STUDY OF THE GENUS *UROPHORA* ROBINEAU-DESVOIDY, 1830 (DIPTERA: TEPHRITIDAE) IN ECEBSIR REGION WITH TWO SPECIES AS NEW RECORDS FOR IRAN

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ABSTRACT: Based on specimens collected from Ecebshir area during 2009-2010, five species of *Urophora* were recognized of which two species *Urophora affinis* and *U. solstitialis* are new records for the Iran insect fauna. Identification key, the locality, host plants as well as photos of verified species are provided.

KEY WORDS: Tephritidae, Fruit flies, Myopitinae, *Urophora*, Ecebsir, Iran.

Ecebsir region is located in south western of East Azerbayjan province, close to eastern beach of the Urumiyeh Lake with UTM (Universal Transfer Mercator) coordinate system, X from 572964.47 to 599802.25 E; Y from 4147773.18 to 4161843.04 N and varying latitude from 1744 m to 2113 m. This area has rich grass lands with various species of Astraceae, Umblifera, Legominaceae and Ronunculaceae.

Tephritidae (true fruit flies) is a large family of the order Diptera with more than 4400 described species around the world. Considering their damage on fruit plantations, they are important insects from the agricultural point of view as well as forest entomology (Merz, 2001).

The genus *Urophora* includes about 100 species, sometimes known as gall flies, most of which are Palaearctic. However, the genus also includes seven Nearctic species, thirty-two Neotropical species, five Afrotropical species and two Oriental species (White & Korneyev, 1989).

The genus was first named by Meigen (1800) as *Euribia,* to include eighteen unlisted species Later, *Urophora* was described by Robineau Desvoidy (1830), who included *Musca cardui* Linnaeus, which was subsequently designated as the type species by Westwood (1840) Between 1835 and 1855 (White & Korneyev, 1989).

Morphologically, proboscis elongated with narrow labella, posteromarginal wing cells (alar cells) not tapering toward apex; M_{1+2} ending in alar margin near apex (Richter, 1970).

Some *Urophora* species are practical or potential agents for the biological control of composite (Asteraceae) plants of Palaearctic origin which have become noxious to weeds. The species which have been successfully established are *U. affims* and *U. quadnfasaata* for *Centaurea maculosa* and *C. diffusa, U. cardui* for *Cirsium arvense,* and *U. stylata* for *Cirsium vulgar*. Two additional species are currently being considered as potential biocontrol agents, namely *U. urunaseva* for *Centaurea solstitiahs,* and *U. solstitialis* for *Carduus acanthoides* and *C. nutans* (Harris 1984a,b; Harris & Wilkinson, 1984; White & Clement, 1987 and

White & Korneyev, 1989). Since the *Urophora* species in Ecebsir region have not been investigated thus it subjected for the present study.

MATERIALS AND METHODS

Adult specimens were swept weekly on flowers head of Asteraceus plants in twenty-three localities which situated through the working area during 2009-2010 (Fig. 1). The samples were killed in a killing jar containing potassium cyanide and the voucher specimens were deposited at Insect Museum of Tabriz University. The species were identified based on valid keys (Freidberg & Kugler, 1989; Freidberg & Mathis, 1986; Richter, 1970).

RESULTS

Five species of the genus *Urophora* were identified which infested the head of Astraceus plants. Two of them marked with an asterisk are being newly reported for the Iran insect fauna and all of them listed as follows: **Urophora affinis, U. impicta, U. jaceana, U. quadrifasciata* and **U. solstitialis.*

Key to studied species of the genus *Urophora*:

1. Wings with 3 or 4 distinct crossband (Fig. 2; a, b, c, d).....**2**
- Wings without distinct crossband (Fig. 2; e).....*U. impicta*
2. Wings with 3 distinct crossband (Fig. 2; a).....*U. affinis*
- Wings with 4 distinct crossband (Fig. 2; b, c, d).....**3**
3. Aculeus with subapical steps (Fig. 3; a, b).....**4**
- Aculeus without subapical steps (Fig. 3; c).....*U. quadrifasciata*
4. Femora yellow, whit black stripes .....*U. solstitialis*
- Femora yellow, whitout black stripes.....*U. jaceana*

Species *Urophora* Robineau-Desvoidy, 1830 in Ecebsir:

***Urophora affinis* Frauenfeld, 1857**
Material examined: 5 specimens (3♂♂, 2♀♀): Gunbed; 37°30' N 46°01' E, 1437 m, 13 February 2010 (collected by Y. Gharajedaghi, Depasited at Insect Museum of Tabriz University).
Host plants: *Centaurea* spp. (Korneyev & With, 1993).
Distribution: Central Europe, east to Afghanistan; introduced to western North America (White & Korneyev, 1989). New record for the Iran fauna.
Diagnostic characters: *U. affinis affinis*; **Head**. first flagellomere orange; palpi yellow, darkening to orange api-cally; palpi shape similar to U.cardui; gena about 0.3-0.4 times eye height; labellum about 1.5 times length of first flagellomere. **Thorax**. scutum with a dense tomentum which obscures the underlying cuticle; postpronotal lobe largely yellow; basal scutellar seta on or near margin of central yellow and marginal black area; femora orange. **Wing**. base hyaline; subbasal crossband absent, or represented by a faint mark extending between veins Ri and Ai; discal crossband sometimes broken into spots; discal and preapical crossbands separate; hyaline area between preapical and discal crossbands 3-4 times as broad along vein R4+5 as breadth of preapical crossband on vein R4+5; preapical and apical crossbands separate (Fig. 2; a).

***Urophora impicta* Hering, 1942**
Material examined: 1 specimens (1♀).
Host plants: *Cousinia eryngioides* (Korneyev & White, 1993).
Distribution: Russia, Turkmenistan, Afghanistan (Thompson, 1998).

***Urophora jaceana* Hering, 1935**
Material examined: 9 specimens (7♂♂, 2♀♀).
Host plants: *Centaurea jacea* L., and *C. nigra* L. (White & Korneyev, 1989).
Distribution: Most of Europe; from Ireland and France in the West and Norway and Northern Russia (Kola Peninsula) in the North to the Pyrenees, Alps, Caucasus, and Turkey in the South and Ural Mountains in the East; introduced into Eastern America (Korneyev & White, 1999; Kutuk, 2003).

***Urophora quadrifasciata* Meigen, 1826**
Material examined: 2 specimens (1♂, 1♀).
Host plants: The larvae develop in flowerhead galls on *Centaurea iberica* Trev. ex Spreng, *C. solstitialis* L., *C. aspera* L., *C. sterilis* L., *C. breviceps* Trev. ex Spreng., *C. nicaeensis* Trev. ex Spreng., *C. procurrens* Sieb., *C. jacea* L., *C. maculosa* Lam., *C. splendens* Sieb., *C. nigrescens* L., *C. cyanus* L, *C. calpitropa* L., *C. nigra* L., and *Serratula tinctoria* L. (Giray, 1979; White, 1988; White & Korneyev, 1989; Freidberg & Kugler, 1989; Merz, 1994; Korneyev & White, 2000; Kutuk, 2003).
Distribution: Most of Europe, Turkey, Kazakhstan, Israel, Iran, East Palaearctic and Nearctic region, and North Africa (Kutuk & Ozgur, 2003; Merz & Korneyev, 2004).

***Urophora solstitialis* Linnaeus, 1758**
Material examined: 1 specimens (1♀): Zaviyeh; 37°29' N 45°52' E, 1320 m, 24 March 2010 (collected by Y. Gharajedaghi, Depasited at Insect Museum of Tabriz University).
Hostplants: *Carduus defloratus* L., *C. nutans* L., *C. personata* (L.) Jacq., *C. acanthoides* L., *C. crispus* L., *Cirsium vulgare* (Savi) Ten., and *C. heterophyllum* (L.) Hill. (White, 1988; Merz, 1994; Kutuk, 2003).
Distribution: Most of Europe, except Spain and Mediterranean region (Merz and Korneyev, 2004), North Caucasus, Armenia, Turkey, Kazakhstan, Western China (Xingjian), Far East Russia (Magadan) (Korneyev and White, 1999), North America, Australia, and New Zealand (Norrbom et al., 1999). New record for the Iran fauna.
Diagnostic characters: Head. Height of gena 0.3-0.5 height of eye. **Thorax**. Bases of *b scut* at border of yellow, medial and lateral black areas of scutellum, only in some montane spms. on black background. Femora yellow, with black stripes or spots, except some montane spms. with almost entirely black femora; in most spms. only femora with black stripe and often without it. **Wing.** Bands: subbasal band distinct, black, extending from anterior margin of wing to *A*, slightly posterior to it; from discal band isolated at *C* by yellow interval; hyaline interval between discal and preapical bands approximately twice as wide as preapical band at level of *R4+5;* preapical and apical bands fused to *Rj+i* or isolated (Fig. 2; b). **Terminalia.** Apex of aculeus as in (Fig. 3; a), Distance between primary and secondary processes of blade considerably greater than 1/14 (1/8-1/12) total length of blade and greater than width of apex of blade distal of primary steps or (rarely) as long as width of apex of blade. *WL* ♀ = 3.8±0.34 (3.0-4.6), *AL* = 2.8+0.42 (1.9-3.6), *AL/WL* = 0.71+0.11 (0.49-0.92) (n = 64). In spms. from N Russia (probably associated with *Carduus crispus* only) blade of ovipositor somewhat shorter than average (*AL* = 2.3+0.25, *AL/WL* = 0.58±0.04) and in populations from S regions (associated with different species of *Carduus,* including *C. nutans* aggr. with large inflorescence), slightly longer *(AL* = 3.1±0.32, *AL/WL* = 0.80±0.04), (Korneyev & White, 1993).

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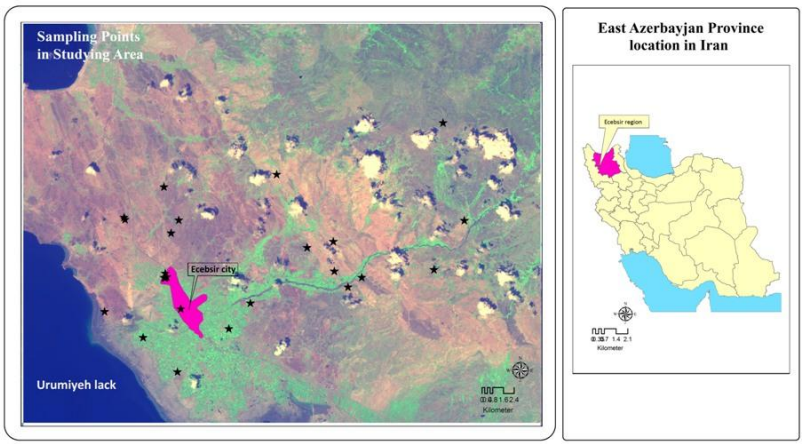

Figure 1. Location of sampling points on satellite image (SPOT) of Ecebsir region.

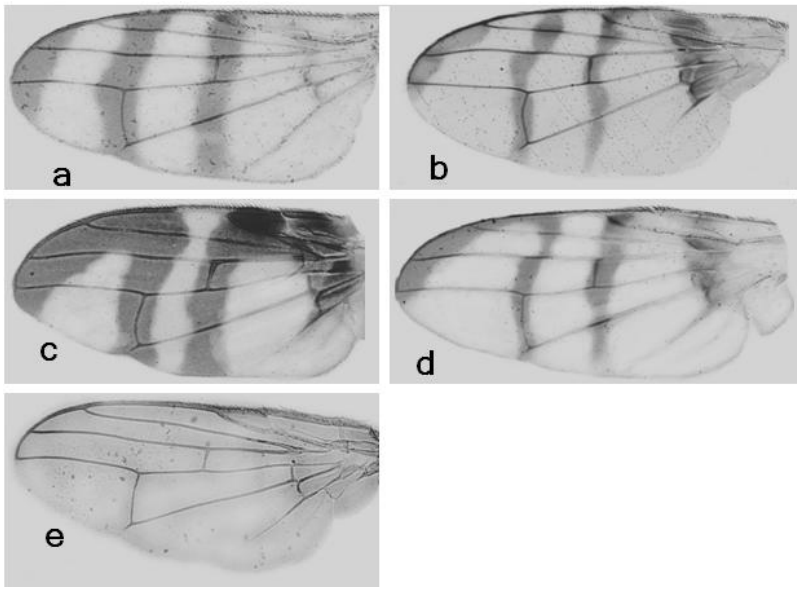

Figure 2. The pattern of left wing; a) *Urophora affinis* b) *U. solstitialis* c) *U. quadrifasciata* d) *U. jaceane* e) *U. impicta* (original).

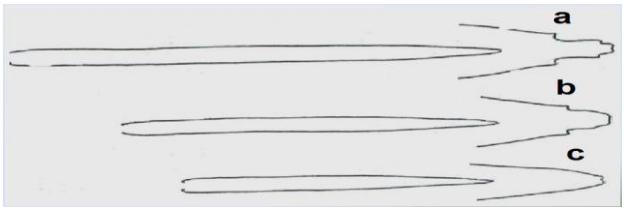

Figure 3. Aculeus apex in *Urophora* species; **a**, *U. solstitialis* ***b***, *U. jaceane* **c**, *U. quadrifasciata* (White, 1988).