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ODONATA FROM BULGARIA IN THE COLLECTION OF NATIONAL MUSEUM OF BOSNIA AND HERZEGOVINA

DEJAN KULIJER[1] and MILEN MARINOV[2]

1 National Museum of Bosnia and Herzegovina, Zmaja od Bosne 3, 71000 Sarajevo, Bosnia and Herzegovina
E-mail: dejan.kulijer@gmail.com
2 University of Canterbury, Freshwater Ecology Research Group, Private Bag 4800, Christchurch 8140, New Zealand
E-mail: mg_marinov@yahoo.com

Abstract

The entomological collection of the National Museum of Bosnia and Herzegovina is one of the oldest Balkan insect collections. Eighty-seven (87) dragonfly specimens from 19 species that originate from Bulgaria were found in this collection. In this paper we present the oldest and till now unknown records of dragonflies from Bulgaria from this collection. Some interesting and new distribution data on several species are also presented and discussed.

KEY WORDS: Dragonflies, Odonata, Bulgaria, Apfelbeck, Museum

Introduction

The National Museum of Bosnia and Herzegovina comprises some of the oldest and richest Natural History collections in the Balkans. During more than 115 years of existence and through research conducted by the scientists from the Museum, vast collections have been gathered, mostly from the Balkan Peninsula.

One of the biggest and most important collections in the National Museum is the entomological collection of the Balkan Peninsula. This collection is the result of the work of one of the most important Balkan entomologists, Viktor APFELBECK (1859-1934), who was the first Curator of the Entomological collection at the National Museum. He was mainly interested in the Coleoptera order, especially Carabidae, Curculionidae and Silphidae, but also collected material from other insect groups (POPOVIĆ, 1934; SIJARIĆ, 1988; KOTROŠAN, 2002). During his fruitful career he described 620 new taxa from the Balkan Peninsula (NONVEILLER, 1999).

His work resulted in the collection of more than 500,000 specimens from whole Balkan Peninsula that are today stored in the "Collection of Viktor APFELBECK" in the National Museum in Sarajevo.

During more than 30 years of his research of entomofauna of Bosnia and Herzegovina he also conducted research in Albania, Bulgaria, Greece, Montenegro, Romania and Turkey.

In 1892 APFELBECK conducted a research expedition to Bulgaria. During this expedition from June 7th till August 4th he visited areas around Sofia, Vitosha Mountain, around the cities of Burgas and Varna on the Black Sea coast, and Plovdiv and Kalofer. His journey finished in the western part of Rodopi Mountain when V. APFELBECK got sick from malaria. Thanks to this expedition vast entomological material was collected.

Viktor APFELBECK published some data from his travels to Bulgaria in the scientific journal of the National Museum „Glasnik Zemaljskog muzeja u Bosni i Hercegovini". In APFELBECK (1892) he describes his journey and the area he visited with remarks on habitats and interesting species he found, mainly Coleoptera. There is only one short remark on dragonflies in this article concerning marshland area near Papaslia, where he said "... gdje sam nalovio mnogo vrsta vodenih kukaca i vodenih konjica (Libelle)" [... where I caught numerous species of water beetles and dragonflies (Libelle)].

In the collection of Viktor APFELBECK 1.079 specimens of dragonflies are stored (Fig. 1). During a survey of the material in this collection 87 specimens of dragonflies from Bulgaria were found.

Figure 1. Dragonflies in the entomological collection of Viktor APFELBECK in National Museum of B&H.

Compared to other countries in the Balkan Peninsula data on Bulgarian Odonata are very good and an extensive overview of the bibliography is given by MARINOV (2001). According to MARINOV (2001) the first known records of dragonflies in Bulgaria come from HRISTOVITCH (1892) who published some notes on *Libellula depressa* and from KLAPALEK (1894a, 1894b) who published two papers on Bulgarian dragonflies, mentioning altogether nine species. Many studies have been conducted since, resulting in a comprehensive number of papers dealing with Bulgarian Odonata fauna. Research in this field is ongoing with most of the records in recent years resulting from increased interest in the Balkan dragonflies. Those insects were recognized on national and international scales and received particular attention in some current nature protection actions. Balkan countries were included in the recently published distribution atlas of the Mediterranean and North Africa (BOUDOT *et al.*, 2009) and appraisal of their conservation status (RISERVATO *et al.*, 2009). The cooperation between scientists living within the area or working with Balkan Odonata led to the establishment of the Balkan OdoBase (BOB) (JOVIĆ et *al.*, 2010), a network created to enhance the

scientific studies of Balkan Odonata, support the beginners in this field and increase public awareness of this insect group. The present paper is one of the first examples of the great importance of such collaborative work between parties of mutual interest. With insight into the APFELBECK bibliography (APFELBECK, 1923), by comparison of data from the collection with data from the odonatological database of Bulgaria, and with published records we concluded that these data are new. They represent the oldest known records of these species from Bulgaria collected nearly 120 years ago and stored in the entomological collection of The National Museum of Bosnia and Herzegovina.

Material and Methods

Revision of the Odonata collection in the National Museum revealed the presence of 87 specimens of dragonflies from Bulgaria. The examined material is a part of the entomological collection of the Balkan Peninsula and specimens from Bulgaria were mixed with other Odonata specimens from Balkans.

All specimens were examined for correct species identification and each of them was assigned an inventory number. Specimens are mainly in good condition, considering that they are almost 120 years old and not accommodated in optimal conditions, especially during the recent war when the Museum was heavily damaged. Some specimens are broken, but most of the collection is well preserved.

All specimens in the collection are provided with APFELBECK original labels with information on locality. Most of the labels are printed; only a few are handwritten. APFELBECK'S name is also typed on some specimen labels, but not all. Unfortunately dates are missing on all labels - the case not only with these specimens but also with a significant part of the collection from the time when labels noted mainly only the locality name and the name of the collector. Fortunately after APFELBECK'S notes (APFELBECK, 1892) we were able to determine at least close, and sometimes exact, dates of collection of all specimens.

Names of localities that are printed on labels correspond to the localities that APFELBECK visited during his research in Bulgaria in 1892. On some labels his name is also printed, proving that these specimens were collected by him. Although there were no dates on specimen labels, these 82 specimens surely were collected during the expedition that Viktor APFELBECK conducted to Bulgaria in 1892. That was also confirmed by comparison of those labels with the labels on specimens from other insect groups which were no doubt collected in 1892 in Bulgaria by APFELBECK.

According to labels on some specimens it is evident that at least some of the material was reviewed by Czech entomologist F. KLAPALEK, probably during his excursion to Bosnia in 1897 when he visited the Museum (KLAPALEK, 1898). Later in 1947 Ž.R. ADAMOVIĆ, a prominent entomologist in former Yugoslavia, reviewed most of the dragonfly collection, including specimens from Bulgaria, and on those that had been wrongly identified he put his label with new species determination. ADAMOVIĆ (1948) published only records from the collection originating from the territory of former Yugoslavia.

For another five specimens we could not determine their locality of origin nor when they were collected. They have different labels with only the country name printed on them. Based on all those data labels a provisional list with locality names is provided with coordinates extracted from the Bulgarian Odonata database.

The species list and the collection data are given in Tab. I. The nomenclature used in this paper is given according to DIJKSTRA & LEWINGTON (2006).

Results

Our work revealed a total of 87 specimens belonging to 19 species of dragonflies from Bulgaria in the collection of the National Museum. From those, 82 specimens of 16 species were collected by Viktor APFELBECK from a total of 8 localities (Fig. 2) in Bulgaria in 1892.

Table I. Dragonfly specimens collected in Bulgaria from the entomological collection of the National Museum of Bosnia and Herzegovina (highlited specimens were not collected by Viktor APFELBECK).

Family / Species	Locality	Legator	Detector	♂	♀
Calopterygidae					
Calopteryx splendens (Harris,1782)	Kalofer	Apfelbeck		2	
C. splendens (Harris,1782)	Burgas	Apfelbeck		1	
C. splendens balcanica Fudakowski, 1930*	Burgas	Apfelbeck		1	4
Calopteryx virgo (Linnaeus,1758)	Kalofer	Apfelbeck		1	1
Lestidae					
Lestes sponsa (Hansemann, 1823)	Varna			1	
L. sponsa (Hansemann, 1823)	Kamtschik				1
Lestes dryas Kirby, 1890	Vajakiöj-S., Burgas	Apfelbeck	Klapalek (1♂)	5	
L. dryas Kirby, 1890	Burgas		Klapalek	2	
Lestes barbarus (Fabricius, 1798)	Varna	Apfelbeck			1
L. barbarus (Fabricius, 1798)	Kamtschik			1	
L. barbarus (Fabricius, 1798)	Burgas	Apfelbeck (1♂, 1♀)	Klapalek (1♂, 1♀)	1	2
Lestes virens (Charpentier, 1825)	Varna		Adamović		1
L. virens (Charpentier, 1825)	Kamtschik		Klapalek (1♂, 1♀), Adamović (1♀)	2	4
Lestes macrostigma (Eversmann, 1836)	Vajakiöj-S., Burgas	Apfelbeck		8	9
L. macrostigma (Eversmann, 1836)	Burgas			4	
Sympecma fusca (Vander Linden, 1820)	Kalofer	Apfelbeck		1	
S. fusca (Vander Linden, 1820)	Varna	Apfelbeck			1
Coenagrionidae					
Ischnura elegans (Vander Linden, 1820)	Vajakiöj-S., Burgas	Apfelbeck (3 1♂)		3	1
I. elegans (Vander Linden, 1820)	Devno-See, Varna	Apfelbeck		1	2
I. elegans (Vander Linden, 1820)	Plovdiv		Klapalek		1
Ischnura pumilio (Charpentier, 1825)	Devno-See, Varna	Apfelbeck	Klapalek (1♀)	1	1
I. pumilio (Charpentier, 1825)	Vajakiöj-S., Burgas	Apfelbeck			1
Coenagrion puella (Linnaeus,1758)	Vajakiöj-S., Burgas	Apfelbeck		1	1
Platycnemididae					
Platycnemis pennipes (Pallas, 1771)	Burgas			1	
P. pennipes (Pallas, 1771)	Devno-See, Varna	Apfelbeck		1	3
P. pennipes (Pallas, 1771)	Vajakiöj-S., Burgas	Apfelbeck		1	1

Family / Species	Locality	Legator	Detector	♂	♀
Gomphidae				(Table I - continued)	
Gomphus flavipes (Charpentier, 1825)	Plovdiv		Adamović		1
Libellulidae					
Libellula quadrimaculata Linnaeus,1758			Klapalek		2
Sympetrum sanguineum (Müller, 1764)	Varna			1	1
S. sanguineum (Müller, 1764)				1	
Sympetrum flaveolum (Linnaeus,1758)	Burgas		Klapalek	1	1
Sympetrum meridionale (Sélys, 1841)	Bijeli Isker			1	
S. meridionale (Sélys, 1841)	Varna			1	1
Crocothemis erythraea (Brullé, 1832)			Klapalek (1♀)	1	1
Number of specimens				45	42

***** APFELBECK was the first to recognize differences of some populations of *Calopteryx splendens* in the Balkans and he regarded these populations as different species, which he named *Calopteryx balcanica*. Later FUDAKOWSKI described new subspecies on the basis of specimens from the Alfelbeck collection from Hercegovina and Dalmatia (FUDAKOWSKI, 1930; ADAMOVIĆ & VIJATOV, 1996).

List of localities

Names of localities given in italics are the species localities taken verbatim from the labels; a short explanation follows about the most probable place. All coordinates are given as the best guess as we cannot be certain where exactly APFELBECK collected his specimens.

1. *Vajakiöj-S., Burgas*. Correct name: Burgasko ezero (Burgas Lake) or Lake Vaya (42°27'N; 27°27'E; 0 m a.s.l.)

2. *Burgas*. Coordinates given as above due to their close proximity (42°27'N; 27°27'E; 0 m a.s.l.)

3. *Devno-See, Varna*. As it is a big lake the coordinates given are those of the town of Devnya with no altitude provided (43°13'N; 27°36'E).

4. *Varna*. Coordinates taken as those of the town of Varna (43°13'N; 27°55'E; 0 m a.s.l.).

5. *Kamtschik*. Probably Kamchiya River situated S of the town of Varna. Coordinates given as those for the locality of *Kamchiya River, Poda, by the bridge on the road Burgas – Varna* (43°01'N; 27°49'E; 6 m a.s.l.).

6. *Kalofer*. Coordinates given as those of the town of Kalofer with no altitude provided (42°36'N; 25°01'E).

7. *Plovdiv*. Coordinates given as those of the town of Plovdiv with no altitude provided (42°09'N; 24°45'E).

8. *Bijeli Isker*. Probably Iskar River by the village of Beli Iskar. Coordinates given as those of the village of Beli Iskar with no altitude provided (42°16'N; 23°32'E).

Discussion

The dragonfly collection of the National Museum of Bosnia and Herzegovina has great historical importance. It represents one of the oldest preserved dragonfly collections from the Balkans.

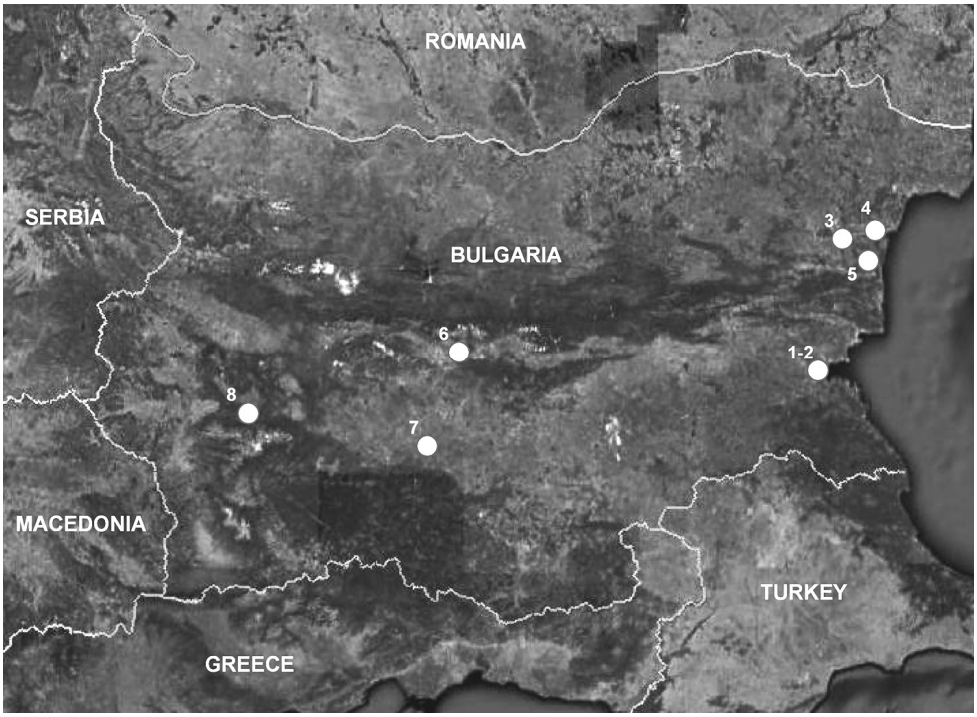

Figure 2. Map of the localities from which specimens were gathered (background map: ©2010 Google Earth)

Material collected by V. APFELBECK in Bulgaria represents the oldest known specimens of dragonflies from Bulgaria, and in accordance with that these records have great historical importance for odonatological research in Bulgaria.

According to most recent data Odonata fauna of Bulgaria comprises 68 species (BESCHOVSKI & MARINOV, 2007). Sixteen of them were collected in 1892 by APFELBECK and specimens were deposited in the National Museum in Sarajevo. These specimens are the oldest known records of those dragonfly species from Bulgaria.

Besides its historical importance, the dragonfly collection of Viktor APFELBECK also gives some interesting distribution data on some species. Below is a commented species list with particular emphasis on the highlights of the APFELBECK's collection.

Calopteryx splendens balcanica. BESCHOVSKI (1989) gives the most recent overview of the family Calopterygidae in Bulgaria. He refers to Bulgarian populations as *C. s. balcanica*; however, he emphasizes the necessity of thorough revision of the actual situation throughout the Balkan Peninsula because the distribution of the true subspecies lies in the western part of the peninsula and is away from the Bulgarian populations. *C. splendens* specimens with large wing spots are often found among Bulgarian populations. They resemble *C. s. balcanica* in the extent of dark area which goes to the wing tip and light area just at the wing base; however, the specimens do not fully reflect the original description given by FUDAKOWSKI (1930). In Bulgarian specimens, the dark area in males ends with a round edge towards the base of the wing; females have transparent wings without spots. Female specimens found in APFELBECK'S collection have a dark area covering most of their wings with visible pseudopterostigma. The wing tip in the forewing is pale;

the wing spot in the basal area of the wing is not rounded and extends halfway between the node and the base. The species could be mistaken for *C. virgo* specimens which come from the very SE part of the country where they have a dark wing area developed in both sexes with a light wing base. Living individuals are rather typical and unmistakable, but the dried specimens preserved in collections for a long time may have faded wing colouration and look more like *C. s. balcanica*. Due to the differences among Bulgarian *C. s. balcanica* specimens and the similarities with *C. virgo* from SE Bulgaria, the identification of specimens from the Burgas region as *C. s. balcanica* seems suspicious and should not be incorporated in the database given above unless additional proof is found. Therefore the data on *C. splendens balcanica* are given here in the manner established by the Museum collection. Further molecular work on *C. s. balcanica* and a comparison of the results with the morphometric studies such as ADAMOVIĆ & VIJATOV (1996) are imperative.

Lestes macrostigma. The locality reported here – Burgasko ezero or Lake Vaya – has been considerably modified since the initial visit to Bulgaria in 1892. Now it is dammed by a very narrow channel built to connect it to the Black Sea, its water level has risen,and the salinity decreased, rendering it no longer suitable to support *L. macrostigma* populations. The closest area where the species has been discovered is known as PODA Protected Area, a remnant of the large Mandra Lake situated about 1.5-2 km to the south of Lake Vaya. The Apfelbek records are very important from the point of view of conservation because they show that we have lost an important biotope for this species proposed for inclusion as Critically Endangered for the forthcoming Bulgarian Red Data Book. It is known from only five published localities along the Bulgarian Black Sea coast (DARAŽ, 2009).

Sympetrum flaveolum. This species is included in the group of Northern distribution type – species with a secondary peak in the distribution records in lowland areas (BESCHOVSKI & MARINOV, 2007). They are typically mountain species rarely encountered at lower elevations and usually along the Black Sea coast. The only previous record of *S. flaveolum* from the coast is that of BESCHOVSKI (1964) at the Aladzha monastery north of the town of Varna.

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ОДОНАТА ИЗ БУГАРСКЕ У КОЛЕКЦИЈИ ЗЕМАЉСКОГ МУЗЕЈА У САРАЈЕВУ

ДЕЈАН КУЛИЈЕР и МИЛЕН МАРИНОВ

Извод

Ентомолошка збирка Земаљског музеја Босне и Херцеговине у Сарајеву једна је од настаријих колекција инсеката на Балканском полуострву. У овој збирци се налази 87 примерака инсеката из реда Odonata сакупљених на територији Бугарске. У овом раду су представљени најстарији и до сада необјављени налази 19 врста Odonata у Бугарској, на основу података из наведене збирке. Интересантни и нови подаци о распрострањењу неколико врста су посебно дискутовани.

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