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Species of the Genus *Thrips* (Thysanoptera, Thripidae) from the Afro-tropical Region

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Abstract

An illustrated key is provided to distinguish the 34 species of genus *Thrips* reported from the Afrotropical Region, including La Réunion. Seven new synonyms are established as a result of checking type specimens; two new species are described, *T. solari* from Nigeria and *T. kurahashii* from South Africa; and the new combination *Craspedothrips ghesquierei* (Priesner) is established for a species described in *Taeniothrips*. A diagnosis is given for each species with an indication of the known distribution.

Key words: Thrips, Afrotropical Region, identification, synonymies, new species

Introduction

The volume of fresh horticultural products exported by African countries to other parts of the world has increased greatly in recent years (Mwebaze, et al., 2010). For quarantine authorities of importing countries, these plants and plant products provide considerable problems. Quarantine officers are expected to identify potential pest or invasive species, although invasiveness and even pest status are not readily predictable (Maynard & Nowell, 2009). Such difficulties are increased when the products come from parts of the world such as Africa for which there is such limited information concerning the insect fauna (Nickle, 2008; Mound, 2009). A parallel problem exists for exporting countries, because there is an increasing expectation under trade agreements that exports will be certified as free of potential pests. The Thysanoptera is one particular group of insects that becomes involved in such problems. The purpose of the work presented here is thus to facilitate identification, by quarantine authorities in both importing and exporting countries, of the species of the genus *Thrips* Linnaeus that have been recorded from Africa.

Systematic considerations

Thrips is the most species-rich genus of Thysanoptera, with about 250 described species worldwide (Mound, 2010). Identification systems are now available for the species of this genus from many parts of the world [Europe and Mediterranean: zur Strassen (2003); Asia and Australasia: Palmer (1992), Mound & Masumoto (2005), Mound & Azidah (2009); North America: Nakahara (1994), Hoddle et al. (2009)]. However, only one published key is available to any species of this genus from Africa (Hood, 1932), and that includes very few species and is based on a long out-dated concept of the genus.

Most thrips species from Africa named prior to 1940 cannot be recognised from their descriptions, and re-examination of type specimens for this paper has thus resulted in seven new synonyms. Moreover, for no African species has there been any studies on structural variation within and between populations. At the time that these African species were described, the genus *Thrips* and the genus *Taeniothrips* were confused. Indeed, Stannard (1968: 358) suggested that these two "grade into each other". However, Mound (1968) indicated

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character states that differ between several groups of Thripinae, subsequently incorporating these into a treatment of the British thrips fauna (Mound et al., 1976), and Bhatti (1978, 1980) firmly established the lack of close relationships between the two genera. Several of the African species treated here were described in the genus *Taeniothrips* on the basis that they had 8-segmented antennae and a rather long head. However, these species all have paired ctenidia on the abdominal tergites, and on tergite VIII the ctenidia are postero-mesad of the spiracle. In contrast, species of *Taeniothrips* do not have any abdominal ctenidia. The other major genus in which species have abdominal ctenidia is *Frankliniella*, and this is sometimes confused with *Thrips*. However, in *Frankliniella* species the ctenidia on tergite VIII are anterolateral to the spiracles (Mound, 2002), and these two genera are probably only distantly related.

All species described from Africa in the genus *Taeniothrips* are now recognised as members of *Thrips* genus, with the exception of *T. ghesquierei* Priesner (1937). Based on a single female from the Congo, the holotype of this species in the museum at Tervuren has now been re-examined, and the species is here placed in a new combination as *Craspedothrips ghesquierei* (Priesner) **comb.n.** The antennal segments are much longer than in *Taeniothrips* species, and segments V and VI both bear the stout dagger-shaped sensorium on the external margin that is typical of the African and Asian species placed in *Craspedothrips* by Bhatti (1995). However, in contrast to the generic definition given by Bhatti (1995), *C. ghesquierei* has only two sensoria on segment V, the inner one being very slender. The tergites and sternites lack craspeda, and ocellar setae pair I is not present on the head, but these character states are considered by Bhatti to be variable among *Craspedothrips* species. On tergite VIII, *C. ghesquierei* bears an irregular group of microtrichia mesad of the spiracles, and the posteromarginal comb is long and regular. The metanotal sculpture is mainly transverse, the median setae are at the anterior margin of this sclerite, and a pair of campaniform sensilla is present near the posterior margin. Illustrations of the holotype were published by Faure (1959). Another related genus from Africa is *Ceratothripoides*, but the species in that genus have ocellar setae pair I present (Mound & Nickle, 2009).

The present work is not a formal taxonomic revision; such a study will need to be based on extensive field work in Africa, to establish structural variation and host-plant associations. This paper has the limited intention of facilitating identification of the recorded species, and establishing several new synonyms. As with any such product, the strength of the identification key is limited by the number of specimens available for study. Carried out largely at the Australian National Insect Collection, Canberra, it is based on examination of material, including type specimens, from the major collections at Berlin, Frankfurt, London, Paris, Stockholm, Tervuren, and Washington.

Faunal considerations

A total of 34 species in the genus *Thrips* are considered here from the Afro-tropical zoogeographical Region. This is a part of the world from which the Thysanoptera are particularly poorly collected. Almost all of the African endemic species considered here were described before 1940, and there have been almost no studies on the fauna since the colonial period. Indeed, basic faunal lists have been published for only three areas: West Africa (Pitkin & Mound, 1973), South Africa (zur Strassen, 2006), and the island of La Réunion (Bournier, 2000).

Of the 34 species, nine are clearly introduced to Africa. Most of these are Oriental in origin, but with two from Europe and one from Australia. Of the African endemic species, curiously few lack discal setae on the abdominal sternites, whereas species lacking these setae comprise approximately 50% of *Thrips* species known from Europe (zur Strassen, 2003) or the Oriental Region (Palmer, 1992). The most common African species in this group is *T. pusillus*, a close relative of *T. palmi*, the widespread tropical pest thrips. Several of the African species with eight antennal segments have relatively elongate heads, and are thus similar to species of *Taeniothrips*, but despite this most have unusually short inter-ocellar setae. Although this appears to be an endemic radiation, the same patterns of structural variation exist between the individual species of this group that are found among species in the genus *Thrips* elsewhere in the world. Thus species that are

otherwise closely similar in structure have either few or many setae on the forewing first vein (and the number also varies within some species). Several of the African species with seven antennal segments have particularly large numbers of sternal discal setae; some of these species have pleurotergal discal setae, but others have none. There is thus the similar extensive homoplasy in character state expression that is evident among *Thrips* species from other parts of the world (Palmer, 1992; Mound & Masumoto 2005).

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The illustrations were produced with a Leica DM2500 D.I.C.microscope, the images being processed with Automontage software.

Key to species

* placed here from description only

1. Sternites and pleurotergites (Fig. 3) without discal setae; antennae 7-segmented 2
-. Sternites with discal setae (Fig 19); pleurotergites with or without discal setae (Figs 27, 32); antennae 7- or 8-segmented (Fig. 14) 10
2. Forewing first vein with 7–10 setae on distal half; metanotum with bold equiangular reticulation, usually with some markings inside reticles (Fig. 35); tergite VIII with comb absent medially (Fig. 36) ..... *orientalis* [part]
-. Forewing first vein usually with 3 setae on distal half, sometimes 4–6; metanotum without equiangular reticulation; tergite VIII comb present medially (Fig. 48) 3
3. Head, thorax and legs yellow, abdomen dark brown, forewing uniformly dark including basal area *aurantithoracis**
-. Never both sharply bicoloured and with uniformly dark forewings 4
4. Micropterous, hemimacropterous or macropterous; tergites V–VII with setae S1 and S2 at least 0.5 as long as median length of tergite, at least two lines of sculpture extending between median pair of setae (Fig. 34); metanotum with irregular large reticles (Fig. 33) ..... *nigropilosus*
-. Always macropterous; tergites V–VII with setae S1 and S2 no more than 0.3 as long as median length of tergite, no sculpture lines present between median setae; metanotal sculpture essentially linear (Figs 37, 45) 5
5. Metanotum with several reticles medially (Fig. 45) 6
-. Metanotum with median sculpture lines mainly parallel (Figs 37, 43) 7
6. Abdominal pleurotergites with closely spaced rows of regular, fine microtrichia (Fig. 54); lateral margins of tergites with microtrichia on sculpture lines; tergite IX with one pair of campaniform sensilla, anterior pair absent; antennal segment V not sharply paler than IV ..... *tabaci*
-. Abdominal pleurotergites without such rows of fine microtrichia; lateral margins of tergites without microtrichia on sculpture lines; tergite IX with two pairs of campaniform sensilla, anterior pair present; antennal segment V sharply paler than segments IV and VI ..... *quilicii*
7. Body yellow, at most with tergites brown medially 8
-. Body brown to light brown, abdomen darkest 9
8. Abdomen yellow, forewings pale; metanotal campaniform sensilla present (Fig. 37) ..... *palmi*
-. Abdomen with brown areas medially, tergites IX-X usually dark; forewings weakly shaded; metanotal campaniform sensilla absent (Fig. 43) ..... *pusillus*
9. Pronotal discal setae robust, about 0.2 as long as median length of pronotum (Fig. 41); antennal segment III three times as long as wide ..... *priesneri*
-. Pronotal discal setae weak, scarcely 0.1 as long as median length of pronotum (Fig. 49); antennal segment III twice as long as wide ..... *solari* sp.n.
10. Pleurotergites with discal setae (Fig. 32) 11

-. Pleurotergites with no discal setae (Fig. 27) 18
11. Antennae 8-segmented ..... *abyssiniae*
-. Antennae 7-segmented 12
12. Sternites with less than 15 discal setae, in one transverse row 13
-. Sternites with more than 15 discal setae, arranged in more than one irregular transverse row (Figs 53, 55) 14
13. Body and legs clear yellow ..... *candidus*
-. Body and legs light brown ..... *bourbonensis*
14. Forewing first vein with almost complete row of setae, no more than one seta absent in this setal row ..... *australis*
-. Forewing first vein with long interval before distal group of setae 15
15. Body, also mid and hind tibiae dark brown; forewing clavus with 7–9 marginal setae ..... *hoodi*
-. Body and legs largely or completely yellow; forewing clavus with 5 marginal setae 16
16. Abdominal tergite VIII posteromarginal comb with wide gap medially (Fig. 56); ocellar setae III arising close together behind first ocellus within the triangle; sternites V–VI with about 12 marginal setae (Fig. 55)..... *subnudula*
-. Abdominal tergite VIII posteromarginal comb complete medially; ocellar setae III arising outside ocellar triangle; sternites V–VI with 6 marginal setae (Figs 32, 53) 17
17. Tergites yellow with brown median area, tergite IX yellow, X brown distally; antennal segments IV–V brown .... *tenellus*
-. Tergites yellow with no brown area; antennal segments IV–V yellow basally ..... *microchaetus*
18. Antennae 7-segmented 19
-. Antennae 8-segmented (Fig. 14) 27
19. Abdominal sternite VII with no discal setae (Fig. 39) 20
-. Discal setae present on sternite VII 21
20. Sternites III–VI with no more than 6 discal setae; metanotal reticulations with many internal markings (Fig. 35); forewing brown, scarcely paler at base ..... *orientalis* [part]
-. Sternites III–VI with 5–15 discal setae; metanotal reticulations rarely with internal markings (Fig. 38); forewing brown with base paler ..... *parvispinus*
21. Pronotum with longest posteroangular setae no more than 15 microns ..... *brevisetosus*
-. Pronotum with two pairs of long posteroangular setae (Fig. 13) 22
22. Metanotal median setae arise behind anterior margin; metanotum usually reticulate, at least between median setae (Fig. 2) 23
-. Metanotal median setae arise at anterior margin (Fig. 20); metanotum with transverse striae on anterior but longitudinal striae on posterior half 26
23. Ocellar setae III lateral to ocellar triangle; abdominal tergite II with 4 lateral marginal setae; metanotal campaniform sensilla usually present 24
-. Ocellar setae III posterior to fore ocellus; abdominal tergite II with 3 lateral marginal setae; metanotal campaniform sensilla not present 25
24. Male tergite IX with transverse row of four setae medially ..... *acaciae*
-. Male tergite IX without transverse row of four setae medially but with pair of short stout setae sub-medially on posterior margin ..... *quadridentatus*
25. Tergite VIII posteromarginal comb of short, widely spaced microtrichia; metanotum with equiangular reticulation on posterior half; forewing first vein with 3 setae on distal half; body dark brown, legs paler ..... *speratus*
-. Tergite VIII posteromarginal comb of long fine microtrichia (Fig. 26); metanotum with narrow elongate reticulation medially on posterior half (Fig. 25); forewing first vein with 6–9 setae on distal half; body yellow, abdominal tergites shaded with dark antecostal ridges ..... *kurahashii* sp.n.
26. Forewing clavus with terminal seta longer than subterminal seta (Fig. 12); mesonotum with lines of sculpture close to anterior pair of campaniform sensilla; head with postocular setae I and II subequal ..... *hawaiiensis* [part]
-. Forewing clavus with terminal seta shorter than subterminal seta (Fig. 11); mesonotum with no lines of sculpture close to anterior pair of campaniform sensilla; head with postocular setae II much smaller than setae I .... *florum* [part]
27. Forewing first vein with 7 or more setae on distal half 28
-. Forewing first vein with less than 5 setae on distal half 32
28. Metanotum closely striate with markings between the striae (Figs 21, 29) ..... *meruensis*
-. Metanotum with reticulate sculpture (Figs 10, 52) 29
29. Metanotal median setae arise at anterior margin, reticles without internal markings ..... *fumosus*
-. Metanotal median setae arise behind anterior margin, reticles with many internal markings (Figs 10, 52) 30
30. Metanotal campaniform sensilla absent (Fig. 52); forewing first vein with 6–10 setae on distal half..... *simplex*
-. Metanotal campaniform sensilla present (Fig. 10); forewing first vein with almost complete row of setae 31
31. Forewing with basal area pale ..... *scotti*
-. Forewing almost uniformly shaded at base ..... *fumosoides*

32. Metanotal median setae at or close to anterior margin (Figs 20, 40)..... 33
-. Metanotal median setae well behind anterior margin (Fig. 2)..... 36
33. Metanotum reticulate (Fig. 40)..... 34
-. Metanotum not reticulate, with transverse striations on anterior half (Fig. 20)..... 35
34. Metanotal reticles with internal markings; forewing almost uniformly shaded; mid and hind tibiae dark, paler at base and apex [male colour not known] ..... *tenebricosus*
-. Metanotal reticles with no internal markings (Fig. 40); forewing sharply pale at base; mid and hind tibiae and tarsi clear yellow [male largely yellow, abdomen brown at apex]..... *pretiosus*
35. Forewing clavus with terminal seta longer than subterminal seta (Fig. 12); mesonotum with lines of sculpture close to anterior pair of campaniform sensilla; head with postocular setae I and II subequal ..... *hawaiiensis* [part]
-. Forewing clavus with terminal seta shorter than subterminal seta (Fig. 11); mesonotum with no lines of sculpture close to anterior pair of campaniform sensilla; head with postocular setae II much smaller than setae I .... *florum* [part]
36. Antennal segment IV with distinct apical neck, more than 3.0 times as long as median width; ocellar setae III well outside triangle, length twice that of a hind ocellus; metanotum with transverse sculpture in front of median setae (Fig. 46); comb on VIII short and weak (Fig. 47) ..... *rufescens*
-. Antennal segment IV only 2.1 times as long as wide, apex not constricted to neck(Fig. 14); ocellar setae III on or close to anterior margins of triangle, no longer than longitudinal diameter of an ocellus (Fig. 13); metanotum with reticulate sculpture in front of median setae (Figs 15–18); comb on tergite VIII of well-spaced, usually strong but sometimes irregular, microtrichia ..... *gowdeyi*

Thrips abyssiniae (Moulton)

Taeniothrips abyssiniae Moulton 1928: 229

Known only from two females collected in Ethiopia, this is the only species with 8-segmented antennae considered here that has pleurotergal discal setae as well as sternal discal setae.

Diagnosis. Body dark brown, forewing dark with paler sub-basal area. Antennae 8-segmented. Ocellar III short, outside the ocellar triangle. Pronotum with some transverse lines, about 20 strong discal setae; posteroangular setae long, about 60% as long as pronotum. Metanotal sculpture transverse at anterior but almost striate near posterior, median setae near anterior margin; campaniform sensilla present. Forewing first vein with 4–5 distal setae. Abdominal tergite I fully reticulate, II–IV with no lines reaching campaniform sensilla or setae S1; tergite VIII comb long, complete but irregular; pleurotergites with several discal setae; sternites V–VII with about 15 discal setae in irregular transverse row, almost two rows laterally.

Thrips acaciae Trybom

Thrips acaciae Trybom, 1910: 161
Thrips kikuyuensis Trybom, 1912: 6 **syn.n.**
Thrips spadix Hood, 1932: 131 **syn.n.**
Thrips hirtiventris Hood, 1932: 126

This is here interpreted as a widespread and variable species. Faure (1964) recognised that *T. hirtiventris* from Tanzania was a synonym. Trybom (1912) did not compare *T. kikuyuensis* from Kenya with *T. acaciae* that he had described previously (1910) from Namibia (Kalahari). However, a cotype of *kikuyuensis* has been examined and these two cannot be distinguished satisfactorily. One paratype female of *T. spadix* has been studied, and this is also considered to be a synonym, despite Hood indicating that the third antennal segment was rather longer. As discussed below, *quadridentatus* is possibly a further synonym of *acaciae*. Material recognisable as *T. acaciae* has been studied from Sudan, Kenya, Tanzania, Zululand, Namibia and Cameroon.

Diagnosis. Body and legs brown, tarsi and fore tibiae yellow; antennal segments I–II brown, III mainly yellow, IV–V yellow at base; forewing shaded with small white oval near base. Antennae 7-segmented. Ocellar setae III arising outside triangle (Fig. 1), shorter than distance between hind ocelli. Pronotum with

many transverse sculpture lines not closely spaced, about 40 discal setae; posteroangular setae about 0.3 as long as pronotum; with 4 or 5 pairs of posteromarginal setae. Mesonotal anteromedian campaniform sensilla present. Metanotum medially with longitudinal row of large slightly elongate reticles (Fig. 2), median setae near but not at anterior margin, campaniform sensilla present or absent. Forewing first vein with 2–4 setae on distal half; clavus with 5–8 marginal setae and 1 discal seta (Fig. 2). Abdominal tergites with sculpture lines extending to setae S1; VIII posterior margin with weak but complete comb; pleurotergites with no discal setae, but with weakly dentate or slender microtrichia on widely spaced lines of reticulation (Fig. 3); sternites III–VII with more than 24 short discal setae in two irregular rows.

***Thrips aurantithoracis* Hood**

Thrips aurantithoracis Hood 1932: 135

Known only from the holotype female in the collections of the USNM, this species was collected in the Cameroons, 10.xii.1915. According to the description, the head and pronotum are yellow, but the abdomen and forewing brown, the sternites lack discal setae, tergite VIII has a well developed posteromarginal comb of microtrichia, and antennal segment IV is about 2.4 times as long as wide. This specimen has not been re-examined, and although distinguished in the key above on colour character states, there is no good evidence that the species is distinct from *Thrips priesneri*. The image of the holotype metanotum (Fig. 6; provided by David Nickle) indicates closer striation than that of *priesneri* (Fig. 42).

***Thrips australis* (Bagnall)**

Isoneurothrips australis Bagnall, 1915: 592

This species breeds particularly in the white flowers of *Eucalyptus* species, but also in similar flowers of a few other Myrtaceae. Although native to Australia, it has been introduced around the world almost wherever *Eucalyptus* trees are grown. It can produce very large populations, and adults will then disperse and be found in the flowers of many different plants. It is variable in colour and size, and as a result has been described under four other names (Mound, 2010). In Africa it is known to be established in both Kenya and South Africa, where there are large plantations of *Eucalyptus*, but it probably also occurs elsewhere on these trees. *T. australis* is often placed in a monobasic genus *Isoneurothrips*, because the forewing clavus bears six (instead of the normal five) marginal setae, and the pronotum has a strong sub-marginal ridge at the posterior. Such generic placement is unjustified. The number of claval marginal setae varies from five to eight in *T. acaciae* and from seven to nine in *T. hoodi*, and a pronotal posteromarginal ridge is developed in several of the larger species of this genus.

Diagnosis. Colour variable from yellow to extensively brown; body and legs usually yellow, tergites with brown area medially, X largely brown; antennal segments I and III yellow, remaining segments largely brown; forewings pale with dark setae, hind margin often shaded. Antennae 7-segmented, VII short, VI bullet-shaped. Ocellar setae III just within anterior margins of triangle, close to fore ocellus. Pronotum with 2 pairs of short stout posteroangular setae. Metanotum reticulate, median setae arising well behind anterior margin, campaniform sensilla present. Forewing first and second veins with almost complete row of closely set setae; clavus with 6 marginal setae. Tergite VIII with comb incomplete medially, about 8 teeth laterally; pleurotergites commonly with several discal setae; sternites with up to 30 discal setae.

***Thrips bourbonensis* Bournier**

Thrips bourbonensis Bournier, 2000: 94

In describing this species from La Réunion, the author made no formal attempt to distinguish it from the species *Thrips candidus* that he had described previously from that territory. The only distinction was given in a table of character states: in this the comb on tergite VIII of *candidus* was stated to be "complete but irregular" in contrast to "complete and regular" in *bourbonensis*. Paratype females of these two have been compared, and there is no significant difference between them in this comb (Figs 7–8), nor in any aspect of the chaetotaxy or sculpture, including the metanotum (Figs 4–5). The difference in body colour is possibly due to the specimens of *candidus* having been kept in ethanol for a long time before slide mounting.

Thrips brevisetosus Trybom

Thrips brevisetosus Trybom 1912: 10
Anaphothrips cuthbertsoni Moulton, 1930: 201
Thrips spadix var. *brevipes* Hood, 1932: 134 **syn.n.**

Described from Kenya, and the two listed synonyms from Zambia and Cameroon, this is one of seven species in the genus *Thrips* that lack two pairs of elongate pronotal posteroangular setae (Mound & Azidah, 2009). *T. brevisetosus* is particularly similar in structure to *T. hanifahi* Mound & Azidah from Malaysia.

Diagnosis. Body brown, tibiae and tarsi yellow, antennae brown with III paler; forewings shaded. Antennae 7-segmented. Ocellar setae III small, anterolateral to ocellar triangle. Pronotum midline with transverse faint striae; setae all small but inner posteroangular setae a little larger than marginal setae. Metanotum reticulate, median setae far from anterior margin, campaniform sensilla present. Forewing first vein with 3 setae on distal half. Abdominal tergite VIII posterior margin concave medially, comb complete; pleurotergites without discal setae; sternites III–VII with about 15 discal setae.

Thrips candidus Bournier & Bournier

Thrips candidus Bournier & Bournier, 1988: 76

This species from La Réunion was stated to be described from a holotype female and two males, but in the Paris Museum the holotype is accompanied by one female paratype and three males all with identical data (Nel, 2008). The female paratype and one of the males have been examined, and the species is discussed above under *T. bourbonensis* of which it is likely to prove to be the senior synonym.

Diagnosis. Body and legs yellow, antennal segments IV–VII brown, forewings pale. Antennae 7-segmented. Ocellar setae III small, just inside anterior margins of ocellar triangle. Metanotum with longitudinal reticulation medially, median setae far from anterior margin; campaniform sensilla present. Tergite VIII with comb of long slender microtrichia; sternites III–VII with 3 to 8 discal setae.

Thrips florum Schmutz

Thrips florum Schmutz, 1913: 1003
Thrips exilicornis Hood, 1932: 129

This species is widespread around the tropics, and includes a further seven synonyms (Mound, 2010), including *T. exilicornis* that was described from Nigeria. Character states for distinguishing *T. florum* from the closely similar and even more widespread *T. hawaiiensis* are provided by Bhatti (1999). An analysis of the patterns of variation within and between populations variously identified as *T. florum*, *T. exilicornis* and *T. hawaiiensis* is given by Palmer & Wetton (1987).

Thrips fumosoides (Priesner)

Taeniothrips fumosoides Priesner, 1938: 349

Described from Zaire, this is similar to *T. fumosus* in appearance and sculpture, although the two differ in the sculpture of the metanotum and the position of the median setae on that sclerite. Redescribed and illustrated by Faure (1959), *T. fumosoides* is possibly the same species as *T. scotti* described from Ethiopia. However, the latter has the clavus and base of the forewing pale, and antennal segment III more extensively yellow.

Diagnosis. Large dark brown species, with dark forewings including clavus; mid and hind tibiae brown, tarsi yellow; antennal segment III brown with extreme base yellow. Antennae 8-segmented. Head relatively long, ocellar setae III small on anterior margins of triangle; postocular setae II and IV minute. Pronotum medially with weak transverse lines; midlateral setae long, posteroangular setae about 0.7 of pronotal length. Metanotum reticulate (Fig. 10), many reticles with internal markings; median setae well behind anterior margin; campaniform sensilla present. Forewing with complete setal row on first vein. Abdominal tergite II with four lateral marginal setae; tergites almost without sculpture mesad of setae S2; VIII with complete fine comb; sternites with about 9 long discal setae, pleurotergites without discal setae.

Thrips fumosus (Trybom)

Physopus fumosus Trybom, 1908: 3

Described from many specimens of both sexes from Mt Meru, Tanzania, specimens have also been seen from Rwanda. Faure (1962) re-examined the type series and noted that the chaetotaxy of the first vein of the forewing is highly variable. The species is remarkably similar to *T. fumosoides* in many details.

Diagnosis. Large dark brown species, with dark forewings including clavus; mid and hind tibiae brown, tarsi yellow; antennal segment III brown with extreme base yellow. Antennae 8-segmented. Head relatively long, ocellar setae III small on anterior margins of triangle; postocular setae II and IV minute. Pronotum medially with widely spaced transverse lines; midlateral setae long, posteroangular setae about 0.7 of pronotal length. Metanotum reticulate, almost equiangular but reticles with no internal markings; median setae long near anterior margin; campaniform sensilla present. Forewing first vein with setae on distal half varying from 7 to 12 (usually 8 or 9). Abdominal tergite II with four lateral marginal setae; VIII with complete fine but short comb; sternites with about 10 long discal setae, pleurotergites without discal setae.

Thrips gowdeyi (Bagnall)

Ceratothrips gowdeyi Bagnall, 1919: 254
Physothrips neavei Karny, 1925b: 129
Taeniothrips modestus Hood**,** 1925: 134 **syn.n.**
Taeniothrips debilis Hood, 1925: 136
Physothrips gowdeyi Bagnall, 1926: 105
Taeniothrips umtali Moulton, 1930: 203 **syn.n.**

Type material of all of these nominal species has been examined. *Ceratothrips gowdeyi* and *Physothrips gowdeyi* both have the same collection data, "Flowers of *Solanum,* Kampala, Uganda, 11.xi.1917", and the type specimen of *Physothrips neavei* was also from Kampala, in flowers of *Ipomea hildebrantei*, 26.xii.1920. The types of *modestus* came from Cameroon, of *debilis* from southern Nigeria, and of *umtali* from Zimbabwe. Specimens have also been studied from Kenya and South Africa. This widespread species is generally similar to *T. acaciae*, but has eight antennal segments, only three instead of four lateral marginal setae on tergite II, and fewer pronotal discal setae. The metanotal sculpture varies in detail (Figs 15–18), particularly between

large and small individuals.

Diagnosis. Body variably brown, abdomen sometimes paler, tibiae sometimes yellow; forewing weakly shaded, scarcely paler at base; antennal segment III largely yellow, remaining segments brown. Antennae 8-segmented. Ocellar setae III short, on or just outside ocellar triangle. Pronotum with irregular transverse lines; posteroangular setae about 0.3 as long as pronotum. Mesonotal anterior campaniform sensilla present. Metanotum with irregular longitudinal reticulation medially (Figs 15–18), no campaniform sensilla, median setae close together not near anterior margin. Forewing first vein with 3 setae on distal half; clavus with 5 marginal setae. Tergite II with 3 lateral marginal setae; tergal sculpture lines scarcely reach campaniform sensilla; VIII with complete weak comb; sternites III–VII with 10 to 25 discal setae in two irregular rows; pleurotergites with microtrichia almost ciliate, no discal setae. Male yellow, sternites III–VII with transverse row of discal setae posterior to rather small oval pore plate.

***Thrips hawaiiensis* (Morgan)**

Euthrips hawaiiensis Morgan, 1913: 3

Closely related to *T. florum* (see Bhatti, 1999), this widespread and common species has many synonyms in various parts of the tropics. Although not seen commonly from Africa, specimens have been studied from Nigeria, and it is also recorded from La Réunion (Bournier, 2000).

Diagnosis. Colour variable, body sometimes brown but usually bicoloured, head and thorax paler than brown abdomen; legs yellowish; antennal segment III yellow; forewing brown with base paler. Antennae 7- or 8-segmented. Ocellar setae III stout, just outside ocellar triangle. Pronotum with 2 pairs of long posteroangular setae. Mesonotum with lines of sculpture around anterior campaniform sensilla. Metanotal sculpture longitudinal medially, transverse at anterior; median setae at anterior margin (Fig. 20); campaniform sensilla almost always present. Forewing first vein with 3 setae on distal half; clavus with subapical seta shorter than apical seta. Tergite VIII with comb complete medially, microtrichia small and irregular; pleurotergites without discal setae; sternal discal setae in transverse row varying from 10 to 25.

***Thrips hoodi* Priesner**

Thrips hoodi Priesner 1938: 352

Described from an unspecified number of females from Zaire, a few specimens have also been studied from Angola. This species is unusual in having so many setae on the margin of the forewing clavus and posterior margin of the pronotum.

Diagnosis. Body and legs brown, tarsi and fore tibiae yellowish, antennal segment III yellow; forewing shaded but slightly paler near base. Antennae 7-segmented. Ocellar setae III small, just within ocellar triangle. Pronotum without sculpture, posterior margin with 5–6 pairs of setae between the posteroangular setae. Metanotum with narrow elongate reticulation with internal markings, median setae not at anterior margin; campaniform sensilla present. Forewing first vein with 2 or 3 distal setae; clavus with 7–9 marginal setae. Abdominal tergite VIII with long slender comb. Sternites with up to 20 discal setae in two irregular rows; pleurotergites with up to 6 discal setae.

***Thrips kurahashii* sp.n.**

Female macroptera. Colour of macerated, slide-mounted females yellow, with abdomen faintly shaded medially and antecostal ridges darker; antennal segments III–V darker in apical third, VI–VII light brown; forewings pale to weakly shaded. Antennae 7-segmented. Ocellar setae III small, shorter than distance

between hind ocelli, just behind first ocellus and within or on margins of ocellar triangle (Fig. 24). Pronotum transversely striate, with about 30 discal setae; anterior margin with about 5 pairs of setae, posterior margin with 3 (or 4) pairs between the posteroangular setae. Mesonotum without anterior campaniform sensilla (Fig. 25). Metanotum closely striate laterally, with widely spaced transverse lines in front of median setae, sculpture varying posteromedially from closely striate to narrow elongate reticulation; campaniform sensilla absent (Fig. 25). Forewing first vein with 6–9 setae on distal half; clavus with 5 (or 6) marginal setae. Abdominal tergites with a few sculpture lines extending to median setae and campaniform sensilla (Fig. 26); tergite II with 3 lateral marginal setae; ctenidia present on V–VIII; comb on VIII long and slender; IX with no anterior campaniform sensilla (Fig. 26); pleurotergites with no discal setae, with many rows of fine microtrichia (Fig. 27). Sternites III–VII with 16–20 discal setae placed irregularly, on III–VI some of these are close to posterior margin; sternite II with about 3 discal setae.

Measurements (holotype female in microns). Body length 1270. Head, length 90; width across eyes 145; ocellar setae III 15. Pronotum, length 115; width 175; posteroangular setae 30, 35. Forewing length 750. Antennal segments III–VII length 45, 40, 32, 48, 15.

Male. Similar to female but smaller; pleurotergal microtrichia more irregular on sculpture lines; tergite VIII posteromarginal comb reduced to 5 long microtrichia medially, none laterally; tergite IX setal pairs S1 and S2 with bases arranged almost in straight line; sternites IV–V with slender, transverse pore plate.

Type material. Holotype female, **SOUTH AFRICA**, Cape Town, on *Osteospermum barbersa* (Asteraceae), 14.viii.2002 (H. Kurahashi), in The Natural History Museum, London.

Paratypes: 1 female with same data as holotype, also 1 female with similar data except "on Compositae", both in Plant Protection Collection, Yokahama, Japan; 1 female with similar data except "on Compositae", and 1 male with similar data except "on *Euryops abrotanifolius* (Compositae)", in the Natural History Museum, London; also four series collected by Sverre Kobro from flowers, Cape Town, 4 females, 9.xi.2009; Arniston, 6 females, 10.xi.2009; Agulhas, 5 females, 1 male, 11.xi.2009; Galitzdorp, 3 females, 17.xi.2009, in N.H.M. London; Senckenberg Museum, Frankfurt; and ANIC Canberra.

Comments. The pleurotergal microtrichia of females of this species are rather similar to those of *Thrips tabaci*, a character state also shared with *T. speratus*, and to a lesser extent with some specimens of *T. acaciae*. However, although closely related to *T. speratus*, this new species is readily distinguished by the larger number of setae on the forewing first vein, and also by the other character states indicated in the key above. The specimens on which this description was initially based were collected in South Africa by H. Kurahashi, a quarantine officer from Japan, and kindly submitted for study by Kazushige Minoura of the Japanese Plant Protection service. Subsequently, Sverre Kobro sent further slides of the same species, and these are included here as paratypes. One of the four females he collected at Cape Town has on the metanotum a single campaniform sensillum, whereas all of the other available specimens lack such a structure on the metanotum.

Thrips meruensis (Trybom)

Physopus meruensis Trybom, 1908: 6
Taeniothrips ugandai Moulton, 1936: 502 **syn.n.**
Taeniothrips (*Isochaetothrips*) *holmi* zur Strassen, 1972: 86 **syn.n.**

Redescribed and illustrated by Faure (1962), this species is characterised by the closely striate metanotum with small markings between the striae (Figs 21, 29). Described from Tanzania, with the synonymic species from Uganda and Kenya, specimens have been seen also from Zaire, and there are females in the BMNH from "East Africa, 22.i.1912 Alluard et Jeannel 39". It resembles *fumosoides* and *fumosus* in the long head with short ocellar setae, the large number of setae on the forewing, and the lack of sculpture on the pronotum.

Diagnosis. Large dark brown *Taeniothrips*-like species; antennal segment IV largely brown; forewing dark with paler sub-basal area. Antennae 8-segmented; VII & VIII small. Head relatively long; ocellar setae III on or just inside anterior margins of ocellar triangle, no longer than distance between hind ocelli (Fig. 28); postocular setae II and IV much shorter than I, III and V. Pronotum with almost no sculpture (Fig. 30),

posteroangular setae about 0.75 as long as pronotum. Mesonotum with or without anteromedian campaniform sensilla. Metanotum closely striate, with small markings in between some major lines (Figs 21, 29); median setae not close to anterior margin; campaniform sensilla present. Forewing first vein with almost complete row of setae (Fig. 22), clavus with 5 marginal setae, sub-terminal seta slightly longer than terminal, discal seta longest. Tergites II–VII with median setae small and wide apart, anterior to campaniform sensilla; almost no sculpture lines mesad of setae S2; VIII with long fine regular comb (Fig. 23); IX with 2 pairs campaniform sensilla, X with long split, major setae long and dark. Sternites III–VII with 9 to 13 long discal setae in irregular transverse row; no discal setae on pleurotergites. Male with no comb on VIII; tergite IX setae slender; sternites III–VII with large oval to round pore plate.

Thrips microchaetus Karny

Thrips microchaetus Karny 1920: 27
Thrips banicus zur Strassen, 1968: 52

This species appears to be widespread across the northern part of the Afro-tropical region. It was described from Sudan, and the synonym from Morocco, but has been seen from Kenya, Egypt, Israel and Yemen (zur Strassen, 2003). In structure it is particularly similar to *T. tenellus* from South Africa, but females lack the dark tergal markings of that species, and the metanotum appears to be more closely striate.

Diagnosis. Body and legs yellow, antennal segments IV–V with apex brown, VI–VII brown; forewings uniformly pale. Antennae 7-segmented. Ocellar setae III outside ocellar triangle. Pronotum with transverse lines of sculpture and about 40 discal setae. Metanotum with transverse lines at anterior, almost longitudinally striate on posterior half, median setae not at anterior margin (Fig. 31); campaniform sensilla present and close together. Forewing first vein with three distal setae. Abdominal tergite VIII with complete comb. Sternites with 30 or more discal setae arranged irregularly; pleurotergites with 6 or more discal setae (Fig. 32).

Thrips nigropilosus Uzel

Thrips nigropilosus Uzel 1895: 198

This European species is widespread around the world as a minor pest on various plants, including lettuce. In Kenya it has been considered to be associated particularly with the Pyrethrum crop. Adults are variable in structure, and can be either fully winged or micropterous. However, the abdominal tergites always have the median setae long, and with two or more transverse lines of sculpture medially (Fig. 34).

Diagnosis. Macropterous or micropterous; body mainly yellow, setae black, abdominal tergites shaded medially; antennal segments III–VII dark brown; forewings pale with dark setae. Antennae 7-segmented. Ocellar setae III longer than side of triangle, lateral to fore ocellus. Pronotum with 3 pairs of discal setae larger than remaining discal setae, two near anterior margin and one near lateral margins. Metanotum with irregular reticulations (Fig. 33), median setae arising behind anterior margin; campaniform sensilla absent. Tergite II with 3 lateral marginal setae; II–III with median pair of discal setae at least half as long as median length of tergite (Fig. 34); VIII with complete comb of long slender microtrichia; pleurotergites without discal setae; sternites without discal setae.

Thrips orientalis (Bagnall)

Isoneurothrips orientalis Bagnall, 1915: 593
Thrips hispidipennis Hood, 1932: 122

This common Asian species has been recorded from Africa only rarely, the synonym having been described from Tanzania. It is found usually in the perfumed white flowers of *Jasminum* and *Gardenia*.

Diagnosis. Body and legs brown; tarsi and antennal III and base of IV yellow; forewings uniformly brown. Antennae 7-segmented, III and IV elongate with apex constricted, VII small. Ocellar setae III small, on anterior margins of triangle; postocular setae pair II minute. Pronotum with 2 pairs of long posteroangular setae. Metanotum with equiangular reticles, usually with distinctive internal markings (Fig. 35); median setae long, arising well behind anterior margin; campaniform sensilla absent. Forewing first vein with 8 or more setae on distal half, row sometimes complete; clavus with subapical seta longer than the apical seta. Tergites with no sculpture near campaniform sensilla; VIII with comb absent medially, several small microtrichia laterally (Fig. 36); pleurotergites without discal setae. Sternal discal setae variable, sometimes absent but III–VI usually with 2–6 discal setae placed laterally.

***Thrips palmi* Karny**

Thrips palmi Karny, 1925a: 10

This worldwide tropical pest, the melon thrips, has been described from parts of Asia under five other names (Mound, 2010). There are few published records from Africa, but it has been reported from Côte d'Ivoire (Bournier, 2002), and from La Réunion (Bournier, 2000). It is very similar to the African species *T. pusillus*, but that usually has dark markings on the tergites, and ocellar setae III closer together behind the fore ocellus.
Diagnosis. Body and legs yellow, major setae shaded; antennal segments IV–V yellow but brown distally, VI–VII brown; forewings pale. Antennae 7-segmented. Ocellar setae III small, just outside ocellar triangle. Pronotum with 2 pairs of long posteroangular setae, discal setae well-developed. Metanotal sculpture lines converging to posterior margin, but transverse and curving at anterior (Fig. 37); median setae arising behind anterior margin; campaniform sensilla present. Forewing first vein with 3 (or 2) setae on distal half. Tergite VIII with complete comb, microtrichia long and slender; pleurotergites and sternites without discal setae, sternal marginal setae almost as long as sternites.

***Thrips parvispinus* (Karny)**

Isoneurothrips parvispinus Karny 1922: 106

This polyphagous oriental species has been studied from La Réunion (Bournier, 2000) and also from Mauritius, and is likely to be present on the African continent.

Diagnosis. Brown, head and thorax paler than abdomen, legs mainly yellow; antennal segment III yellow, also basal half of IV–V; forewings brown with base sharply pale. Antennae 7-segmented. Ocellar setae III small, on anterior margins of triangle; postocular setae pair II minute. Pronotum with 2 pairs of long posteroangular setae. Metanotum variably reticulate, sometimes with faint internal markings (Fig. 38); median setae long, arising behind anterior margin; campaniform sensilla absent. Forewing first vein with complete row of setae. Tergite VIII comb almost absent, a few microtrichia sometimes laterally; pleurotergites without discal setae; sternites III–VI with 6 to 12 discal setae in irregular row, sternites II and VII without discal setae (Fig. 39).

***Thrips pretiosus* (Priesner)**

Taeniothrips pretiosus Priesner, 1938: 347

Described from Zaire, this species appears to be known only from the type series of both sexes, and these

were illustrated by Faure (1959). It differs from *T. fumosus* in having few setae on the distal half of the forewing first vein, but is otherwise similar in sculpture and chaetotaxy.

Diagnosis. Body and femora dark brown, tibiae and tarsi clear yellow, antennal segment III yellowish, IV–V yellow at extreme base; forewing dark with basal area sharply pale; male yellow with abdomen increasingly brown to posterior. Head about as long as wide; ocellar III short, on or near anterior margins of ocellar triangle; postocular setae II and IV very small. Antennae 8-segmented, VII–VIII small, III and IV with constricted apical neck. Pronotum with little sculpture medially; posteroangular setae about 0.7 as long as pronotum; one pair of anteromarginal and one of midlateral setae unusually long. Metanotum reticulate without markings inside reticles, median setae at or close to anterior margin, campaniform sensilla present (Fig. 40). Forewing first vein with 3 setae on distal half; clavus with 5 marginal and one unusually long and stout discal seta. Tergites with sculpture lines scarcely extending mesad of setae S2; VIII with complete comb of short fine microtrichia (absent in male); tergite X long; sternites with about 10 long discal setae in one transverse row.

Thrips priesneri Hood

Thrips priesneri Hood, 1932: 136

Two of the original 14 females have been studied, collected from flowers in the Cameroons, 16.ii.1916. The original description suggests that the body is sharply bicoloured, as was also described for *T. aurantithoracis*. However, the two paratypes are better described as light brown with the abdomen darkest, legs mainly brownish yellow, forewing uniformly shaded with small paler area between the veins sub-basally. At present, *aurantithoracis* and *priesneri* cannot be distinguished satisfactorily, and may prove to represent the same species (cf. Figs 6, 42). A closely related new species, *T. solari*, is described below from southern Nigeria, but that has the pronotal discal setae much weaker than the condition found in *T. priesneri* (Fig. 41). .

Diagnosis. Antennae 7-segmented, segments III–IV with weak apical neck, IV about 3.1 times as long as wide. Ocellar setae III on anterior margins of triangle, about as long as distance between two ocelli. Pronotum with about 30 transverse lines, posteroangular setae about 0.5 as long as pronotum (Fig. 41). Metanotum almost striate, median setae behind anterior margin (Fig. 42). Forewing first vein with 3 setae on distal half. Abdominal tergites with sculpture lines extending sometimes almost to campaniform sensilla; tergite VIII with complete regular comb; sternites and pleurotergites without discal setae.

Thrips pusillus Bagnall

Thrips pusillus Bagnall, 1926: 112
Thrips meliaefloris Hood, 1932: 138

The lectotype and paralectotype of *pusillus*, from Ghana, Aburi, 9.xi.1915, are very pale and were clearly damaged chemically when slide mounted. However, a specimen mounted onto a slide by Priesner, and bearing a manuscript subspecies name, is equally pale. These three specimens have ocellar setae III close together, scarcely further apart than the width of the fore ocellus, although other specimens have these setae more clearly on the anterior margins of the triangle. This species is very similar in structural details to *T. palmi*, with similar metanotal sculpture (Fig. 43), boldly setose pronotal disc, a long comb on tergite VIII, and no sternal discal setae but unusually long sternal marginal setae. In contrast to *T. palmi* the tergites are usually darker medially although the body is otherwise yellow. Teneral individuals that lack the brown tergal markings could easily be misidentified as *T. palmi* if the ocellar setae III are not close behind the fore ocellus; however the available specimens of *T. pusillus* all lack campaniform sensilla on the metanotum. A few specimens have also been studied from Angola, Nova Sintra, with the body more generally brown. *T. pusillus* has been studied from the following countries: Ghana, Sierre Leone, Nigeria, Angola, Kenya, Zimbabwe, Yemen. The new

species, *T. solari*, that is described below from southern Nigeria is also closely related, as is *T. priesneri*.

Diagnosis. Body and legs mainly yellow, major setae dark, tergites II–VIII with median third brown; antennal segments I–II yellow, III brown distally, IV yellow only at base; forewings weakly shaded. Antennae 7-segmented. Ocellar setae III small, usually just within ocellar triangle. Pronotum with 2 pairs of long posteroangular setae, discal setae well-developed. Metanotal sculpture lines converging to posterior margin, transverse and curving at anterior; median setae arising behind anterior margin; campaniform sensilla absent (Fig. 43). Forewing first vein with 3 setae on distal half. Tergite VIII with complete comb of long and slender microtrichia; pleurotergites and sternites without discal setae; sternal marginal setae about as long as a sternite.

***Thrips quadridentatus* Trybom**

Thrips quadridentata Trybom, 1910: 164

This species is known only from the two original males, collected in the flowers of *Acacia horrida* in the Kalahari, in January, 1905. These specimens are preserved in the collections of the Museum für Naturkunde, Berlin, and mounted onto slides by J.S. Bhatti in 1970. Long preservation in alcohol has caused serious deterioration in the two specimens. The most complete specimen, labelled "Lectotype", has a single metanotal campaniform sensillum, although a pair of sensilla is present on the incomplete specimen (Fig. 44). Microtrichial rows are visible on the anterior pleurotergites of the Lectotype, but these are not visible on the second specimen. Males in the genus *Thrips* typically have a row of four setae medially on tergite IX, but on neither specimen of *T. quadridentatus* can these setae be seen. Unfortunately tergite IX is severely distorted in both specimens, but one pair of short stout setae can be seen sub-medially on the posterior margin. The identity of this species remains in doubt, but the type specimens are possibly aberrant individuals of *Thrips acaciae*, with which species they were collected.

***Thrips quilicii* Bournier**

Thrips quilicii Bournier, 2000: 100

Described from a long series of both sexes at various sites on La Réunion, two female paratypes have been studied (Bassin Martin, under *Citrus sinensis* in Moericke trap, ix.1987 & x.1987). The species is similar in structure to *T. tabaci* in many character states, including the comb on tergite VIII (Fig. 48). However, it lacks microtrichia on the pleurotergites and laterally on the tergites, tergite IX bears an anterior pair of campaniform sensilla, the metanotum is more clearly reticulate (Fig. 45), and the pronotum has more discal setae.

Diagnosis. Body mainly yellow, antennal segments II, IV and VI–VII brown, III and V yellow but V brown in apical third; wings pale; major setae on pronotum and abdominal segments III–X dark brown. Ocellar setae III no longer than length of an ocellus, arising on margin of ocellar triangle close to fore ocellus; postocular setae I and III small, II and IV minute. Pronotum with about 30 weak discal setae. Metanotum with elongate reticles medially, campaniform sensilla present (Fig. 45). Tergal sculpture lines extending to campaniform sensilla, VIII with comb of long fine microtrichia (Fig. 48).

***Thrips rufescens* (Hood)**

Taeniothrips rufescens Hood, 1925: 137

This species was described from six females with the data: Tanzania, Rufiji River, 11.viii.1917. The following notes are based on one of these females, and the species can be distinguished from the more widespread *T.*

gowdeyi by the key above.

Diagnosis. Body brown, thorax paler; antennal segment III dark yellow with apex brown; forewings shaded with base paler. Antennae 8-segmented; head with ocellar setae III well outside triangle, almost lateral to first ocellus, about twice as long as a hind ocellus; postocular setae I and III almost as long as ocellar III, postocular setae II and IV minute. Pronotum with about 24 transverse lines. Metanotum with elongate reticles medially, transverse at anterior, median setae not close to anterior margin. Forewing first vein with 3 distal setae; clavus terminal seta longer than subterminal seta. Tergites with lateral sculpture lines not extending to campaniform sensilla; VIII with complete but short comb; pleurotergites with no discal setae; sternites with about 13 discal setae in irregular transverse row medially, 12 on sternite VII.

***Thrips scotti* (Moulton)**

Isochaetothrips scotti Moulton, 1928: 228

Described from seven females collected in forest at 9000 feet on Mt Chillalo, Ethiopia, the following diagnosis is based on the holotype. In structure, this species seems to be identical to *T. fumosoides* from Zaire, but has the base of the forewing sharply pale.

Diagnosis. Body & legs dark brown, tarsi yellow; forewing brown with basal quarter pale; antennal segment III largely yellow with brown apex. Antennae 8-segmented. Head as long as wide; ocellar setae III short, on anterior margins of triangle; postocular setae 2 & 4 much shorter than 1, 3 and 5. Pronotum almost without sculpture lines medially, posteroangular setae about 0.7 as long as pronotum. Metanotum with equiangular reticulation, and markings within reticles; median setae not at anterior margin, campaniform sensilla present. Forewing first vein with complete row of closely spaced setae; terminal seta on clavus slightly shorter than sub-terminal seta. Abdominal tergite II with four lateral marginal setae; tergites almost without sculpture mesad of setae S2; VIII with complete comb of slender microtrichia, but these shorter medially. Sternites III–VII with transverse row of about 10 discal setae; pleurotergites without discal setae.

***Thrips simplex* (Morison)**

Physothrips simplex Morison, 1930: 12
Taeniothrips quinani Moulton, 1936: 506

Four synonyms are listed under this species (Mound, 2010), and of these *T. quinani* was based on a series of specimens from South Africa collected in the flowers of a vine. The Gladiolus Thrips is now found worldwide, but presumably originated in southern Africa in association with the extensive Iridaceae flora of that area.

Diagnosis. Body and legs dark brown, tarsi and antennal segment III paler; forewings brown, base paler. Antennae 8-segmented. Ocellar setae III small, just inside ocellar triangle; postocular setae pair II minute. Pronotum with 2 pairs of posteroangular setae, external pair slightly shorter than inner pair. Metanotum reticulate, reticles elongate on posterior half, with faint sculptured internal markings (Fig. 52); median setae short, behind anterior margin; campaniform sensilla absent. Forewing first vein usually with 7 setae on distal half. Tergite VIII comb complete but slightly irregular; pleurotergites without discal setae, with rows of coarsely ciliate microtrichia; sternite II with 1 or 2 discal setae, III–VII with about 12 discal setae in single row.

***Thrips solari* sp.n.**

Female macroptera. Colour mainly medium brown, all tibiae and tarsi mainly yellow, antennal segment III

paler than II or IV; forewings and clavus light brown with small clear area at fork of veins. Antennae 7-segmented; segments III–IV without an apical neck, each with prominent forked sensorium extending to a point at least one third beyond base of succeeding segment. Ocellar setae III small, shorter than length of hind ocellus, arising on or just outside margins of ocellar triangle (Fig. 49); postocular setae pair II much smaller than pairs I or III; vertex with transverse lines or transverse reticulation. Pronotum with more than 22 transverse striae (Fig. 49), and more than 30 discal setae; anterior margin with about 5 pairs of setae, posterior margin with 3 pairs; posteroangular setae less than 0.4 as long as pronotum. Mesonotum with anterior campaniform sensilla (Fig. 50). Metanotum transversely striate at anterior, longitudinally striate on posterior half, median setae well behind anterior margin; campaniform sensilla absent (Fig. 50). Forewing first vein with 7 setae at base, 3 setae on distal half; clavus with 5 marginal and 1 discal setae. Abdominal tergites with sculpture lines scarcely extending to median setae and campaniform sensilla (Fig. 51); tergite II with 3 lateral marginal setae; ctenidia present on V–VIII; comb on VIII long and slender; IX with anterior campaniform sensilla; pleurotergites and sternites with no discal setae.

Measurements (holotype female in microns). Body length 1320. Head, length 115; width across eyes 125; ocellar setae III 10. Pronotum, length 120; width 175; posteroangular setae 45. Forewing length 600. Antennal segments III–VII length 40, 35, 30, 40, 15.

Type material. Holotype female, **NIGERIA**, Ibadan, on flowers of *Dioscorea dumetorium* (Dioscoreaceae), 18.vii. 1972 (W.K.Whitney), in The Natural History Museum, London.
Paratypes: Three females collected with holotype.

Comments. This species is similar to *Thrips priesneri* in many structural details. It differs in the shorter antennal segments with longer sensoria on III and IV, in the weak setae on the pronotum (Fig. 49), and the shorter pronotal posteroangular setae. The specific epithet commemorates the contributions of my late wife, Jean Solari, to work on insects in Nigeria during 1959–1961.

Thrips speratus zur Strassen

Thrips speratus zur Strassen, 1978: 241

Based on two females from Namibia, this species was subsequently recorded from Natal (zur Strassen, 2006). The original illustration indicates that the pronotal external posteroangular setae sometimes may be scarcely 0.5 as long as the inner pair.

Diagnosis. Body dark brown, tibiae yellow, forewing dark with basal quarter pale. Antennae 7-segmented. Ocellar setae III posterior to fore ocellus, within ocellar triangle. Pronotum with transverse striae, discal setae small, inner posteroangular setae longer than external pair. Metanotum reticulate medially, median setae relatively short and far behind anterior margin. Forewing first vein with 3 setae on distal half. Tergite VIII with complete comb of rather widely spaced but short, microtrichia; pleurotergites with no discal setae but with many rows of microtrichia; sternites with numerous discal setae.

Thrips subnudula (Karny)

Ramaswamiahiella subnudula Karny, 1926: 208

This is a widespread Oriental species that has also been recorded from Nigeria (Mound & Masumoto, 2005) and South Africa (zur Strassen, 2006). It is remarkable within the genus for the large number of marginal setae on the sternites (Fig. 55).

Diagnosis. Body and legs yellow, antennal segments III–V brown distally; forewings pale. Antennae 7-segmented. Ocellar setae III small, arising within ocellar triangle behind fore ocellus. Pronotum with numerous small discal setae, 2 pairs of short posteroangular setae; posterior margin with 4–5 pairs of setae. Metanotum with irregular longitudinal reticulation medially; median setae small, well behind anterior margin;

campaniform sensilla present. Forewing first vein with 3 setae on distal half. Tergite VIII with comb broadly interrupted medially, with a few small microtrichia laterally (Fig. 56); pleurotergites with 4–8 discal setae, also rows of ciliate microtrichia; sternite II with 8 marginal setae, III–VI with about 12 marginal setae (Fig. 55), VII with 3 pairs of marginal setae; sternite II with about 6 discal setae, III–VI with up to 18 discal setae in a single row, VII with about 20 discal setae in a double row (Fig. 55).

Thrips tabaci Lindeman

Thrips tabaci Lindeman 1889: 61

Now found worldwide, particularly on onions, this eastern Mediterranean species occurs rarely in the wet tropics. In Africa, specimens have been seen from South Africa, La Réunion and northern Nigeria. It is highly variable in size and colour, partly depending on the temperature during development (Murai & Toda, 2002), and thus has been described under many different names (Mound, 2010). It can usually be recognised by the grey (instead of red) ocellar pigment, and the regular rows of fine microtrichia on the pleurotergites (Fig. 54) are diagnostic.

Diagnosis. Body varying from yellow to dark brown; ocellar pigment never red, usually grey; antennal segments III–IV brown with basal half pale; forewings pale. Antennae 7-segmented. Ocellar setae III small, arising on anterior margins or just within ocellar triangle. Pronotum with 2 pairs of rather short posteroangular setae. Metanotum irregularly reticulate medially, lines converging to midpoint of posterior margin; median setae short, arising behind anterior margin; campaniform sensilla absent. Forewing first vein usually with 4 (2–6) setae on distal half. Tergite VIII with complete comb of long slender microtrichia; pleurotergites without discal setae, sculptured with rows of fine microtrichia (Fig. 54); sternites without discal setae.

Thrips tenebricosus (Priesner)

Taeniothrips tenebricosus Priesner, 1938: 345

This species is known only from the few original females collected in 1937 at Kivu, Zaire, and these were redescribed and illustrated by Faure (1959). It is similar to *T. fumosoides* in many details, but has only three setae on the distal half of the forewing first vein.

Diagnosis. Body, legs and antennae dark, antennal segment III slightly paler at base; forewing dark with small white mark near base. Antennae 8-segmented. Ocellar setae III small. Pronotal disc with little sculpture; posteroangular setae about 0.7 as long as pronotum. Metanotum reticulate, reticles with internal markings; median setae close to anterior margin; campaniform sensilla present. Forewing first vein with 3 setae on distal half. Abdominal tergite II with 4 lateral marginal setae; Pleurotergites without discal setae; sternites with about 10 long discal setae in single row.

Thrips tenellus Trybom

Thrips alni tenella Trybom, 1913: 6

Described from a single female collected in 1904 under a stone in Natal, this thrips appears to be common in at least the eastern areas of South Africa. It is quite similar to *microchaetus*, but that species occurs in countries further north and lacks the dark median mark on the tergites.

Diagnosis. Body and legs yellow, tergites II–VII with brown median area, IX yellow, X brown at apex; antennal segments I-III yellow, IV-VII brown; forewings pale. Antennae 7-segmented. Ocellar setae III lateral to fore ocellus. Pronotum with many transverse lines and many small discal setae. Metanotal median setae not

at anterior margin, sculpture transverse on anterior, similar to *palmi* on posterior, no campaniform sensilla. Tergal lines of sculpture extend medially to setae S1; posterior margin of VIII weakly concave, with complete but irregular comb. Pleurotergites with 3–5 discal setae; sternites with numerous discal setae in more than one irregular row (Fig. 53).

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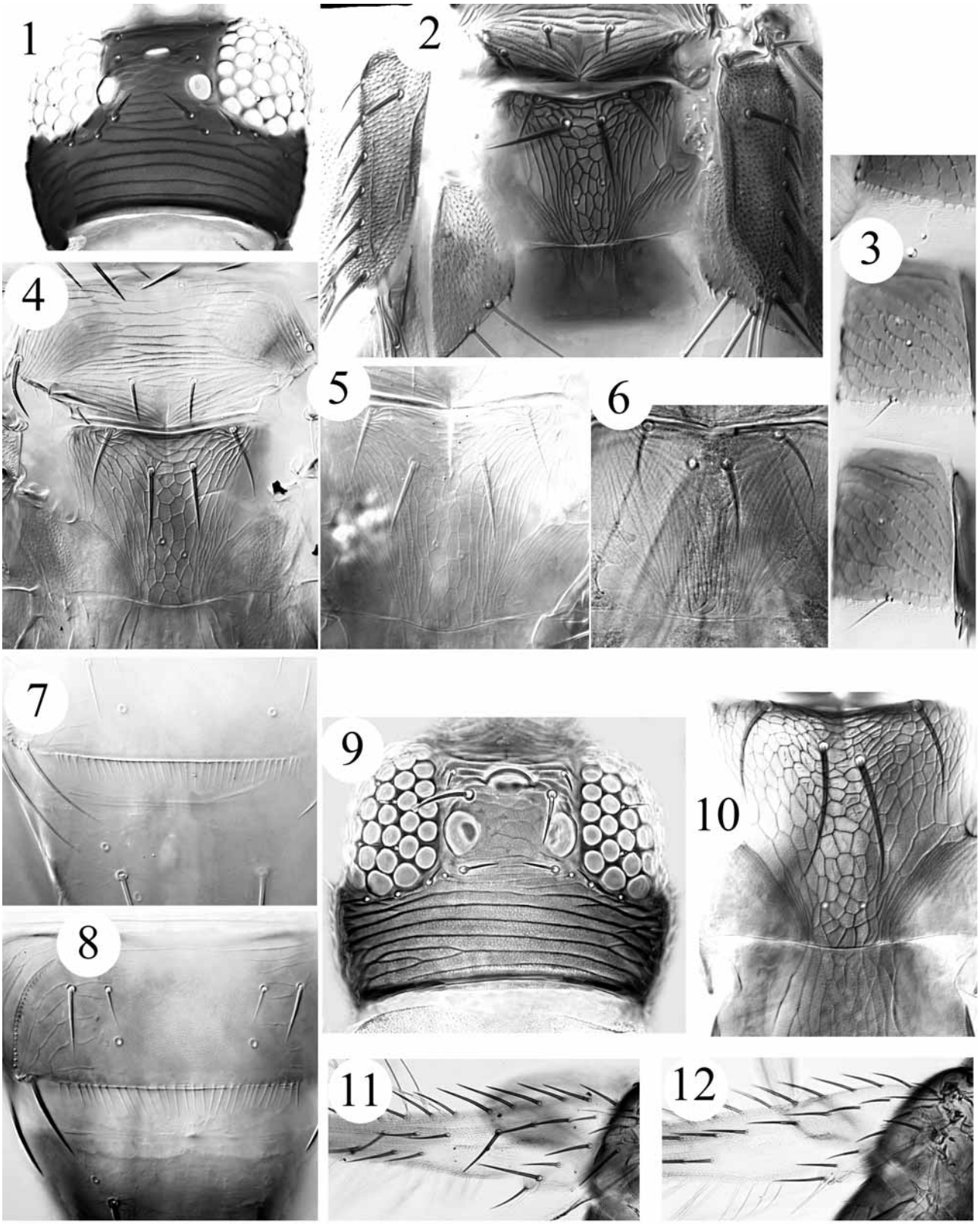
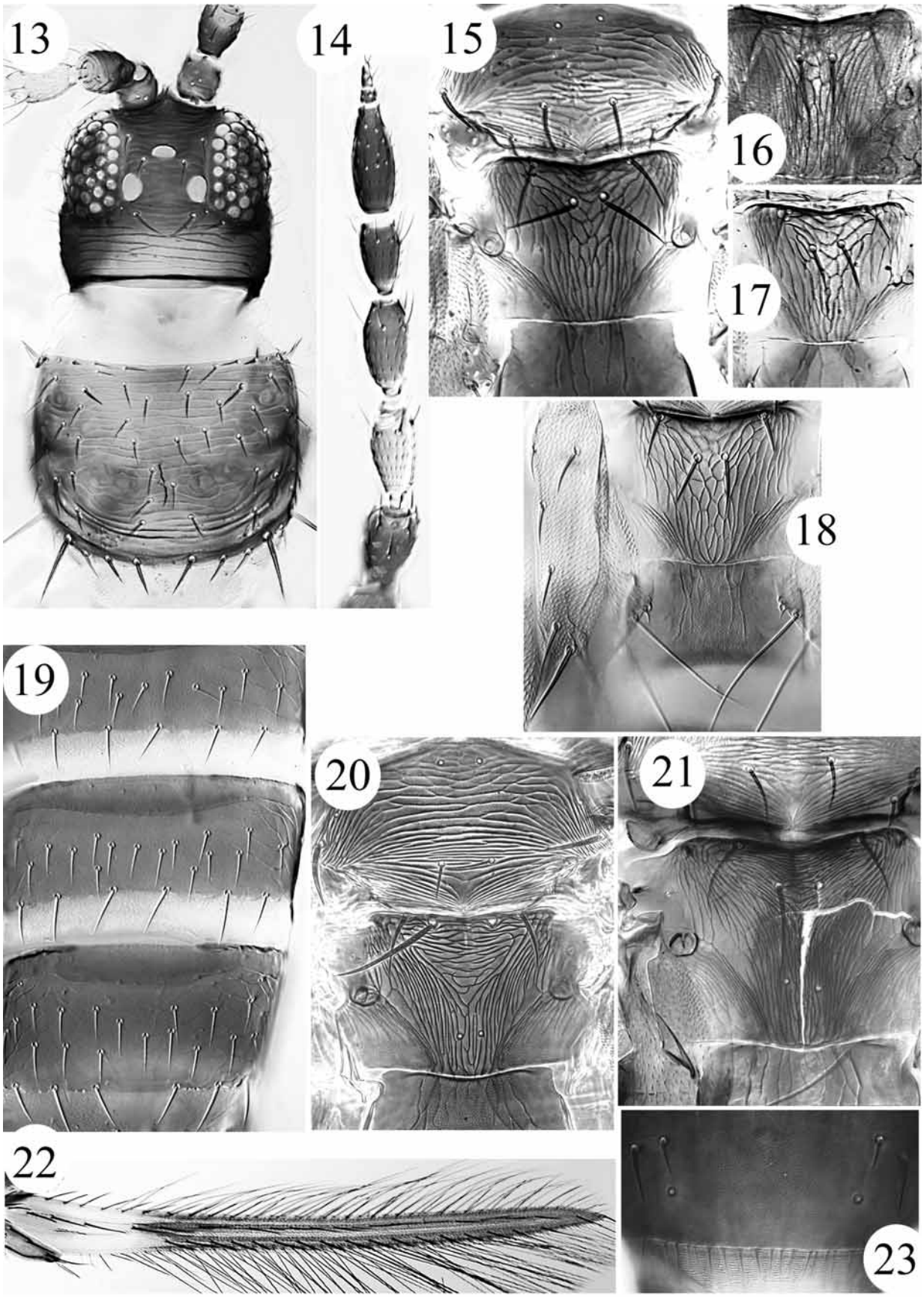
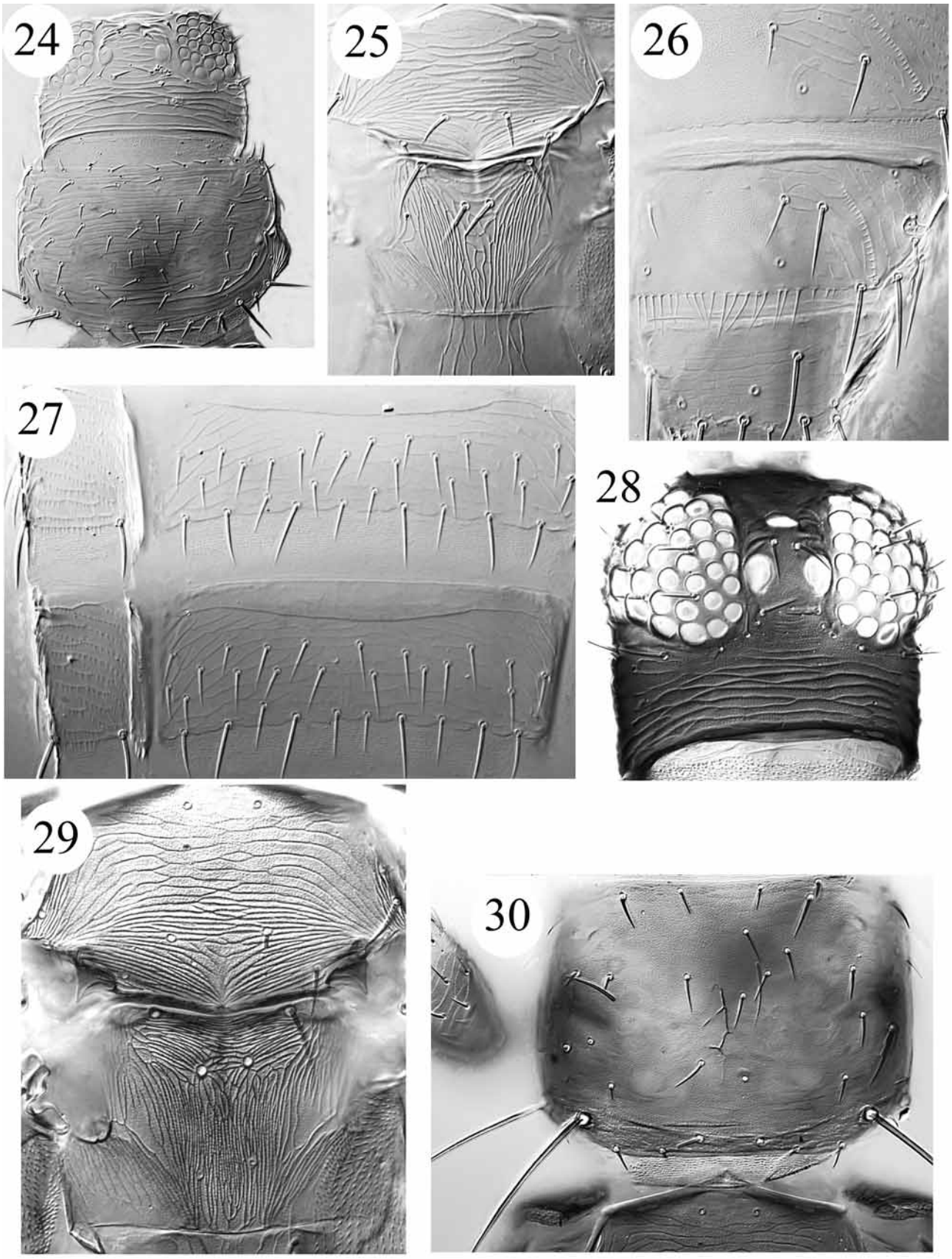


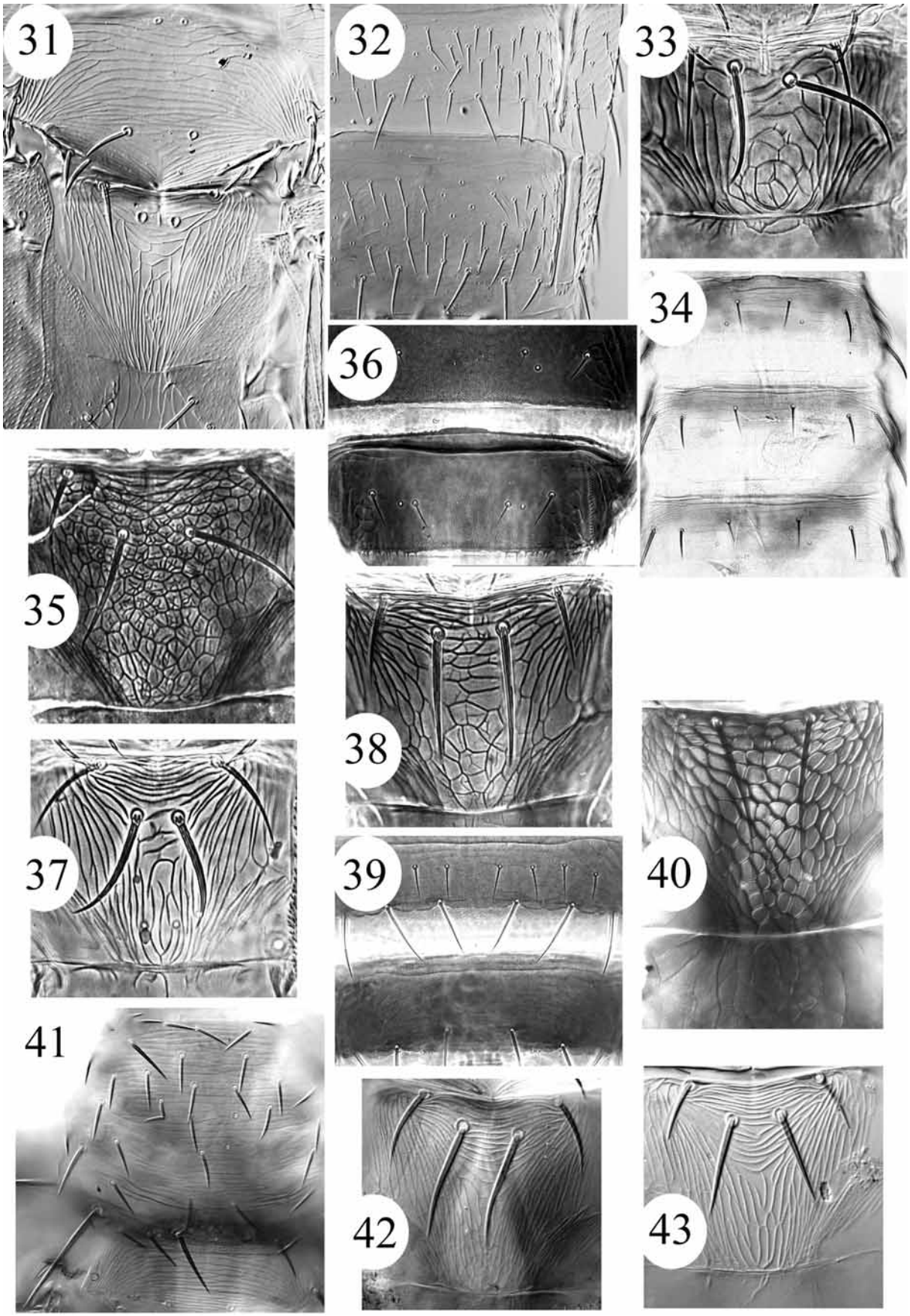
FIGURES 1–12. *Thrips* species. **(1)** *acaciae*, head. **(2)** *acaciae*, metanotum and clavus. **(3)** *acaciae*, pleurotergites. **(4)** *bourbonensis*, paratype metanotum. **(5)** *candidus*, paratype metanotum. **(6)** *aurantithoracis*, holotype metanotum. **(7)** *candidus*, paratype tergite VIII. **(8)** *bourbonensis*, paratype tergite VIII. **(9)** *florum*, head. **(10)** *fumosoides*, metanotum. **(11)** *florum*, forewing clavus. **(12)** *hawaiiensis*, forewing clavus.



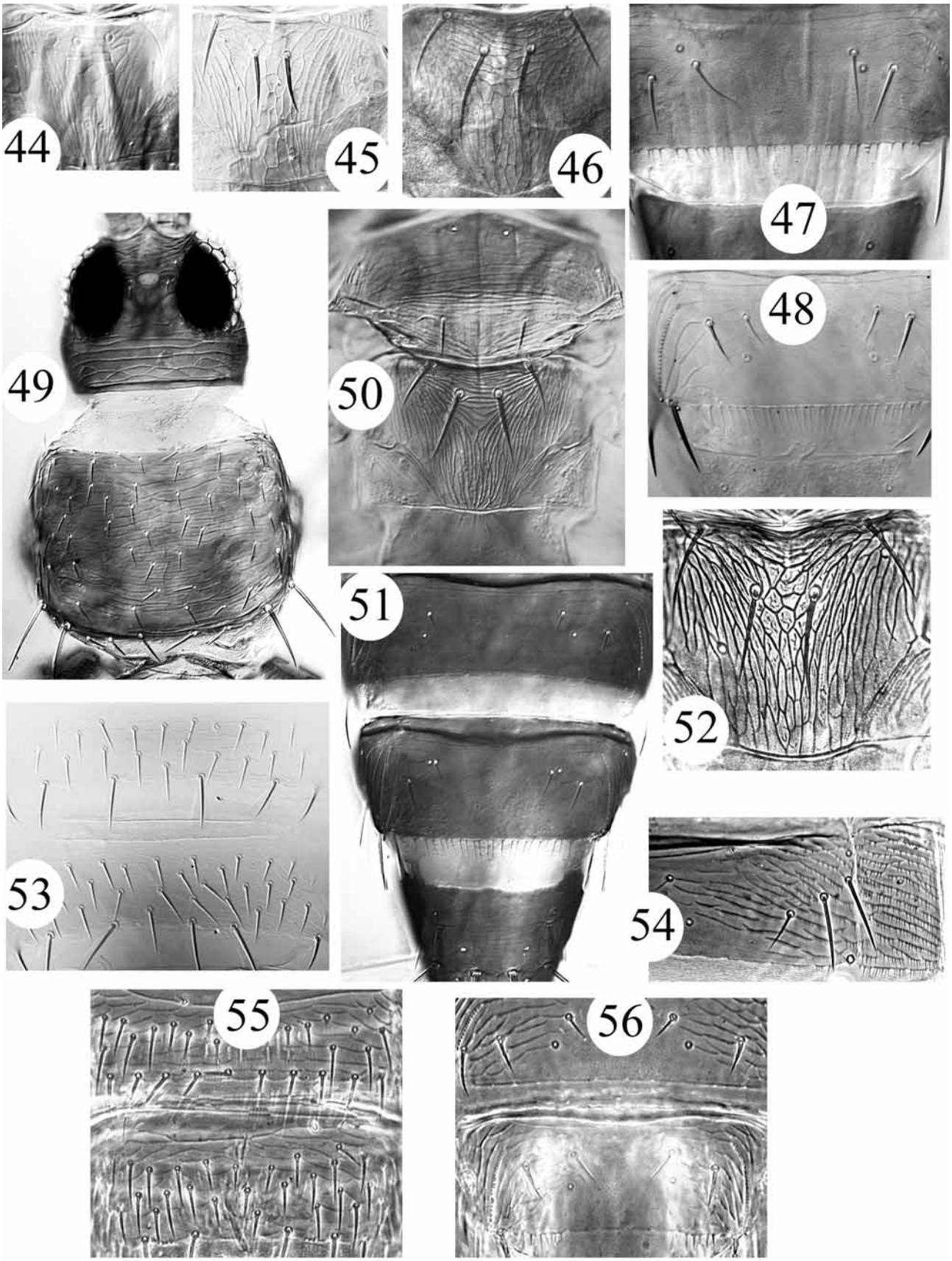
FIGURES 13–23. *Thrips* species. *gowdeyi* 13–19: **(13)** head & pronotum; **(14)** antenna; **(15)** mesonotum & metanotum; **(16)** metanotum of *umtali* holotype; **(17)** metanotum of small female; **(18)** metanotum and clavus; **(19)** sternites V–VII. **(20)** *hawaiiensis*, mesonotum & metanotum. *Thrips meruensis* (*holmi* holotype) 21–23: **(21)** metanotum; **(22)** forewing; **(23)** tergite VIII.



FIGURES 24–30. *Thrips* species. *kurahashii* 24–27: **(24)** head & pronotum; **(25)** mesonotum & metanotum; **(26)** tergite VIII; **(27)** sternites V–VI. *Thrips meruensis* male 28–30: **(28)** head; **(29)** mesonotum & metanotum; **(30)** pronotum.



FIGURES 31–43. *Thrips* species. **(31)** *microchaetus*, mesonotum & metanotum. **(32)** *microchaetus*, sternites VI–VII. **(33)** *nigropilosus*, metanotum. **(34)** *nigropilosus*, tergites II–IV. **(35)** *orientalis*, metanotum. **(36)** *orientalis*, tergite VIII. **(37)** *palmi*, metanotum. **(38)** *parvispinus*, metanotum. **(39)** *parvispinus*, sternites VI–VII. **(40)** *pretiosus*, metanotum. **(41)** *priesneri*, pronotum. **(42)** *priesneri*, metanotum. **(43)** *pusillus*, metanotum.



FIGURES 44–56. *Thrips* species. **(44)** *quadridentatus*, paralectotype metanotum.**(45)** *quilici*, paratype metanotum. **(46)** *rufescens*, paratype metanotum. **(47)** *rufescens*, paratype tergite VIII. **(48)** *quilici*, paratype tergite VIII. **(49)** *solari*, holotype head & pronotum. **(50)** *solari*, mesonotum & metanotum. **(51)** *solari*, tergites VII–VIII. **(52)** *simplex*, metanotum. **(53)** *tenellus*, sternites VI–VII. **(54)** *tabaci*, pleurotergite. **(55)** *subnudula*, sternites VI–VII. **(56)** *subnudula*, tergites VII–VIII.