

A New Species of *Urophora* Robineau-Desvoidiy, 1830 (Diptera: Tephritidae) from Turkey, with a Key to the Species of the *Urophora quadrifasciata* Group

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Abstract: This study was based on *Urophora* Robineau-Desvoidiy, 1830 specimens collected from Turkey during 1999-2005. *Urophora doganlari* n. sp., reared in flowerhead galls on *Centaurea bornmuelleria* (Hausskn & Bornmuelleria, 1905), is described from Turkey and placed in the *U. quadrifasciata* species group. The other species are associated with *Centaurea* spp. and *Ptilostemon* spp. The best characters for defining the group are the preapical step in the female aculeus, oviscapae length, colour of femora and first flagellomere, wing pattern, and pollinose on the scutum. In this study, the *U. quadrifasciata* group is redefined and a key to the 3 species included is provided. All species appear to induce galls, either in the flowerhead or on the upper or lower stem of host plants.

Key Words: *Urophora doganlari* n. sp., *U. quadrifasciata* group, Key, Tephritidae, Turkey

Türkiye'den *Urophora* Robineau-Desvoidiy, 1830 (Diptera: Tephritidae) Cinsine Bağlı Yeni Bir Tür ile *Urophora quadrifasciata* Grubu Türlerinin Teşhis Anahtarı

Özet: Bu çalışma 1999 – 2005 yıllarında Türkiye'den toplanan *Urophora* Robineau-Desvoidiy, 1830 örneklerine dayanmaktadır. Türkiye'den yeni tür olarak tanımlanan *Urophora doganlari* n. sp. konak bitki olan *Centaurea bornmuelleria* (Hausskn & Bornmuelleria, 1905)'nin çiçek tablasında gal meydana getirir ve *U. quadrifasciata* grubu içerisinde yer alır. Grubun diğer türleri *Centaurea* spp. ve *Ptilostemon* spp. üzerinde bulunurlar. Grubu tanımlayan en iyi karakter dişi aculeus'larındaki girintiler, oviscapae uzunluğu, kanat deseni, femur rengi, birinci flagellomere rengi ve scutum üzerindeki tozlanmalardır. Bu çalışmada, *U. quadrifasciata* grubu tekrar tanımlandı ve üç türü kapsayan bir teşhis anahtarı hazırlandı. Bütün türler konukçu bitkiler üzerinde bitkinin alt veya üst kısmında ya da çiçek tablası içerisinde gal meydana getirirler.

Anahtar Sözcükler: *Urophora doganlari* n. sp., *U. quadrifasciata* grup, Teşhis Anahtarı, Tephritidae, Türkiye

Introduction

Korneyev and White (1993) proposed the *Urophora quadrifasciata* group of *Urophora* and included *U. quadrifasciata* (Meigen) and *U. neuenschwanderi* Freidberg, West –Palaeartic species. The apomorphic characters suggested to support the monophyly of the group were mostly related to the wing pattern, ovipositor, flagellomere, labellum, scutum femora and the association with host plants of the genera *Centaurea* and *Ptilostemon* (Asteraceae).

In summer 2003 - 2005, a new species was collected from Turkey that infested the flowerheads of *Centaurea bornmuelleria* (Hausskn & Bornmuelleria, 1905) and undoubtedly belongs to the *U. quadrifasciata* group. In

this paper, new species are described, the species group is redefined and a key to all 3 species included is provided.

For convenience, the following species accounts are presented in alphabetical order. Conversely, the key couplets and the figures are presented in an order generally representing a transition from a heavily banded wing pattern.

Materials and Methods

The samples were collected in Turkey during 1999-2005. The adults of *Urophora* were collected by insect net. The net was swung at random around the host plants or adult specimens seen on the host plants were collected.

The samples were killed in a killing jar containing potassium cyanide. Samples were prepared in the laboratory. Specimens were collected from different provinces in Turkey. These specimens were preserved as museum material at İnönü University, Faculty of Arts and Science, Department of Biology.

Species were identified according to Hering (1944), Korneyev and White (1999) and Merz (1994). The terminology follows primarily White et al. (1999), Merz (1994) and Freidberg and Mathis (1986). Extensive synonymy and bibliography are found in Thompson (1998). The host plant of new species was diagnosed by Assoc. Prof. Elman İskender and Assoc. Prof. Yusuf Zeynalov (University of Gaziantep, Department of Biology, Gaziantep, Turkey).

In this paper, 3 species are presented in the *U. quadrifasciata* group from Turkey. The identification key of the species was prepared for species of the *U. quadrifasciata* group. The material examined, their host range, their distribution and pictures of the wing of all species are given. The measurements of the body and wing of the species are presented, as well as information on the collecting of specimens including geographical coordinates.

Results and Discussion

Urophora doganlari n. sp. is described from Turkey. The identification key of the species of the *U. quadrifasciata* group was prepared. The distribution of the species in Turkey and the rest of the world is presented, along with the host plants of the species. Thus this study contributed to the Turkish Tephritidae fauna and identification of species of the *U. quadrifasciata* group, and the species group was redefined.

Urophora Robineau-Desvoidy, 1830

Type species: *Urophora cardui* Linnaeus, 1758. *Syst. Nat. Ed.*, 10, 1: 600.

Extensive synonymy and bibliography in Thompson (1998).

Diagnosis

Urophora is distinguished from other Myopitinae genera by the following combination of characters (only

the major characters are listed; a more complete list of characters can be found in Korneyev and White (1991)).

Head: Yellow, not pollinose, with darker frontal stripe and antennae; occiput widely black; arista dark brown in apical 0.75, yellow at base; frons slightly narrowing anteriorly; frontal stripe bare, not pollinose, length 1.0-1.2 times width; antennae shorter than face pedicel and scape with short black hairs, first flagellomere rounded or obtuse-triangular apically; proboscis genuculate.

Thorax: Black, almost shiny, dense rarely weakly pollinose on mesonotum; length of mesonotum 0.95-1.1 times width; scutellum round or trapezoid, convex or slightly flattened dorsally, almost shiny, without hairs (only in *U. maura* Fraunfeld with 3-5 black marginal setae). All setae black; halter yellow to reddish.

Wing: Length of wing 2.3-2.9 times width at level of pterostigma; veins mostly straight; r_{4+5} and m slightly bent posteriorly near apex, and in some species these veins and r_{2+3} distinctly sinuate or bearing 1-2 short blunt processes; vein m usually ending at apex of wing or slightly posterior to it, and only in some Central Asiatic species ending distinctly anterior to it; r_{4+5} bare or rarely with 1-2 setae at base ventrally; wing pattern 3-4 banded (Figure 1), sometimes disrupted into spots or hyaline; further, in descriptions names of bands are given by Steyskal (1979) as subbasal, discal, preapical and apical bands (Figure 1).

Legs: Femora yellow, black or partly black, rarely tibia also black, with black or dark yellow setae and hairs; forefemora with row of stout posteroventral setae and posterodorsally, with 2 or 3 less regular rows of setae; midtibia always with 1 preapical spine; tarsi without any peculiarities in structure and chaetotaxy in either sex.

Abdomen: Always black or dark brown, almost shiny, with black hairs and setae; length of 5th tergite of male approximately equal to length of 3rd and 4th tergites together; 6th tergite of female slightly shorter than 5th tergite. Oviscape longer than preabdomen.

Diagnosis of *Urophora quadrifasciata* group

First flagellomere darkened to black, grey or yellow; palpi not dilated, always yellow and on apex orange, labellum of proboscis 1.5 times as long as first flagellomere; scutum shiny, with indistinct fine pollinose

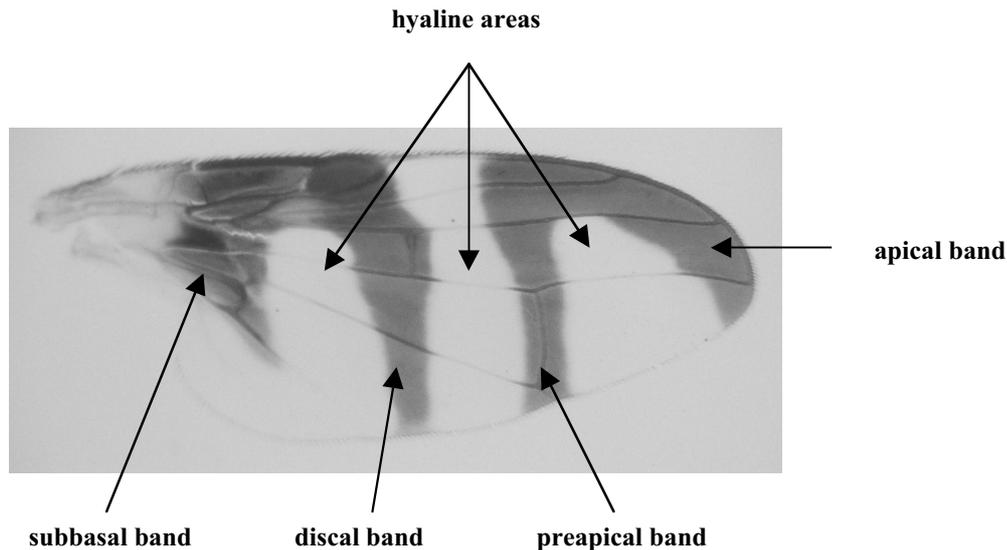


Figure 1. Components of the wing pattern of the *Urophora quadrifasciata* group.

stripes, not hiding underlying cuticle; cx_1 in both sexes with setae without spines; femora black; wing with yellow base and 4 bands fused in pairs to level of cell R_{4+5} ; subbasal with discal and preapical band fused with apical band; ovipositor of female blades apically truncate, without distinct steps (in *U. neuenschwanderi* from Crete with one pair of smoothed-out steps).

Composition: The group includes 3 species (*U. quadrifasciata*, *U. neuenschwanderi* and *U. doganlari* n. sp.). All of the species of the *U. quadrifasciata* group were found in Turkey.

Biology: *Urophora doganlari* n. sp., causing flowerhead galls on *Centaurea bornmuelleria* (Figure 8), is described from Turkey. The other species are associated with *Centaurea* spp. and *Ptilostemon* spp. (White and Korneyev, 1989), as well as *Stachelina* spp., *Medicago* spp. and *Serratula* spp. (Korneyev and White, 2000).

Key to Species of the *Urophora quadrifasciata* group

1. Subbasal band and discal band are parallel (Figures 4, 5); smaller species, length of female usually less than 5 mm; subbasal band of wing less or more projected to hand margin of wing (Figure 4, 5) 2

- Subbasal band and discal band are not parallel (Figures 2, 3); larger species, length of female usually greater than 7 mm; subbasal band of wing ending on hand margin of cell AN (Figures 2, 3) *doganlari* n. sp.
- 2. Antennae dark brown or black; subbasal band of wing pattern extending to posterior margin of wing (Figure 4); anal lobe black to brown; discal and preapical bands near hand margin of wing (Figure 4) *neuenschwanderi* Freidberg
- Antennae yellow; subbasal band of wing pattern not extending to posterior margin of wing (Figure 5); anal lobe hyaline in greater part; discal and preapical bands not near hand margin of wing (Figure 5) *quadrifasciata* Meigen

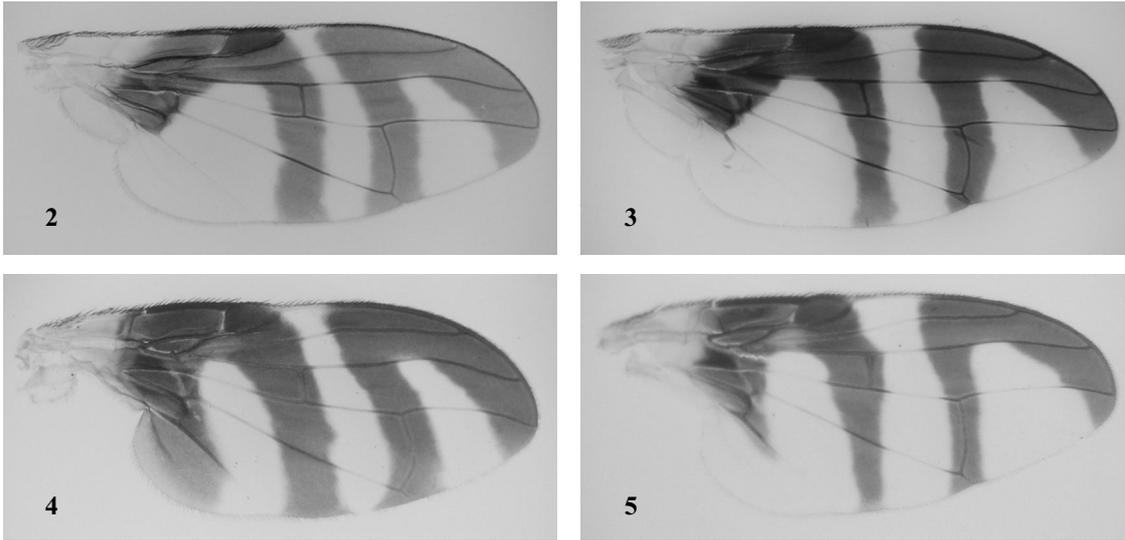
***Urophora doganlari*, n. sp.**

(Figures 2, 3, 6, 7, 8)

The following description contains only specific characters not mentioned in the generic and species-group diagnoses or in the generic descriptions given by Korneyev and White (1991) and Merz (1994).

Description

Head: Yellow, not pollinose, with darker frontal stripe and antennae; first flagellomere red and with white



Figures 2-5. The wings of the *Urophora quadrifasciata* group 2- *U. doganlari* (male), 3- *U. doganlari* (female), 4- *U. neuenschwanderi*, 5- *U. quadrifasciata*.

hairs; ocellar triangle brown; arista black at apical 0.75, and at base brown; all setae of head black; palp with red to brown hairs; labella with white hairs; frontal-facial angle 110°; occiput brown; proboscis genuculate.

Thorax: Ground colour brown to black; grey shiny pollinose present on mesonotum; more silvery on scutum, forming distinct pattern of 4 alternating dark and silvery vittea on scutum; all setae on thorax dark brown or black and acuminate; black hairs present on mesonotum; scutellum yellow to reddish; apical scutellar setae sometimes crossed; halter reddish.

Legs: Femora dark brown and black, only at apical 0.15 red; tibia red; mostly black hairs present on legs.

Wing: Length of wing 2.3 times width at level of pterostigma; veins mostly straight; r_{4+5} and m slightly bent posteriorly near apex; vein m usually ending at apex of wing; wing pattern 4 banded; subbasal and discal band not parallel (Figure 1); preapical and discal band parallel; subbasal band extending to A_1 , in form light brown darkened to A_2 and posterior margin of wing; band of wing larger than r-m vein length; vein m 1.7 times as long as penultimate part; costal spine indistinct.

Abdomen: Dark brown and mostly black hairs present on abdomen; oviscapae 1.8-1.9 times as long as preabdomen; black hairs present on oviscapae; aculeus pointed (Figure 6) and slight indented at apex (Figure 7).

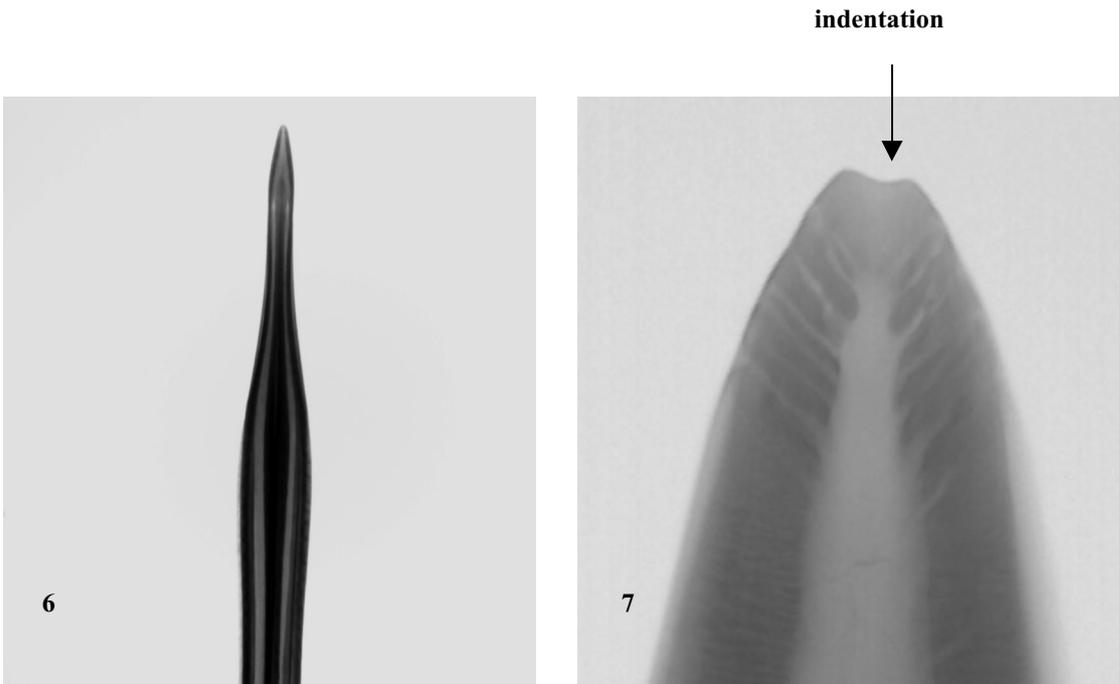
Material Examined: Holotype ♀, Turkey: Sivas, Şarkışla, Tavladere, 39.07 N, 36.25 E, 1745 m, 10.VI.2003, M Kütük / flowerhead gall on *Centaurea bornmuelleria*. Paratypes: Same collection data as holotype (21 ♂♂, 24 ♀♀). Additional paratypes: Kayseri, Şarız 38.16 N, 36.23 E, 1545 m, 23.V.2005, M Kütük (14♂♂, 17♀♀). The holotype is in excellent condition, mounted with an insect pin, and is deposited in İnönü University together with most paratypes.

Host Plant and Biology: The larvae develop in flowerhead galls on *Centaurea bornmuelleria* (Asteraceae). The adults of *Urophora doganlari* lay on the flowerhead of the host plant (Figure 7). The host plant of *U. doganlari* n. sp. is deposited in İnönü University.

Measurements (length in mm): Male: body 4.1-5.0; wing 3.5-4.2. Female: body 7.2-9.1; wing 4.3-5.4.

Etymology: This species is named after Dr. Oğuzhan Doğanlar, a friend and excellent entomologist, who has contributed much to the study of Palaearctic Chalcidoidea.

Comments: *U. doganlari* n. sp. larger than *U. neuenschwanderi* and *U. quadrifasciata*. The larvae of *U. doganlari* develop only in flowerhead galls on *Centaurea bornmuelleria* (Asteraceae); subbasal and discal bands of wing of *U. doganlari* n. sp. are not parallel (Figures 2, 3),



Figures 6-7. The aculeus of *Urophora doganlari* n. sp.; 6 – aculeus, 7- enlarged aculeus at apex.



Figure 8. *Urophora doganlari* n. sp. is laying in the flowerhead of the host plant.

but these bands of *U. neuenschwanderi* and *U. quadrifasciata* are parallel (Figures 4, 5); subbasal band of *U. doganlari* n. sp. ending on hand margin of cell AN (Figures 2, 3); subbasal band of wing pattern of *U. neuenschwanderi* and *U. quadrifasciata* more or less extending to hand margin of wing (Figures 4, 5).

Urophora neuenschwanderi Freidberg, 1982: Soc. Wash., 10: 56-64.

(Figure 4)

Material Examined: 7 ♂♂, 11 ♀♀, Hatay, Samandağı, Çörükler, 36.04 N, 36.01 E, 175 m, 14.VI.2002.

Distribution: Greece, Crete, Italy, China and Turkey (Freidberg, 1982; Merz, 1994; Kütük, 2003).

Host Plant and Biology: The larvae develop in flowerhead galls on *Centaurea iberica*, *C. solstitialis*, *Ptilostemon chamaepeuce*, *P. gnaphaloides* and *Staelhelia arborea* (Freidberg, 1982; White and Korneyev 1989; Korneyev and White, 2000; Kütük, 2003).

Measurements (length in mm): Male: body 3.0-3.6; wing 2.7-3.4. Female: body 3.5-5.0; wing 2.7-3.7.

Comments: *U. neuenschwanderi* similar to *U. quadrifasciata*, but the first flagellomere of antennae of *U. neuenschwanderi* is dark brown to black. The first flagellomere of antennae of *U. quadrifasciata* is yellow. The subbasal band of wing pattern of *U. neuenschwanderi* projected to the hand margin of the wing (Figure 4). The subbasal band is slightly projecting on *U. quadrifasciata* (Figure 5). The subbasal and discal bands of the wing pattern of *U. neuenschwanderi* are parallel to those of *U. quadrifasciata* (Figures 4, 5). But subbasal and discal bands of the wing pattern of *U. doganlari* n. sp. are not parallel (Figures 2, 3).

Urophora quadrifasciata (Meigen, 1826): Syst. Beschr., 5: 331.

(Figure 5)

Material Examined: 2 ♂♂, 5 ♀♀, Adana, Pozantı, Alpu, 37.28 N, 34.54 E, 1120 m, 31.VI.2001; 2 ♀♀, Adana, Aladağ, Büyük Sofulu, 37.33 N, 35.10 E, 1030 m, 28.VI.2001; 2 ♂♂, 4 ♀♀, Adana, Tufanbeyli, Doğanbeyli, 38.05 N, 36.10 E, 1455 m, 30.V.2002; 2 ♂♂, Antalya, Kaş, Sinekçibeli, 36.27 N, 29.39 E, 1455 m, 24.VI.2000; 1 ♂, 1 ♀, Burdur, Yeşilova, Salda, 37.15 N,

29.41 E, 1000 m, 21.V.1999; 3 ♀♀, Denizli, Çal, İsabey, 37.57 N, 29.26 E, 900 m, 17.VI.1999; 1 ♂, 2 ♀♀, Denizli, Kale, Gökçeören, 37.20 N, 28.43 E, 920 m, 18.VII.2000; 1 ♂, 1 ♀, Hatay, Erzin, İlicalar, 36.57 N, 36.15 E, 465 m, 03.V.2002; 6 ♂♂, 4 ♀♀, Hatay, Kırıkhan, Çiloğlan, 36.30 N, 36.26 E, 110 m, 08.V.2002; 2 ♂♂, 1 ♀, Hatay, Reyhanlı, Batı Ayrancı, 36.19 N, 36.32 E, 110 m, 08.V.2002; 5 ♂♂, 3 ♀♀, Hatay, Kumlu, Tayfur Sökmen, 36.15 N; 36.27 E, 110 m, 08.V.2002; 3 ♂♂, 1 ♀, Hatay, Serinyol, Fırnız, 36.21 N, 36.07 E, 1010 m, 13.VI.2002; 1 ♂, 1 ♀, Hatay, Samandağı, Çörükler, 36.04 N, 36.05 E, 175 m, 10.VII.2002; 2 ♂♂, 3 ♀♀, Isparta, Yalvaç, Yarikkaya, 38.27 N, 31.02 E, 1500 m, 21.VI.2000; 1 ♂, 4 ♀♀, Isparta, Senirkent, Gençali, 38.14 N, 30.45 E, 950 m, 21.VI.2000; 4 ♂♂, 2 ♀♀, Isparta, Senirkent, Gençali, 38.14 N, 30.45 E, 19.VII.2000 1 ♂, Kahramanmaraş, Andırın, Efirağızlı, 37.30 N, 36.21 E, 565 m, 20.VI.2002; 2 ♂♂, Kahramanmaraş, Kılılı, 37.26 N, 36.53 E, 495 m, 21.VI.2002.

Distribution: Canada, Kazakhstan, Russia, North, Africa, Israel, Switzerland, Estonia, Latvia, Ukraine, Moldova, Azerbaijan, Georgia, Armenia, Iran, England, Spain, Italy and Turkey (Foote, 1984; White, 1988; Freidberg and Kugler, 1989; Merz, 1994; Kütük, 2003).

Host Plant and Biology: The larvae develop in flowerhead galls on *Centaurea iberica*, *C. solstitialis*, *C. aspera*, *C. sterilis*, *C. breviceps*, *C. nicaeensis*, *C. procurrens*, *C. jaceana*, *C. maculosa*, *C. splendens*, *C. nigrescens*, *C. cyanus*, *C. calpitropa*, *C. nigra*, *Serratula tinctoria*, *Medicago sativa*, and *Serratula tinctoria* (Fraunfeld, 1857; Schiner, 1858; Zwölfer, 1965; Giray, 1979; White, 1988; White and Korneyev, 1989; Freidberg and Kugler, 1989; Merz, 1994; Korneyev and White, 1996; Korneyev and White, 2000; Kütük 2003).

Measurements (length in mm): Male: body 2.6-3.4; wing 2.2-2.9. Female: body 3.5-4.4; wing 2.7-3.5.

Comments: *U. quadrifasciata* is a small species as is *U. neuenschwanderi*, but *U. doganlari* n. sp. is larger. In addition, see comments under *U. neuenschwanderi* and *U. doganlari* n. sp.

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