongate with many very long setae (Fig. 29).

Specimens studied. Holotype female, **KENYA**, Western District, Kakamega Forest, at 1620m, no host data, 4.iii.2007 (S. Okajima), in NMK. Paratype, 1 male collected with holotype, in NMK.

Comments. The two specimens on which this species is based bear the same collection data as two females of *poecilus*, but in contrast to that species there are craspeda on the tergites in the female. Moreover, the sculpture on the first abdominal tergite is unlike that of any other species of Thripinae.

Craspedothrips xanthocerus (Hood)

(Figs 30–33)

Physothrips xanthocerus Hood, 1916: 131
Plesiopsothrips carvalhoi Bournier 1974: 156. **syn.n.**

The original descriptions of both *xanthocerus* and *carvalhoi* are well illustrated. The single female from Uganda on which *xanthocerus* was based has been examined (in USNM), but the type material of *carvalhoi* from Angola is not in the Paris Museum and has not been studied. Despite that, there is little doubt about the identity of this species

and the above synonymy is based on a long series of *xanthocerus* from *Coffea robusta* in Angola (in BMNH). Also the following have been studied (in BMNH): Uganda - a long series from the underside of leaves of *Coffea arabica*; Tanzania—a series from coffee leaves in association with *Hemileia vastatrix*; Kenya—three females in association with *Hemileia vastatrix* at the coffee research station, Kisii. The association of both *xanthocerus* and *antennatus* with this coffee fungus remains unclear, whether it involves feeding on the spores or feeding on damaged leaf tissues as is known for some Panchaetothripinae species. Antennal segments III–VI (Fig. 33) are unusually pale in *xanthocerus*, the pronotal discal area lacks setae and sculpture lines, the metascutum is weakly sculptured (Fig. 31), and on sternite VII setae S2 arise in front of the posterior margin by a distance equal to about twice the diameter of their basal pores. This species shares with *ghesquierei* the unusual condition of lacking a pair of setae in front of the first ocellus.

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