

## *Podothrips*: first record from Iran with a new species (Thysanoptera: Phlaeothripidae)

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Received: 24.09.2014

Accepted/Published Online: 24.04.2015

Printed: 30.09.2015

**Abstract:** *Podothrips erami* Minaei sp. nov. is described and illustrated from Fars Province in southern Iran. This is the first record of the genus from Iran. The new species is bicolored and conforms with *P. denticeps* Hood and *P. distinctus* Ananthakrishnan in bearing a lateral forward-directed tooth behind the compound eyes.

**Key words:** Fars Province, Haplothripini, new record, new species, *Podothrips*

Fourteen families of thrips are recognized in the insect order Thysanoptera, including 5 fossil families (Mound, 2013). Among them, Phlaeothripidae, with 2 subfamilies (Idolothripinae and Phlaeothripinae), is the most species-rich family, with 3550 species assigned to some 460 genera (ThripsWiki, <http://thrips.info/wiki/>). Members of subfamily Idolothripinae feed on fungal spores (Mound and Palmer, 1983). The members of the subfamily Phlaeothripinae exhibit a wide range of biologies, ranging from fungus feeding (Mound and Marullo, 1996; Minaei, 2013a; Dang et al., 2014), to phytophagy (Minaei and Mound, 2008), to feeding on mosses (Mound, 1989), to pollinators on particular plants (Moog et al., 2002). A few species are obligate predators of other small arthropods on leaves (zur Strassen, 1995) or on the bases of grasses (Palmer and Mound, 1991). One unusual Haplothripini species has been demonstrated to be a predator of eggs of social wasps (Cavalleri et al., 2013).

The predatory species of phlaeothripids are mainly within the *Haplothrips* lineage, or tribe Haplothripini. One haplothripine species, *Karnyothrips flavipes* (Jones), has a worldwide distribution and is known to be a predator on scale insects (Okajima, 2006), and several species in *Haplothrips* are known to be predators on mites or small arthropods (Bailey and Caon, 1986; zur Strassen, 1995; Kakimoto et al., 2006). Similar predatory habits are characteristic of species of *Podothrips* that live on grasses; these thrips are reported to feed on coccoids (Ritchie, 1974; Palmer and Mound, 1991). The geographical distribution of the genus is mainly tropical and subtropical.

A review of 18 species in this genus was provided by Ritchie (1974); subsequently, 4 species were described from southeast Asia including India (Bhatti, 1978; Okajima, 1978), and 2 from New Zealand (Mound and Walker, 1986). In the most recent treatment of this genus, Mound and Minaei (2007) described another 6 species from Australia. Thus, the genus now comprises 30 species worldwide.

The objective of this paper is to record the genus *Podothrips* for the first time and to describe a new species of *Podothrips*, collected from the bases of grasses in Fars Province, southern Iran. Full nomenclatural information on the genus *Podothrips* is available on the web (ThripsWiki, <http://thrips.info/wiki/>).

The specimens discussed in this study were collected in Shiraz, Fars Province, Iran, by beating the bases of grasses onto a plastic tray. The specimens were collected with a fine brush into a collecting vial containing 95% ethyl alcohol. Thrips specimens were mounted onto slides in Canada balsam after dehydration through a series of ethanols, using a form of the protocol given by Mound and Marullo (1996). The photomicrographs and measurements were obtained using a Motic BA310 microscope with an attached camera. The terminology follows Ritchie (1974), Mound and Minaei (2007), and Minaei and Mound (2008). The holotype of the new species and a male were deposited in the Forschungsinstitut Senckenberg, Frankfurt, Germany. Two paratype specimens (1 female and 1 male) were deposited in the Australian National Insect Collection, Canberra, Australia. The other materials were deposited in the collection of the Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran.

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*Podothrips erami* sp. nov. Minaei

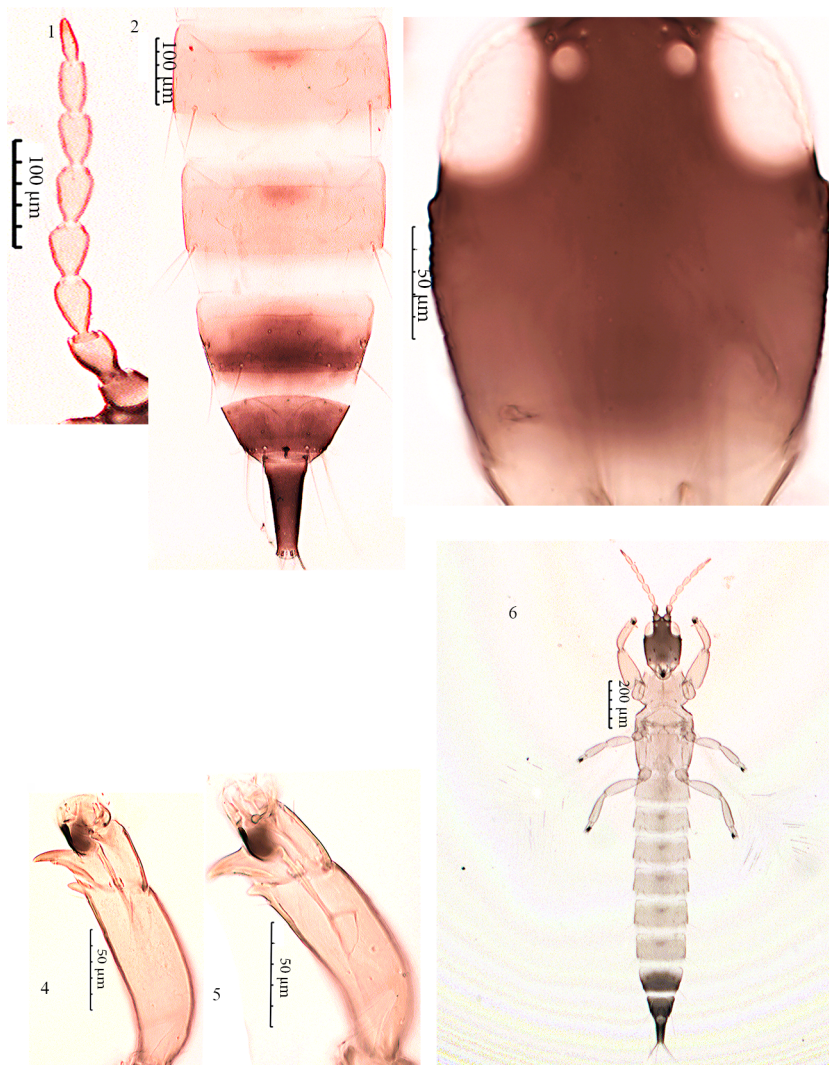
**Material studied.** Holotype female, IRAN, Fars Province, Shiraz, from grass (Poaceae), 15.viii.2014 (KM 1241).

Paratypes, 1 female, 1 male, taken with holotype. 1 male, same place, same plant, 23.ix.2011 (KM 562); 3 females, 25.viii.2014 (KM 1249); 4 males, 29.viii.2014 (KM 1251).

**Description:** Female

Macroptera. Bicolored; head, antennal segment I, and most of II brown (Figure 1); abdominal segments I–II yellow, III–VII with a brown area on the anterior, VIII–X brown (Figure 2); forewing pale, major setae on prothorax and abdominal tergites yellow, postocular setae brownish-yellow; rest of body and legs yellow.

Antennae 8 segmented (Figure 1); segment II with campaniform sensilla situated between middle and apex of the segment; segments III and IV each with 2 sense cones, the inner one on III is small, about half as long as the outer one. Head longer than broad, without distinct sculpture, with a pair of well-developed and weakly capitate postocular setae, ocellar setae minute; cheeks without stout setae, with a distinct tooth just behind eyes (Figure 3). Mouth-cone short and rounded; maxillary stylets not retracted to base of postocular setae, about one-third of head width apart, maxillary bridge present. Eyes normal; ocelli well developed, posterior pair far apart from each other. Pronotum well developed, longer than broad, all major setae (except anteromarginal setae) well developed and apically capitate or blunt, anteromarginal



**Figures 1–6.** *Podothrips erami* sp. nov. (1) Antenna (female); (2) Abdominal tergites VI–X (female); (3) Head (female); (4) Fore tibia and tarsus (female); (5) Fore tibia and tarsus (male); (6) male.

setae reduced, no longer than discal setae, apically acute; notopleural sutures complete. Surface of mesonotum and metanotum weakly sculptured, median setae on metanotum small. Fore tarsal tooth with pronounced tooth; fore tibia with subapical tubercle, fore femora stout (Figure 4). Basantra well developed, longer than broad; ferna and prospinasternum moderately developed; mesopresternum complete, boat-shaped. Metathoracic sternopleural sutures present. Forewing slightly constricted medially, with 2–3 duplicated cilia; sub-basal setae S1, S2 capitate, S3 blunt. Pelta bell-shaped. Abdominal tergites II–VII with 2 pairs of sigmoid wing-retaining setae, the posterior pair on tergite VII straight. Two campaniform sensilla on tergite VII close with 2 microsetae laterally, tergite VIII campaniform sensilla further apart, the microsetae almost located between them. Tube shorter than head, about twice as long its basal width; anal setae longer than tube.

**Measurements** (holotype female in microns). Body length 2255. Head, length 300, maximum width 186, postocular setae 39. Pronotum, length 223, median width 332; epimeral setae, 50. Forewing length 800. Pelta length 67, maximum width 116, tergite IX setae S1 118. Tube length 123, basal width 64; anal setae 250. Antennal segments I–VIII lengths 26, 43, 50, 46, 48, 44, 49, 38.

**Male macroptera.** Color and structure generally similar to female but smaller (Figures 5, 6). Sternal pore plates absent; S2 setae on tergite IX short. Aedeagus spoon-shaped at apex.

**Measurements** (male, in micrometers). Body length 1840. Head, length 185, maximum width 161, postocular setae 33. Pronotum, length 148, median width 263; epimeral setae, 43. Fore wing length 720. Pelta length 60, maximum width 97, tergite IX setae S1 98. Tube length 112; basal width 48; anal setae 120. Antennal segments I–VIII lengths 21, 36, 43, 41, 46, 42, 41, 36.

**Comments.** *P. erami* is apparently close to *P. denticeps* Hood and *P. distinctus* Ananthakrishnan, having a pronounced lateral forward-directed tooth behind the eyes. The new species has duplicated cilia on the forewing in comparison to the other 2 species. Moreover, *denticeps* has only 1 sense cone while *erami* has 2 on antennal segment III. In *distinctus* as in *erami*, there are 2 sense cones on antennal segment III, but the 2 species are different in

their major setae (acute in *distinctus*, blunt or capitate in *erami*). Only 2 species have been recorded from Europe, as well as from Egypt (Priesner, 1964, 1965; see also Marullo and Grazia, 2013): *P. graminium* Priesner and the type species of the genus, *P. semiflavus* Hood. The new species is different from both of these in having duplicated cilia on the forewing. The coloration also differs in these 3 species. *P. graminium* is unicolorous brown, but the other 2 are bicolored. However, abdominal segments I–II are yellow in *erami*, while they are brown in *semiflavus*.

**Etymology.** The name of the species refers to Eram, a historical Persian garden in Shiraz, Iran.

With the record of *Podothrips*, 7 genera of Haplothripini including *Bagnalliella* Karny, *Dolicholepta* Priesner, *Haplothrips* Amyot & Serville, *Karnyothrips* Watson, *Neoheegeria* Schmutz, *Plicothrips* Bhatti, and *Podothrips* have been recorded from Iran (see also Miramirkhani et al., 2014). Consequently, the number of recorded genera of Phlaeothripidae for Iran now totals 21 (see also Minaei, 2013b; Mirab-balou, 2014). The grasses examined in this survey were infested by mites, and no scale species were detected. Of the 7 genera mentioned above, the members of 4 genera are exclusively phytophagous, but members of *Podothrips* and *Karnyothrips* as well as several species in *Haplothrips* are predatory.

The presence of *Podothrips* in Iran is remarkable as there are no records of the genus in neighboring countries such as Iraq, Turkey, Pakistan, and Afghanistan. However, this is probably a consequence of inadequate surveys in these countries, rather than a reflection of the real distribution of the genus.

### Acknowledgments

During a short visit to Shiraz in August 2012, Dr Laurence Mound (Australian National Insect Collection, CSIRO, Canberra), on the basis of the only male that was available at that time, confirmed the generic assignment of the new species discussed in this paper.

Thanks to Dr Alice Wells (Australian Biological Resources Scientific, Canberra, Australia) for her editorial help and critical comments. The manuscript was improved through the advice and criticism provided by 2 anonymous referees.

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