*Zootaxa* 4683 (3): 447–450
https://www.mapress.com/j/zt/


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ISSN 1175-5326 (print edition)
**ZOOTAXA**
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4683.3.9
http://zoobank.org/urn:lsid:zoobank.org:pub:3CA08D86-8574-446F-8FC9-7B6BADBDBCA3

# Reduced antennal segmentation in a new species from Iran of the genus *Aeolothrips* (Thysanoptera: Aeolothripidae)

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The number of antennal segments in adults of the different families and genera in the insect order Thysanoptera varies between five and nine. The plesiotypic number is considered to be nine (Zhang *et al.* 2019), and fossil thrips reported to have 10 to 15 segments (Tong *et al.* 2019) are generally considered to be aberrations in which the terminal segment bears transverse striae. The 9-segmented condition occurs particularly amongst species that exhibit several other characters in a plesiomorphic state, including all Melanthripidae, two genera of Merothripidae, also most species of Fauriellidae, Stenurothripidae, Heterothripidae, and Aeolothripidae (Mound *et al.* 1980). Curiously, members of a few genera of Thripidae (Palmer & Mound 1985; Minaei 2012) also have nine antennal segments, but this is considered a reversion from the 8-segmented condition that is assumed to be plesiomorphic for that family (Zhang *et al*. 2019). Variation between eight and nine segments occurs in the genus *Anaphothrips*, and within that genus a few species exhibit intraspecific variation in antennal segmentation (Mound & Masumoto 2009). Intraspecific variation in various characters, including body size, color and wing length, is well documented for the order Thysanoptera (Mound 2005 a, b). However, amongst the 207 listed species of Aeolothripidae there has never been any report of a species bearing antennae with other than nine segments, although these vary in length and shape amongst the different genera. We here describe from Iran a curious species of the genus *Aeolothrips* that is unusual in having only seven antennal segments, with the number reduced to six or even five in a few individuals in which the terminal segments are fused. These females with 7-segmented antennae were initially considered to be aberrant individuals of some other species. However, 25 females with such antennae have been collected over two years, all from a group of *Tamarix* trees. Despite extensive studies on the genus *Aeolothrips* in Iran (Alavi & Minaei 2018, 2019), with 30 species now being recorded from this country, no other species has been found with the same colour pattern of the body and fore wings. We therefore conclude that the available specimens represent a valid species in which the antennal segmentation is reduced, and with the terminal segments unstable.

Full nomenclatural information about Thysanoptera is available on the website ThripsWiki (2019).

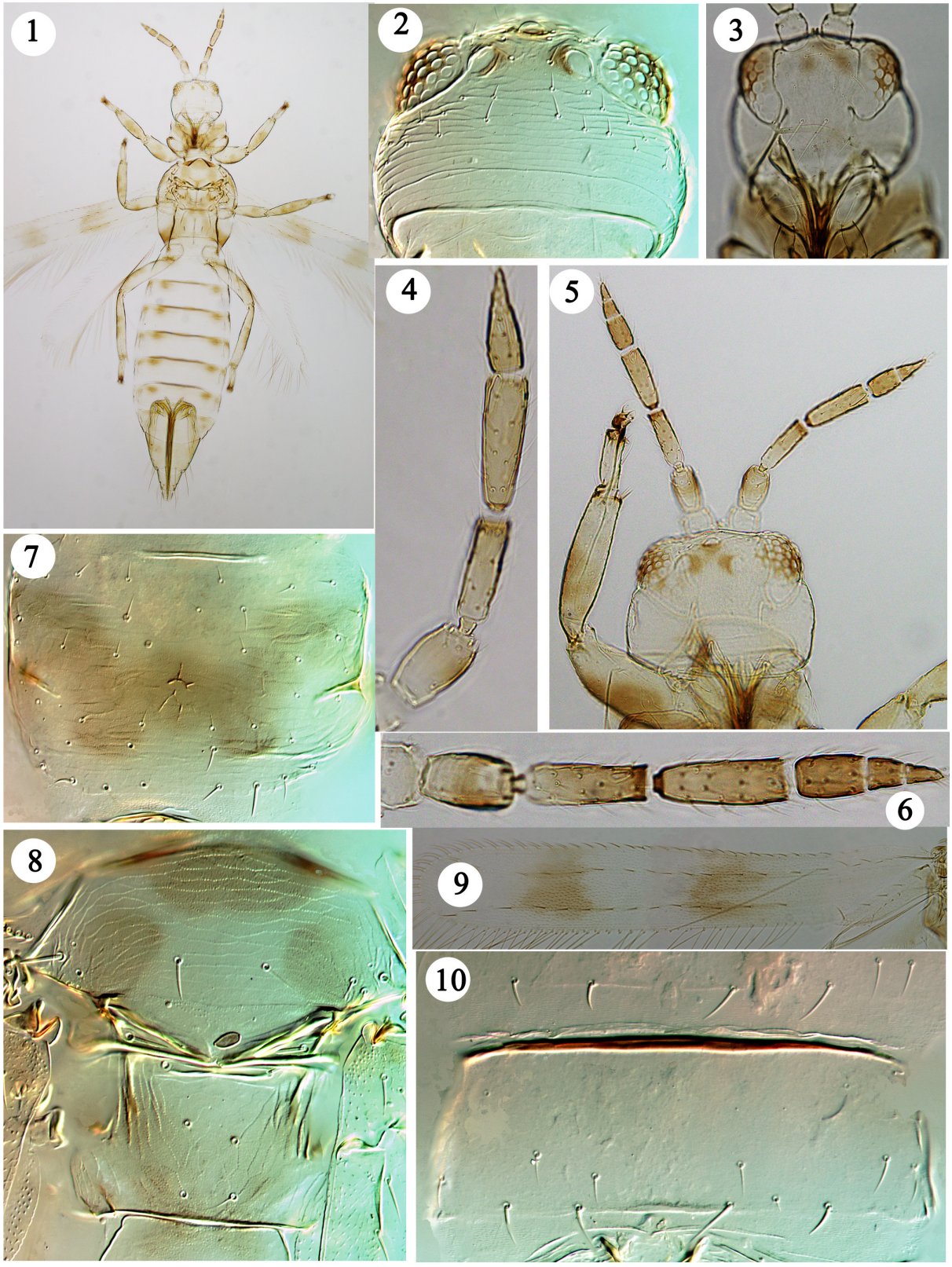
## *Aeolothrips naderii* sp. n.

*Female macroptera*. Body largely yellowish white (Fig. 1), pronotum, meso and metanotum slightly shaded, abdominal tergite I white, II–VIII with pair of brown markings laterally, antecostal line pale but weakly shaded medially on VIII, tergite IX shaded laterally, tergite X pale (Fig. 1); sternites III–VII with antecostal ridges dark; antennal segment I yellow, II–VII shaded; fore wings with two separate shaded transverse bands (Fig. 9), clavus pale; femora and tibiae yellow with light brown markings, tarsi yellow; major body setae pale.

Antennae usually with 7 segments (terminal 2 or 3 segments sometimes fused to produce 6 or 5 segments) (Figs 4, 5, 6); III with small linear sensorium, less than 1/6 as long as segment; IV a little wider at apex with linear sensorium nearly 0.25 as long as segment; V–VII forming a single unit with IV; VII slightly shorter than VI (Fig. 6). Head wider than long, not produced in front of eyes, with weak transverse lines of sculpture; 2 pairs of setae arising within ocellar triangle, one of them arising between posterior ocelli; postocular area with 5–8 pairs of setae in two widely spaced rows (Fig. 2); frontoclypeus with less than 10 pairs of setae between compound eyes, one pair of mid-lateral setae beside compound eyes slightly longer than other setae (Fig. 3); compound eyes prolonged ventrally. Pronotum with weak transverse striations, with about 20 discal setae; four to six pairs of posteromarginal setae, stouter than pronotal discal setae (Fig. 7). Mesonotum transversely striate, with pair of median setae, anteromedian campaniform sensilla absent. Metanotum with very weak reticulation (Fig. 8). Abdominal tergite I with almost no striations, with no campaniform sensilla, II–X with weak transverse striations, II–VIII with paired campaniform sensilla posterolateral to median setae; setae S1 on tergite

*Accepted by A. Cavalleri: 9 Sept. 2019; published: 9 Oct. 2019*

IX almost as long as tergite length; X with pair of reduced trichobothria bearing long axial seta. Sternite II with 2 pairs of posterior setae arising sub-marginally; III–VII with 3 pairs of posteromarginal setae of which the lateral pair is sub-marginal (V–VII sometimes with 4 pairs of which the two lateral pairs are sub-marginal); all abdominal sternites without discal setae, sternite VII with 2 pairs of sub-median accessory setae, arranged one in front of the other and with pair of anterolateral campaniform sensilla (Fig. 10). Spermatheca structure not recognisable.




**FIGURES 1–10.** *Aeolothrips naderii* **sp.n. (1)** Female; **(2)** Head; **(3)** Frontoclypeus; **(4)** Antenna (5-segmented); **(5)** Head and antennae (right: 6, left: 7-segmented); **(6)** Antenna (7-segmented); **(7)** Pronotum; **(8)** Meso and metanotum; **(9)** Fore wing; **(10)** Sternite VII.

**Measurements** (holotype female in microns). Body distended length 1430. Head length (width) 135 (172). Pronotum length (width) 125 (200). Fore wing length (median width) 680 (110). Tergite IX S1 setae 100. Antennal segments length (width) I 26 (30), II 40 (26), III 57 (17), IV 60 (17), V 27 (20), VI 17 (14), VII 15 (6).

*Male* not known.

**Specimens studied.** Holotype female, IRAN, Kohgiluyeh and Boyer-Ahmad Province, Yasuj, from *Tamarix* sp. (Tamaricaceae), 27.vi.2018 (KM 1931), deposited in the Natural History Museum, London, United Kingdom.

Paratypes, all from same place and plant: 8 females collected with holotype; 3 females, 23.viii.2017 (KM 1708); 10 females, 1.ix.2017 (KM 1709), 3 females, 26.vii.2018 (KM 1935), deposited in the Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran, with 5 females in Australian National Insect Collection, CSIRO, Canberra.

**Comments.** As is clear from the description above, and from the illustrations, this species has all of the structural character states of a typical species of genus *Aeolothrips*, with the exception of the antennal segmentation. It is therefore interpreted as an aberrant species of that genus.

Of the 25 females examined here, 16 have both antennae with 7 segments; seven of them have one antenna with 7 segments and the other antenna with 6 segments; and two of them have one antenna with 7 segments, the other with 5 segments. The number of antennal segments in this new species is unique among Aeolothripidae species, and when first examined the assumption was that the individuals were exhibiting some sort of developmental aberration. The reduction from seven segments to six or even five is clearly the result of fusion of two or three of the apical segments. But the 7-segmented condition has been found consistently in this population on *Tamarix* over a period of two years and thus is presumably inherited between generations. In trying to identify the species, if the antennal character is ignored, then the new species runs to the three species (*gloriosus*, *montivagus*, *tauricus*) in couplets 37 and 38 of the key to species of *Aeolothrips* by zur Strassen (2003). Moreover, in the key to 27 Iranian species (Alavi & Minaei 2018) this species runs to couplets 4 and 5 i.e. *gloriosus*, *montivagus* and *wittmeri*. It differs from *gloriosus*, *montivagus* and *tauricus* in the colour of the antennal segments (IV–IX dark brown in these three species but IV–VI lightly shaded in *naderii*). Moreover, it differs from *tauricus* in the head colour (brown in *tauricus*, mostly yellow in *naderii*). From *wittmeri*, the new species is easily distinguished in body colour (most parts including antennal segments are brown in *wittmeri*). The new species is also comparable to *intactus* Pelikan (1963) that was described from Uzbekistan and recently recorded from Iran (Alavi & Minaei 2019). However, these two can be distinguished from each other by the presence of two shaded bands on the fore wing of *naderii* whereas the fore wings of *intactus* are almost uniformly pale.

From all above species, *naderii* is also distinguished by the colour of abdominal segment X (uniformly yellow in *naderii* but dark at least laterally or posteriorly in others).

**Etymology.** The species is named in honor of Dr. Firouz Naderi (born 1946 in Shiraz, Iran). He is an Iranian-American scientist who spent more than 30 years in various technical and executive positions at NASA's Jet Propulsion Laboratory where he contributed to some of America's most iconic robotic space missions. He retired in 2016.

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