

**Original article (Orijinal ara tırma)****The first records of three *Oxycera* species (Diptera: Stratiomyidae) from Turkey and zoogeographical analysis**

Türkiye'den *Oxycera* (Diptera: Stratiomyidae) cinsine ait üç yeni kayıt ve zooco rafik analizleri

**Turgay ÜSTÜNER<sup>1\*</sup>****Abdullah HASBENL<sup>2</sup>****Üzeyir ÇA LAR<sup>3</sup>****Summary**

In this study, during our investigations of some families of Diptera Brachycera (e.g. Asilidae and Bombylidae) in Turkey in 1999-2011, we discovered there species which represent interesting additions to the *Oxycera* (Diptera: Stratiomyidae) fauna of Turkey. These species, *Oxycera fallenii* Staeger, 1844, *Oxycera leonina* (Panzer, 1798), and *Oxycera muscaria* (Fabricus, 1794), are recorded from Turkey for the first time. The females of *O. fallenii* and *O. leonina*, and a male of *O. muscaria* were shortly characterised and documented by photographs. The distribution of these species is briefly discussed. Each species represents a separate biogeographical element in Turkey and Palearctic region.

**Key words:** Stratiomyidae, *Oxycera*, taxonomy, zoogeography, Turkey

**Özet**

Türkiye' de 1999-2011 yılları arasında Brachycera grubuna ba lı bazı sinek familyalarının (Asilidae ve Bombylidae) faunası üzerine yapılan çalı malar esnasında, Stratiomyidae familyasından *Oxycera* cinsine ait üç tür tespit edilmi tir. Tespit edilen *Oxycera fallenii* Staeger, 1844, *Oxycera leonina* (Panzer, 1798) ve *Oxycera muscaria* (Fabricus, 1794) türleri Türkiye faunası için ilk kez kaydedilmi lerdir. *O. fallenii* ve *O. leonina* türlerine ait di i bireyler ile *O. muscaria* türüne ait erkek bireyin karakteristik özellikleri kısaca anlatılmı ve bu örneklere ait foto raflar sunulmu tur. Bu üç türün yayılı alanları kısaca tartı ılmı tir. Her türün Türkiye ve Palaeartik Bölgedeki biyoco rafik da lımı verilmi tir.

**Anahtar Sözcükler:** Stratiomyidae, *Oxycera*, taksonomi, zooco rafya, Türkiye

<sup>1</sup> Selçuk University, Faculty of Science, Department of Biology, Selçuklu, Konya, Turkey

<sup>2</sup> Department of Biology, Faculty of Science, Gazi University, Teknikokullar, Ankara, Turkey

<sup>3</sup> Gazi University, Vocational School of Health Services, Gölbaşı, Ankara, Turkey

\* Sorumlu yazar (Corresponding author) email:tustuner@selcuk.edu.tr

Received (Alını ): 06.08.2015

Accepted (Kabul edili ): 09.10.2015

## Introduction

The number of the World *Oxycera* species in Stratiomyidae is estimated as more than 100. Among these, 96 described *Oxycera* species are distributed worldwide, but with greatest diversity in the Palaearctic Region, in which 66 species have been described. 11 species of *Oxycera* were found in the Oriental Region. 11 species in the Afrotropical Region, and 8 species were recorded in the Nearctic Region (Dušek & Rozkošný, 1974; Narchuk, 1988; Rozkošný, 1980; 1983; Rozkošný & Nartshuk, 1988; Woodley 2001; 2011; Üstüner & Hasbenli, 2004, 2007; Üstüner et al., 2014; Yang et al., 2012). Of 66 Palaearctic *Oxycera* species only eleven species have been reliably recorded in Turkey (Üstüner et al., 2002; Üstüner & Hasbenli, 2004, 2007, 2013; Woodley, 2001;2011).

Turkey is located at the intersection of the old world continents of Asia, Africa and Europe in the Palaearctic Region. The Anatolian Peninsula, as a very large part of Turkey, is the westernmost point of Asia divided from Europe by the Bosphorus and Dardanelles straits. Thrace is the western part of Turkey on the European continent. There are four faunistic regions called West Anatolian, Anatolian-Iranian, Mediterranean and Caucasian in our country (Udvardy, 1975; Rozkošný, 1980). Distributional area of *Oxycera fallenii* was placed among European biogeoelements by Rozkošný (1980) & Nartshuk (2009) and that of *Oxycera leonina* was defined as Middle European by Rozkošný (1980) and included among Euro-Caucasian biogeoelements by Nartshuk (2009). *Oxycera muscaria* was designated as East Mediterranean by Rozkošný (1980).

The aim of this study was to contribute to knowledge of the Stratiomyidae fauna of Turkey.

## Materials and methods

All were collected by an insect net and some of them by a light trap at 4 localities in Anatolia from 1999 to 2005. One specimen of *O. fallenii* was collected by a light trap from the willow tree community in Sultan Mountains and the second by an insect net over the willow tree leaves, nearby the eastern Taurus Mountains in the Asian part of Turkey (Anatolia). *O. leonine* was collected by a light trap from forested areas at İnebahtı in the European part of Turkey and *Oxycera muscaria* was collected using an insect net from the middle Taurus Mountains in Anatolia. During fifteen years of field investigations, no additional *O. fallenii* female specimen, *O. leonina* female specimen and *O. muscaria* male specimen have been obtained. All specimens examined are deposited in the collection of the Selçuk University, Department of Biology in Konya, Turkey. Morphological terminology follows Papp & Darvas (2000). Illustrations of the specimens were made with Leica EZ4 D stereomicroscope and then imported into Adobe Photoshop CS9 for labeling and plate composition.

## Results and Discussion

### *Oxycera fallenii* Staeger, 1844

Material examined: Turkey: Isparta, Yalvaç, Sultan mountains, 38° 13' N. 31° 22' E, elev. 1630 m, 25 VII 2001, , leg. Üstüner; Adana, Tufanbeyli, Avcıpınarı Village, 38°.05'.866"N, 36°.10'.161" E, 1414 m, 25 V 2005, , leg. Çal. lar.

Female (Figs 1-2). Length: body 9.0-6.5 mm, wing 7.0-5.5 mm. Frons with broad yellow stripes along eye margins, stripes continuing along inner margin of eyes on face. Postocular rim almost completely yellow (Rozkošný, 1983). Scutum with stripes, that are not connected with postpronatal callus spots. Notopleura broadly yellow from postpronatal callus to transverse suture. Abdomen black with well-separated, 3 pairs of yellow oblique side markings, with yellow basal spot on tergite 1 and apical spot on tergite 5.



Figures 1–2. *Oxycera fallenii*: 1. Female in dorsal; 2. Lateral view. Scale bar: 1 mm.

*Oxycera fallenii* is a typical European species that is distributed from Austria, Czech Republic, Denmark, England, Germany, Ireland, Italy, Poland, Romania, Slovakia, Sweden, Switzerland, eastern Fenoscandia and Ukraine (Karkov) (Dušek & Rozkošný, 1974; Rozkošný, 1980, 1983; Rozkošný & Nartshuk, 1988; Woddley, 2001). Woodley (2001) stated in his World Catalog of the Stratiomyidae that this species is also spread in Russia (although without a precise locality).

One of the two adults was collected on *Salix* sp. at night with a light trap at a valley where tree has been destroyed and there are only willow tree areas in Sultan Mountains. The other was caught with an insect net on leaves of willow located in the transition zone between the Anatolian steppe region and the Mediterranean region.

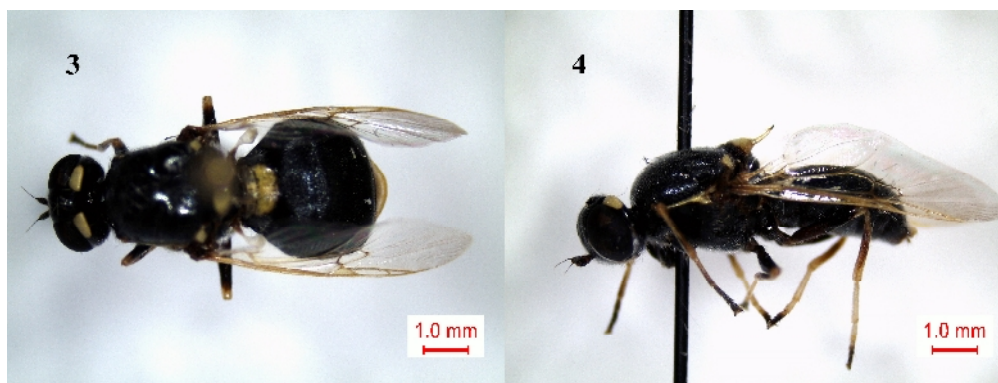
*O. fallenii* is known as a European species (Nartshuk, 2009; Rozkošný, 1980), it probably penetrated through the Balkans to Turkey. The species harbors the important refuge areas in Anatolia. The southern boundary of distribution area of this European species was known in Romania. Our record in Turkey represents thus a new southernmost point of its range and the first evidence of its occurrence in the southern Anatolia and Turkey at all.

The species has been designated as Central-European, atlantic (British-Irish forest), sub-mediterranean and pontic geoelement in the Palearctic Region (Rozkošný, 1980; Nartshuk, 2009). During our study in Turkey, the species have been found in the Anatolian-Iranian zoogeographical area of the Palearctic region for the first time. In addition to the other zoogeographical areas in the Palearctic Region, our discovery confirms that this species is an Anatolian-Iranian geoelement.

#### ***Oxycera leonina* (Panzer, 1798)**

Material examined: Turkey: Kirklareli, İnebağ, meada, between Saka Lake and Deniz Lake, 41° .46'.043"N 27° .59'.707" E, elev. 10 m, 27 VII 2003, , leg. Hasbenli.

Female (Figs 3-4). Length: body 7.0 mm, wing 5.5 mm. Head shining black, sparsely punctate. Frons about 0.33 times of head-width in dorsal view with sparse, short, white hairs. Eyes sparsely short haired. Postocular rim with a nearly oblong yellow spots on upper part and with pale stripes at lower-half eye-margins, covered with dense silvery-white, velvet-like pubescence above postgena. Face with white pollinose stripes along eyes margin at each side. Facial part of these stripes almost reaching middle of frons, as broad as pedicel of antennae (Rozkošný, 1983). Scutum black, postpronotal callus, postalar callus and anepisternum yellow. Scutellum and scutellar spines yellow but base of scutellum and tip of scutellar spines black. All coxae, femora and last 3 tarsal segments black, remaining parts of legs yellow. Abdomen black, with basal and apical yellow spots.



Figures 3–4. *Oxycera leonina*: 3. Female in dorsal; 4. Lateral view. Scale bar: 1 mm.

*Oxycera leonina* is a typical Middle-European species that is distributed from Europe except for northern areas, and absent in Ireland and Great Britain (Dušek & Rozkošný, 1974; Rozkošný, 1980, 1983; Woddley, 2001). The species ranges from Denmark to Spain, Italy, Bosnia-Herzegovina, Romania, Russia and Ukraine (Rozkošný & Nartshuk, 1988). Considering the distribution of this species in eastern Europe, it seems to be spread in the countries bordering the Black Sea in Romania (Herculebad (Baile Herculane)), Moldavia, Ukraine (Cehrnigov, Poltava, Crimea, Podolia, Kherson, Karhiv) and Georgia (Abkhazia: Sukhumni) (Rozkošný, 1983). The species is designated as Middle Europe biogeoelement by Rozkošný (1980) and arranged among Euro-Caucasian geoelements by Nartshuk (2009).

The species is recorded for the first time for the fauna of Turkey. Kırklareli (neada) where the species was collected from is situated on the western bank of the Black Sea and was located in Thrace, European part of Turkey. When all the distribution data of this species are analyzed, our record appears to be in a framework of a presumed East Mediterranean distribution area.

Zoogeographical classification of *O. leonina* has been determined as west-mediterranean (Spain), sub-mediterranean (Italy, Bosnia-Herzegovania), pontic (Ukraine) and Caucasian in the Palearctic Region (Rozkošný, 1980; Nartshuk, 2009).

#### ***Oxycera muscaria* (Fabricus, 1794)**

Material examined: Turkey, Antalya, Gündo mu , Güneycik Village, Topraktepe Place, 36° 46' N. 31° 45' E, elev. 200 m, 23 VI 1999, leg. Üstüner.

Male (Figs 5-6). Length: body 5.0 mm, wing 4.2 mm. Dark and small species without longitudinal stripes on scutum. Frons and face shining black. Thorax shining black. Small postpronotal callus, postalar callus yellow. Scutellum and scutellar spines yellow, but scutellum narrowly black at base. And Yellow upper margin of anepisternum narrow and hardly expanded in front of wing -base. All legs yellow. Abdomen black with two pairs of oblique yellow lateral stripes.



Figures 5–6. *Oxycera muscaria*: 5. Male in dorsal; 6. Lateral view. Scale bar: 1 mm.

So far, it has been known that *O. muscaria* is an East Mediterranean species recorded from the Croatia, Greece, Israel, Italy, Montenegro (Vizpazar) and Macedonia (Oteševo) (Rozkošný, 1983; Rozkošný & Nartshuk, 1988; Woddley, 2001). A discovery of this species in Turkey is thus not surprising though *O. muscaria* is recorded here as a new species for Turkey.

One male was collected on leaves of trees at the stream edges in a forest with the Mediterranean maquis vegetation.

This species was included among east-mediterranean and sub-mediterranean (Italy and Macedonia) geoelements (Rozkošný, 1980). We discovered *O. muscaria* in the mediterranean zoogeographical area of Turkey.

## Acknowledgments

We are very grateful to Prof. Rudolf Rozkošný (Masaryk University, Brno, Czech Republic) for critically reviewing the manuscript.

## References

- Dušek, J. & R. Rozkošný, 1974. Revision mitteleuropäischer Arten der Familie Stratiomyidae (Diptera) mit besonderer Berücksichtigung der Fauna der CSSR V. Gattung *Oxycera* Meigen. Acta Entomologica Bohemoslovaca, 71: 322–341.
- Narchuk, E.P., 1988. 36. Family Stratiomyidae. In: Keys to the Insects of the European Part of the USSR, G. Ya. Bei-Bienko (Ed.), 5 (2): 701–738.
- Nartshuk, E.P. 2009. The character of soldier fly distribution (Diptera, Stratiomyidae) in eastern Europe. Entomological Review, 89 (1): 46–55.
- Papp, L. & B. Darvas, 2000. Contribution to a Manual of Palaearctic Diptera (with special reference to flies of economic importance). Volume 1. General and Applied Entomology. Science Herald, Budapest, 978 pp.
- Rozkošný, R., 1980. Zoogeography of the European Stratiomyidae (Diptera). Acta Universitatis Carolinae- Biologica 1977: 387–396.
- Rozkošný, R. 1983. A biosystematic study of the European Stratiomyidae (Diptera). Volume 2. Clitellariinae, Hermetiinae, Pachygasterinae and Bibliography. W. Junk. The Hague, The Netherlands; Boston, Massachusetts, USA and London, England, UK. viii + 431 pp.
- Rozkošný, R. & E.P. Nartshuk, 1988. Stratiomyidae. In: Catalogue of Palaearctic Diptera, Athericidae - Asilidae, Vol. 5: 42-96. (Eds: Á. Soos & L. Papp), Budapest, 446 pp.
- Üstüner, T., A. Hasbenli & A. Aktümsek, 2002. Contribution to Subfamily Clitellariinae (Diptera, Stratiomyidae) Fauna of Turkey. Journal of the Entomological Research Society 4(1): 19–24.
- Üstüner, T. & A. Hasbenli, 2004. A new species of *Oxycera* Meigen (Diptera: Stratiomyidae) from Turkey. Entomological News, 115(3):163-167.
- Üstüner, T. & A. Hasbenli, 2007. A new species and some new records of the genus *Oxycera* (Diptera: Stratiomyidae) from Turkey. Entomological News, 118(2):179-183.
- Üstüner, T. & A. Hasbenli, 2013. Contributions to Family Stratiomyidae (Diptera) Fauna of Konya Province (Turkey). Journal of Selçuk University Natural and Applied Science, 2(4): 40-55.
- Üstüner, T., A. Hasbenli & Ü. Ça lar, 2014. Description of the male *Oxycera quadrilineata* Üstüner and Hasbenli, 2007 (Diptera: Stratiomyidae) from Turkey. Life: The Excitement of Biology, 2(3): 175-179.
- Udvardy, M.D.F., 1975. A Classification of the Biogeographical Provinces of the World. IUCN Occasional Paper No. 18, International Union for Conservation of Nature and Natural Resources, Morges, Switzerland, 48 pp.
- Woodley, N.E., 2001. A World Catalog of the Stratiomyidae (Diptera). Myia 11:viii+475 pp.
- Woodley, N.E. 2011. A World Catalog of the Stratiomyidae (Insecta: Diptera): A Supplement with Revisionary Notes and Erata. Myia, 12: 379–415.
- Yang, Z.H, J.Y. Yu, & M.F. Yang, 2012. Two new species of *Oxycera* (Diptera, Stratiomyidae) from Ningxia, China. ZooKeys 198: 69–77.