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Eremiothrips negevi, a new species of thrips from Israel (Insecta: Thysanoptera: Terebrantia: Thripidae)

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ABSTRACT

A new species of thrips, *Eremiothrips negevi* n. sp., is described from the Negev, an arid region in southern Israel. The new species differs from its congeners in having nine antennal segments, narrowly transverse pore plates on sternites IV–VII of males, and in the absence of drepanae on tergite IX of males. *Eremiothrips negevi* n. sp. is considered a pest to *Sarcocornia fruticosa* (Amarantaceae), which is commercially grown in greenhouses in southern Israel.

KEYWORDS: Thysanoptera, *Eremiothrips*, Israel, Negev, new species, agricultural pest.

INTRODUCTION

Until 2010, only two species of the genus *Eremiothrips* Priesner were recorded from Israel, viz. *E. antilope* (Priesner, 1923) (Priesner 1964; zur Strassen 2003) and *E. efflatouni* (Priesner, 1965) (zur Strassen 2000, 2003; Halperin & zur Strassen 2001). However, zur Strassen and Kuslitzky (2011–2012) published an updated list of the thrips of Israel with data on the material examined by the first author in the early 2000's. This list included another three *Eremiothrips* species, but the identification of each of them was accompanied with a question mark: *E.* ?*brunneus* (zur Strassen, 1975) [Dead Sea Area, Newé Zohar, 1♀ from *Atriplex* sp., 1♀ from *Arundo donax,* 27.i.2005]; *E.* ?*similis* Bhatti, 1988 [Jordan Valley, Mehola, 1♂, 3♀ from *Prosopis farcta* 20.vii.2003]; *E.* ?*taghizadehi* (zur Strassen, 1975) [Negev, Arava and the Dead Sea area, from various plants including *Prosopis farcta*, *Parkinsonia* sp., *Amaranthus* sp., *Portulaca* sp., vi–ix.2002]. Currently it is therefore impossible to know if those records were valid.

The genus *Eremiothrips* currently includes 20 named species, and is recorded from Asia (India, Pakistan, Uzbekistan, Kazakhstan, Tajikistan, Inner Mongolia), Middle East (Iran, Iraq, Saudi Arabia, Yemen), Eastern Mediterranean (Algeria, Cyprus, Egypt, Israel, Morocco), North Africa (Sudan), and Europe (Romania, the Canary Islands) (ThripsWiki 2017). Minaei (2012) noted that females of several species—*E. acutus* (Bhatti, 1972), *E. antilope*, *E. farsi* Bhatti & Telmadarraiy, 2003, *E. similis*, *E. taghizadehi* and *E. varius* (zur Strassen, 1975))—cannot at present be distinguished from each other; he followed Bhatti (1972), who separated the species based on male characters. The objective of the present paper is to describe a further new species of *Eremiothrips* from the Negev Desert, southern Israel.

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Fig. 1: Larva of *Eremiothrips negevi* n. sp. (arrowed) on *Sarcocornia fruticosa* stem.

Species of *Eremiothrips* are presumably all phytophagous on flowers and foliage (Minaei 2012). Host association in *Eremiothrips* was discussed by Minaei (2012), who concluded that the distribution of this eremophilous genus largely depended on geography rather than any specific host plant. For example, halophytes of the family Chenopodiaceae (e.g. *Halocnemon strobilaceum*, *Suaeda frutiosa*, *Traganum moquini*) are listed among the host plants of *E. efflatouni*. However, the list of plants given by zur Strassen (2003) include the Amaranthaceae, Apiaceae, Asclepiaceae, Asteraceae, Brassicaceae, Triticeae and Zygophyllaceae, with no evidence that *Eremiothrips* actually breeds on all of them.

Until now, there has been no proof that any species in this genus adversely affect crops, although these thrips are sometimes found in huge numbers in southern Iran (Minaei 2014). I report herewith that large populations of immatures (Fig. 1) and adults of a new species of *Eremiothrips* living on stems of *Sarcocornia fruticosa* (Amarantaceae) can cause damage to the halophytic plant when grown as an agricultural crop. Thrips feeding resulted in grooves and supeficial scratches on the stems (Fig. 2). Initially, the damage is similar to the typical injury to chives (*Allium schoenoprasum* (Amaryllidaceae)) caused by *Thrips tabaci* Lindeman, 1889. Numerous grooves in the lower part of the stem lead to dehydration of the canopy and, in extreme case, to plant death.

Fig. 2: Grooves and superficial scratches on *Sarcocornia fruticosa* stems as a result of *Eremiothrips negevi* n. sp. feeding. Degree of damage to stems rises from right to left.

Sarcocornia fruticosa plants were experimentally cultivated in a greenhouse at the Ramat Negev Desert Agro research Center (RNDAC) for consuming fresh or as a salty component of green salad. Damage of a similar economic scale was observed on *S. fruticosa* grown in a greenhouse in Kadesh Barnea, 20 km southwest of the RNDAC. Both sites are situated in the arid region. *Sarcocornia fruticosa*, which supports all life stages of the thrips, usually grows in salty moist soil and coastal salt marshes, and is distributed in the Mediterranean, Middle East, North Africa, Polynesia, and Central and South America. It is abundant along the Mediterranean coast of Israel, south and north of Haifa, where it grows in estuarine

marshes that are partly dry in summer. Attempts to collect thrips during October 2016 in the Na'aman estuary near Acre, however, were unsuccessful.

MATERIALS AND METHODS

Collection, preservation and slide preparation

Thrips were beaten from *Sarcocornia fruticosa* plants on a white tray and transferred to 1.5 ml vials with 96% ethanol by Dr Phyllis Weintraub (Agricultural Reasearch Organization, Israel). The specimens were mounted on slides in Canada Balsam, following Bisevac (1997) method for mounting thrips.

Morphological examination techniques

Morphological terminology follows Bhatti *et al*. (2003) and Hoddle *et al.* (2012).

The photomicrographs and measurements were taken with a phase contrast and direct interference contrast compound microscope BX61, Olympus, equipped with a high-resolution digital camera DP-73, Olympus, using the image analysis software Olympus CellSens Dimension 1.11.

Depositories

The holotype of the new species is deposited in the insect collection of the Steinhardt Museum of Natural History (SMNHTAU), Tel Aviv University, Tel Aviv, Israel. One female and one male paratypes are deposited in the Australian National Insect Collection, CSIRO Ecosystem Sciences, Canberra. Two females are deposited in the Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany. Other specimens are kept in the insect collection of the Plant Protection and Inspection Services (PPIS), Ministry of Agriculture and Rural Development, Bet Dagan, Israel.

TAXONOMY

Genus *Eremiothrips* Priesner, 1950

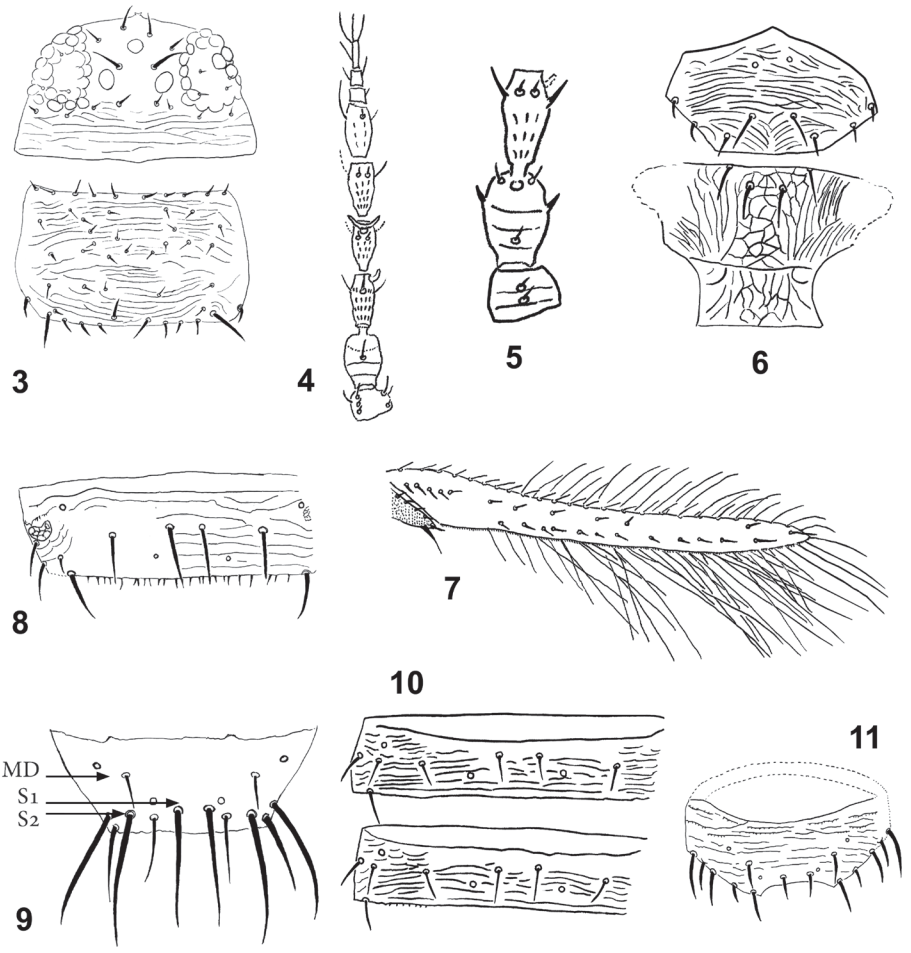
Eremiothrips negevi n. sp.

(Figs 3–14)

LSID: urn:lsid:zoobank.org:act:DFF74633-2AC1-492F-AA2E-F38FA1815A71.

Etymology: The species is named after the Negev, southern Israel, where the species was discovered.

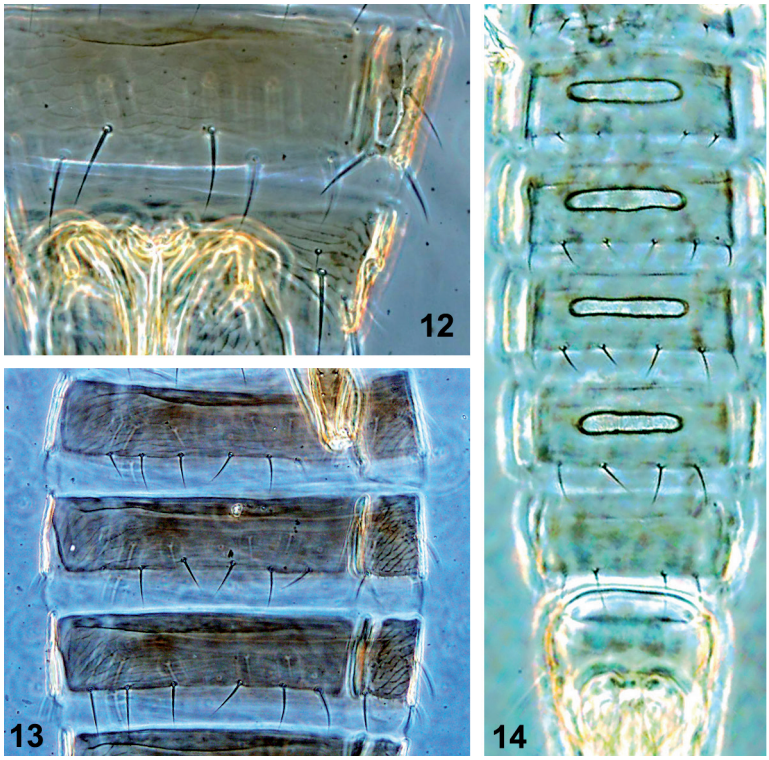
Description: Female (macropterous, brachypterous and apterous). Body uniformly light brown. Antennal segments light brown, segment I pale. Setae on head setiform, dark; fore wing uniformly grey. Head broader than long (Fig. 3), compound eyes with 6 pigmented facets ventrally; 3 pairs of ocellar setae, pair III in front of hind ocelli, inside triangle, about 1.5× as long as ocellar setae I and II; 4 pairs of postocular setae (Fig. 3), postocular seta I about twice as long as other postocular setae. Maxillary palp 3-segmented. Antenna 9-segmented, stylet 3-segmented (Fig. 4), segment I with 2 small median dorsal setae (Fig. 5), III and IV with microtrichia, segment III with pedicel and dorsally with forked sense



Figs 3–11: *E. negevi* n. sp.: (3–10) female: (3) head and pronotum, (4) ventral aspect of antenna, (5) dorsal aspect of antennal segments I–III, (6) mesonotum and metanotum, (7) forewing, (8) tergite VIII, (9) tergite IX [MD–mid-dorsal setae], (10) tergites V–VI; (11) male, tergite IX.

cone, segment IV ventrally with forked sense cone, segment VI with sensorium reaching the anterior third of segment VIII. Segment VI without pedicel (Fig. 4).

Pronotum with fine transverse striae, one pair of posteroangular setae twice as long as median posteromarginal setae (Fig. 3); about 20 discal setae; anterior margin with 5 pairs of setae, posterior margin with 4–6 pairs of setae stouter and thicker than discal setae (Fig. 3), ferna divided into two halves, unconnected. Mesonotum with transverse lines, one pair of campaniform sensilla present (Fig. 6). Mesoacrotergite with 4 pairs of microsetae. Metanotal sculpture polygonal, median setae situated 12 μm caudad of anterior margin, stouter than outer pair



Figs 12–14: *E. negevi* n. sp.: (12, 13) female: (12) sternite VII, (13) sternites III–V; (14) male, pore plates on sternites IV–VII.

located at anterior margin of metanotum, no campaniform sensilla present (Fig. 6); mesothoracic sternopleural suture present; spinula present on mesosternum, absent from metasternum. Fore wing, when present, slender with posterior cilia wavy; first vein with 5 setae on basal third, 5 in middle part of wing (in brachypterous female there are up to 3 and in fully winged female there are up to 7 setae in middle part of wing) and 2 setae in distal half, second vein with 12 setae (Fig. 7); clavus with 4 veinal and 1 discal setae.

Abdominal tergites with weak transverse sculpture medially, diagonal and denser laterally; with neither ctenidia nor craspeda; posterior margins of tergites VI–VII bear small teeth, mainly laterally (Fig. 10). Two pairs of tergal campaniform sensilla present, one posterolateral to median (S1) setae, near posterior margin and second close to anterior margin of tergite, above middle (of three) lateral discal setae (Fig. 9). Tergite II with lateral setae; tergite VIII with complete and developed comb of broad-based unevenly spaced short teeth and surface with lightly transverse linear sculpture (Fig. 8). On tergite IX median dorsal setae short, not extending to posterior margin of tergite (Fig. 9); tergite X with longitudinal split. Ovipositor

developed; pleurotergites with no discal setae. Sternites with neither discal setae nor marginal craspedum, sternite II with 2 pairs of marginal setae, sternites III–VII with 3 pairs; sternite VII with faint polygonal pattern and with median setae S1 not in a marginal position, located at a distance of *ca*. one-third of their length anterior to hind margin of sternite (Fig. 12). Posteromarginal setae of sternites (except for VII) all marginal in position, equal in length and spacing. Sternites medially with fine transversed stria, changing to diagonal laterally (Fig. 13). Pleurosternites diagonally striated, with no discal setae, with a large posteromarginal seta and 5–10 small triangular teeth marginally.

Measurements (holotype, μm). Body length, 1340. Head length, 100; width across eyes, 126; ocellar setae, III 23. Pronotum length, 107; maximum width, 170; posteroangular setae, 38. Fore wing length, 655. Mesonotum median setae, 19. Metanotal median setae, 26; S2, 26. Tergite IX setae S1, 63; S2, 67. Antennal segments II–IX length, 30, 33, 25, 26, 24, 10, 8, 17. Outer sense cone on segment VI, 20.

Male (macropterous, brachypterous and apterous). Similar to female in color and details but smaller, with a narrowly transverse pore plate on discal area of each sternite IV–VII (Fig. 14); tergite IX posterior margin without drepanae (Fig. 11).

Measurements (paratype, μm). Body length, 880. Head length, 80; width across eyes, 105; ocellar setae III, 16. Pronotum length, 86; maximum width, 150; posteroangular setae, 23. Fore wing length, 93 (males of high population in winter 2014–2015 were all wingless; males of low population in the summer 2017 had full size wings of 440–455 μm). Metanotal median setae, 15. Sternites IV–VII pore plates (width/length): 70/12, 71/13, 72/8, 62/12. Antennal segments III–IX, 23, 26, 27, 30, 7, 7, 14.

Holotype: ♀ **Israel:** Ramat Negev Desert Agro research Center [30.982430°N 34.7101186°E], on stem of *Sarcocornia fruticosa*, 14.xii.2014, P. Weintraub (SMNHTAU).

Paratypes: 12♀ (2 apterous; 4 brachypterous), 4♂ (1 apterous; 3 brachypterous), same data as holotype, 14.xii.2014 and 1.i.2015.

Comparison: The new species is unique amongst its congeners in having the wing polymorphism (macropterous, brachypterous and apterous). The character suite that best delineates this species from other members of the genus is a combination of nine antennal segments, narrowly transverse pore plates on sternites IV–VII of males, and the absence of drepanae on tergite IX of males. *Eremiothrips farsi* also lacks drepanae and has 9-segmented antennae, but its male has slightly oval, almost round pore plates. The species of *Eremiothrips*, including the new species, are usually characterized by the presence of one pair of setae on the posterior angles of the pronotum. However, neither *E. efflatouni* nor *E. eshghii* (Minaei, 2014) has long setae on the pronotum, and *E. bhattii* (Minaei, 2012) has two pairs.

Remarks: The record of the new species in the arid zone of southern Israel corroborates the preferred habitat of other *Eremiothrips* species.

When large populations of *E. negevi* develop on halophytes cultivated in a greenhouse under warm conditions, the species may be considered as a plant pest.

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