

# New records of *Epallage fatime* (Charpentier, 1840) in Macedonia (Odonata: Euphaeidae)

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**Abstract.** Formerly known from Macedonia only from two old records made in the southeasternmost part of the country, the species has been newly recorded on 20-VII-2008 at the Luda Mara stream south of Kavadarci (S Macedonia), on 24-VII-2008 at the Konska Reka stream west of Gevgelija (SE Macedonia) and on 26-IV-2010 at the Sermeninska Reka stream northwest of Gevgelija (SE Macedonia). At all localities, the species' development has been confirmed. Its currently known distribution in Macedonia and the neighbouring countries is presented and a short zoogeographical discussion provided.

Key words: *Epallage fatime*, dragonflies, distribution, Macedonia, the Balkans

**Izvleček. NOVE NAJDBE VRSTE EPALLAGE FATIME (CHARPENTIER, 1840) V MAKEDONIJI (ODONATA: EUPHAEIDAE)** – Predhodno znana iz Makedonije le na podlagi dveh starih podatkov s skrajnega jugovzhodnega dela države, je bila vrsta ponovno najdena 20-VII-2008 na potoku Luda Mara pri mestu Kavadarci (J Makedonija), 24-VII-2008 na potoku Konska Reka zahodno od mesta Gevgelija (JV Makedonija) in 26-IV-2010 na potoku Sermeninska Reka severozahodno od Gevgelije. Na vseh lokalitetah je bil potrjen razvoj vrste. Prikazana je njena trenutno znana razširjenost v Makedoniji in sosednjih državah ter dodana kratka zoogeografska razprava.

Ključne besede: *Epallage fatime*, kačji pastirji, razširjenost, Makedonija, Balkan

## Introduction

Until recently, the dragonfly fauna of the Republic of Macedonia has been known only from very fragmentary sources. The most comprehensive older works include Karaman (1972, 1979) and Peters & Hackethal (1986). In the last few years, Bedjanič & Bogdanović (2006) refer to 56 species for Macedonia, while the Atlas of the Odonata of the Mediterranean and North Africa lists 59 species for the country (Boudot et al. 2009). Recent new contributions to the Macedonian dragonfly fauna made by Micevski et al. (2008) and Bedjanič et al. (2009) were included in the before-mentioned overview, while the work by Jović & Mihajlova (2009) brought another species addition, thus bringing the number of recorded dragonfly species for Macedonia to a current total of 60 species. However, the knowledge on individual species distribution has numerous gaps and is still far from being complete, not to mention biology, ecology or nature conservation aspects.

One of the most enigmatic dragonfly species, the sole representative of the family Euphaeidae in Europe, is *Epallage fatime*. For Macedonia, only two older records have been known. A single male of this damselfly was first recorded back in 1918 at the state border between Macedonia and Greece in the village of Nikolić north of Lake Dojran (Bilek 1966). More than half a century later, larvae of *E. fatime* were found a few kilometres northwards in a stream on the southern slopes of Mt. Belasica (Karaman 1979, 1981). Quotation by Bedjanič & Bogdanović (2006) on the record of the species in the hills north of Lake Dojran relates to the two aforementioned sources.

In the summers of 2008 and 2010, field surveys were carried out by the senior author in different habitats throughout Macedonia, aiming at improving knowledge of the dragonfly fauna of this particular part of the Balkan Peninsula. In addition, biology students of the University of Ljubljana organized a field research camp named »Ekosistemi Jadrana 2010 - Makedonija« in the spring 2010, focusing on different animal groups, including dragonflies. Here, some interesting new records gathered on the occurrence of *E. fatime* are presented.

### **New records of *Epallage fatime* in Macedonia**

Between 10 and 27 July 2008, merged with family summer holidays, the senior author undertook an odonatological survey in Macedonia. In the morning of 20-VII-2008, we surveyed the Luda Mara stream south of Kavadarci. Car was left at a small artificial accumulation lake 5.5 km SE of Kavadarci; from there, we headed upstream (N41°23'22", E22°02'24", alt. 380 m). At the stream, numerous individuals of *Calopteryx virgo* and *C. splendens* prevailed in sunny weather around noon, while *Platycnemis pennipes*, *Onychogomphus forcipatus*, *Libellula depressa*, *L. fulva* and *Orthetrum brunneum* were found only in low numbers, and *Gomphus vulgatissimus* only in its larval stage. More than 500 m of the Luda Mara stream were investigated when turning over a larger stone and work with our water net surprisingly resulted in 2 larvae of *Epallage fatime*. In the same moment, children found a wing of an adult male of the species along the stream, probably a leftover of a bird's feast. Additional searching resulted in observation of 2♂ and 1♀ of *E. fatime* (Figs. 1 & 2). The species' habitat aspect at the Luda Mara stream is shown in Fig. 3.



**Figures 1 & 2.** *Epallage fatime* male and larva, photographed on 20-VII-2008 at the Luda Mara stream south of Kavadarci. Photo: M. Bedjanič.

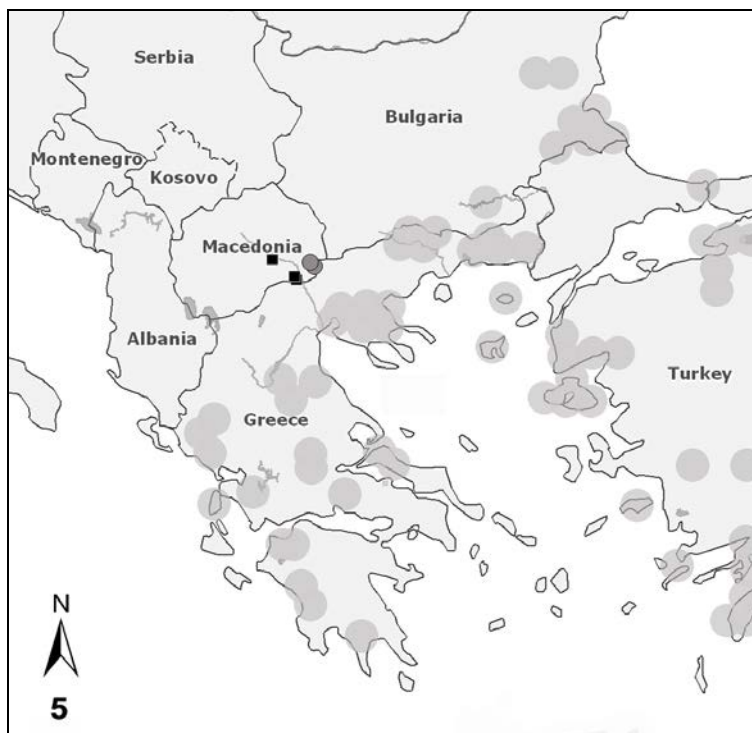
**Sliki 1 & 2.** Samček in ličinka vrste *Epallage fatime*, fotografirana 20-VII-2008 na potoku Luda Mara južno od Kavadarcev. Foto: M. Bedjanič.



**Figures 3 & 4.** Localities with new records of *Epallage fatime* – Luda Mara stream south of Kavadarci (Fig. 3) and Kanska Reka stream west of Gevgelija (Fig. 4). Photo: M. Bedjanič.

**Sliki 3 & 4.** Lokaliteti z novimi podatki o pojavljanju vrste *Epallage fatime* – potok Luda Mara južno od Kavadarcev (Sl. 3) in potok Kanska Reka zahodno od Gevgelije (Sl. 4). Foto: M. Bedjanič.

On 24-VII-2008, while travelling from Lake Dojran towards the northern part of Macedonia, a stop was made at the Konska Reka stream 1 km W of Novo Konjsko village, approximately 6.5 km SSW of the town of Gevgelija (N41°09'20", E22°25'34", alt. 190 m; Fig. 4). In cloudy weather around noon, *C. splendens* was again the most abundant species, accompanied only by two juveniles of *P. pennipes* and 2♂ of *O. forcipatus*, while larvae of the latter and *G. vulgatissimus* were found in approximately 300 m stretch of the stream. Initially, no adults or larvae of *E. fatime* were found until our prolonged sampling by turning stones and sweeping produced 3 larvae from under partly decomposed small trunk at the edge of a larger pool.



**Figure 5.** The distribution of *Epallage fatime* in Macedonia and in the Balkans, on Greece islands and in western Turkey (compiled after Boudot et al. 2009 and Lopau 2010 and marked with large light grey circles). Two older records from Macedonia (Bilek 1966, Karaman 1979, 1981) are marked with grey circles, while three new localities are delineated with black squares.

**Slika 5.** Razširjenost vrste *Epallage fatime* v Makedoniji in na Balkanu, na grških otokih ter v zahodni Turčiji (prirejeno po Boudot et al. 2009 in Lopau 2010 in označeno z velikimi svetlo sivimi krogci). Dva stara podatka za Makedonijo (Bilek 1966, Karaman 1979, 1981) sta označena s sivimi krogcema, tri nove lokalitete pa s črnimi kvadrati.

On the same day, the nearby Sermeninska Reka stream, 2km SWW of Negorci village and approximately 5.5 km NW of Gevgelija, was also visited (N41°10'45", E22°27'24", alt. 150 m). The dragonfly community resembled that of Konska Reka, with *C. splendens*, *P. pennipes*, *O. forcipatus* and *G. vulgatissimus* present, but with no signs of *E. fatime*. However, almost two years later, on 26-IV-2010, the butterfly group of the »Ekosistemi Jadrana 2010 - Makedonija« field research camp managed to confirm the development of the species in Sermeninska Reka. They surprisingly secured a single freshly emerged male of *E. fatime* at Sermeninska Reka near Mrzenci village, just 3 km SE of the locality visited in 2008 (N41°09'48", E22°29'11", alt. 80 m; N. Kogovšek leg., D. Vinko det.). Without detailed faunistic data, the above record of *E. fatime* is referred to in the report by odonatological group from the above-mentioned field research camp (Vinko 2012).

## Discussion

The distribution of *Epallage fatime*, the only Mediterranean representative of the Oriental damselfly family Euphaeidae consisting of about 60 species in Southeast Asia, extends from Kashmir in the East to Greece and Macedonia in the West (Boudot et al. 2009, Dijkstra & Lewington 2006).

In the Mediterranean, *E. fatime* it is not uncommon in western Turkey, Cyprus and Greece (Fig. 5). According to Lopau (2010), the relative scarcity of records from continental Greece and Peloponnese could be due to lower intensity of fieldwork in late spring and early summer when flight season of the adults takes place. The species has also been found on some of the Aegean islands like Evia, Kos, Lesvos, Lemnos, Rhodes, Samos and Samothrace and on Lefkada Island in the Ionian Sea (Lopau 2010). In Bulgaria, *E. fatime* is rare and distributed only in the southeastern part of the country, along the Black Sea coast, with individual records known from the Eastern Rhodopes and the Eastern Balkan Mts. (Marinov 2000, Beschovski & Marinov 2007; Fig. 5).

As mentioned in the introduction, *E. fatime* was first recorded in Macedonia literally at the state border with Greece in the village of Nikolić north of Lake Dojran. Bilek (1966) reported on a single male specimen in the State Collection of Zoology in Munich, collected there on 17-VII-1918. This old record could not be confirmed in the field by Karaman (1972), but some years later the same author, without describing the exact locality or other details on the habitat, reports on larvae of *E. fatime* found some kilometres northwards in a stream on the southern slopes of Mt. Belasica (Karaman 1979, 1981).

Our three new records contribute to the knowledge on the species distribution in Macedonia (Fig. 5). The records from Konska Reka and Sermeninska Reka streams near Gevgelija come from the area approximately 25km southwest of Mt. Belasica, while the record from Luda Mara stream south of Kavadarci extends the known range of the species in Macedonia some 50 km northwest. It is interesting to note that recently *E. fatime* was also mentioned in an unpublished report of the Environmental impact assessment study for the highway section Demir Kapija – Smokvica (Melovski *et al.* 2008). Even more, together with

*Orthetrum brunneum*, *Sympetrum sanguineum* and *Calopteryx splendens*, it is stated to be among the commonest dragonfly species and distributed in the entire investigated area. Unfortunately, no details for such judgement were provided. Due to the fact that obviously no odonatologists were involved in the fieldwork and report elaboration, the records and assessments by Melovski et al. (2008) are doubtful. On the other hand, it should be added that *E. fatime* has not been found during few relatively extensive odonatological studies carried out by Peters & Hackethal (1986) and recently by Jović (2009) and Kitanova et al. (2008). On top of it all, it is not included in the rich odonatological collection of the Macedonian Museum of Natural History in Skopje (Jović & Mihajlova 2009).

Further fieldwork oriented both in search of larvae and especially adults in the period from the end of April to mid July will surely bring additional *E. fatime* records for the country. From the hereto gathered knowledge on species distribution it is clear that it favours areas with very warm climate. In Macedonia, the influence of the Aegean Sea stretches from Gevgelija in the southeast along the Vardar River valley northwards to Demir Kapija and to a lesser extent also further northwest towards Veles. Effects of this climate also reach the Strumica River valley as well as the proximity of Lake Dojran. Speculating from the climatic point of view and based on presumed existence of suitable habitats as read from the maps, *E. fatime* could eventually occur at some of the streams originating on the southern slopes of Plavuš, Gradeška Planina and Konečka Planina Mts., perhaps even reaching the vicinity of the towns of Štip or Veles. On the southern edge of the Vardar valley, streams on the eastern slopes of Klepa and Visoka Glava Mts. as well as streams originating from Vitačevo, Bošava and Kožuf Mts. and flowing towards the Vardar valley should be checked for the presence of this species.

However, the above speculations may be too optimistic for several reasons. One is the scarcity of hitherto known records and the fact that southeastern and southern Macedonia delineates the extreme northwestern edge of *E. fatime* distribution. Furthermore, the whole Vardar valley with surrounding slopes is under considerable agricultural pressure, which is responsible for the increasing water extraction from streams as well as for stream pollution. For now, the European IUCN Red list of dragonflies classifies *E. fatime* only as a near threatened (NT) species, but with annotation that its population trend is decreasing (Kalkman *et al.* 2010). The regional threat status of the species in Macedonia might better be classified as falling between the official IUCN categories of vulnerable (VU) and endangered (EN). However, more fieldwork and faunistic data are needed for such evaluation.

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## References

- Bedjanić M., Bogdanović T. (2006): Regional guide to dragonflies: Other states of former Yugoslavia. In: Dijkstra K.-D.B. (Ed.), Lewington R. (Illustr.), Field guide to the Dragonflies of Britain and Europe. British Wildlife Publishing, Dorset, p. 57.
- Bedjanić M., Micevski N., Micevski B. (2009): On the dragonfly collection in the Natural History Museum in Struga, Macedonia (Insecta: Odonata). *Biologia Macedonica* 61(2008): 97-105.
- Beschovski V., Marinov M. (2007): Fauna, Ecology, and Zoogeography of Dragonflies (Insecta: Odonata) of Bulgaria. In: Fet V., Popov A. (Eds.), Biogeography and Ecology of Bulgaria, *Monographiae biologicae*, Vol. 82. Springer, pp. 191-231.
- Bilek A. (1966): Ergebnisse der Albanien-Expedition 1961 des Deutschen Entomologischen Institutes. 46. Beitrag. Odonata. *Beitr. Entomol.* 16(3/4): 327-346.
- Boudot J.-P., Kalkman V.J., Azpilicueta Amorín M., Bogdanović T., Cordero Rivera A., Degabriele G., Dommanget J.-L., Ferreira S., Garrigós B., Jović M., Kotarac M., Lopau W., Marinov M., Mihoković N., Riservato E., Samraoui B., Schneider W. (2009): Atlas of the Odonata of the Mediterranean and North Africa. *Libellula Supplement* 9, 256 pp.
- Dijkstra K.-D. B., Lewington R. (2006): Field guide to the dragonflies of Britain and Europe. British Wildlife Publishing, Dorset, 320 pp.
- Jović M. (2009): Report on Macedonia 2008 project – Odonata. IDF-Report 21: 1-23.
- Jović M., Mihajlova B. (2009): Catalogue of the Odonata collection in the Macedonian Museum of Natural History. *Acta entomologica serbica* 14(2): 133-146.
- Kalkman V.J., Boudot J.-P., Bernard R., Conze K.-J., De Knijf G., Dyatlova E., Ferreira S., Jović M., Ott J., Riservato E., Sahlén G. (2010): European Red List of Dragonflies. Publications Office of the European Union, Luxembourg.
- Karaman B.S. (1972): Prilog poznavanju faune Odonate u ekosistemu Dojranskog jezera. Magistarski rad, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Zagreb, 90 pp.
- Karaman B.S. (1979): Ekološko faunistička istraživanja faune odonata SR Makedonije. Disertacija. Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Zagreb, vi+152 pp.
- Karaman B.S. (1981): Contribution à la connaissance de la faune des Odonates du lac de Doiran. *Ann. Fac. Biol. Univ., Skopje* 34: 215-222.
- Kitanova D., Slavevska Stamenković V., Kostov V., Marinov M. (2008): Contribution to the knowledge of dragonfly fauna of the Bregalnitsa river, Macedonia (Insecta: Odonata). *Natura Montenegrina* 7(2): 169-180.
- Lopau W. (2010): Verbreitungsatlas der Libellen in Griechenland (Odonata). *Libellula Supplement* 10: 5-153.
- Marinov M. (2000): Pocket field guide to the dragonflies of Bulgaria. Eventus Publishing House, Sofia, 104 pp.
- Melovski L., Hristovski S., Veleviski M., Avukatov V. (2008): Final Construction of Corridor X, Highway E – 75, Section Demir Kapija – Smokvica, Environmental Impact Assessment Study - Revised. Civil Engineering Institute »Makedonija« J. S., Fund for national and regional roads of the Republic of Macedonia, Skopje, 274 pp. + appendices.

Micevski N., Micevski B., Bedjanič M. (2008): *Aeshna cyanea* and *A. juncea*, new for the fauna of Macedonia (Odonata: Aeshnidae). *Libellula* 27(3/4): 267-273.

Peters G., Hackethal H. (1986): Notizen über die Libellen (Odonata) in Mazedonien. *Acta Musei Macedonici Scientiarum Naturalium* 18(5/151): 125-157.

Vinko D. (2012): Poročilo odonatološke skupine. In: Borko Š. (Ed.), *Ekosistemi Jadrana – Makedonija 2010*. Društvo študentov biologije, Ljubljana, pp. 8-16.