



Species of *Astrothrips* from China, with one new species and a list of plant associations (Thysanoptera, Panchaetothripinae)

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Abstract

Seven species of the Panchaetothripinae genus *Astrothrips* are recorded from China, and an illustrated key provided for their identification. One new species is described, *A. glanduculus* sp.n., and the following three species are newly recorded from China, *A. asiaticus*, *A. globiceps*, and *A. tumiceps*. The male of *A. aucubae* is described for the first time, and plants from which *Astrothrips* have been taken are listed.

Key words: leaf-feeding, new species, new records, key to species

Introduction

Taxonomists aim to find ways of distinguishing between species with the objective of providing a system of names through which biological observations can be communicated. Optimally there is then a feed-back mechanism such that observations on biology and host plants help confirm taxonomic decisions. Unfortunately, there is very little biological information associated with the thrips species of the genus *Astrothrips*. It is rare to collect more than a few specimens of each species at any one time, males are particularly rare, and larvae and host plants remain unknown for most species. These are leaf-feeding thrips, the typical habit of all Panchaetothripinae, but the published “host-associations” involve a bewildering assortment of plant families, with little evidence of host-specificity for most species. The many plants from which species of *Astrothrips* have been reported by taxonomists were listed by Rachana *et al.* (2019), and Table 1 presented here lists the plants from which the present authors have collected *Astrothrips* species in China. These plant records are based only on the presence of one or more winged adults, so it is not possible to deduce if this is a measure of polyphagy or of adult dispersive activity. The lack of good population samples results in doubts about the identity of some species. For example, the pronotal sculpture apparently varies considerably in the new species described below (Figs 14–15), and the number of antennal segments is here interpreted as variable in *aucubae*.

The objective here is to record from China seven species of the genus *Astrothrips*, one of which is newly described, to provide an illustrated identification key to these species, and to list the many plants from which the adults have been taken in this country. Specimens discussed here are deposited in Yunnan Agricultural University, Kunming (YNAU), with some specimens in the Australian National Insect Collection, CSIRO, Canberra (ANIC). Full nomenclatural details are available in ThripsWiki (2020).

TABLE 1. Plants from which *Astrothrips* species have been taken in China

Plant family	Plant species	<i>Astrothrips</i> species
Acanthaceae	<i>Asystasia gangetica</i>	<i>asiaticus</i>
Aceraceae	<i>Acer fabri</i>	<i>glanduculus</i>
Adoxaceae	<i>Viburnum chinshanense</i>	<i>aucubae</i>
Amaranthaceae	<i>Achyranthes bidentata</i>	<i>chisinliaoiensis</i>
Amaranthaceae	<i>Alternanthera sessilis</i>	<i>globiceps</i>
Anacardiaceae	<i>Rhus chinensis</i>	<i>aucubae</i>
Araceae	<i>Amorphophallus</i> sp., <i>Caryota maxima</i>	<i>aucubae</i>
Araceae	<i>Syngonium podophyllum</i>	<i>globiceps</i>
Aristolochiaceae	<i>Aristolochia kaempferi</i>	<i>aucubae</i>
Asparagaceae	<i>Ophiopogon japonicus</i>	<i>globiceps</i>
Asparagaceae	<i>Cordyline fruticosa</i>	<i>globiceps</i> ; <i>aucubae</i>
Asteraceae	<i>Eupatorium adenophora</i>	<i>aucubae</i>
Betulaceae	<i>Corylus heterophylla</i>	<i>aucubae</i>
Brassicaceae	<i>Brassica rapa</i>	<i>aucubae</i>
Burseraceae	<i>Canarium pimela</i>	<i>aucubae</i>
Chloranthaceae	<i>Sarcandra glabra</i>	<i>asiaticus</i> ; <i>tumiceps</i>
Convolvulaceae	<i>Ipomoea batatas</i>	<i>aucubae</i> ; <i>asiaticus</i> ; <i>globiceps</i>
Cornaceae	<i>Alangium chinense</i>	<i>aucubae</i>
Cucurbitaceae	<i>Sechium edule</i>	<i>aucubae</i>
Cyperaceae	<i>Gahnia tristis</i>	<i>glanduculus</i>
Dryopteridaceae	“fern”	<i>glanduculus</i>
Euphorbiaceae	<i>Acalypha australis</i>	<i>globiceps</i>
Euphorbiaceae	<i>Alchornea</i> sp.	<i>aucubae</i>
Euphorbiaceae	<i>Lasiococca comberi</i>	<i>chisinliaoiensis</i>
Euphorbiaceae	<i>Acalypha wilkesiana</i> , <i>Alchornea trewioides</i> , <i>Mallotus barbatus</i> , <i>Ricinus communis</i>	<i>aucubae</i>
Fabaceae	<i>Canavalia gladiata</i>	<i>globiceps</i>
Fabaceae	<i>Canarium pimela</i> , <i>Tephrosia candida</i> , <i>Pueraria</i> sp.	<i>aucubae</i>
Fagaceae	<i>Lithocarpus corneus</i>	<i>aucubae</i>
Gramineae	<i>Miscanthus floridulus</i>	<i>aucubae</i>
Hamamelidaceae	<i>Loropetalum chinense</i>	<i>glanduculus</i>
Lauraceae	<i>Cinnamomum camphora</i> , <i>Lindera aggregata</i> , <i>Lindera megaphylla</i> , <i>Litsea pungens</i>	<i>aucubae</i>
Loganiaceae	<i>Gardneria multiflora</i>	<i>glanduculus</i>
Moraceae	<i>Ficus</i> spp.	<i>globiceps</i> ; <i>tumiceps</i>
Moringaceae	<i>Moringa oleifera</i>	<i>tumiceps</i>
Phyllanthaceae	<i>Aporusa</i> sp., <i>Glochidion hirsutum</i>	<i>aucubae</i>
Poaceae	“grasses”	<i>globiceps</i>
Poaceae	<i>Pleioblastus maculatus</i>	<i>glanduculus</i>
Polygonaceae	<i>Fallopia multiflora</i>	<i>aucubae</i>
Proteaceae	<i>Helicia reticulata</i>	<i>aucubae</i>
Rhamnaceae	<i>Paliurus hemsleyanus</i>	<i>aucubae</i>
Rosaceae	<i>Laurocerasus zippeliana</i>	<i>aucubae</i>
Rubiaceae	<i>Mycetia gracilis</i>	<i>asiaticus</i>

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TABLE 1. (Continued)

Plant family	Plant species	<i>Astrothrips</i> species
Rubiaceae	<i>Serissa foetida</i>	<i>asiaticus</i>
Rutaceae	<i>Acronychia pedunculata</i>	<i>aucubae</i>
Sapindaceae	<i>Dodonaea viscosa</i>	<i>aucubae</i>
Schisandraceae	<i>Kadsura caulis</i>	<i>aucubae</i>
Simaroubaceae	<i>Brucea javanica</i>	<i>aucubae</i> ; <i>chisinliaoensis</i>
Stachyuraceae	<i>Stachyurus chinensis</i>	<i>aucubae</i>
Thelypteridaceae	<i>Pronephrium</i> sp.	<i>aucubae</i> ; <i>chisinliaoensis</i>
Verbenaceae	<i>Clerodendrum cyrtophyllum</i>	<i>chisinliaoensis</i>
Vitaceae	<i>Ampelopsis cantoniensis</i>	<i>aucubae</i>
Zingiberaceae	<i>Globba racemosa</i>	<i>aucubae</i>
Not known	Not known	<i>strasseni</i>

Astrothrips Karny

Astrothrips Karny, 1921. Type species *Heliothrips globiceps* Karny.

Head with raised reticulate sculpture, ocellar area sometimes elevated; maxillary palps 2-segmented. Antennae 8-segmented, but usually with the distal segments fused to produce only 5, 6 or 7 visible segments; sense cones on III and IV forked or simple. Pronotum with some reticulate sculpture. Mesoscutum usually with anterior notch. Tarsi 1-segmented. Fore wings banded, bearing stout veinal setae, costal setae shorter than costal cilia; posteromarginal cilia wavy. Abdominal tergite II with anterior margin strongly constricted, and anterolaterally with a group of prominent strongly recurved microtrichia; tergites III–VII with transverse reticulation; VIII with no posteromarginal comb; X divided longitudinally. Males frequently with pore plates on abdominal sternites (absent only in *aucubae* and *tumiceps*).

Comments. The members of this genus are all from the Old World tropics, including northern Australia, and in structure they are similar to those of *Anisopilothrips*, *Tryphactothrips* and *Elixothrips*. However, of these three genera the species in the first two have distinctive sculptured areolae on the tergites and sternites (Wilson 1975), and the single species in *Elixothrips* has the mesonotum with a longitudinal division and the tenth abdominal tergite with a pair of capitate setae (Zhang *et al.* 2020). Recent phylogenetical studies recovered a polytomy between *Astrothrips* and two other clades: *Elixothrips*+*Anisopilothrips* and *Copidothrips*+*Panchaetothrips* (Zhang *et al.* 2019).

The first review of *Astrothrips* was provided by Stannard and Mitri (1962) with a key to females of four species. Bhatti (1968) subsequently provided a key to five species, and Wilson (1975) reviewed the genus and provided a key to ten species. Kûdo (1979) described *A. strasseni* from Southeast Asia, Chen (1980) described *A. chisinliaoensis* from Taiwan, and Rachana *et al.* (2019) published a key to six *Astrothrips* species known from India. The genus now comprises 12 species (*Thrips Wiki* 2020), with only three previously recorded from China (Mirab-balou *et al.* 2011; Zhang *et al.* 2020), *Astrothrips aucubae*, *A. chisinliaoensis*, and *A. strasseni*. However, four more *Astrothrips* species are here newly recorded from China of which one is newly described.

Key to species of *Astrothrips* from China

1. Antennae 8-segmented (Fig. 26); metanotum with triangle of reticulation weakly defined (Fig. 17)..... 2
- Antennae with 5 to 7 segments (Figs 24–25); metanotum triangle of reticulation sharply defined (Figs 20, 22)..... 3
2. Antennal segments III–IV with sense cone forked..... *strasseni*
- Antennal segments III–IV with sense cone simple..... *asiaticus*
3. Pronotum with a strong transverse submarginal apodeme extending fully across posterior margin (Fig. 15); sternites of male with a minute circular pore plate (Fig. 4)..... *glanduculus* **sp.n.**
- Pronotum without such a long transverse submarginal ridge (Figs 9–10, 13); sternites of male with U-shaped pore plate or with pore plate absent (Fig. 5)..... 4

4. Abdominal tergite X of female with the tips of apical setae expanded (Fig. 7) *chisinliaoensis*
 -. Abdominal tergite X of female with tips of apical setae pointed (Fig. 6) 5
 5. Mesonotum anterior third fully divided with no sculptured reticulate connection (Fig. 21) [male with no sternal pore plates].
 *tumiceps*
 -. Mesonotum anterior third with reticulate sculpture and U-shaped transverse ridge joining the pair of lateral areas (Figs 17, 18, 20, 22). 6
 6. Pronotum with weak submarginal ridge across little more than median third of posterior margin (Fig. 10); antennae 6-segmented; sternites IV–VII of male each with U-shaped pore plate *globiceps*
 -. Pronotum posterior margin without a transverse submarginal ridge (Fig. 9); antennae 5–7 segmented; sternites of male without any pore plate *aucubae*

Astrothrips asiaticus (Bhatti)

(Fig. 16)

Most *Astrothrips* species have two or three of the distal antennal segments fused, but in *asiaticus* and *strasseni* all eight antennal segments are clearly separated. This species has 8-segmented antennae with the sense cone on segments III–IV simple, and the male with U-shaped sternal pore plates. It was described originally (Bhatti 1967) in a monobasic genus, *Semprothrips* but was subsequently transferred to *Astrothrips* by Wilson (1975). Previously known only from western India, this species is here newly recorded from China.

Material studied. CHINA, Yunnan Province, Xishuangbanna, tropical botanical garden (26°05'53"N, 102°15'37"E), 2 females from *Pronephrium* sp., 8 females from *Sarcandra glabra*, 1 female from *Ipomoea batatas*, 11.iii.2017; 4 females, 1 male from *Mycetia gracilis*, 1.viii.202; Mengla County, Bubeng Village, 3 females, 2 males, unknown, 2 females from grasses, 27.v.2018; Menglun Town, 4 females, 3 males, from *Asystasia gangetica*, 2.vi.2018; Nabanhe National Nature Reserve, 1 female from *Ipomoea batatas*; Mansha Village, Jinghong Industrial Park Management Committee, 2 females from *Ipomoea* sp., 10.iii.2017; Kunming, Kunming arboretum, 2 females, from bamboo, 28.x.2018. Sichuan Province, Chengdu City, 2 females from grasses, 3.x.2016, (specimens all collected by Li Ya-jin); Hainan Province, Haikou Geopark, 2 males from *Serissa foetida*, 8.x.2018 (Xie Yan-lan) (YNAU).

Astrothrips aucubae Kurosawa

(Figs 9, 19, 20)

Kurosawa (1932) described this species from near Tokyo, Japan based on six females from *Aucuba japonica*. Wilson (1975) examined the type specimens, but the only slide labelled as a male contained only a crushed head. The male of this species is therefore described here for the first time. It is similar to the female in having a simple sense cone on each of antennal segments III–IV. Kurosawa interpreted the original specimens as having only five segments, but the illustration he provided is remarkably similar to the drawing of the antenna of *aucubae* by Kudo (1992) who interpreted this species as having six (and rarely seven) antennal segments. Wilson (1975) states that *aucubae* has seven antennal segments. In the specimens listed below from China the base of antennal segment VI is clearly narrower than the apex of segment V. However, the suture medially across segment VI varies from complete (thus producing a 7-segmented condition) to incomplete or even absence. However, specimens showing this variation are sometimes taken together, and one female has been studied with seven segments on one antenna but six on the other.

Male macroptera. Smaller and paler than the female; head and pronotum brown, mesonotum, metanotum and abdominal segment I dark brown, segments II–X golden yellow. Antennal segments III–IV with sense cone simple; abdominal tergite IX with three pairs of setae not in a transverse row; sternites without pore plate.

Material studied. CHINA, Yunnan Province. Xishuangbanna, Nabanhe National Nature Reserve, 9 females, 1 male from *Ipomoea batatas*, 3 females, 1 female from Poaceae, 1 male from *Ricinus communis*, 2 females from *Alchornea*, 10.iii.2017 (Zhang Hong-rui); 4 females from Fabaceae, 2 females from *Canarium pimela*, 22.x.2017 (Zhang Hong-rui); Xishuangbanna tropical botanical garden, 2 females from *Pronephrium* sp., 2 females from *Aporosa* sp., 10.iii.2017 (Zhang Hong-rui); 4 females from *Acalypha wilkesiana*, 1 male from *Cordyline fruticosa*, 2.viii.2018 (Hui Liu); Mengla County, Bubeng Village, 2 females from *Pueraria*, 27.v.2018 (Li Ya-jin); 2 females

from Theaceae, 10-15.iv.1987 (Zhang Weiqiu). Simao, 1 female from *Cinnamomum camphora*, 10.iv.1987 (Zhang Weiqiu) (ANIC). Wenshan, Malipo County, 4 females from *Eupatorium adenophora*, 21.v.2018; 3 females from *Brucea javanica*, 20.v.2018 (Liu Hui); Xihua Park, 3 females from *Glochidion hirsutum*, 19.v.2018; Yanshan County, 1 female from *Lindera aggregata*, 22.v.2018; Ma guan county, 1 female from *Corylus heterophylla*, 20.v.2018; Xichou County, 1 female from *Dodonaea viscosa*, 21.v.2018 (Li Ya-jin). Yuxi City, Tianzi Mt., 2 females from *Acronychia pedunculata*, 12.v.2017 (Li Ya-jin). Honghe, Puxiong forest, 2 females from *Caryota maxima*, 21.v.2017; Pingbian Dawei Mt., 1 female from *Laurocerasus zippeliana*, 13.x.2017. Pu'er City, Meizihe Park, 1 female from *Miscanthus floridulus*, 5.viii.2018 (Li Ya-jin). **Guizhou Province**, Zheng'an County, Yangxi Town, 2 females from *Rhus chinensis*, 2 females from *Amorphophallus* sp., 15.viii.2016 (Yan Xue-qiang); Nine channel water Forest Park, 2 females from *Sechium edule*, 17.viii.2016 (Yan Xue-qiang). Liupanshui City, Weishe County, 2 females from *Lithocarpus corneus*, 11.ix.2017 (Kong Bo). Danzhai County, Cat nose ridge Forest Park, 2 females from *Brassica rapa*, 23.viii.2016 (Yan Xue-qiang), 1 female from *Litsea pungens*, 3 females from *Stachyurus chinensis*, 5.viii.2017 (Li Yajin). Anlong County, Xianheping National Forest Park, 2 females from *Tephrosia candida*, 3 females from *Alangium chinense*, 31.viii.2016 (Yan Xue-qiang); 1 female from *Viburnum chinshanense*, 1 female from *Paliurus hemsleyanus*, 1 female from *Globba racemosa*, 10.ix.2017 (Li Ya-jin); 1 female from *Lindera megaphylla*, 1 female from *Helicia reticulata*, 1 female from *Fallopia multiflora*, 10.ix.2017 (Kong Bo). Fanjing Mt Reserve, 1 female from *Ampelopsis cantoniensis*, 2 females from *Aristolochia kaempferi*, 10.viii.2017 (Zhang Hong-rui). Xingyi City, Wan feng lin, 1 female from *Mallotus barbatus*, 9.ix.2017 (Li Ya-jin); Xingyi, 1 female from *Kadsura caulis*, 18.viii.2018 (Li Yajin) (ANIC). **Hainan Province**, Jianfengling, 1 female from *Brucea javanica*, 27.vi.2018 (Xie Yanlan) (ANIC).

Astrothrips chisinliaensis Chen

(Figs 7, 11, 18, 25)

Described from Taiwan Province, on *Morus* leaves (Chen 1980), this species was subsequently recorded from Malaysia (Kudo 1995) and is here recorded from Hainan and Yunnan Provinces of southern China. The apically expanded setae on tergite X (Fig. 7) are unique to *A. chisinliaensis* among species of *Astrothrips*, but curiously are also found in the related Trypactothripini species, *Elixothrips brevisetis* (Bagnall) (Kudo 1992).

Material studied. CHINA, **Yunnan Province**, Xishuangbanna tropical botanical garden, 2 females from *Pro-nephrium* sp., 11.iii.2017 (Zhang Hong-rui, Li Ya-jin); 2 females from *Lasiococca comberi*, 31.v.2018 (Li Ya-jin) (YNAU); 1 female from *Achyranthes bidentata*, 26.v.2018 (Li Ya-jin) (ANIC). **Hainan Province**, Jianfengling, 3 females, 1 male from *Brucea javanica*, 27.vi.2018 (Xie Yan-lan); Haikou City, Jinniuling, 4 females, 3 males from *Cinnamomum camphora*, 1 female, 1 male from *Hamelia* sp., 3.x.2018 (Xie Yan-lan); Haikou Geopark, 3 females, unknown, 8.x.2018 (Xie Yan-lan) (YNAU).

Astrothrips glanduculus sp.n.

(Figs 1–4, 8, 14, 15, 22, 23, 24)

Female macroptera. Body dark brown (Fig. 1), with abdominal segments VIII–X slightly paler; all femora brown; fore tibiae and tarsi golden yellow; middle tibiae golden yellow at base and apex but dark brown medially; hind tibiae and tarsi yellow; antennal segments golden yellow (Fig. 24); fore wings with base golden yellow, with submedian and sub-apical dark bands, apex pale yellow, setae on pale parts light yellow (Fig. 23); clavus brown with apex slightly paler.

Head with complete flange on cheeks, anterior margin of head covered by a flange of raised sculpture (Fig. 15). Cheeks narrowing to base then sharply constricted, ocellar hump developed, over-reaching frontal costa when head is tilted forwards; posterior dorsum with some reticles arranged in 5 rows; vertex with about 11 large reticles across posterior dorsum of head in a crescentic series. Ocellar region strongly elevated; postocellar setae II and III present, setae III longer than setae II. Antennae without microtrichia, apparently 7-segmented (Fig. 24), suture sometimes weakly developed between morphological VI and VII; III–IV with sense cone simple, III with basal neck much longer than apical; long sense cone on VI not surpassing apex of antennae.

Pronotum (Fig. 15) wider than long, anterior half with raised sculpture, posterior half weakly reticulate; posteromarginal apodeme forming a thick ridge, with a margin of raised sculpture, sometimes a dark brown bridge present across the middle defining a rectangle on the posterior half of the pronotum (Fig. 14); anterior and posterior marginal setae small, lateral and posterior discal setae fusiform. Anterior and posterior margin of mesoscutum notched along mid-line, length of median part as long as the length of combined notched portion (Fig. 22). Two pairs of median setae well developed, the inner pair about 1.5 times longer than the outer pair, not lying in the same level, the inner pair situated anterior to the outer pair. Metascutal triangle distinctly formed, uniformly reticulate, with a thick heavy median longitudinal ridge of sculpture, posterior process stout with a broad transverse apical fork; median setae on posterior half, metanotal campaniform sensilla present; metascutellum almost smooth (Fig. 22). Fore wing (Fig. 23) bearing stout setae, costal setae shorter than costal cilia; posteromarginal cilia wavy; costa with 16–18 setae, first vein with 11–15 setae and second vein with 8–11 setae; clavus with 5 marginal setae, discal setae absent.

Abdominal tergite I with weak, irregular transverse reticulations; tergite II with anterior margin strongly constricted, and anterolaterally with a group of prominent strongly recurved microtrichia; tergites III–VII with transverse reticulation on anterior half and laterotergites, anterior margin with a thick costal line (Fig. 8); VIII with no posteromarginal comb; X divided longitudinally. Both sternites and tergites with craspedum on posterior margin; sternites II–VII with weak reticulations and three pairs of posteromarginal setae, except for S1 and S2 on sternite VII, all the setae are situated in front of posterior margin.

Measurements (holotype female in microns). Body length 1375. Head, length 150; width across eyes 210. Pronotum, length 119; maximum width 221. Fore wing length 870. Antennal segments III–VII length 70, 55, 41, 21, 30.

Male macroptera. Similar to but paler than female (Fig. 2); color of abdominal tergites changes from brown to golden yellow, segments I–II darkest, tergite X most pale; fore wing with a dark band sub-medially, sometimes the sub-apical dark band paler or absent. Abdominal tergite IX with three pairs of setae, S1 and S2 are almost situated in a line, S3 setae situated behind S1 and S2 (Fig. 3); sternites IV or V–VII with a pore plate on posterior half each of which is no more than 10 microns in diameter (Fig. 4); this minute pore plate varies in shape from transverse (10x4 microns) to sub-circular (4 microns).

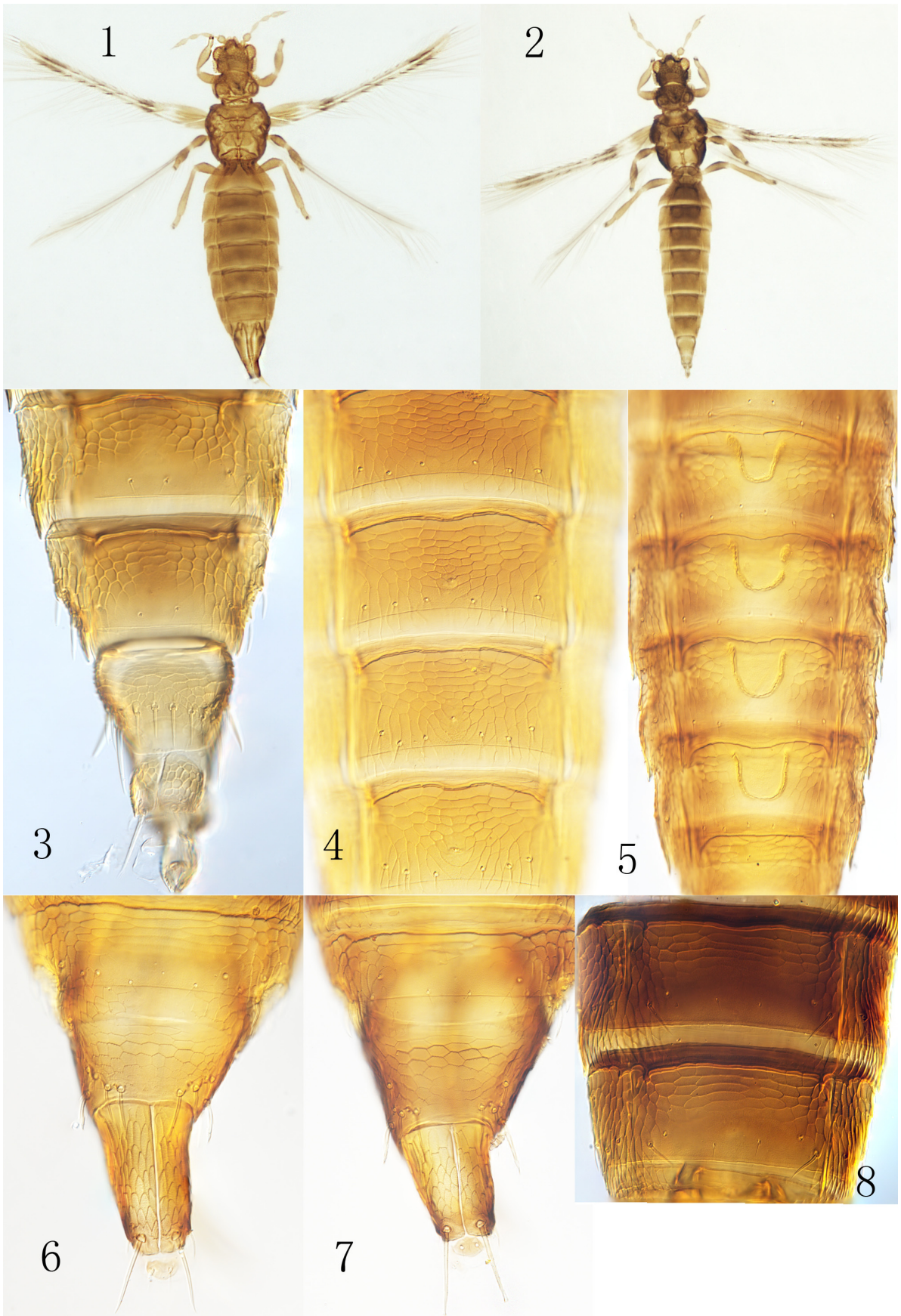
Measurements (paratype male in microns). Body length 1281. Head, length 113; width across eyes 166. Pronotum, length 111; maximum width 178. Fore wing length 713. Antennal segments III–VII length 64, 46, 37, 19, 34.

Material studied. Holotype female: CHINA, Yunnan Province, Wuding County, Chuxiong Prefecture, Lion Mountain (25°32'N, 102°22' E), from fern, 25.x.2016 (Zhang Hong-Rui & Li Ya-Jin), in collection of Yunnan Agricultural University, Kunming.

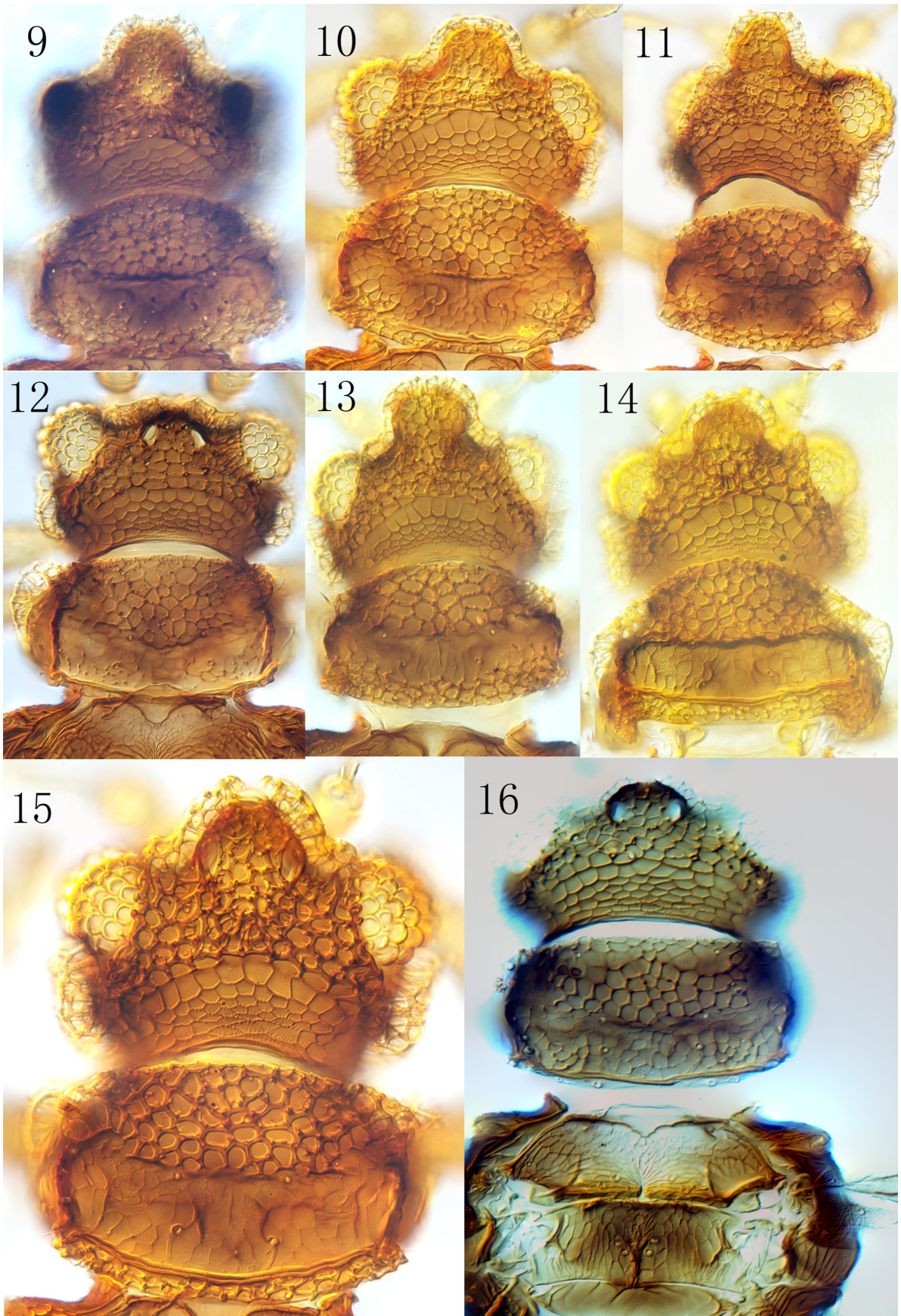
Paratypes: 17 females, 10 males, same data with holotype. Lion Mountain, 1 female from *Pleioblastus maculatus*, 1 female from *Quercus* sp., 2 females, unknown, 15.iv.2015; Pingbian County, Dawei Mountain, 1 female from *Loropetalum chinense*, 1 female from *Gardneria multiflora*, 1 female from *Acer fabri*, 3.viii.2017 (Li Ya-jin) (YNAU). 2 females, 1 male, same data with holotype; 2 females from fern, 1 male, unknown, 25.x.2016; 1 male from *Gahnia*, 16.v.2018 (Li Ya-jin) (ANIC).

Etymology. The specific name *glanduculus* is in reference to the minute pore plate on the abdominal sternites of males.

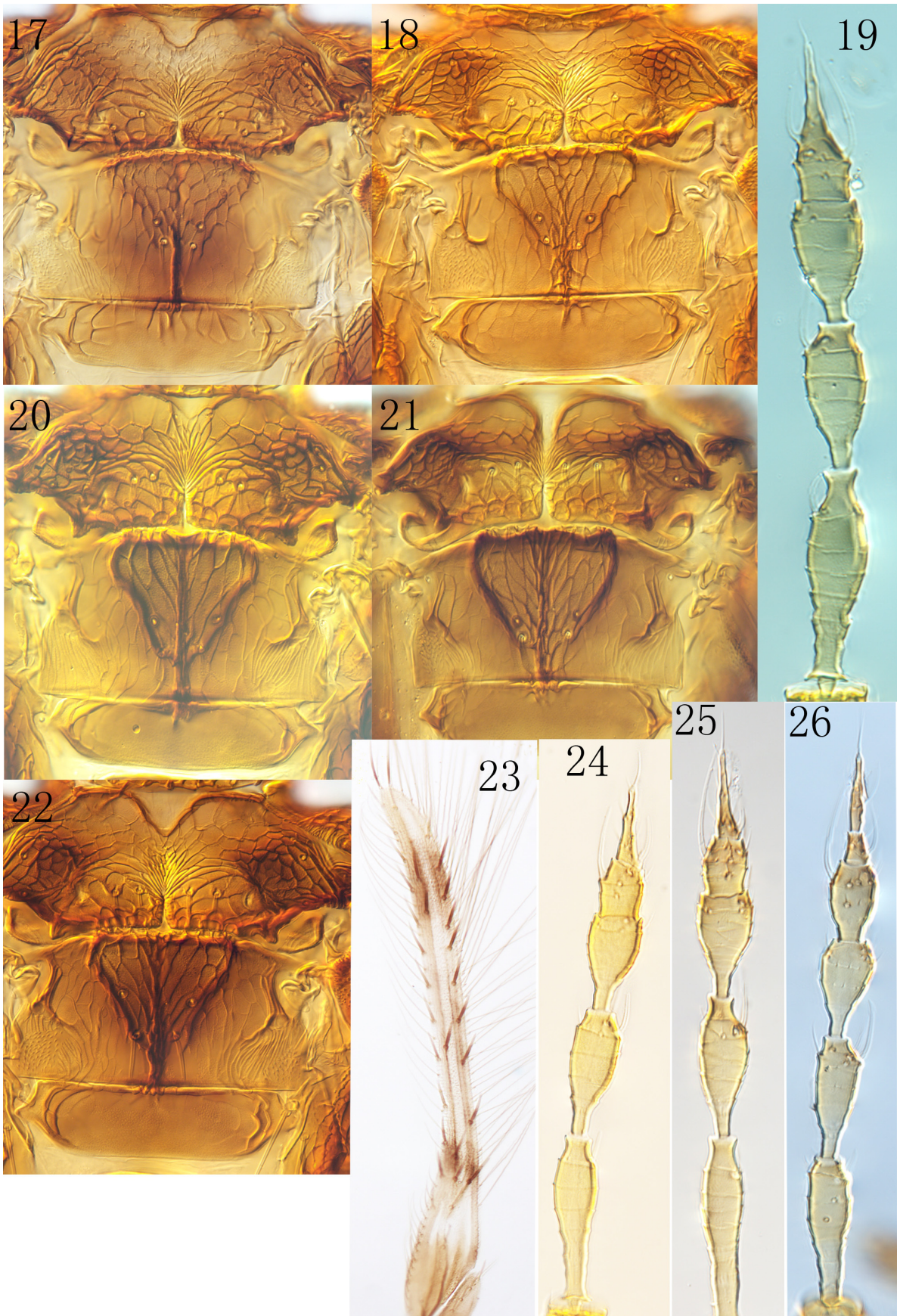
Comments. Based on the keys, comments and illustrations provided by Bhatti (1968) and Wilson (1975) this new species is similar to *lantana*, a species known only from two females taken in central India. The antennae of the new species are closely similar to the available illustration of *lantana*, but the latter is illustrated as having the pronotum evenly reticulate across the entire surface, in contrast to the transverse band without reticulation in *glanduculus* (Figs 14, 15). Moreover, the ocellar hump of *glanduculus* is much greater than that illustrated for *lantana*. The transverse band on the posterior third of the pronotum varies in shape (Figs 14, 15), but the submarginal ridge extends fully across the pronotal posterior margin. Males of *Astrothrips* species usually have V- or U-shaped sternal pore plates, but *glanduculus* is the first species to be described as having a minute circular pore plate on some of these sternites.



FIGURES 1–8. *Astrothrips* species. 1–4 *A. glanduculus* sp.n (1) Female; (2) Male; (3) Abdominal tergites VII–X of male; (4) Abdominal sternites V–VII of male. 5–6 *globiceps*. (5) Abdominal sternites IV–VII of male; (6) Abdominal tergites VIII–X of female; (7) Abdominal tergites VIII–X of *chisinliaensis*; (8) Abdominal tergites VI–VII of *glanduculus*.



FIGURES 9–16. Head and pronotum of *Astrothrips* species. (9) *aucubae*; (10) *globiceps*; (11) *chisinliaensis* (12) *strasseni*; (13) *tumiceps*; (14) Pronotum of *glanduculus* (variant); (15) *glanduculus*; (16) *asiaticus*.



FIGURES 17–26. *Astrothrips* species. 17–18, 20–22. Meso-metanotum of *Astrothrips* species (17) *strasseni*; (18) *chisinliaoensis*; (19) Antennae of *aucubae*; (20) *aucubae*; (21) *tumiceps*; (22) *glanduculus*; (23) Fore wing of *glanduculus*; 24–26 Antennae of *Astrothrips* species (24) *glanduculus*; (25) *chisinliaoensis*; (26) *strasseni*.

Astrothrips globiceps (Karny)

(Figs 5, 6, 10)

Described from the island of New Britain, Papua New Guinea (Karny 1913), this species is recorded widely across southeast Asia from India to Japan and the Philippines (Rachana et al. 2019). However, the identity of *globiceps* has been difficult to establish, due to confusion created by Wilson (1975) in placing the species twice in his key to species, but without comment or explanation in his main text. It was keyed as either having, or as not having, a submarginal ridge near the pronotal posterior margin. Photographs of the pronotum of Karny's original specimen have been studied, and *globiceps* is now diagnosed as having a small transverse ridge that extends across only the median third of the pronotal posterior submargin (Rachana et al. 2019). These authors also referred to a male from Timor Leste as having U-shaped sternal pore plates (Fig. 5), and this condition is here confirmed by the specimens listed below that newly record *globiceps* from Southern China in Hainan and Yunnan Provinces.

Material studied. CHINA, **Hainan Province**, Haikou City, Jinniuling, 1 female from *Syngonium podophyllum*, 3.x.2018 (Xie Yan-lan); Haikou Airport, 7 females from *Ipomoea batatas*, 24.xii.2014 (Zhang Hong-rui), 3 females, 1 male from *Ficus* sp., 1 female, 3 males from *Acalypha australis*, 3.x.2018 (Xie Yan-lan); Xinglong County, Tropical Flower Garden, 3 females, 5 males from *Clerodendrum cyrtophyllum*, 6 females from *Canavalia gladiata*, 4 females from grasses, 5.x.2018 (Xie Yan-lan) (YNAU). Haikou Airport, 1 male from *Ipomoea batatas*, 24.xii.2014 (Zhang Hong-rui); Danzhou, 1 female, 1 male from *Alternanthera sessilis*, 24.vi.2018 (Xie Yan-lan) (ANIC). **Yunnan Province**, Mengla County, Xishuangbanna tropical botanical garden, 3 females from *Ophiopogon japonicus*, and 1 male from *Ipomoea batatas*, 11.iii.2017 (Zhang Hong-rui) (YNAU). Xishuangbanna tropical botanical garden, 1 female from *Ophiopogon japonicus*, 11.iii.2017; 1 male from *Ficus altissima*, 24.x.2017; 1 female from *Cordyline fruticosa*, 1.viii.2018. (Li Ya-jin) (ANIC).

Astrothrips strasseni Kudo

(Figs 12, 17, 26)

Described originally from bamboo in Myanmar (Kudo 1979), this species was subsequently recorded from Orchidaceae in China, Yunnan, Xishuangbanna (Zhang & Tong 1993), where recently another four specimens were collected from an unknown plant. This species is readily recognized among *Astrothrips* species by the 8-segmented antennae with segments III–IV having the sense cone forked.

Material studied. CHINA, **Yunnan Province**, Menghai County, *Man'gao Village*, 3 females, unknown plant, 16.v.2019 (Xie Yan-lan) (YNAU), 1 female with same data is deposited in ANIC.

Astrothrips tumiceps Karny

(Figs 13, 21)

Described from Java, Indonesia, this species is recorded widely across Southeast Asia from India to Japan and northern Australia (Rachana et al. 2019). It is here recorded in China for the first time. The anterior half of the mesonotum in this species is clearly divided into two by a deep notch (Fig. 21). Antennal segments III–IV of males have the sense cone forked but in female these sense cones are simple (Kudo 1995).

Material studied. CHINA, **Yunnan Province**, Xishuangbanna tropical botanical garden, 4 females and 1 male from *Moringa oleifera*, 1 female from *Ficus championii*, 1 female from *Sarcandra glabra*, 11.iii.2017 (Zhang Hong-rui, Li Ya-jin).

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