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New record of predatory thrips, *Aeolothrips melaleucus* (Thysanoptera, Aeolothripidae) from Iran

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A b s t r a c t : A predatory species, *Aeolothrips melaleucus* (HALIDAY) is recorded on the base of materials collected on apple and bean caper leaves in Fars Province, south of Iran. The species is very similar to another predatory thrips *Aeolothrips versicolor* UZEL in forewing in which posterior margin of forewing is dark except at base and apex in both species. The characters on which these two species are separated together with illustrations are provided and predatory habitat of *A. melaleucus* is discussed briefly.

K e y w o r d s : *Aeolothrips*, biology, Fars Province, predator.

Introduction

Most members of the insects, order Thysanoptera or thrips are phytophagous on living plants or mycophagous on dead branches and in leaf litter (MOUND 1997). However a widespread behavioral attribute amongst these tiny insects has been demonstrated. Some thrips play role as pollinators (LEWIS 1973), some induce gall (CRESPI et al. 2004) and a few have been recorded as obligate predator (PALMER & MOUND 1991). Moreover, larvae and adults of species in the genus *Aulacothrips* (Heterothripidae) have become ectoparasite on some members of insect order Hemiptera in Brazil (CAVALLERI et al. 2010, 2012). More recently CAVALLERI et al. (2013) reported a novel interaction between a phlaeothripid (family Phlaeothripidae) species, *Mirothrips arbiter*, and three species of social paper wasps, the genus *Polistes* (Vespidae). This thrips species breeds inside the wasp colonies, and larval and adult thrips feed on wasp eggs, which become severely damaged.

Currently the 6.000 described species in insect order Thysanoptera are classified into nine families (MOUND 2011) but 95 % are placed in one or other of the two families Phlaeothripidae or Thripidae. In contrast, the Aeolothripidae, as the third largest family in the order, comprises scarcely 5 % of the total described species of thrips, with 194 extant species in 23 genera worldwide (THRIPSWIKI 2013). Members of this family exhibit a wide range of biologies, from obligate phytophagous in flowers to obligate predators of other small arthropods on leaves, although many species in this family appear to be facultative predators of other small arthropods, in that they feed on both floral tissues as well as on small arthropods that live in flowers (MOUND 1997, MOUND & MARULLO 1998). In Iran, species of *Aeolothrips*, as the main aeolothripid genus, are common in a

wide range of flowers, and most of these seem to be facultative predators, living on various flowers (MINAEI 2013, MINAEI et al. 2013). However, a few species recorded in this country appear to be obligate predators on leaves. These include *A. albicinctus*, breeding on base of grasses (BHATTI et al. 2009) and *A. versicolor* that have been collected on leaves of *Fraxinus* so far (MINAEI et al. 2001).

The purpose of this paper is to record another predatory *Aeolothrips* species in Iran based on materials which have been recently collected in Fars province, southern Iran and its comparison with related species. Illustrations and diagnosis characters are also provided. Full nomenclatural information about Thysanoptera is available on the web (THRIPSWIKI 2013).

Materials and methods

Thrips specimens were collected by beating leaves of plants onto a plastic tray. The specimens were removed with a fine brush into a collecting vial containing 70 % ethyl alcohol. They were then mounted onto slides in Canada balsam using the form of a protocol given by THRIPSWIKI (2013). Microphotographs were obtained using a Dino-Lite Microscope, Eyepiece Camera. Digital images were enhanced and plates prepared by Adobe Photoshop™. The terminology used here follows ZUR STRASSEN (2003) and HODDLE et al. (2013). All specimens studied are deposited in the collection of the Plant Protection Department, College of Agriculture, Shiraz University, Shiraz, Iran.

Results

The species discussed below is belonging to the genus, *Aeolothrips*. This genus belongs to family Aeolothripidae and can be recognized by the following characters from the other genera in the family: Antennae 9-segmented, III and IV with linear sensorium, V-IX closely related; head without long setae behind the compound eyes, pronotum without prominent posteroangular setae and the forewings broad with the apex rounded and usually with two dark transverse bands.

Aeolothrips melaleucus (HALIDAY)

Coleothrips melaleuca HALIDAY, 1852: 1117.

D i a g n o s i s : Female macroptera. Body and legs brown, antennal segments III yellow, IV variable in color, yellow in basal quarter to half or almost entirely yellow (Fig. 1A); forewing posterior half dark after clavus to apex with two transverse dark bands (Fig. 1D). Antennal segment III with linear sensorium about 0.3 as long as segment, IV with linear sensorium 0.4 as long as segment and a little curved and wider at the apex. Tergite IX setae S1 about as long as length of tergite; sternite VII with 2 pairs of supernumerary setae arranged one in front of the other arising well in front of margin (Fig. 1E).

Male with colour and structure generally similar to female but paler and smaller. Tergites IV-V with paired tubercles (Fig. 1F); tergite IX with stout curved seta and non-bifurcate clasper (Fig. 1G).

Distribution: Canada (PUTMAN 1942), Britain (MOUND et al. 1976); Europe (ZUR STRASSEN 2003); USA (HODDLE et al. 2012); Turkey (TUNC et al. 2012); Iran.

Material studied: 1♀, IRAN, Fars Province, Khafr, from apple tree (*Malus domestica*), 15.iv.2008 (KM 59); 4♀ 1♂, Fars Province, Mohr, Heraj, from bean caper (*Zygophyllum* sp.), 3.iv.2013 (M. Abdolahi).

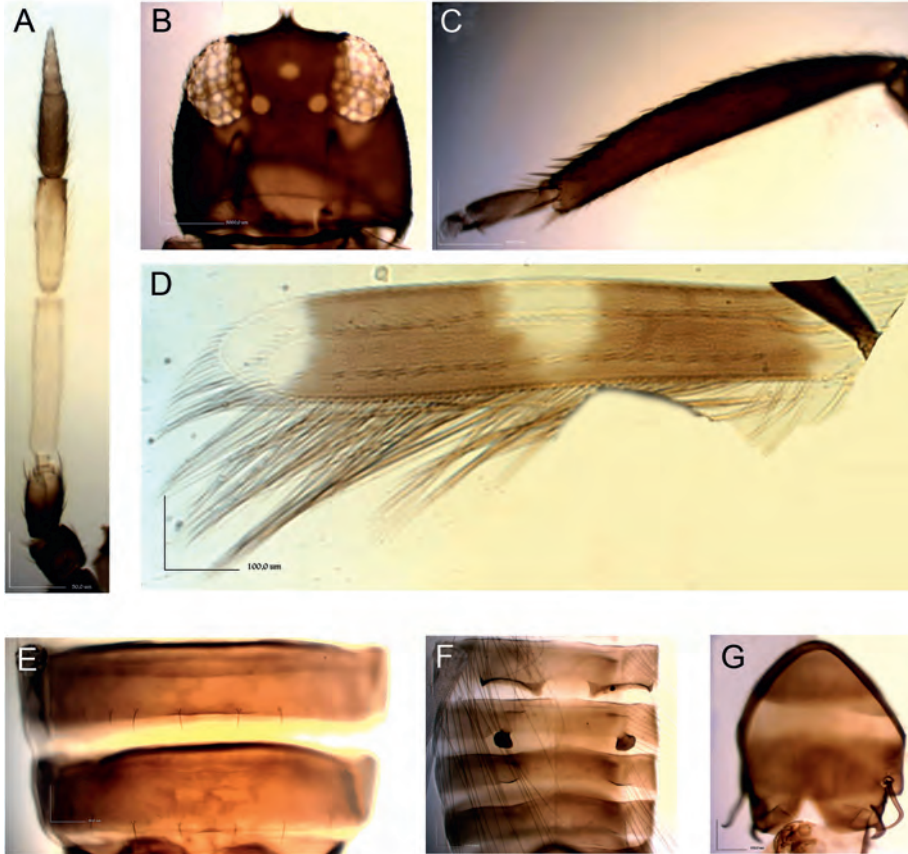


Fig. 1: *Aeolothrips melaleucus*, female (A) antenna; (B) head; (C) leg; (D) forewing; (E) sternites VI-VII; male (F) tergites IV-VII; (G) tergite IX.

Comments: In most Iranian *Aeolothrips* species, posterior margin of forewing is pale medially between two dark cross bands whereas in four species, *A. eremicola* PRIESNER, *A. melaleucus* and *A. versicolor* and *A. wittmeri* PRIESNER posterior margin of forewing is dark except at the base and apex (Figs 1D, 2C). However, *A. eremicola* and *A. wittmeri* are distinguished from *melaleucus* and *versicolor* by the narrow form of the band along the fore wing posterior margin between the two cross bands, in contrast to the other two species that have a wider band. *A. melaleucus* is readily distinguish from *A. versicolor* in both sexes. In the females, head is prolonged in *A. versicolor* (versus without prolongation in *A. melaleucus*) (Figs 1B, 2A). Furthermore, all tibiae are brown in *A. melaleucus* in contrast to *A. versicolor* which is pale in the distal part of all tibiae

(Figs 1C, 2B). In the male sex, tergites are without tubercles and tergite IX has no claspers and stout curved setae in *A. versicolor* whereas tergites IV-V have paired tubercles and tergite IX with stout curved seta and non-bifurcate clasper (Figs 1F, 1G).

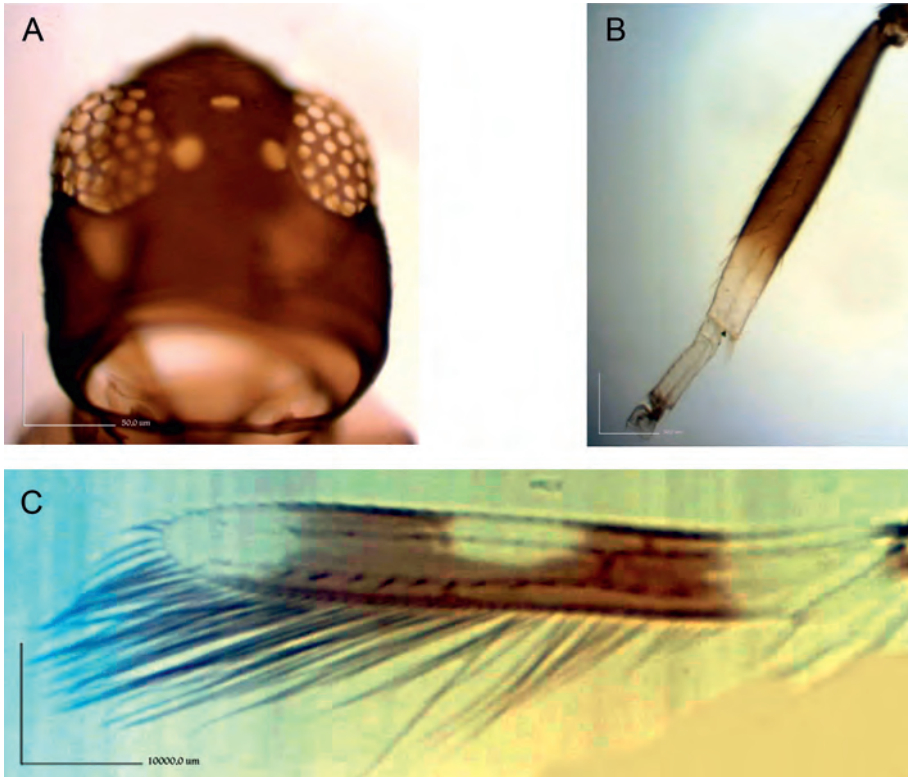


Fig. 2: *Aeolothrips versicolor*, female (A) head; (B) leg; (C) forewing.

Discussion

In the family Aeolothripidae, four genera including *Aeolothrips* with 17 species (MINAEI 2013), *Rhipidothrips* UZEL with 4 species (BHATTI et al. 2009), *Indothrips* BHATTI, and *Orothrips* MOULTON each with 1 species (CHERAGHIAN 2000, MINAEI et al. 2001) are recognized in Iran. Most species in the genus *Aeolothrips* are distributed around Europe, Middle East and North America (THRIPSWIKI 2013) and it seems likely that Iran has one of the richest faunas of this genus probably due to its wide area as well as its usually warm weather. With the record of *A. melaleucus* the number of species in this genus reaches 18 including one new species, *A. zurstrasseni* (MINAEI 2013) and the description of the male sex for *A. afghanus* (MINAEI et al. 2013) as well as *A. eremicola* (ALAVI et al. 2013).

All materials have been collected on the leaves. However, no mite or other small arthropods have been observed on bean caper during the collecting process, while the leaves of

apple tree have been infested by spider mites (Family Tetranychidae) as well as aphids. The low density of collected materials as well as the presence of the species on leaves suggests the species is predator as PUTMAN (1942), MOUND et al. (1976), ZUR STRASSEN (2003) and HODDLE et al. (2013) have demonstrated this habitat for *Aeolothrips melaleucus*.

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Zusammenfassung

Die räuberische Art *Aeolothrips melaleucus* (HALIDAY) (Thysanoptera, Aeolothripidae) wurde auf Apfel- und Kapernsstrauchblättern in der Provinz Fars, im Süden Irans nachgewiesen. Die Unterschiede zur naheverwandten Art *Aeolothrips versicolor* UZEL wurden herausgearbeitet und grafisch illustriert.

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