



A new species from southwestern China of the holarctic genus *Odontothrips* (Thysanoptera: Thripidae)

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Abstract

Odontothrips yunnanensis sp.n. is described from Yunnan in Southwestern China. Unlike most species of this Holarctic genus, the fore tarsi and fore tibiae do not have any teeth. The base of the sensorium on the sixth antennal segment is more than half as long as the total length of this sensorium, as is typical of species in the genera *Odontothrips* and *Odontothripiella*. In contrast, species of the Asian tropical genus *Megalurothrips* have the base of this sensorium less than 0.3 as long as the sensorium. Almost all species in these three genera breed only in flowers of Fabaceae. Males of this new species bear on tergum IX a pair of stout sigmoid processes.

Key words: *Odontothrips yunnanensis*, new species, China, Fabaceae flowers, *Megalurothrips*.

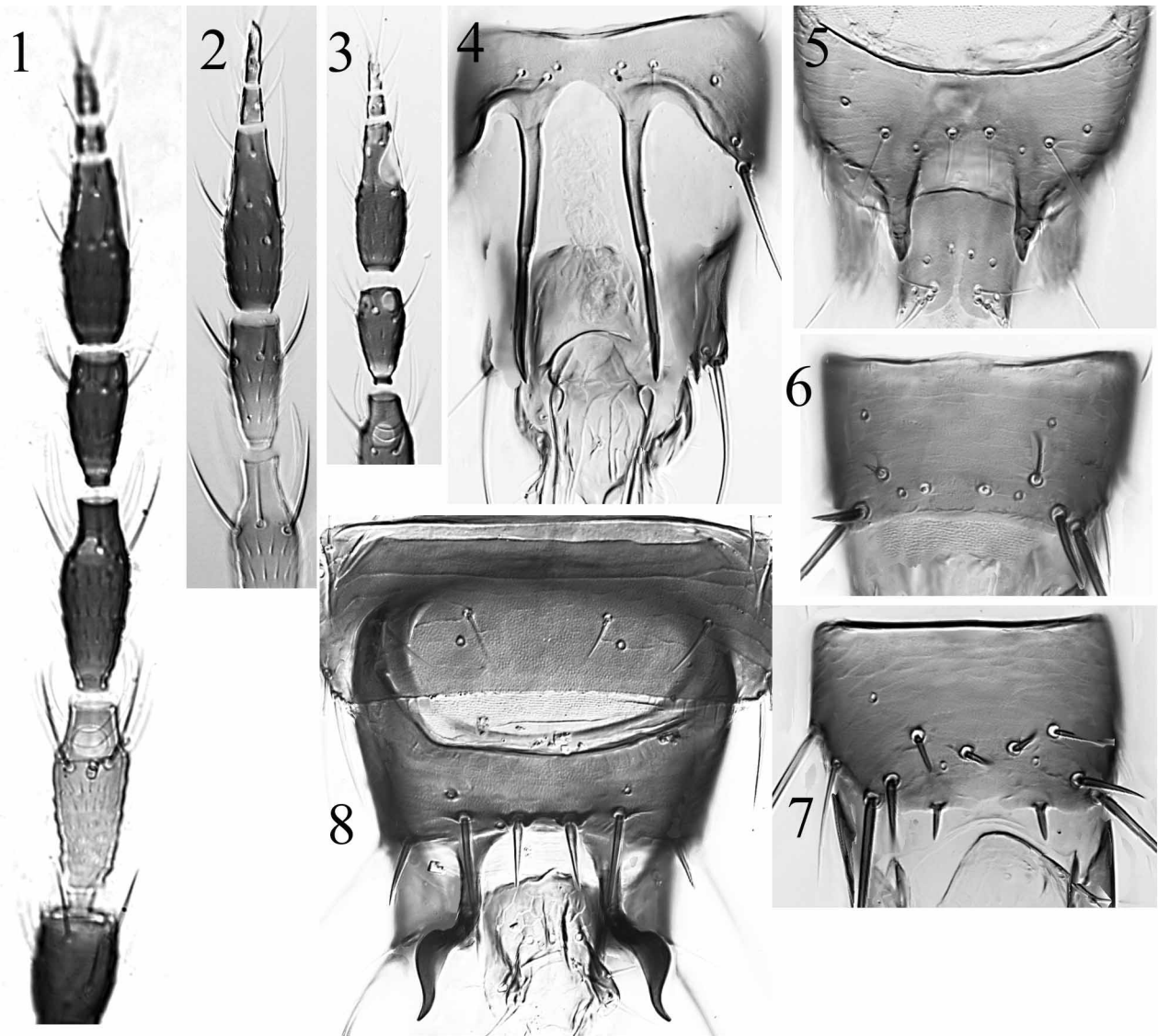
Introduction

The characteristic keeled flowers in the plant family Fabaceae are recognisable worldwide, and are commonly assumed to be adapted for pollination by bees. However, in many parts of the Old World the flowers of Fabaceae are inhabited by large numbers of thrips of three particular genera, and this association often involves a high level of host specificity (Pitkin 1976). Across the Palearctic Region, most of the 30 described species in the Thysanoptera genus *Odontothrips* breed only in Fabaceae flowers (Pitkin, 1972a; zur Strassen, 2003), although the single endemic Nearctic member of this genus seems to have a different host association, and nothing is known about one species described from Africa. In Australia, most of the 18 species in the related genus *Odontothripiella* also breed in Fabaceae flowers, although at least two species breed only in the florets of one or more species of Poaceae (Pitkin, 1972b). In the Old World tropics, but particularly in Southeastern Asia, there is a third genus, *Megalurothrips*, in which species breed only in Fabaceae flowers (Palmer, 1987), including trees as well as herbs (Mound & Azidah, 2009). In China, nine species of *Odontothrips* are recorded, mainly from northern areas (Dang et al., 2010), whereas several species of *Megalurothrips* are listed from southern areas (Mound, 2010). The objective of the present paper is to describe a new species that has been found in Southwestern China in an area that is at the margins of the ranges of these two genera. Moreover, as discussed below, the generic position of this species is equivocal in that it exhibits characters states that place it intermediate between *Odontothrips* and *Megalurothrips*, but with the posterior margin of tergum IX in males more similar to species of the Australian genus *Odontothripiella*.

Systematic relationships of *Odontothrips*

Species of *Megalurothrips*, *Odontothrips*, and *Odontothripiella* share the following character states: antennae 8-segmented, segment I with pair of dorso-apical setae (Fig. 11); antennal segment VI with base of external sensorium enlarged; head with ocellar setae pair I present; pronotum usually with two pairs of long posteroangular setae; metanotum with median setae arising at anterior margin (Fig. 12); terga without paired ctenidia laterally, VIII with

an irregular group of microtrichia present anterolateral to each spiracle, posteromarginal comb of microtrichia present only laterally; male sterna without pore plates; male tergum IX posterior margin usually with pair of tubercles or short, stout setae (Figs 4–8). This suite of character states indicates that these three genera are closely related within the *Megalurothrips* genus-group (Mound & Palmer, 1981), a relationship further supported by their shared host-plant associations with members of the Fabaceae. Species of the Australian genus *Odontothripiella* have two (rarely one) curved claw-like tubercles at the apex of each fore tibia. Similar curved tubercles also occur on the fore tibiae of species of *Odontothrips*, although in many species of this genus the tubercles are small and easily overlooked. In contrast, the species of *Megalurothrips* never have fore tibial tubercles. In species of *Odontothripiella* and *Odontothrips* the base of the sensorium on antennal segment VI is greatly expanded (Figs 1, 3), the maximum length of the base being more than 0.7 of the total length of this sensorium. In contrast, the base of this sensorium in species of *Megalurothrips* is only a little longer than wide, with a maximum length less than 0.3 of the sensorium total length (Fig. 2). Species of *Odontothripiella* can be distinguished from members of the other two genera because on antennal segment V they all have the base of the sensorium enlarged (Fig. 3), two to four times as large as the base of the nearest seta, whereas this sensorium does not have an enlarged base in species of the other two genera. Moreover, *Odontothrips* and *Megalurothrips* species always have two pairs of equally long pronotal poster-angular setae, whereas species of *Odontothripiella* usually have the outer pair of these setae considerably shorter than the inner pair, and both pairs are very short in one species.



FIGURES 1–8. *Odontothrips* and related genera. (1) *O. yunannensis* antenna. (2) *Megalurothrips typicus* antennal segments IV–VIII. (3) *Odontothripiella australis* antennal segments IV–VIII. Male tergum IX 4–8: (4) *O. australis*; (5) *Odontothripiella buloba*; (6) *M. usitatus*; (7) *M. sjostedti*; (8) *O. yunannensis*.

Odontothrips yunnanensis sp. n.

(Figs 1, 8–13)

Female macroptera. Body dark brown (Fig. 9); all tarsi yellow, also fore tibia, apex of fore femur, and antennal segment III; fore wing including clavus brown, with basal quarter pale (Fig. 13). With the character states indicated above; antennal segment VI with base of sensorium more than 0.7 as long as total length of this sensorium (Fig. 1). Head with ocellar setae pair III arising on anterior margins of ocellar triangle, postocular setae small (Fig. 11). Fore tibia without claw-like processes at apex; fore tarsus without tubercles on inner margin. Metanotum with campaniform sensilla arising medially (Fig. 12). Fore wing first vein with setal row comprising about 4 setae at base, then 11–12 setae, then 4–5 setae near apex; second vein with complete row of setae (Fig. 13); clavus with 5 marginal and one discal setae, terminal seta longer than subapical. Abdominal tergum I with transversely reticulate sculpture; terga IV–VIII with no sculpture mesad of setal pair S2; IX with two pairs of campaniform sensilla; median split on X short; pleuroterga and sterna without discal setae; sternum VII setal pair S1 arise in front of margin, S2 and S3 arise at margin.

Measurements (holotype female in microns). Body length 1690. Head, length 160; width across eyes 165. Ocellar setae III length 58. Pronotum, length 170, maximum width 220; posteroangular setae length 66, 70. Metanotum median setae length 68. Fore wing, length 900. Abdominal tergum IV median setae length 13; tergum X setae length 110. Antennal segments III–VIII length 63, 64, 42, 60, 17, 18; sensorium on antennal VI length 36, length of base 25.

Male macroptera. Body smaller and more slender than female (Fig. 10); colour similar to female but antennal segment II yellow, and all tibiae and apices of femora sometimes yellow; sternal posterior margins without median lobe; tergum IX posterior margin with pair of stout sigmoid processes, basal half straight but then curving sharply dorsally, and then curving to posterior and terminating in a blunt point (Fig. 8).

Measurements (paratype male in microns). Body length 1280. Fore wing, length 685. Antennal segments III–VIII length 48, 49, 32, 46, 13, 14; sensorium on antennal VI length 28, length of base 19.

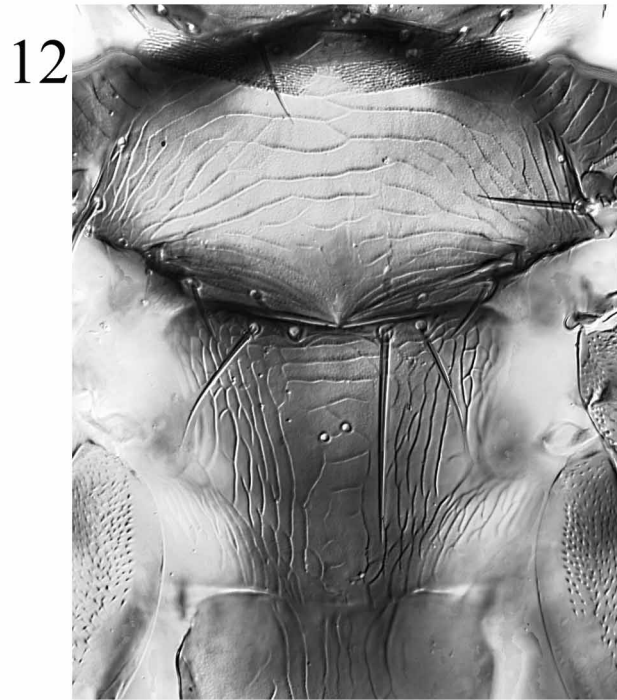
Specimens examined. Holotype female, CHINA, Yunnan Province, Yanjin County, (28° 06' N, 104° 14' E), from *Phaseolus vulgaris* flowers at 639 m, 23.vi.2010, (Xie Yong-Hui), in Yunnan Agricultural University, Kunming.

Paratypes: 29 females, 14 males, collected with holotype; paratypes deposited in Academy of Sciences, Beijing; South China Agricultural University, Guangdong; Australian National Insect Collection, Canberra.

Comments. At species level this new species is readily distinguished, by the long base of the sensorium on the sixth antennal segment, the lack of fore tibial tubercles, the presence of several setae on the distal half of the first vein of the fore wing, and the armature on tergum IX of males. However, its systematic position is more equivocal, being intermediate between the three major genera of the *Megalurothrips* genus-group. The complete absence of tibial and tarsal tubercles suggests a relationship with *Megalurothrips*. However, the enlarged sensorium on antennal segment VI (but not on V) suggests a relationship to *Odontothrips*, but the very large processes on the posterior margin of tergum IX in males seem more similar to the structures found in this position in some species of *Odontothripiella*. Despite the fact that males in many species of these three genera have either processes or prominent setae on the posterior margin of tergum IX, the homologies of these processes remain unclear. For example, *Megalurothrips sjostedti* has a pair of spine-like processes (Fig. 7) that are homologous with but considerably larger than those of the type species, *M. typicus*, whereas *M. usitatus* has no such processes (Fig. 6). In contrast, some but not all *Odontothrips* species have a pair of small, stout setae on short tubercles, and some *Odontothripiella* have similar setae that are often on much longer processes (Figs 4, 5).

Acknowledgements

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FIGURES 9–13. *Odontothrips yunannensis*. (9) Female. (10) Male. (11) Head and pronotum. (12) Mesonotum and metanotum. (13) Fore wing.

References

- Dang, L.-H., Han, Y.-F., Qiao, G.-X. & Zheng, Z.-M. (2010) Two newly recorded species of the genus *Odontothrips* Amyot & Serville (Thysanoptera: Thripidae) from China with a key to Chinese known species. *Acta Zootaxonomica Sinica*, 35, 212–217.
- Mound, L.A. (2010) Thysanoptera (Thrips) of the world--a checklist [accessed 3.xii.2010] <http://www.ento.csiro.au/thysanoptera/worldthrips.html>
- Mound, L.A. & Azidah, A.A. (2009) Species of the genus *Thrips* (Thysanoptera) from Peninsular Malaysia, with a checklist of recorded Thripidae. *Zootaxa*, 2023, 55–68.
- Mound, L.A. & Palmer, J.M. (1981) Phylogenetic relationships between some genera of Thripidae (Thysanoptera). *Entomologica Scandinavica*, 15, 153–170.
- Palmer, J.M. (1987) *Megalurothrips* in the flowers of tropical legumes: a morphometric study. Pp 480–495 in Holman J, Pelikan J, Dixon AFG & Weismann L. [eds] *Population structure, genetics and taxonomy of aphids and Thysanoptera*. The Hague (SPB Academic Publishing).
- Pitkin, B.R. (1972a). A revision of the flower-living genus *Odontothrips* Amyot & Serville (Thysanoptera: Thripidae). *Bulletin of the British Museum of Natural History (Entomology)*, 26, 371–402.
- Pitkin, B.R. (1972b). A revision of the Australian genus *Odontothripiella* Bagnall, with descriptions of fourteen new species (Thysanoptera: Thripidae). *Journal of the Australian Entomological Society*, 11, 265–289.
- Pitkin, B.R. (1976). The hosts and distribution of British thrips. *Ecological Entomology*, 1, 41–47.
- zur Strassen R. (2003) Die terebranten Thysanopteren Europas und des Mittelmeer-Gebietes. *Die Tierwelt Deutschlands*, 74, 1–277.