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Caliothrips tongi sp.n. (Thysanoptera, Thripidae) from China, and a dubious record of North American Bean Thrips

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Abstract

A new species, *Caliothrips tongi*, is described from eastern China, and an old record of the North American bean thrips, *Caliothrips fasciatus* (Pergande), from the same area is considered unreliable. *Oneilliella pallidizonata* Kudo is transferred to *Caliothrips* as a new combination.

Key words: *Caliothrips fasciatus*, bean thrips, *Oneilliella*, Thripidae

Introduction

The North American Bean Thrips, *Caliothrips fasciatus* (Pergande), is endemic to North America where it ranges from Florida to Idaho and California, and south into western Mexico (Hoddle et al., 2006, 2008). One outstanding locality record of this thrips is from China, Foochow (Fuzhou, Fujian Province), by Steinweden & Moulton (1930), a record that has been repeated by other authors (Wilson, 1975) but apparently without the original specimen from Foochow being re-examined. The extensive account of the Thysanoptera fauna of China (Han, 1997) records *C. fasciatus* from Fujian and Guangdong Provinces, however, the illustrations and description provided by Han are copied from publications of overseas authors, and are not based on Chinese specimens. An added complication is that *C. fasciatus* was detected in 2008 by the Australian Quarantine Service on plants imported from China, although little reliability can be placed on distribution records based on quarantine interceptions because of the high risk of cross contamination in transit. There is thus a lack of evidence that this North American pest species actually occurs in China. One female from Fujian Province, that had been labelled provisionally as *C. fasciatus* by Prof. Tong Xiao-Li, based on the information in Han (1997), was examined several years ago and considered to be an undescribed species, but its condition was too poor to warrant description. More recently, this same species has been collected at Hangzhou, Zhejiang Province, and the two purposes of this paper are to describe this new *Caliothrips* species, based on both sexes, and to comment on the record of *C. fasciatus* from China as a result of examining the original specimen. Nomenclatural details of all thrips taxa mentioned here are web-available (Mound, 2010).

Caliothrips Daniel

Caliothrips Daniel, 1904: 296. Type species *C. woodworthi* Daniel, now considered a synonym of *Heliothrips fasciatus* Pergande.

Wilson (1975) provided a key to the 18 species of this genus that were recognised at that time, and Nakahara (1991) subsequently described two further species, from Florida and Georgia, with a key to the 10 species recorded

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from the Nearctic Region. A total of 12 members of the genus are from the New World (this includes *C. braziliensis* from South America as a synonym of the North American *C. phaseoli*), with five species from Africa and three from Asia. To this total of 20 species a further two species from Asia should now be added. One is the new species, *C. tongi*, described below from eastern China. The other is *Caliothrips pallidizonata* (Kudo) **comb.n.**, described as the second species in the genus *Oneilliella* Wilson and collected from *Selaginella* in Peninsular Malaysia (Kudo, 1995). The original description of this species is well illustrated, showing the reticulations of the body sculpture with numerous internal markings as is typical among species of *Caliothrips*, and the head with gently rounded cheeks. In contrast, the only known species of *Oneilliella* comes from Trinidad, lacks markings within the reticulations (Mound & Marullo, 1996), and has the head sharply angulate behind the eyes (Wilson, 1975). *C. pallidizonata* has longitudinal tergal sculpture rather similar to that of *C. tongi* (cf. Fig. 6), but the vertex lacks the strong transverse line, and the fore wing is sharply pale at the apex.

Members of the genus *Caliothrips* are recognisable, not only by the form of the sculpture on the head and pronotum with prominent markings within the reticulations, but also by the presence of a coiled apodeme within each hind coxa. This apodeme is presumably one of the various adaptations amongst thrips adults that are associated with the ability to jump suddenly. Bhatti (2006), in drawing attention to this structure, placed *Caliothrips* in a new monobasic family, although the phylogenetic significance of this remains unclear. At present, *Caliothrips* is retained in the subfamily Panchaetothripinae of the Thripidae.

The host range within the genus *Caliothrips* is extensive. Some species breed only on certain grasses, including the Asian/Australian species, *C. striatopterus*, and its Indian equivalent, *C. luckmanni*. This host association is also found in three New World species, *C. cinctipennis*, *C. insularis* and *C. punctipennis* (Wilson, 1975; Nakahara, 1991). In contrast, some species seem to be associated particularly with the leaves of Fabaceae, including *C. fasciatus*, *C. multistriatus* and *C. phaseoli* in the New World, as well as the Oriental species *C. indicus*. However, some of these can probably breed on a wider range of hosts, and *C. indicus* and *C. sudanensis* are both recorded as pests on cotton leaves. Curiously, *C. fasciatus* was once considered a pest of pears and walnuts in California, USA (Bailey, 1933; 1937; 1938), but the pest status of this species has waned to non-significance (Hoddle et al. 2006). A few species are widely distributed, including *C phaseoli* from North America to Brazil (= *C. braziliensis*), also *C. graminicola* that extends from Sudan through India to Australia. Other members of the genus, judging from the records in Wilson (1975), have a more restricted distribution, although Bhatti (2006) records the North American species, *C. punctipennis*, as established in India, at New Delhi.

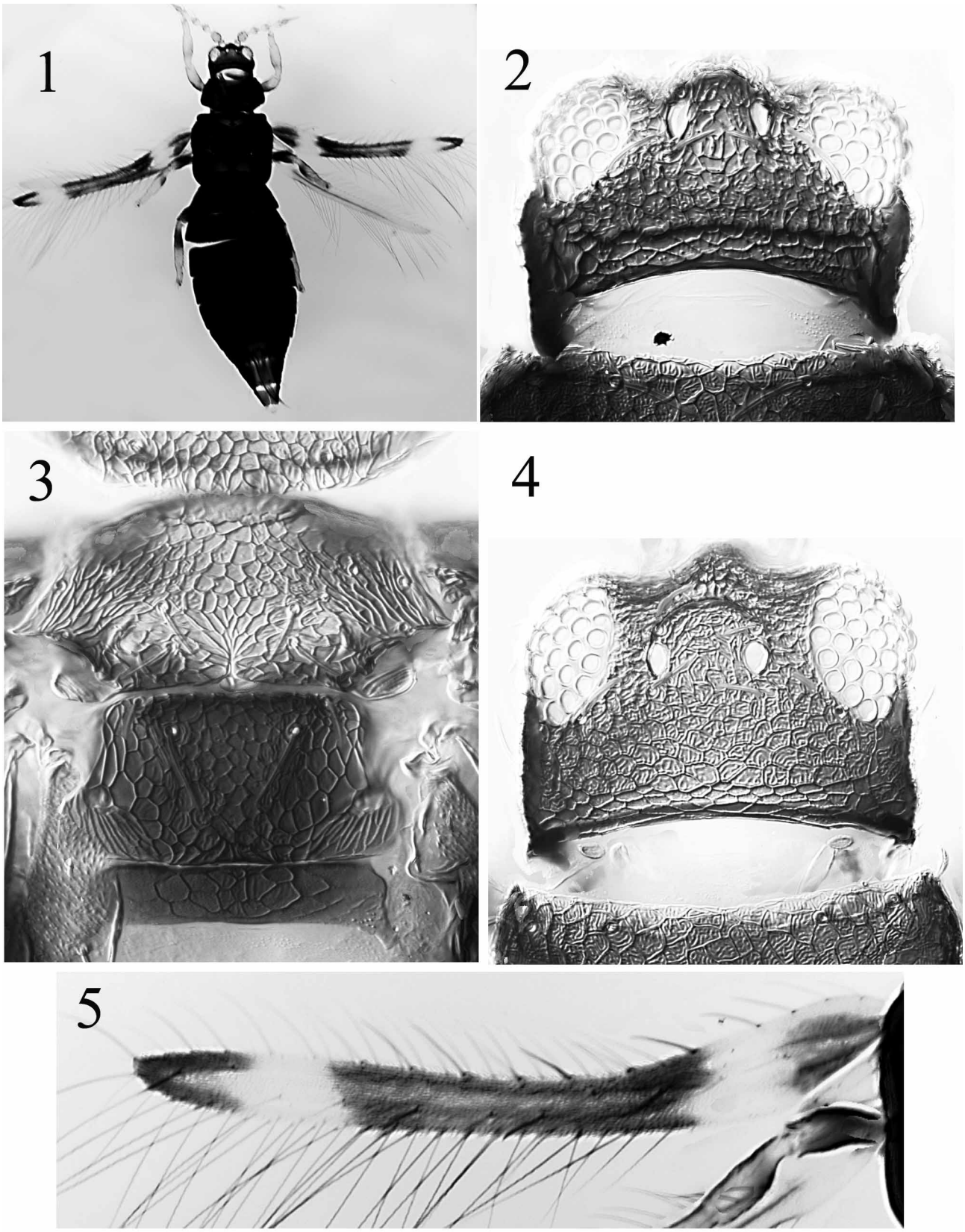
Caliothrips fasciatus (Pergande)

Heliothrips fasciata Pergande, 1895: 391

Widespread in western and southern USA, the record of this species from China, published by Steinweden & Moulton (1930), is based on a single female. This has been studied on loan from the California Academy of Sciences, and has the following data on the slide label: “CHINA, Foochow, Citrus, 7.i.27, C.R.Kellogg”. The specimen has the head and tergal sculpture that are typical of *fasciatus* (Figs 4, 7), but the locality record is less certain. *C. fasciatus* is abundant and flies readily in California, and the specimen possibly arrived inadvertently during slide preparation in California, and is thus mislabelled. A similar situation has been reported previously (Marullo & Mound, 1994); *Orothrips raoi* Moulton was described from a single female stated to be from India, but this was subsequently recognised as the common Californian species *O. yosemitii* Moulton. For the present, there remains no conclusive evidence that the North American bean thrips has occurred in, let alone is established in, China.

Caliothrips tongi sp. n.

Female macroptera. Body dark brown (Fig. 1), tarsi yellow, tibiae yellow with variable brown area medially, fore femora yellow distally, antennal segments III–V largely yellow with apices light brown; fore wing dark with two pale areas, sub-basal pale area short, apical dark area shorter than distal pale area (Fig. 5), clavus mainly pale; first vein with one sub-basal and one apical setae dark, second vein with 2 setae dark.

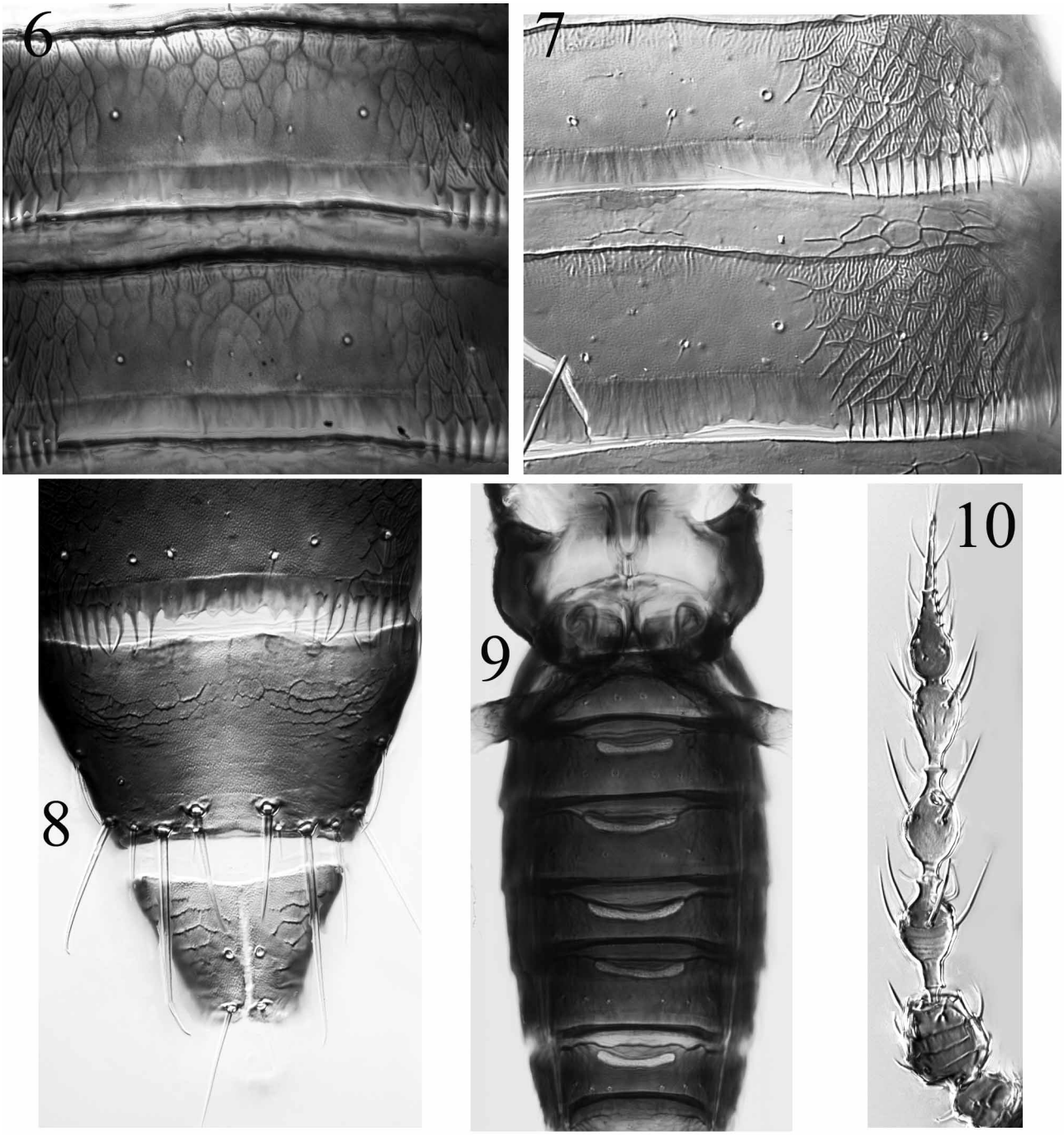


FIGURES 1–5. *Caliothrips* species. **(1)** *C. tongi* female. **(2)** *C. tongi*, head. **(3)** *C. tongi*, mesonotum & metanotum. **(4)** *C. fasciatus*, head. **(5)** *C. tongi*, fore wing.

Antennae 8-segmented (Fig. 10); III–IV with strongly constricted apical neck, sensoria forked, on III extending scarcely beyond base of IV, on IV extending to mid-point of V; microtrichia absent on III, VI, and dorsal surface of

IV, present on ventral surface of IV and both surfaces of V; VIII much longer than VII. Head wider than long; cheeks convex, constricted to weak basal neck; vertex reticulate with markings inside the reticles, the margins of one row of submarginal reticles forming a transverse ridge (Fig. 2); three pairs of long pale postocular setae.

Pronotum, mesonotum and metanotum reticulate with many markings inside each reticle, setae long and pale; median metanotal setae wide apart and far from anterior margin (Fig. 3). Mesothoracic furca without spinula; metathoracic furca long and lyre-shaped, extending to mesothorax (Fig. 9). Hind coxae each with prominent internal coiled apodeme; tarsi long, 1-segmented. Fore wing first vein with about 5 setae at base, 2 setae near apex; second vein with 5 or 6 setae; posteromarginal cilia strongly wavy; clavus with 4 veinal but no discal setae.



FIGURES 6–10. *Caliothrips* species. **(6)** *C. tongi*, tergites IV–V. **(7)** *C. fasciatus*, tergites IV–V. **(8)** *C. tongi*, tergites VIII–X. **(9)** *C. tongi*, male ventral surface. **(10)** *C. tongi*, antenna.

Abdominal tergites I–VIII posterior margin with craspedum medially, forming long teeth laterally; median area of tergites reticulate, with one pair of minute setae, lateral reticulation longitudinal (Fig. 6); IX with no campani-

form sensilla; X with median split complete (Fig. 8). Sternites II–VII with 3 pairs of marginal setae anterior to broad craspedum.

Measurements (holotype female in microns). Body length 1250. Head, length 85; maximum width 160; pair II postocular setae 30. Pronotum, length 115; maximum width 210. Metanotal median setae length 30. Forewing length 680. Abdominal tergite IV median setae 6; tergite IX 80, median setae 50, lateral setae 90; tergite X 60, terminal setae 50. Antennal segments III–VIII length, 50, 45, 35, 25, 12, 30.

Male macroptera. Colour and sculpture similar to female but smaller and more slender; tergite IX median discal setae shorter and stouter than posterior and midlateral pairs; sternites III–VII with slender transverse pore plate (Fig. 9).

Measurements (paratype male in microns). Body length 1000. Forewing length 550. Tergite IX, setae S1 30; S2 40; S3 30. Pore plate width, sternite IV 75; sternite VII 60.

Material studied. Holotype female: **CHINA**, **Zhejiang Province**, Cangnan County (27°31'34.45"N, 120°25'55.75"E), from sweet potato (*Ipomoea batatas*) at 753 m, 25.viii.2009 (Bei Yawei), in Yunnan Agricultural University, Kunming.

Paratypes: 22 females, 7 males collected with holotype (deposited in Yunnan Agricultural University, Kunming; Academy of Sciences, Beijing; South China Agricultural University, Guangdong; Zhejiang Academy of Agriculture Science, Hangzhou; Australian National Insect Collection, Canberra); **Fujian Province**, Wuyi Mountain (27°38'N, 117°56'E), 1 female from unknown plant, 16.viii.1984 (Zhang Wei-qiu), South China Agricultural University, Guangdong.

Comments. This new species is distinct within the genus *Caliothrips* because of the transverse ridge across the vertex (Fig. 2), moreover, the median areas of the abdominal tergites are distinctly reticulate (Fig. 6). These two character states readily distinguish the new species from *C. fasciatus* (Figs 4, 7). Moreover, the apical dark area and the sub-basal pale band of the fore wing of *C. tongi* are both considerably shorter than in *C. fasciatus*. Using the key to species in Wilson (1975), *C. tongi* will run to the eastern North American *cinctipennis*, but that species has the head with uniform reticulation, and the males have small circular sternal pore plates.

The head of *Caliothrips* species typically has parallel-sided cheeks, and the sculpture on the vertex is uniform in appearance including the posterior margin, unlike *C. tongi.* However, the following species exhibit an increasing tendency for the cheeks to be convex: *sudanensis*, *insularis*, *helini*. The first of these has the sculptured reticles on the vertex uniform in shape. In contrast, *helini* not only has the cheeks distinctly convex, but has a weakly differentiated band of reticles near the posterior margin, although this is not as sharply prominent as in *tongi*.

The only other species of *Caliothrips* recorded from China is *C. indicus,* from Yunnan and Guangdong (Han, 1997). The record of this species also requires confirmation through further field collections, as it is a potential pest of soy beans.

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