Bulletin of the Natural History Museum, 2013, 6: 65-69.
Received 24 Feb 2013; Accepted 11 Dec 2013.

DOI: 10.5937/bnhmb1306065K
UDC: 595.733(497.11)

Short communication

CORDULEGASTER INSIGNIS SCHNEIDER, 1845 (ODONATA: CORDULEGASTRIDAE) THE FIRST RECORD FROM SERBIA OVER A CENTURY LATER

LENA KULIĆ, KATARINA ERIĆ, MARIJA GAJIĆ

Društvo odonatologa Srbije, 11000 Belgrade, Serbia,
e-mail: lekilecko@gmail.com

The first data on Odonata research in Serbia were collected in the late 19th century (Adamović *et al.* 1992, Frivaldszky 1877, Petrović *et al.* 1891). For the next 150 years research studies have been conducted with varying intensity and continuity. The last published checklist of dragonflies of Serbia contains 60 species whose distribution data were included in the Atlas of Odonata of the Mediterranean and northern Africa (Boudot *et al* 2009). This was the average value for a country with the geographical location and size of Serbia. Since then, records on some newly recorded species and additional notes on the distribution of Odonata in Serbia have been published (Jović *et al.* 2009, 2010, Kulijer & Boudot 2013). However, given the lack of exploration of some parts of Serbia and climate changes, we can expect some changes in the list of Odonata species present in the country (both in terms of new findings and in terms of the disappearance of certain species).

The first record of *Cordulegaster insignis* Schneider 1845 in Serbia was most probably collected during one of the expeditions to vicinities of Poža-

revac in the 19th century. Material consisting of two specimens from that area is kept in the National Museum of Bosnia and Herzegovina in Sarajevo (Kulijer & Boudot 2013). This locality represents the global western-most point of the species distribution area which covers southeastern Europe and southwestern Asia. The rest of the species range in Europe includes: S Romania, Bulgaria, some Aegean islands in Greece and Turkey, Turkish Thrace and Macedonia (Holuša & Holušova 2012, Kulijer & Boudot 2013). It is assumed that species distribution in the eastern part of the Balkans is mostly related to the tributaries of the Danube River and coastal parts of Bulgaria and Turkish Thrace. Further, it possibly penetrates Serbia and Macedonia from both north and south. Most probably *C. insignis* reaches Danube tributaries in eastern Serbia "going upstream", using suitable habitats along the flow of Danube.

The Sokobanjska Moravica is a tributary of the Južna Morava River, created by the merging of the Tisovik and Izgar and flowing through the Sokobanja and Aleksinac Valleys. Sokobanja Valley is located between the Bovan and Skrobnička gorges in the central part of eastern Serbia. A significant characteristic of its geographic position is its location in the system of the expansive Carpathian-Balkan mountain range, whereas its smaller part in the west encroaches in the zone of old Rhodope mass. It is surrounded by high mountains: Rtanj (1567 *m*), Ozren (1186 *m*), Devica (1174 *m*), Slemen (1098 *m*) and Bukovik (1069 *m*) (Marković 1977). Isolated in such a way, the basin is opened towards the southeast (where it reaches the South Morava Valley, narrow ravine and Bovan gorge, where the continental influence comes from) and to the northwest, along the Sokobanja Valley, through the Skrobnička gorge where it is opened to the influence of continental air masses which extend to it from eastern and northern Europe through the Vlaška depression and Timok basin. This region is characterized by a moderate continental climate with warm summers and mild winters, as well as annual temperature amplitudes up to 23ºC with Mediterranean influences in some places in the pluviometric regime (Pavlović *et al*. 2011). Construction of the water gate at Bovan gorge in 1978 formed an accumulation lake with the aim of regulating the Morava River basin, and providing both flood protection for and water supply of Aleksinac (Zlatković *et al*. 2010). The middle course of the river, from accumulation lake Bovan to the city landfill, is a fluvial plateau at an altitude of 250-280 *m* where the river bed width is between 5 and 10 *m* and the depth is to 2 *m*, with a muddy, sandy and gravelly bottom. The river flow is here characterized by meanders, slow water flow and variable water level caused by climate and discharging water from the accumulation lake. Along the coast there is a narrow belt of forest communities and bushy willow, alder and poplar surrounded by cultivated land. The river has numerous tributaries and a big marshy area.

Dragonfly fauna of the middle course of the Sokobanjska Moravica was studied from June to October of 2011. There is no data of previous research in this area.

The research was carried out by collecting and observing during five field days. Adult specimens were collected with entomological net and deposited into envelopes. Identification was performed using a binocular and pocket magnifier; these keys for determination: Beschovski (1994), Marinov (2000), Dijkstra & Lewington (2006), paper by Jović *et al*. (2009); and comparing specimens with those in the collection of the Natural History Museum in Belgrade. The voucher specimen of *Cordulegaster insignis* is deposited in the Natural History Museum in Belgrade; the rest of the material is in the personal collection of the first author.

One hundred and forty-three adult individuals were collected during the research in the described area. The presence of 21 species from 16 genera and 8 families were noted (Tab. 1).

Table 1. - List of noted species with presence during the season.

	Family	Species	Date recorded				
ZYGOPTERA	Calopterygidae	*Calopteryx virgo* (Linnaeus, 1758)	5.VI	7.VII	11.VIII		
		Calopteryx splendens (Harris, 1782)	5.VI		11.VIII		
	Lestidae	*Lestes parvidens* Artobolevskii, 1929			11.VIII	12.IX	
		Lestes barbarus (Fabricius, 1798)			11.VIII	12.IX	
		Sympecma fusca (Vander Linden, 1820)	5.VI				
	Platycnemidae	*Platycnemis pennipes* (Pallas, 1771)	5.VI	7.VII	11.VIII	12.IX	
	Coenagrionidae	*Pyrrhosoma nymphula* (Sulzer, 1776)	5.VI				
		Coenagrion puella (Linnaeus, 1758)	5.VI	7.VII			
		Enallagma cyathigerum (Charpentier, 1840)			11.VIII		
		Ischnura pumilio (Charpentier, 1825)	5.VI	7.VII			
		Ischnura elegans (Vander Linden, 1820)			11.VIII	12.IX	
ANISOPTERA	Aeshnidae	*Aeshna mixta* Latreille, 1805					6.X
	Gomphidae	*Gomphus vulgatissimus* (Linnaeus, 1758)	5.VI				
		Onychogomphus forcipatus (Linnaeus, 1758)		7.VII			
	Cordulegastridae	*Cordulegaster insignis* Schneider,1845	5.VI				
	Libelullidae	*Orthetrum cancellatum* (Linnaeus, 1758)			11.VIII		
		Sympetrum meridionale (Selys, 1841)		7.VII		12.IX	6.X
		Sympetrum fonscolombii (Selys, 1840)			11.VIII	12.IX	6.X
		Sympetrum sanguineum (Müller, 1764)		7.VII	11.VIII	12.IX	
		Libelulla depressa Linnaeus, 1758		7.VII			
		Crocothemis erythraea (Brullé, 1832)			11.VIII		

In June, a female of *C. insignis* was caught above the wheat fields. Nearby is a wooded shallow tributary that matches the type of habitat

which this species prefers (Dijkstra & Lewington 2006). The locality was visited in 2012 and 2013 unfortunately without success. The specimen was identified by a yellow patch on the sides of the first abdominal segment characteristic of the *bidentata* group, an extended yellow pattern on the abdomen, black markings on the *frons*, a yellow convex occipital triangle and basal lighter spot on ovipositor.

Species of genus *Cordulegaster* were quite problematic in the past and have gone through many changes in nomenclature (Kulijer & Boudot 2013). Due to a lack of appropriate literature for identification of *Cordulegaster* at that time, in the 1940's Adamović labeled specimens from the Sarajevo collection as *C.annulatus* with the comment that these do not completely fit the description of middle European ones (Adamović 1948), so the historical record of *C.insignis* from 1894 remained hidden for more than a century until publication by Kulijer & Boudot (2013).

Given that most of the localities where *C. insignis* occur along the Danube in Bulgaria were discovered quite recently, the present record was not unpredictable. Kulijer & Boudot (2013) made a brief comment on the possibility of westwards expansion of the species in Bulgaria. Bearing in mind the historical Serbian record from 1894, they presumed that recent western Bulgarian *C. insignis* populations are not the consequence of a recent expansion of the species to the west but are just due to former insufficient field investigations. The same may be true for Serbia.

The territory of Serbia clearly still represents the western border of this species range and therefore study on populations of *C. insignis* in Serbia is one of the priorities for future odonatological research. One record does not provide a basis for making general observations about distribution or conservation. But habitat degradation and fragmentation is every day more visibly induced by climate changes and human impact especially on marshy areas, threatening not only Odonata but all the inhabitants of wetlands.

Acknowledgement. We would like to express our gratitude to Miloš Jović of the Natural History Museum in Belgrade, primarily for his patience, for all his support throughout our study and research, and his suggestions and questions during writing. His guidance keeps us motivated and enthusiastic.

References: ADAMOVIĆ, R. Ž. (1948): Spisak vilinskih konjica (Odonata Fabr.) u Biološkom institutu u Sarajevu. **- Godišnjak biološkog instituta, Sarajevo**; ADAMOVIĆ, Ž., ANDJUS, LJ., MLADENOVIĆ, A. (1992): Cordulegaster heros Theischinger 1979 in Serbia and Macedonia (Odonata: Cordulegastridae). **- Opuscula zoologica fluminensia 101**: 1-11; BESHOVSKI, V. L. (1994): Fauna bulgarica 23. Insecta, Odonata. – Bulgarian Academy of Science, Sofia [in Bulgarian]; Boudot, J.-P., Kalkman, V. J., Azpilicueta Amorin, M., Bogdanović, T., Cordero Rivera, A., Degabriele, G., Dommanget, J.-L., Ferreira, S., Garrigos, 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**: 1-256; DIJKSTRA, K-D. B., LEWINGTON, R. (2006): Field guide to the dragonfies of Britain and Europe. – – British Wildlife Publishing, Dorset; FRIVALDSZKY, J. (1877): Data ad faunam Hungariae meridionalis comitatuum Temes et Krassó. - **Mathematikai és Természettudományi Közlemények 13:** 285-378; JOVIĆ, M., ANĐUS, LJ., SANTOVAC, S. (2009): New data of some rare and poorly known Odonata species in Serbia. - **Bulletin of the Natural History Museum in Belgrade 2**: 95-108; JOVIĆ, M., STANKOVIĆ, M., ANDJUS, LJ. (2010): *Aeshna grandis* (Linnaeus 1758) - a new species in Serbian fauna (Odonata: Aeshnidae). - **Bulletin of the Natural History Museum in Belgrade 3**: 137-140; KULIJER, D, BOUDOT, J.-P. (2013): First evidence of the occurence of Cordulegaster insignis Schneider, 1845 in Serbia (Anisoptera: Cordulegastridae). - **Odonatologica 42**: 55-62; MARINOV, M. (2000): Pocket field guide to the dragonflies of Bulgaria. – ET Aeshna, Sofia [in Bulgarian]; MARKOVIĆ, J. Đ. (1977): Reljef sliva Sokobanjske Moravice. - **Zbornik radova Geografskog instituta „Jovan Cvijić“ 29**: 35-68; PAVLOVIĆ, M., RADIVOJEVIĆ, A., DIMITRIJEVIĆ, LJ. (2011): Climate of Sokobanja basin and its influence on the development of agriculture. - **Journal of the Geographical Institute "Jovan Cvijić" 61(1)**: 13-30; PETROVIĆ, N., MILJKOVIĆ, L., TIPA, P. A., PAVLOVIĆ, P., JURIŠIĆ, Ž. (1891): Drugo putovanje nastavnika i učenika druge beogradske gimnazije po Srbiji i po Bosni 1890. - **Prosvetni glasnik 12(3)**: 104-116, **12(4)**: 189-194, **12(5)**: 247-254, **12(6)**: 320--325, **12(7-8)**: 384-397; ZLATKOVIĆ, S., ŠABIĆ, D., MILINČIĆ, M., KNEŽEVIĆ--VUKČEVIĆ, J., STANKOVIĆ, S. (2010): Geographical and biological analysis of water quality of Bovan Lake, Serbia. – **Archives of Biological Science, Belgrade 62**: (4): 1083-1087.

CORDULEGASTER INSIGNIS SCHNEIDER, 1845 (ODONATA: CORDULEGASTRIDAE) ПРВИ НАЛАЗ У СРБИЈИ ПОСЛЕ ВИШЕ ОД ЈЕДНОГ ВЕКА

И З В О Д

Током 2011. године вршено је истраживање фауне вилинских коњица у Источној Србији, у Сокобањској котлини, на средњем току Сокобањске Моравице. За овај локалитет претходно нису постојали одонатолошки подаци. Регистрована је 21 врста, међу којима се налази и први рецентни налаз врсте *Cordulegaster insignis* Schneider, 1845. Територија Србије очигледно још увек представља западну границу ареала ове врсте и стога проучавање популације *C. insignis* на територији наше земље представља један од приоритета у будућим одонатолошким истраживањима. У саопштењу је дат и списак врста забележених на истраживаном локалитету.