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Revision of *Heringina* Aczél, 1940 (Diptera: Tephritidae), with description of a new species from Iran and Turkey

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Abstract

The genus *Heringina* Aczél, 1940 is revised and shown to belong to the *Tephritis* group of genera and is closely related to *Tephritis* and *Multireticula.* Literature records are revised, and available collection material is listed. The genus includes two species: *H. guttata* (Fallén 1814) originally described from the sand dunes of southern Sweden and occurring from the Baltic region through Ukraine and Caucasus to Turkey, Iran, Kazakhstan, and Kyrgyzstan, and *Heringina arezoana* **sp. nov.**, found in Iran and eastern Turkey. Both species are described, illustrated, and keyed. Host plants and localization of larvae remain unknown; adult flies of both species are commonly swept from (but never reared) flower heads of *Helichrysum arenarium*. Other records of host plants listed by Boie (1847) and repeated in most important European monographs, are obviously based on misidentified flies. Possible relationships of *Heringina* with *Tephritis* and *Multireticula* are discussed.

Key words: Diptera, Tephritidae, Tephritinae, *Heringina, Multireticula, Tephritis*

Introduction

A monotypic genus *Heringina* was established based on the comparative analysis of its type species with *Tephritis* Latreille 1804 and *Euaresta* Loew 1861 by Aczél (1940). Originally described as *Tephritis guttata* Fallén 1814, it was transferred by Hendel (1927) to a New World genus *Euaresta* based on the superficially similar wing pattern. Aczél (op. cit.) has shown that the vein R_{4+5} is setulose dorsally up to the crossvein r-m, differing from both other genera. Another important character of the genus he notified is the presence of bulla (a thickening of wing membrane) in anterior part of cell r_{4+5} at the dm-cu crossvein.

The taxonomic position of *Heringina* remains poorly known. Norrbom *et al*. (1999) classified the tribe Tephritini into six main groups (*Campiglossa* group, *Dyseuaresta* group, *Euarestoides* group, *Spathulina* group, *Sphenella* group, *Trupanea* group) but left *Heringina* in the *incertae sedis* group. Later, Merz (1999) established the *Tephritis* group of genera that included the *Trupanea* group and many genera *incertae sedis* sensu Norrbom *et al*. (1999), but noted that *Spathulina* Rondani, *Elgonina* Munro, *Heringina* Aczél, and *Migmella* Munro form a possibly monophyletic group of genera based on the shining abdominal tergites, which may be an apomorphy of this group.

Later, Freidberg & Merz (2006) revised the Afrotropical *Elgonina, Gymnosagena* Munro and *Marriottella* Munro and keyed *Heringina* and *Tephritis* together with some other genera of Tephritinae that have shining abdominal tergites.

Smit *et al*. (2013) executed a Neighbour-joining analysis of about 135 European species of Tephritidae using COI sequence, which surprisingly placed *Heringina* as an in-group among species of the genus *Tephritis*. None of these papers contains sound proof of phylogenetic relationships of *Heringina*, and its taxonomic position still remains unresolved.

Recently, a hitherto undescribed species of *Heringina* was found by the authors in several parts of Iran and

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Female: tergite 1 brownish with dark brown quadrate spot in the middle, tergite 2 yellowish with brown band. Tergites 3–5 blackish, grayish microtrichose, tergite 6 shining black. Oviscape shining black, yellow in lateral. All setae and setulae dark brown except setulae on tergite 1 (Fig. 18). Aculeus brown, 4 times as long as wide, with one pair of small preapical steps (Figs. 19–20). Eversible membrane as in Fig. 21. Spermathecae papillose, teardrop shaped (Fig. 25); round with narrowed neck.

Measurements. Female. Body length 4–4.5 mm, wing length 3.75–4.4 mm, aculeus length 1–1.25mm; Male. Body length 3.25–4.25 mm, wing length 3.25–4.5 mm.

Etymology. The new species is named in honour of Arezoo Najarpoor, who was one of the first collectors of this species.

Host plant. Unknown. The flies were swept from *Helichrysum arenarium* (L.) Moench, which is a possible host plant.

Discussion. The overlap between diversity of two species of *Heringina* lies in the North-Eastern Iran and Turkey, where both species live sympatrically, and sometimes in the same habitat. Its distribution in the Baltic part of Europe seems to be a result of a very late, almost certainly of postglacial, Neogene time. It is believed very rare or extinct at the edge of its historic distribution in Czech Republic and The Netherlands, and has not been recorded in Southwest Europe. Its possible host plant genus, *Helichrysum* Mill. 1754, with almost 600 species, occurring mostly in Africa (especially in mainland Southern Africa), Madagascar, Southern Asia and Australia, belongs in the tribe Gnaphalieae (family Asteraceae). Flower heads of the plants of that tribe are commonly infested by numerous species of another genus of the Tephritini, *Actinoptera*, which has it centre of diversity in Western and Southern Africa, and is less diverse in Mediterranean Europe, Southern Asia and Australia. *Heringina* is another genus certainly associated with *Helichrysum*, but its close relatives in the Afrotropical Region are not known so far. Afrotropical *Multireticula perspicillata* (Bezzi 1924), which is near the base of the phylogeny of the *Tephritis* group and known to be reared from terminal galls on *Helichrysum* (see Merz 1999), has a broad, round wing, radiate pattern and four hyaline spots beyond pterostigma in r_1 similar to *Heringina* spp. Its wing pattern and shape strongly resembles that in *H. arezoana* **sp. nov.**, but other characters (chaetotaxy, structure of male and female genitalia) neither support, nor contradict their close relationships. *Multireticula perspicillata* differs with *H. arezoana* in having many small hyaline spots in wing pattern, abdomen without shiny black tergites and with paired spots on tergites 3 to 5. Some undescribed species of *Tephritis* swept from Gnaphalieae plants are recognized in the collections by SVK. Possible relationships of *Heringina* with *Multireticula* and *Tephritis* need more detailed phylogenetic analysis, which is out of the scope of this study.

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