J. Entomol. Res. Soc., 20(3): 123-127, 2018
Print ISSN:1302-0250

Research Article
Online ISSN:2651-3579

New Records of *Metreletus balcanicus* (Ulmer, 1920) (Ephemeroptera: Ameletidae) from Republic of Macedonia

Biljana RIMCHESKA[1] Yanka Nikolova VIDINOVA[1]

[1]Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, 1Tsar Osvoboditel Blvd., 1000-Sofia, BULGARIA
e-mails: rimceska@gmail.com, vidinova@yahoo.com

ABSTRACT

Within the present paper we elaborate the first country records for the larval and subimaginal stadium of *Metreletus balcanicus* (Ulmer, 1920) and the second locality for the presence of male imago from the territory of R. Macedonia. Furthermore, illustrated description of larval and adult characteristics, with an overview of species zoogeography and ecology is given.

Key words: Mayfly, larva, subimago, ecoregions.

Rimcheska, B., Vidinova, Y.N. (2018). New records of *Metreletus balcanicus* (Ulmer, 1920) (Ephemeroptera: Ameletidae) from Republic of Macedonia. *Journal of the Entomological Research Society,* 20(3), 121-125.

INTRODUCTION

Metreletus balcanicus is a rare European mayfly species, described as pontomediterranean faunistic element by Haybach (1998: 161, nec Bauernfeind and Soldán, 2012). Its southernmost distribution on the Balkan Peninsula reaches Southern Bulgaria (Russev and Vidinova, 1994; Presolska, 2014; Chertoprud and Palatov, 2017), Macedonia (Bauernfeind and Soldán, 2012) and European part of Turkey (Kazancı, 2001; Kazancı and Türkmen 2012; Salur *et al*., 2016). According to the Fauna Europaea database, the species is present in: Bulgaria, Czech Republic, Germany, Luxemburg, French Mainland, Hungary, Poland and European part of Turkey (de Jong *et al*., 2014). As *M. balcanicus* was not observed in Flanders (Belgium) since 1990 (Lock and Goethals, 2011), nowadays the species is confirmed from the Kiev region in Ukraine (Martynov, 2016).

Concerning the taxonomy of *M. balcanicus* important contributions were done by Ujhelyi (1960) and Puthz (1977), who synonymized *Ameletus hessei* Fizaine, 1931, *Metretopus goetghebueri* Lestage, 1938 and *Metreletus hungaricus* Ujhelyi, 1960 with *Metreletus balcanicus* (Ulmer, 1920). Later, Jażdżewska and Wojcieszek (1997) overviewed in detail the distribution, taxonomy and ecology as well as the ecological niche of this species. Studemann et al. (1988) provided a redescription of *M. balcanicus*. Presolska (2014) mentioned it as “rare” mayfly, known only from several localities in Bulgaria, but populations usually rich in individuals. Martynov (2016) presented it also as very rare species in Ukraine, with only one country record since its first finding in 2011.

The aim of the paper is to present new country records of *M. balcanicus* from R. Macedonia.

MATERIAL AND METHODS

The material (4 larvae and 1♂ subimago) was collected from a small river above the lake of Suvodol (periodically drying up stream, affluent of the river Crna Reka; N 41.081075°; E 21.556038°). The specimens were collected at the end of April 2015. Larvae were picked up by hand net, while the adult was collected with an entomological net. Collected specimens were preserved in 80% ethanol. The species identification was done according to Studemann *et al.* (1992) and Bauernfeind and Humpesch (2001). The drawings were prepared on a microscope Olympus BX41.

RESULTS AND DISCUSSION

Until now the only known locality for this species in R Macedonia was reported in Bauernfeind and Soldán (2012)-1♂ specimen. This material was collected by Wolfram Graf, near village Dolno Divjaci (on 07.07.2010) at elevation of 851m (Bauernfeind, pers. comm.). According to Illies (1978) this locality belongs to the zoogeographic region 6, Hellenic Western Balkan.

The main characters distinguishing the larvae of the species from that of the related ones are elongated, plate-like tracheal gills, submarginally with a fine sclerotized line

along lateral borders (Fig. 1a) and the apically widened maxilla with pectinate bristles (Fig. 1b) (Bauernfeind and Soldán, 2012).

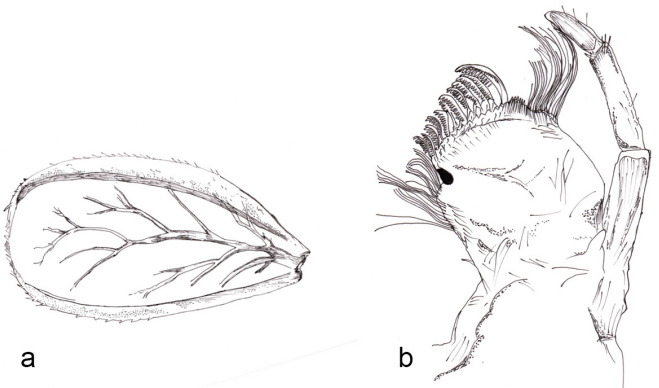

Fig.1: Gill (a) (40x) and Maxilla, ventral view (b) (100x), the larval stadium of *M.balcanicus* (drawings by B. Rimcheska).

In male imago and subimago the posterior border of the forceps base has a deep median incision (Fig. 2a). The penis lobes are typically tubular and strongly sclerotized with acutely pointed longitudinal fold projection (Fig. 2b).

The stream bed from the sampled site is 0.3-0.5 m wide. The substrate was dominated by sand, gravel and small to large sized boulders. The streambank and riparian vegetation were represent with a small amount of decaying trees and vegetation surrounding the locality. In the literature it is familiar that *M. balcanicus* prefers slow flowing streams with muddy and clay bottom, covered with aquatic vegetation and often coexisting with *Siphlonurus* species (Russev and Vidinova, 1994). Furthermore, in periodically drying up streams, *M. balcanicus* life cycle is characterized by adaptation to the peculiar environmental condition, when the imagines emerge in spring before drying up of the stream bed; hatched eggs survives the dry period and in autumn the nymphs of next generation appear (Jażdżewska and Wojcieszek, 1997).

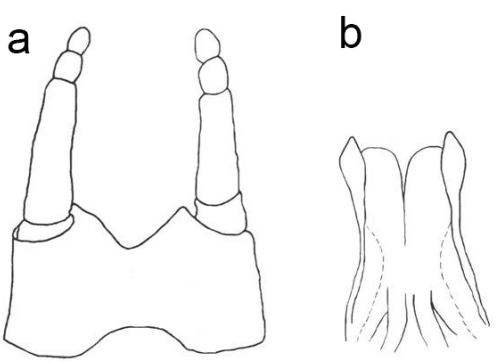

Fig. 2. Forceps, ventral view (a) (40x) and penis lobes, dorsal view (b) (40x), subimago of *M. balcanicus* (drawings by B. Rimcheska).

The species has one generation per year (Soldán, 1978; Jażdżewska and Wojcieszek, 1997; Martynov, 2016). Two types of monovoltine life cycles of *M. balcanicus* are known for Central Europe (Czech Republic and Poland): overwintering only in the egg stadium and overwintering simultaneously both the egg and larval stadia (Martynov, 2016). In Poland, the mature nymphs and imagines have been collected during May and early June (Jażdżewska and Wojcieszek, 1997). In Ukraine, larvae begin to hatch in March, where the middle and elder larvae are recorded in the middle of April, with over wintering of the egg stadium (Martynov, 2016). We recorded the existence of the elder larval stage and subimago at the same period-the end of April.

From a faunistic point of view, *M. balcanicus* represents a rare species for the R. Macedonia, wherein, up to date there are no records from the 7th Ecoregion (Eastern Balkan). This statement would imply that some population of the species should exists in the eastern part of the country, having in mind the records from the 7th Ecoregion from South-Western Bulgaria (Russev and Vidinova, 1994; Presolska, 2014; Chertoprud and Palatov, 2017). Generally this is the second report not just from the territory of R. Macedonia, but from the 6th Ecoregion as well.

In summary, more detailed studies of the sampled site and it's surroundings are needed in order to estimate the overall tendency of species abundance. Thus, we could measure the impact of the anthropogenic influence (when high degradation of the river bed is achieved) at this locality, especially during dry summer period. Furthermore, we select some sites with the potential preferred habitat of the species from the nearby border area with neighboring Bulgaria for potential confirmation of our assumption that *M. balcanicus* exist and in the Eastern part of the country.

ACKNOWLEDGEMENTS

We would like to thank Dr. Ernst Bauernfeind and Dr. Tomáš Soldán for the provided additional information concerning the unpublished data for this species from the R. Macedonia; To Dr. Ernst Bauernfeind for the valuable comments on the manuscript; to Dr. Roman Godunko, Institute for Entomology, České Budějovice for allowing us to make the drawings of the specimen; To Ana Tratnik, Society of biology students (University of Ljubljana, Slovenia), for invitation for the field work during their research visit in Macedonia. We are especially grateful to two anonymous reviewers for the valuable suggestions and comments aiming the improvement of the manuscript.

REFERENCES

Bauernfeind, E., Humpesch, U. H., 2001, *Die Eintagsfliegen Zentraleuropas (Insecta: Ephemeroptera): Bestimmungund Ökologie*, Verlag des Naturhislorischen Museums, Wien, 239.

Bauernfeind, E., Soldán, T., 2012, *The Mayflies of Europe (Ephemeroptera)*, Apollo Books, Ollerup, 781.

Chertoprud, M. V., Palatov, D. M., 2017, Stream macrozoobenthic communities of the Eastern Balkans, *Inland Water Biology*,10(3): 286-295.

De Jong, Y., Verbeek M., Michelsen, V., Bjørn, P. de P., Los, W., Steeman, F., Bailly, N., Basire, C., Chylarecki, P. Stloukal, E., Hagedorn, G., Wetzel, F. T., Glöckler, F., Kroupa, A., Korb, G., Hoffmann, A., Häuser, C. Kohlbecker, A., Müller A., Güntsch, A., Stoev, P., Penev L., 2014, Fauna Europaea-all European animal species on the web. *Biodiversity Data Journal* (2):e4034. doi:10.3897/BDJ.2.e4034.

Illies, J., 1978, *Limnofauna Europaea: Eine Zusammenstellung Aller die Europäischen Binnengewässer Bewohnenden Mehrzelligen Tierarten mit Angaben Uber Ihre Verbreitung und Okologie* (Zweite, überarbeitete und ergänzte Auflage). Gustav Fischer Verlag, Stuttgart, New York, Swets and Zeitlinger B.V., Amsterdam, 532.

Jażdżewska, T., Wojcieszek, A.,1997, *Metreletus balcanicus* (Ulmer, 1920) (Ephemeroptera) in Poland with notes on its ecology and biology, *Polskie Pismo Entomologiczne*, 66: 9-16.

Kazancı, N., 2001, *Türkiye Ephemeroptera (Insecta) Faunası*. *Türkiye İç Suları*. Araştırma Dizisi IX, İmaj Yayınevi, Ankara.

Kazancı, N.,Türkmen, G., 2012, The checklist of Ephemeroptera (Insecta) species of Turkey. *Review of Hydrobiology,* 5: 143-156.

Lock, K., Goethals, P. L. M., 2011, Distribution and ecology of the mayflies (Ephemeroptera) of Flanders (Belgium). *Annales de Limnologie. International Journal of Limnology,* 47: 159-165.

Martynov, A. V., 2016, The Life Cycles of Mayflies (Insecta: Ephemeroptera) of the Eastern Ukraine. Second Report. *Proceedings of the National Museum of Natural History,* 14: 86-94.

Puthz, V., 1977, Über die europäischen Arten der Gattung *Metreletus* Demoulin(Siphlonuridae, Ephemeroptera), *Philippia*, 3(3): 199-205.

Presolska, Y. 2014. *Composition, distribution and ecology of Ephemeroptera (Insecta) in Bulgaria*. PhD thesis, Iber-Bas, Sofia, 367 (In Bulgarian).

Russev, B., Vidinova, Y., 1994, Verbreitung und Ökologie der Vertreter einiger Familien der Ordnung Ephemeroptera (Insecta) in Bulgarien, *Lauterbornia*, 19, Dinkelscherben, 107-113.

Salur, A., Darilmaz, M. C., Bauernfeind, E., 2016, An annotated catalogue of the mayfly fauna of Turkey (Insecta, Ephemeroptera), *ZooKeys*, 620: 67-118.

Soldán, T., 1978, Mayflies (Ephemeroptera) new to the fauna of Czechoslovakia found in 1972-1977, *Acta Entomologica Bohemoslovaca*, 75: 319-329.

Studemann, D., Landolt, P., Sartori, M., Hefti, D., Tomka, I., 1992, Ephemeroptera. 9. Schweizerischen Entomologischen Gesellschaft, Fribourg, 174.

Studemann, D., Landolt, P., Tomka, I., 1988, Morphology and taxonomy of imagines and eggs of Central and Northern European Siphlonuridae (Ephemeroptera). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 61: 303-328.

Ujhelyi, S., 1960, *Metreletus hungaricus* sp. n. eine neue Eintagsfliege (Ephemeroptera) aus Ungarn, *Acta Zoologica Academiae Scientiarum Hungaricae,* 6: 199-209.

Received: December 12, 2017 *Accepted: May 24, 2018*