

Torymid in (Insecta: Hymenoptera: Torymidae) Besaparski Ridove Special Protection Area (Natura 2000), Southern Bulgaria

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Abstract: A list of 18 torymid wasp species (Hymenoptera: Torymidae) occurring in Besaparski Ridove Special Protection Area, southern Bulgaria, is presented. Out of them, three species, i.e. *Pseudotorymus euphorbiae* ZEROVA ET SERYOGINA, 1999, *Pseudotorymus medicaginis* (MAYR, 1874) and *Pseudotorymus verbasci* ERDŐS, 1955, are new to the Bulgarian fauna; 13 species are new records for the region. A zoogeographic classification based on current distribution of the species is presented. The threats and protection of the grassland habitats are discussed. Most of the torymids are associated with herbal plants via their hosts and the protection of the grassland habitats in Besaparski Ridove is of great importance for these hymenopteran insects.

Keywords: Hymenoptera, Torymidae, faunistic, Natura 2000, Special Protection Area, zoogeographic analysis

Introduction

The family Torymidae WALKER, 1833 (Hymenoptera: Chalcidoidea) has worldwide distribution, with about 78 genera and over 960 species (NOYES 2014). Most torymid wasps are primary parasitoids or hyperparasitoids on a wide range of insect hosts of eight orders, mostly on Hymenoptera, Coleoptera, Lepidoptera and Diptera. In this predominantly parasitoid family, there are also phytophagous species as well as species developing asinquilines in galls or as seed-eaters in coniferous trees and rosaceous plants (GRISSELL 1995).

The torymid fauna in Bulgaria is not well studied. Until now, 68 species have been reported for the country (STOJANOVA 2007). Torymids are not well studied in the other Balkan countries, too; however, in well inventoried countries their number is considerably higher, e.g., 116 torymid species have been recorded for the fauna of the Czech Republic (NOYES 2014).

Among the torymids reported for the Bulgarian fauna, only three species have been recorded from Besaparski Ridove Special Protection Area.

Besaparski Ridove (in translation, Besaparski Hills) are situated south-east of the town of Pazardzhik and orographically belong to the northern slopes of Western Rhodope Mts. They are limited to the south and east by Stara Reka River, to the west by Pishmanka River and to the north by Maritsa River. The altitude varies from 350 to 565 m and the highest point is Elenski Peak (536 m) situated in the Ognianovsko-Sinitevski Ridge.

The most specific characters of the studied region are the eroded karstic slopes with high aridity, xerothermic conditions and deforested landscape. Besaparski Ridove have considerable floristic wealth, with about 600 plant species, many of them (43%) of conservation significance (STANEV 1976, ANGELOVA *et al.* 2008). The fauna of the region incorporates many rare, vulnerable and endangered species included in IUCN Red list, CITES and Biological Diversity Act (2012).

The present article reports locality data and zoogeographic classification of torymid species from Besaparski Ridove Special Protection Area.

Material and Methods

The examined materials were collected between 2000 and 2011, mainly by sweeping. Some specimens were reared at laboratory conditions from galls and egg capsules.

The faunistic list includes the following data: the valid name of taxon, published records for Bulgaria and records for Besaparski Ridove, locality name, UTM code, date of collection, number and sex of specimens, host (in case of rearing), zoogeographic complexes and elements.

The specimens are preserved in the author's collection at the University of Plovdiv.

Identification of the species was done mainly after GRAHAM, GIJSWIJT (1998), GRISSELL (1995) and ZEROVA, SERYOGINA (1999). Valid names are given according to GRISSELL (1995) and NOYES (2014). The species recorded as new to Besaparski Ridove are marked with an asterisk; new records to the Bulgarian fauna are marked with double asterisk. The zoogeographic classification is based on data of the current distribution of the species (NOYES 2014) and follows Gruev's concept (GRUEV, KUZMANOV 1994, 1999) of zoogeographic complexes and elements and developed further in later papers (GRUEV 1995, 2000; GRUEV, BECHEV 2000).

Results and Discussion

Totally, 18 Torymid wasp species were recorded in Besaparski Ridove. Out of them, 13 are new records to the region. Three species, i.e. *Pseudotorymus euphorbiae*, *Pseudotorymus medicaginis* and *Pseudotorymus verbasci*, are new to the Bulgarian fauna.

Eridontomerus CRAWFORD, 1907

Eridontomerus isosomatis (RILEY, 1881)

Records for Bulgaria: STOJANOVA (2007): Rhodope Mts.: The Besaparski Hills (Isparihovo vill., Ognyanovo vill.), Gela vill.

Material examined: 3 km SE Glavinitsa vill. (UTM: KG76E5), 16.VI.2002, 1 ♀.

Zoogeographic classification: Siberian complex, Holarctic element.

Exopristus RUSCHKA, 1923

**Exopristus trigonomerus* (MASI, 1916)

Records for Bulgaria: ANGELOV (1970): Rhodope Mts.: Novakovo vill.

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 18.VI.2000, 1 ♂; 1.VII.2000, 1 ♂; 17.V.2001, 2 ♂♂; 16.VI.2002, 2 ♂♂; 15.V.2003, 1 ♂; 3 km N Isparihovo vill. (UTM: KG86D3), 24.VII.2000, 1 ♀; 2 km S Ognyanovo vill. (UTM: KG86D4), 7.VI.2000, 2 ♀♀; 2 km N Byaga vill. (UTM: KG86B2), 16.VI.2002, 4 ♀♀.

Zoogeographic classification: European complex, Mid-European element.

Glyphomerus FÖRSTER, 1856

**Glyphomerus stigma* (FABRICIUS, 1793)

Records for Bulgaria: ANGELOV (1970): Stara Planina Mts.; VASSILEVA-SAMNALIEVA (1974, 1987, 1990): Strandzha Mts., Vitosha Mts.; STOJANOVA (2006): Vitosha Mts., Stara Planina Mts.

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 27.V.2010, 3 ♀♀.

Zoogeographic classification: Siberian complex, Holarctic element.

Idarnotorymus MASI, 1916

**Idarnotorymus pulcher* MASI, 1916

Records for Bulgaria: PELOV (1975): Kostinbrod; GRISSELL (1995).

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 27.V.2010, 1 ♀.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

Idiomacromerus CRAWFORD, 1914

**Idiomacromerus mayri* (WACHTL, 1883)

Records for Bulgaria: ANGELOV (1970): Rhodope Mts.: Oreshets vill.; Plovdiv.

Material examined: 3 km NE Kapitan Dimitrievovo vill. (UTM: KG86B3), 16.VI.2002, 2 ♀♀, 1 ♂; 3 km N Isparihovo vill. (UTM: KG86D3), 12.VIII.2010, 2 ♀♀.

Zoogeographic classification: European complex, Mid-European element.

**Idiomacromerus pannonicus* (RUSCHKA, 1923)

Records for Bulgaria: WALL (1984).

Material examined: 2 km NW Byaga vill. (UTM: KG86A1), 16.VI.2002, 3 ♀♀.

Zoogeographic classification: European complex, Sub-Mediterranean element.

**Idiomacromerus papaveris* (FÖRSTER, 1856)

Records for Bulgaria: STOJANOVA (2007): Plovdiv; Strandzha Mts.

Material examined: 3 km N Isparihovo vill. (UTM: KG86D3), 12.VIII.2010, 3 ♀♀.

Zoogeographic classification: European complex, Sub-Mediterranean element.

**Idiomacromerus terebrator* (MASI, 1916)

Records for Bulgaria: PELOV (1975): Lyulin Mt.

Material examined: 2 km NW Byaga vill. (UTM: KG86A1), 1.VII.2000, 1 ♀; 16.VI.2002, 1 ♀.

Zoogeographic classification:

Subcosmopolitan.

Podagrion SPINOLA, 1811

**Podagrion pachymerum* (WALKER, 1833)

Records for Bulgaria: ANGELOV (1970): Rhodope Mts.: Komuniga vill.

Material: 3 km SW Novo Selo vill. (UTM: KG96A2), 18.VI.2000, 1 ♀, 1 ♂; 16.VI.2002, 1 ♂; 15.IV.2011, 33 ♀♀, 3 ♂♂, reared from egg capsules of mantids (Mantodea).

Zoogeographic classification: European com-

plex, Mid-European element; distributed also in Oriental kingdom.

***Podagrion splendens* SPINOLA, 1811**

Records for Bulgaria: STOJANOVA (2007): Rhodope Mts.: Besaparski Hills (Ognyanovo vill.); Strandzha Mts.

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 18.VI.2000, 1 ♀.

Zoogeographic classification: European complex, Mid-European element.

***Pseudotorymus* MASI, 1921**

****Pseudotorymus arvernicus* (WALKER, 1933)**

Records for Bulgaria: STOJANOVA (2007): Pirin Mts.; Rhodope Mts.; Strandzha Mts.

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 18.VI.2000, 3 ♀♀, 1 ♂.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

*****Pseudotorymus euphorbiae* ZEROVA ET SERYOGINA, 1999**

Material examined: 3 km SE Glavinitsa vill. (UTM: KG76E5), 1.VII.2000, 41 ♀♀, 24 ♂♂; 2 km SW Novo Selo vill. (UTM: KG96A3), 27.VI.2010, 12 ♀♀, 12 ♂♂; 12.VIII.2010, 5 ♀♀, 3 ♂♂; 13.VII.2011, 8 ♀♀, 3 ♂♂. The material was reared from Cecidomyiidae (Diptera) galls on *Euphorbia villosa*.

Zoogeographic classification: European complex, Mid-European element.

*****Pseudotorymus medicaginis* (MAYR, 1874)**

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 18.VI.2000, 4 ♀♀.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

****Pseudotorymus sapphyrinus* (FONSCOLOMBE, 1832)**

Records for Bulgaria: ANGELOV (1970): Chirpan.

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 27.V.2010, 1 ♀.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

****Pseudotorymus papaveris* (THOMSON, 1876)**

Records for Bulgaria: STOJANOVA (2006): Varna.

Material examined: 3 km SE Glavinitsa vill. (UTM: KG76E5), 5.V.2007, 2 ♀♀.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

*****Pseudotorymus verbasci* ERDÖS, 1955**

Material examined: 3 km SW Novo Selo vill. (UTM: KG96A2), 7.V.2000, 2 ♀♀; 28.V.2000, 3 ♀♀; 16.VI.2002, 6 ♀♀; 15.V.2003, 1 ♀; 24.V.2004, 2 ♀♀.

Zoogeographic classification: European complex, Mid-European element.

***Torymoides* WALKER, 1871**

****Torymoides kiesewetteri* (MAYR, 1878)**

Records for Bulgaria: THOMPSON (1958), PELOV (1975): Ropotamo River.

Material examined: 3 km SW Glavinitsa vill.

(UTM: KG76E5), 5.V.2007, 1 ♀.

Zoogeographic classification: Siberian complex, Euro-Asiatic element; distributed also in Oriental Kingdom.

****Torymoides violaceus* (NIKOLSKAYA, 1954)**

Records for Bulgaria: BOUČEK (1970): Sandanski, GRISSELL (1995), ASKEW *et al.* (2001).

Material examined: 2 km SW Novo Selo vill. (UTM: KG96A3), 27.VI.2010, 2 ♀♀, 1 ♂, reared from Cecidomyiidae (Diptera) galls on *Euphorbia villosa*.

Zoogeographic classification: Siberian complex, Euro-Asiatic element.

The studies on torymid wasps presented here are preliminary. The specific climatic conditions and habitats of Besaparski Ridove give the basis to presume that the list is not complete and future studies will increase our knowledge about the unique species diversity of this region. The xerothermic conditions of this area influence the torymid fauna that seems to be similar to the torymid fauna other steppe regions such as David's Valley Hayfields Natural Reserve in Romania (POPESCU *et al.* 2002), with nine species common to both sites.

Seventeen of the recorded species from the region can be arranged into two zoogeographic complexes (Siberian and European) and four elements (Euro-Asiatic, Holarctic, Mid-European and Sub-Mediterranean).

Idiomacromerus terebrator is a parasitoid of weevils (Curculionidae) and seed-eaters (Eurytomidae) on cultivated plants (*Trifolium* spp.) and has Subcosmopolitan distribution because of anthropogenic impact. Because of this reason, it is excluded of the zoogeographic analysis.

The Siberian complex (53%) comprises species with very wide distribution in Palaearctic and Nearctic, mainly with Siberian origin and high ecological tolerance. In Bulgaria, the Siberian species are distributed in a wide range, from the lowlands to the high mountains (GRUEV, KUZMANOV 1999).

The European complex is 47% of the recorded torymids from Besaparski Ridove and it is represented by widespread species in Europe (Mid-European and Sub-Mediterranean). The zoogeographical classification of torymid species from the studied region could be a part of the whole biogeographical analysis of the biota occurring in Besaparski Ridove Special Protection Area.

A new host-plant association of the parasitoid *Pseudotorymus euphorbiae* with *Euphorbia villosa* was observed. ZEROVA, SERYOGINA (1999) reared the species from galls of *Dasyneura* sp. (Cecidomyiidae) on *Euphorbia virgata*.

Most of the recorded torymids in this study are associated with herbal plants via their hosts; thus, protection of the grassland habitats in Besaparski Ridove is of great importance for these hymenopteran insects. The major threat for grassland habitats is

ploughing of lands and turning them into agricultural areas with perennials such as vineyards, orchards and cereals (ANGELOVA *et al.* 2008). The areas of agricultural land used for intensive cultivation of vineyards and grass cultures have been increasing in the last years. On the territory of the Besaparski Ridove, livestock farming is developed as well but only 10% of the animal feed is provided through grazing and mowing natural grasslands. According to ANGELOVA *et al.* (2008), herds in the region have declined significantly in last few years. Burning of the residual herbage from agricultural production, stubble and weeds practiced by local land owners could be a serious threat to grassland habitats in cases of negligence

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