

NEW RECORDS OF *ZYGAENA BRIZAE* (ESPER, 1800) (LEPIDOPTERA: ZYGAENIDAE) IN CROATIA

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Zygaena brizae is one of the rarer species of burnet moths on the Balkan peninsula, with only a handful of recent records. While it has been listed as part of the fauna of Croatia, prior to this survey, records from the country were scarce and imprecise, referring only to Istria or Dalmatia, without any exact locality. During 2021 this species has been recorded in Plitvice Lakes National Park at two localities. At Homoljac only a single specimen was observed, but at the meadows near Prijeboj a seemingly numerous population was recorded. These are the first exact records of *Z. brizae* in Croatia.

Key words: Zygaeninae, Plitvice Lakes, Lika, distribution

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Zygaena brizae jedna je od rjedih vrsta ivanjskih ptičica na Balkanskom poluotoku, sa tek nekoliko novijih opažanja. Iako se vrsta smatra dijelom faune Hrvatske, prije ovog istraživanja svi povjesni podatci bili su oskudni i neprecizni, prilikom čega se spominju se samo Istra i Dalmacija, bez ikakvog točnog lokaliteta. Tijekom 2021. ova je vrsta zabilježena u Nacionalnom parku Plitvička jezera na dva lokaliteta. Na području Homoljca je uočen samo jedan primjerak, ali je na livadama kod Prijeboja zabilježena brojna populacija. Ovo su prvi točni nalazi vrste *Z. brizae* u Hrvatskoj.

Ključne riječi: Zygaeninae, Plitvička jezera, Lika, rasprostranjenost

INTRODUCTION

The Zygaenidae family in Europe consists of three subfamilies, subfamily Chalcosiinae containing a single species present in the western Mediterranean, subfamily Procridinae commonly called forester moths and subfamily Zygaeninae called burnet moths (NAUMANN *et al.*, 1999). In general members of this family display a biology more similar to butterflies; they are diurnal, brightly colored and can be easily spotted in the field with little prior experience. The species identification at the other hand can be somewhat problematic, and in many cases the external morphology is not enough to distinguish very similar species.

In Croatia, two major contributions to knowledge of the Zygaenidae fauna have been made recently (KOREN, 2021; ŠAŠIĆ *et al.*, 2016). Still, records of some species historically present have not been confirmed. One such species is *Zygaena brizae* (Esper, 1800). With its wingspan of 11–14 mm this is one of the smaller species of this genus in Europe. The head, thorax and abdomen of the species are black and strongly haired. Antennae are an important distinguishing feature by being weakly clubbed. As in most similar species, the ground color of the forewings is translucent black with three red streaks while the hindwings are red with a black border. This species can

superficially resemble small specimens of *Z. purpuralis* species group as well as *Zygaena osterodensis* (NAUMANN *et al.*, 1999). The best difference between *Z. brizae* and *Z. osterodensis* is in the antennae, which are weakly clubbed in *Z. brizae* and filiform in *Z. osterodensis* (NAUMANN *et al.*, 1999).

This species is distributed from southern Poland and Austria, to the Caucasus with isolated populations in the Balkans, Greece, Turkey, Middle East and Russia (NAUMANN *et al.*, 1999). Historical records for the western part of the Balkan peninsula have been summarized in NAHIRNIĆ & TARMANN (2014), but in general the species' distribution in the region is rather scarce and discontinuous, not confirming the maps presented in NAUMANN *et al.* (1999). The same is true also for Croatia, for which only a few imprecise records exist. The first mentions were made by DUPONCHEL (1844) and CARRARA (1846) who cite it for Dalmatia. MANN (1869) also lists it in his overview of the Lepidoptera of Dalmatia, but without any exact locality. These records are repeated by REBEL (1904), HOLIK (1936-37) and STAUDER (1921) who also mentions it for the coastal part of the Istrian peninsula. This is probably meant to refer to the parts of the peninsula that nowadays belong to Italy (Trieste, Prosecco), as the localities mentioned in STAUDER (1930) correspond to it. No specimens of this species originating from Croatia are stored in the Natural History Museum in Zagreb (ŠAŠIĆ *et al.*, 2016).

The goal of this paper is to present recent and the first reliable records of *Zygaena brizae* (Esper, 1800) in Croatia.

MATERIALS AND METHODS

Lepidoptera material has been collected in Croatia by the author for the last ten years, and Zygaenidae were collected along with other Lepidoptera families using pyramidal UV light traps for night active species and a butterfly net for diurnal species. The collected specimens (Permit number: UP/I-612-07/21-48/65) were set, identified and stored in the private collection of the author. For the identification, the standard keys for Zygaenidae were used (BERTACCINI & FIUMI, 1999; NAUMANN *et al.*, 1999). The genitalia of a male specimen were extracted using standard protocols and stored in a glycerin micro-vial on the specimen. The identification of the male genital structures was made according to BERTACCINI & FIUMI (1999).

The distribution map of the species in the region was created using records and modified maps from NAHIRNIĆ & TARMANN (2014), NAHIRNIĆ & BESHKOV (2018) and NAHIRNIĆ *et al.* (2019) and references cited therein.

RESULTS AND DISCUSSION

During the author's recent surveys, *Z. brizae* has been recorded at two localities, both located in Plitvice Lakes National Park in the Lika region of Croatia (Fig. 1):

New records: Croatia, Plitvice Lakes National Park, Prijeboj, grassland partially overgrown with bushes, 44.844974° N, 15.678963° E, 705 m, 15.6.2021, 3 m, 1 f, leg. TK; 16.6.2021, >20 ex., obs. & leg. TK; Croatia, Plitvice Lakes National Park, Homoljac, meadows NW of the settlement, 44.792597° N, 15.578369° E, 800 m, 16.6.2021, 1 ex., leg. TK.

While surveying the meadows near the settlement Prijeboj for Lepidoptera, several small *Zygaena* sp. were observed, photographed and in the end collected during

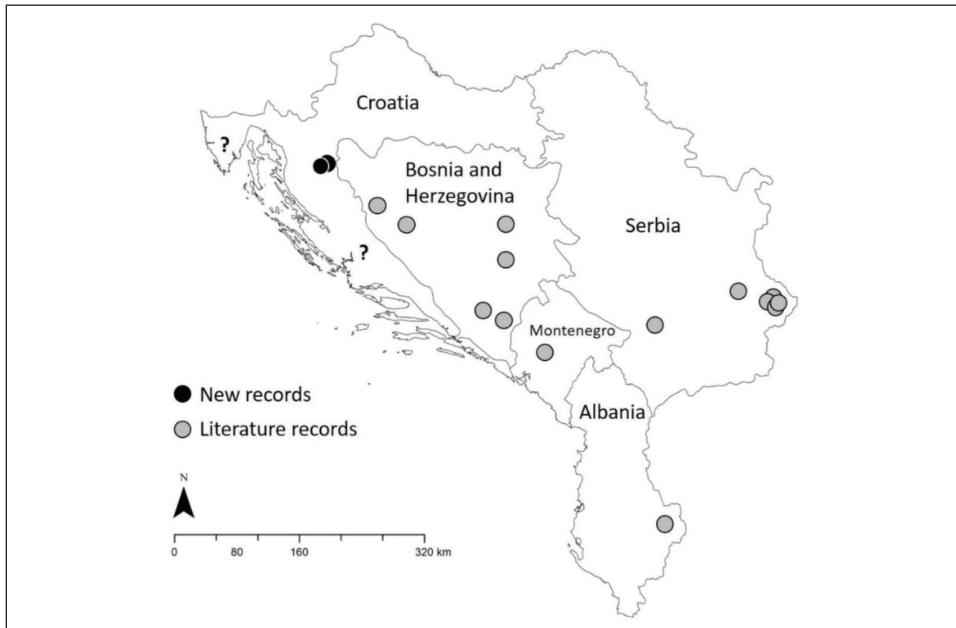


Fig. 1. Distribution of *Zygaena brizae* in Croatia, Bosnia & Herzegovina, Serbia, Montenegro and Albania (SCHAWERDA (1916); HOLIK (1936–1937); RAUCH (1977); NAHIRNIĆ & BESHKOV, 2018; NAHIRNIĆ & TARMANN, 2014; NAHIRNIĆ *et al.*, 2019). Question marks refer to the literature records from Istria and Dalmatia without confirmed localities.

July 15th 2021 (Fig. 2). After the preparation that occurred the same day, it was noted that they do not belong to small *Z. purpuralis* and/or *Z. osterodensis* but rather to *Z. brizae* (Fig. 2). With this in mind, the same area was visited the following day at about 15:00 hours and more than 20 specimens were observed in the area. The weather was sunny and the temperature at the time was around 28°C. Both males and females were observed, but the number of each sex was not counted. Most of the specimens were fresh, but some were obviously worn with paler red color on the forewing. The correct identification was also confirmed by examination of male genitalia (Fig. 3). In *Z. brizae* males, the unci are thin and long (Fig. 3), which is very different from *Z. purpuralis* and *Z. osterodensis* which have shorter and more robust unci (BERTACCINI & Fiumi, 1999).

Some meadows near Prijeboj, the main locality, are on a limestone substrate and can be characterized as dry meadows in the state of succession. In the past the area was used for grazing, but this practice has been abandoned. Only small patches of grasslands remain, surrounded by bushy vegetation. The meadows are surrounded by mixed *Quercus* and *Carpinus* forests from both sides and are rather isolated from the surrounding grasslands in the area.

In an hour-long walk, more than 20 specimens, males and females, were observed. As the habitat itself is rather diverse, different grassland microhabitats have developed in the area. However, almost all of the observed specimens could be found in grassland patches containing *Dianthus* flowers (*Dianthus carthusianorum* group).



Fig. 2. *Zygaena brizae* from Prijeboj, Plitvice Lakes National Park, 16.6.2021. Photo: T. Koren.

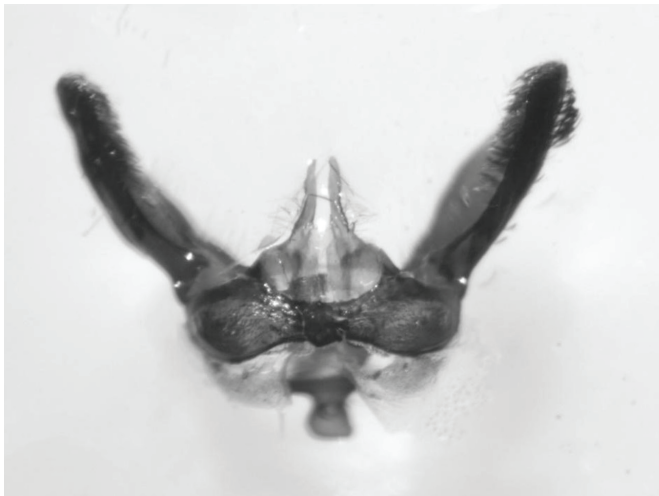


Fig. 3. Male genitalia of *Zygaena brizae* from Prijeboj, Plitvice Lakes National Park, collected on 16.6.2021. Photo: T. Koren.

Moreover, most of the specimens could be observed resting or feeding on these flowers. In the area, *Z. cf. purpuralis* was also observed in large numbers, but it could be easily distinguished from *Z. brizae* by its large size and even different behavior. Indeed, small *Z. brizae* seemed to be very easily disturbed, and at even the slightest disturbance, they would go flying away from their resting place. Similar flight patterns have been noted before (NAUMANN *et al.*, 1999).

Additionally, the species was also recorded in another locality, near Homoljac settlement. There, only a single specimen was collected in a large meadow near the main



Fig. 4. Habitat of *Zygaena brizae* at Prijeboj, Plitvice Lakes National Park, 16.6.2021. Photo: T. Koren.

road. These meadows are also on limestone substrate, and cover a rather large continuous area. Some parts of these meadows are still used as pastures

Further searches of the locality did not yield further specimens, so it is possible that the population occurs in some nearby locality. In total, more than 20 different grassland localities were visited across the whole Plitvice Lakes National Park, but no additional specimens were observed. It is possible that more targeted surveys should be taken in order to record this species in specific habitats. In nearby Bosnia and Herzegovina, during the last observation of the species, it was stated that the moths were rare and were flying in or on the edges of groups of bushes (RAUCH, 1977).

The habitat on which the species was collected in Bosnia and Herzegovina seems to be a little different from that of Plitvice: rocky meadows with typical karst vegetation on both sides (RAUCH, 1977).

The time period in which it was recorded in Croatia corresponds to the one given in the literature. *Z. brizae* has one generation per year and is on the wing from May to July depending on region and altitude (NAUMANN *et al.*, 1999).

From the taxonomic viewpoint, the collected specimen can be referred to as the subspecies *Zygaena brizae drvarica* Rauch, 1977. This subspecies is characterized by a very broad hindwing border that is broadest at the apex. Streaks on the forewing are dark red and narrow (NAHIRNIĆ & TARMANN, 2014; RAUCH, 1977). The locus typicus of this species is the area near Drvar – Bosansko Grahovo, Bosnia and Herzegovina (RAUCH, 1977).

In terms of distribution, the known localities in Croatia, Bosnia and Herzegovina, Serbia, Montenegro and Albania are still dotted and discontinuous (Fig. 1). In Slovenia this species occurred in the 'Kras'/Dinaric region, but in the Red List of endangered Lepidoptera of Slovenia, its status is given as possibly extinct (EX?) (CARNELUTTI, 1992).

For the long-term protection of this species, it is mostly beneficial that both localities are within the borders of Plitvice Lakes National Park. Still, this does not mean

that the species is automatically protected. Especially after the Croatian War of Independence, the grasslands in the area have been in large part abandoned due to the depopulation of the whole Lika area and the complete abandonment of many former villages and settlements. This is clearly visible in higher elevations where many historical localities visited by former Lepidoptera researchers have been completely overgrown (e.g. LORKOVIĆ, 2009). This trend is also visible in many areas of the National Park at lower elevations, including the locality at Prijeboj. While currently the locality is very diverse and rich with Lepidoptera and other insects, it is clear that the area has not been maintained for some time. This could lead to the complete disappearance of grasslands in the near future. As there is no Red List of moths in Croatia, it is somewhat difficult to direct conservation efforts to protect such rare and local species as *Z. brizae*. This should, however, be changed and at least partial restoration of its habitat should be undertaken in the near future. Especially beneficial would be to maintain patches of flowery grasslands with *Dianthus* as well as *Cirsium*, its main hostplant (NAUMANN *et al.*, 1999).

After this survey, the presence of *Z. brizae* in Croatia is finally confirmed, but nothing about its status and general distribution is known. These should be studied in the near future in order to create plans for the protection and the long-term survival of this species in the country.

The Lika area where this species has been recorded is very diverse, and in nearby Mt. Lička Plješevica, another local and rare Zygaenidae species, *Adscita geryon* (Hübner, 1813) was recorded, for the first time after almost a century (KOREN, 2021). This shows the need for visiting and surveying such areas that were not often visited during historical surveys.

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