

## A new species of *Tephritis* Latreille (Diptera: Tephritidae) from Turkey

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**Abstract:** *Tephritis ozaslani* sp. nov. is described from Artvin Province of Turkey and placed in the *T. pulchra* species group. The key to the *T. pulchra* group is provided, which includes 9 species. The main characters that distinguish the new species from the closely resembling Palearctic species, *T. cometa israilis* Freidberg, *T. acanthiophilopsis* Hering, *T. erdemlii* Kütük, *T. divisa* Rondani, *T. recurrens* Loew, *T. merzi* Freidberg & Kütük, and *T. hurvitzi* Freidberg, are discussed. In addition, *Inula oculus christi* L. (Asteraceae) is determined as a host plant of the new species.

**Key words:** New species, *Tephritis*, Tephritidae, Turkey

### Türkiye'den *Tephritis* Latreille (Diptera: Tephritidae)'in yeni bir türü

**Özet:** Türkiye'nin Artvin ilinden *Tephritis ozaslani* sp. nov. yeni tür olarak tanımlanmış ve *T. pulchra* grubuna yerleştirilmiştir. 9 türü içeren *T. pulchra* grubunun teşhis anahtarı yapıldı. Yeni türün yakın Palearktik türlerden *T. cometa israilis* Freidberg, *T. acanthiophilopsis* Hering ve *T. erdemlii* Kütük, *T. divisa* Rondani, *T. recurrens* Loew, *T. merzi* Freidberg & Kütük, *T. hurvitzi* Freidberg'ten ayırımı sağlayan önemli karakterler tartışılmıştır. Ayrıca *Inula oculus christi* L., (Asteraceae) yeni türün konukçu bitkisi olarak belirlenmiştir.

**Anahtar sözcükler:** Yeni tür, *Tephritis*, Tephritidae, Türkiye

### Introduction

According to Norrbom et al. (1999) and Korneyev and Diribek (2000), with about 170 species, *Tephritis* Latreille is the sixth largest genus of Tephritidae and the third largest genus in the Tephritinae. Although the genus is known from all zoogeographic regions, the majority of the species (about 120) are Palearctic. The most complete key to species is that of Hering

(1944), which is outdated. Modern keys to species for several countries are available, such as those of White (1988) for Great Britain, Freidberg and Kugler (1989) for Israel and nearby areas, Merz (1994) for North and Central Europe, Wang (1996) for China, and Kütük (2003) for Turkey, but the coverage, especially for West Asia, is limited. Görmez (2011) reported 115 species of fruit flies from Turkey.

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Most species of *Tephritis* infest the flower heads of Asteraceae hosts, collectively belonging to several tribes, with or without the induction of galls. A few species induce the formation of galls in the upper or subterranean parts of stems of Asteraceae (Freidberg, 1984). The *Tephritis pulchra* group is distinguished by some morphological characters from other *Tephritis* (see Freidberg and Kütük, 2002).

In the summer of 2009, we collected a series of *Tephritis* adults in Turkey as a new species that undoubtedly belongs to the *T. pulchra* group, which infested the flower heads of *Inula oculus christi* Linnaeus. The new species appears to be closely related to *T. erdemlii*, *T. acanthiophilopsis* and *T. cometa israelis*, *T. divisa*, *T. recurrens*, *T. merzi*, and *T. hurvitzii*. This new species is described and illustrated below.

### Material and methods

This study is based mainly on 3 male and 3 female specimens collected in Artvin Province of Turkey in 2009. The terminology and morphological interpretations used in this paper follow those of White et al. (1999). Type specimens were deposited in the Department of Biology, Faculty of Science and Art, Gaziantep University, Gaziantep, Turkey, and the Entomology Museum, Erzurum, Turkey (EMET). The host plant of the new species was identified by Prof Dr Hüseyin Zengin (Atatürk University, Erzurum, Turkey).

### Results

#### Key to species of the *Tephritis pulchra* group

1. Wing pattern: border between hyaline base and main dark area more or less perpendicular to longitudinal axis of wing, meeting posterobasal trail approximately posterior to base of pterostigma (in doubtful cases, such as some specimens of *T. pulchra*, cell  $r_{2+3}$  often with 2 hyaline spots near crossvein R-M, neither being a distinct continuation of the basalmost hyaline spot in cell  $r_1$ ) ..... 2
- Wing pattern: proximal border of main area generally oblique in relation to longitudinal axis of wing, meeting posterobasal trail approximately posterior to apex of pterostigma ..... 5

2. Cell  $r_{2+3}$  near crossvein R-M with 2 hyaline spots, 1 aligned proximal and 1 distal to crossvein ..... 3
- Cell  $r_{2+3}$  near crossvein R-M with only 1 hyaline spot, aligned distal to crossvein ..... 4
3. Cell  $cu_1$  with extensive pattern which reaches distal, desclerotized part of vein  $A_1+Cu_2$ , and with 3 rays or ray-like marks reaching wing margin (including ray on apex of vein  $Cu_1$ ); oviscapal measure about 3-4; larger species (wing length: 4.0-4.9 mm) (inducing galls at root base of *Tragopogon dubius*) ..... **heliophila** Hendel
- Cell  $cu_1$  with less extensive pattern that does not reach distal, desclerotized part of vein  $A_1+Cu_2$ , and with 2 rays or ray-like marks reaching wing margin; oviscapal measure about 2.5; smaller species (wing length: 3.5-4.7 mm) (inducing galls in flower heads of *Scorzonera cana* and *S. laciniata*) ..... **pulchra** (Loew)
4. Two marginal hyaline spots in cell  $r_1$  immediately distal to pterostigma small, nearly equal in size, rounded posteriorly, usually not reaching vein  $r_{2+3}$ , and not extending into cell  $r_{2+3}$ ; hyaline spot in cell  $r_{2+3}$  posterior to these spots small, isolated, not reaching veins (inducing flower head galls on *Scorzonera hispanica*) ..... **carmen** Hering
- Proximal marginal hyaline spot in cell  $r_1$  immediately distal to pterostigma about twice as large as second spot, triangular and oblique, usually extending into cell  $r_{2+3}$ , and then reaching or almost reaching vein  $R_{4+5}$  (inducing flower head galls on *Scorzonera hirsuta*)..... **scorzonerae** Merz
5. Big hyaline area in cell  $r_{2+3}$  does not reach vein  $R_{4+5}$ ; posterobasal trail extends to posterior margin of wing..... 6
- Big hyaline spot in cell  $r_{2+3}$  reaches vein  $R_{4+5}$ ; posterobasal trail does not extend to posterior margin of wing ..... 8
6. Posterobasal trail wider than hyaline gap between it and posterior margin of wing; cell  $r_1$  with small distal hyaline spot in addition to 2 large basal hyaline spots; small gray or blackish markings in hyaline base of wing more or less distinct ..... **recurrens** Loew

- Posterobasal trail narrower than, or equal to, hyaline gap between it and posterior margin of wing; cell  $r_1$  without small distal hyaline spot in addition to 2 large basal hyaline spots; small gray or blackish markings in hyaline base of wing variable ..... 7
- 7. Hyaline base of wing without small gray or blackish markings; dark preapical ray in cell dm, usually reaches hind margin of wing, even if interrupted in middle; mesonotum with indistinct striation; larger species (wing length 3.6-4.9 mm) ..... *hurvitzi* Freidberg
- Hyaline base of wing with distinct gray or blackish markings; dark preapical ray in cell dm usually does not reach hind margin of wing; mesonotum with distinct black and gray striation; smaller species (3.2-4.5 mm) ..... *merzi* Freidberg and Kütük
- 8. Minimum 4 or 5 hyaline areas present in cell m; larger species (female body: 7.0-8.4 mm, wing: 5.5-6.1 mm; male body: 6.0-7.1 mm, wing: 4.5-5.1 mm)..... *ozaslani* sp. nov.
- Maximum 3 hyaline areas present in cell m; smaller species (female body: 5.8-7.7, wing: 4.2-5.4; male body: 4.7-5.4; wing: 4.0-4.8) ..... *erdemlii* Kütük

*Tephritis ozaslani* sp. nov. (Figures 1-9)

#### Type material:

Holotype: ♀, Turkey, Artvin, Yusufeli, 40°43'N, 41°40'E, 700 m, 07.07.2009, M. Kütük and N. Bayrak. Paratypes; 2 ♀♀, 3 ♂♂ (same data as holotype) collected on *Inula oculus christi*. The holotype is in excellent condition and was deposited in the University of Gaziantep's Department of Biology, Gaziantep, Turkey, together with 3 paratypes. There are also 1 ♀ and 1 ♂ deposited in the Entomology Museum, Erzurum, Turkey.

#### Diagnosis

*Tephritis ozaslani* and *Tephritis erdemlii* have somewhat similar wing patterns and body measurements, by which they can be readily distinguished from the other species of *Tephritis*. The clear difference in the wing patterns of these 2 species is that 2 hyaline areas are present in cell  $r_1$  of *T. ozaslani* whereas 3 areas are present in cell  $r_1$  of *T. erdemlii*. Furthermore, the wing pattern extends to cell  $cua_1$  and the axillary lobe in *T. ozaslani*, but the wing pattern does not extend to cell

$cua_1$  and the axillary lobe in *T. erdemlii*; apical fork of *T. ozaslani* is enlarged at wing apex whereas apical fork of *T. erdemlii* is not enlarged; second big hyaline area extends to cell  $r_{2+3}$  of *T. ozaslani*, but does not extend to cell  $r_{2+3}$  of *T. erdemlii*.

#### Description

**Head:** Mostly yellow to brown; yellowish on occiput and ocellar tubercle; anterior orbital setae brown; postorbital setae white; first flagellomere yellowish to brown; basal half on arista yellow, apical half black; pedicel 0.3-0.4 times as long as first flagellomere and with yellow setulae; palpus mostly yellow, brownish at apex; frontofacial angle about 135°; genal seta distinct and brownish.

**Thorax:** Ground color black; microtrichia gray, scutellum shiny and silvery; most of setae brown and acuminate; setulae whitish, 30-35 pairs present on margin of scutellum; basal scutellar seta 1.5 times as long as apical scutellar seta; halter yellow.

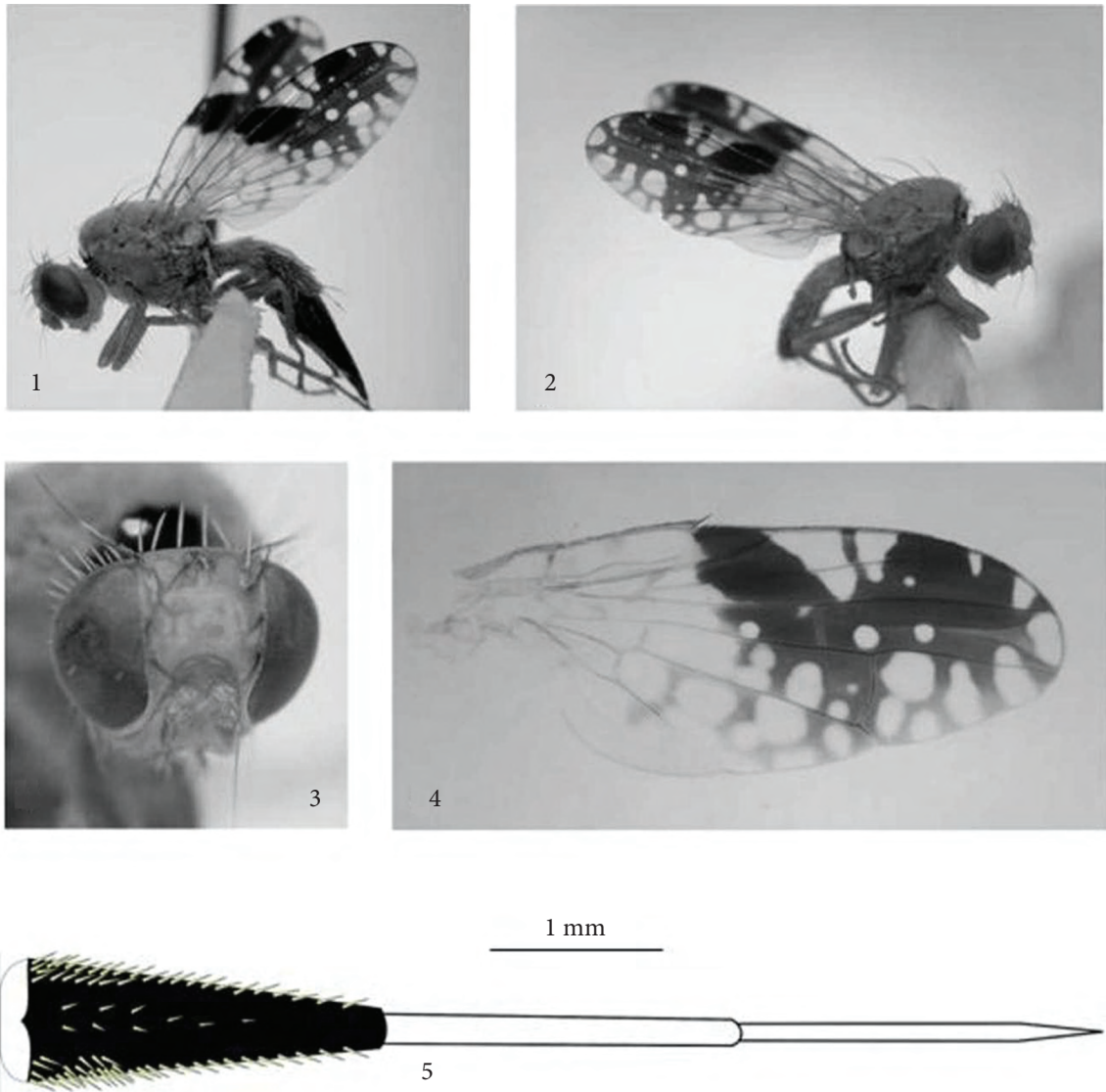
**Legs:** Setulae mostly yellowish, some brown; tarsi brownish; 6-8 setulae present on femora of first legs.

**Wing:** Venation typical for the genus; vein  $R_{4+5}$  ventrally with 9 setulae, on basal section 3; basal half mostly hyaline, apical half brown stellate; wide hyaline costal indentation present distal to pterostigma (including apex of pterostigma), ending slightly distal to crossvein R-M and extending to vein  $R_{4+5}$ ; cell  $r_1$  with 1 additional hyaline area (2 total) extending beyond vein  $R_{2+3}$  (Figure 4); apical fork is enlarged in apex; the wing pattern extending cell  $cua_1$  and axillary lobe.

**Female abdomen:** Ground color black; microtrichia gray with whitish setulae; oviscape shiny black with whitish setulae on margin; aculeus pointed with 3 pairs of hairs at apex (Figure 8); 5 pairs setae present on posterior margin of 6th tergite; oviscape as long as posterior 3 terga of preabdomen.

**Male abdomen:** Ground color black; microtrichia gray with whitish setulae; 5 pairs setae present on posterior margin of 5th tergite; 5th tergite as long as penultimate 2 terga; epandrium (Figures 6 and 7) pale yellow with brown setulae; proctiger pale yellow with brown setulae (Figure 6); glans sclerotized (Figure 9).

**Measurements:** Female body: 7.0-8.4 mm; female wing: 5.5-6.1 mm; male body: 6.0-7.1 mm; male wing: 4.5-5.1 mm.



Figures 1-5. *Tephritis ozaslani* sp. nov.: 1) holotype female; 2) male; 3) head; 4) wing; 5) female postabdomen.

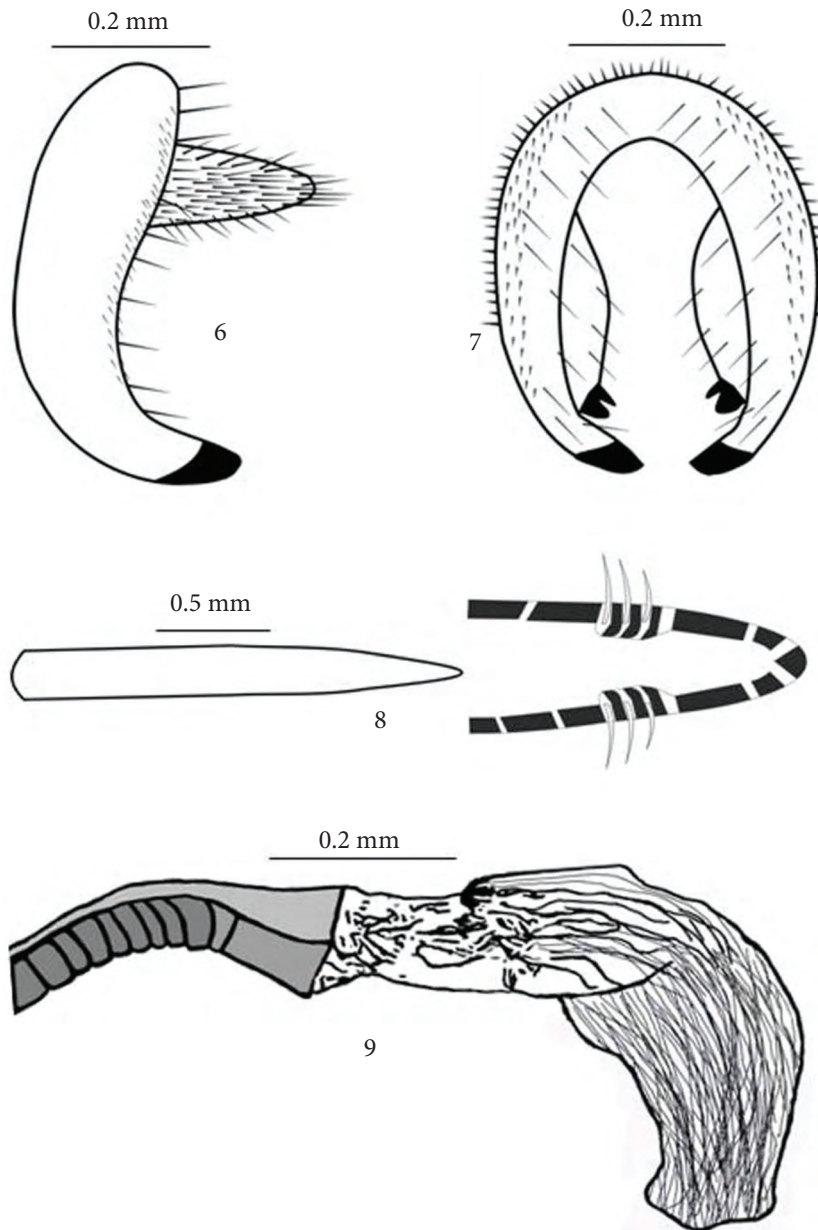
*Host plant and biology:* Unknown, specimens were collected on *Inula oculus christi* L. (Asteraceae).

### Discussion

Sharing with them similar wing patterns (basal half mostly hyaline, apical half brown stellate, wide hyaline costal indentation present beyond pterostigma, including apex of pterostigma), the new species is placed in the *T. pulchra* group, especially closely resembling *Tephritis erdemlii* Kütük from Turkey; *T. acanthiophilopsis* Hering from Turkey

and *T. cometa israelis* (Loew), known from Greece, Syria, and Israel; *T. divisa* Rondani from Turkey; *T. recurrens* Loew from Turkey; *T. merzi* Freidberg & Kütük from Turkey; and *T. hurvitzi* Freidberg from Turkey.

*Tephritis acanthiophilopsis* has a similar wing pattern but the hyaline areas are more restricted, including the large hyaline costal indentation, which often does not extend to vein  $R_{4+5}$  and is often divided into anterior and posterior rounded spots, the 2 other hyaline spots usually not extending to vein  $R_{2+3}$ ;



Figures 6-9. *Tephritis ozaslani* sp. nov.: 6) epandrium and proctiger, lateral view; 7) epandrium and surstyli, posterior view (proctiger removed); 8) aculeus, dorsal view, enlarged at apex; 9) glans, dorsolateral view.

oviscape is 0.4 times as long as preabdomen, length of female specimens is less than 5.4 mm. *Tephritis cometa israelis* has a similar wing pattern but only 1 hyaline spot extends to vein  $R_{2+3}$ , 2 other hyaline areas do not extend to vein  $R_{2+3}$  in cell  $r_1$ , oviscape is 0.3 times as long as preabdomen, length of female specimens is less than 4.5 mm. *Tephritis erdemlii* has

hyaline spots on the wing (3 hyaline spots extending to or crossing vein  $R_{2+3}$  in cell  $r_1$ ), oviscape is 0.6 times as long as preabdomen, length of female specimens is more than 5.8 (5.8-7.7) mm. *Tephritis recurrens* has hyaline spots on the wing (3 hyaline spots extending to or crossing vein  $R_{2+3}$  in cell  $r_1$ ), length of female specimens is more than 3.9 (3.9-4.4) mm. The new

species differs from these 4 species by the 2 hyaline areas in cell  $r_1$  and both hyaline areas extend to cell  $r_{2+3}$ ; apical fork is enlarged in apex; the wing pattern extends to cell  $cua_1$  and axillary lobe, length of female specimens is more than 7.0 (7.0-8.4) mm.

*Tephritis divisa*, *Tephritis merzi*, and *T. hurvitzii* have a similar 2 hyaline areas in the  $r_1$  cell but the hyaline areas are more restricted, including the small hyaline area not extending to vein  $R_{2+3}$  in these species; the small hyaline area wing of the new species extends beyond vein  $R_{2+3}$ .

All compared species are apparently associated with different host plants: *T. cometa israelis* with *Cirsium gaillardotii* (Fridberg and Kugler, 1989), *T. acanthiophilopsis* with an unknown host (Hendel, 1927) replaced by *Cirsium tuberosum* (Freidberg, 1984), *T. erdemlii* with *Cirsium vulgare* (Kütük, 2008), *T. divisa* with *Picris echiodes* (Merz, 1994), *T. recurrens* with *Scorzonera* sp. (Merz, 1994), *T. merzi* with *Scorzonera kotsyi* (Freidberg & Kütük 2002), and *T. hurvitzii* with *Scorzonera syrica* and *Tragopogon longirostris* (Freidberg & Kugler, 1989). *T. ozaslani* sp. nov. is believed to feed in the flower

heads of *Inula oculus christi* L. (Asteraceae). The arms of the apical fork are narrow and longer in the other species, whereas those of *T. ozaslani* sp. nov. are slightly broadened and shorter.

### Etymology

This species is dedicated to Prof Dr Mehmet Özaskan (Department of Biology, Faculty of Science and Art, Gaziantep University, Gaziantep, Turkey), a friend and an excellent biologist, who contributed much to the study of virology in Turkey.

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