



# Synonymy between two little-known Balkan endemic species within the genus *Allolobophora* Eisen, 1873, *sensu lato* (Clitellata: Lumbricidae)

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**Abstract:** Based on identical taxonomic characters and distribution, a proposal to synonymize two Balkan endemic species of the genus *Allolobophora* Eisen, 1873. *Allolobophora* (*s. l.*) *josapi* Blakemore, 2006 (replacement name for *Allolobophora dofleini udei* Šapkarev, 1991) is recognized as a junior synonym of *Allolobophora joncesapkarevi* (Blakemore, 2004) (replacement name for *Allolobophora udei* Šapkarev, 1972).

**Key words:** *Allolobophora* (*s. l.*) *joncesapkarevi*, *Allolobophora* (*s. l.*) *josapi*, Balkan Peninsula, new synonymy, earthworm

## Introduction

The taxonomic history of *Allolobophora* (*s. l.*) *joncesapkarevi* Blakemore, 2004 and *Allolobophora* (*s. l.*) *josapi* Blakemore, 2006 is quite confusing. ŠAPKAREV (1972) published an article entitled *Several species of earthworms (Oligochaeta: Lumbricidae) new for the fauna of Macedonia* containing the description of a new taxon of the genus *Allolobophora* sp. In fact, the author was not sure whether it was a new subspecies of *Allolobophora dofleini* (Ude, 1922) or a new species. However, he mentioned that the type of prostomium, the position of the clitellum and tubercula pubertatis as well as the number of seminal vesicles are some of the main characters, which separate this new taxon from *All. dofleini*, without providing a detail description. He suggested that this is a new species and named it

*Allolobophora udei*. Later, ŠAPKAREV (1978) gave the first list of earthworms in Macedonia but he did not list either *All. udei* or the subspecies *All. dofleini udei*. In his monograph, MRŠIĆ (1991) listed the *Serbiona udei*; he reported this species from Macedonia and the description corresponded to the species that ŠAPKAREV (1972) mentioned as *All. udei*. He considered this species as valid and transferred it to the genus *Serbiona* Mršić & Šapkarev, 1988. In the same year, ŠAPKAREV (1991) published the article *A new subspecies of Allolobophora dofleini Ude, 1922 (Oligochaeta: Lumbricidae), an endemic earthworm of Macedonia*, where he described the new subspecies *All. dofleini udei*, with identical taxonomic characters as those of *S. udei*.

The aim of this paper is to analyse the taxonomic status of the Balkan endemic species *All. (s. l.) joncesapkarevi* and *All. (s. l.) josapi*.

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## Materials and Methods

Based on a review of Endemic earthworms (Oligochaeta: Lumbricidae) of the Balkan Peninsula by TRAKIĆ et al. (2016), we first noticed almost identical distributions for *All. (s.l.) joncesapkarevi* and *All. (s.l.) josapi*. This fact led us to search carefully for the literature data about the mentioned species. During the literature search, our colleagues at the Institute of Biology of the Faculty of Natural Sciences and Mathematics, Ss. Cyril and Methodius University in Skopje, helped us by sending a key article by ŠAPKAREV (1991). Obviously, this work was inaccessible and not taken in view by BLAKEMORE (2008). In fact, access to this article allowed us to solve the intricate taxonomic history of *All. (s.l.) joncesapkarevi* and *All. (s.l.) josapi*.

The figure with the geographic distribution of the species was prepared using GOOGLE MAPS.

## Results

### *Allolobophora (s.l.) joncesapkarevi* Blakemore, 2004

*Allolobophora udei* (nomen nudum) ŠAPKAREV 1972: 120.

*Serbiona udei* MRŠIĆ 1991: 184.

*Serbiona joncesapkarevi* BLAKEMORE 2008: 66.

*Allolobophora (s.l.) joncesapkarevi* TRAKIĆ et al. 2016: 255; CSUZDI 2012: 97–99.

**Morphological description** (from ŠAPKAREV 1972, with additions)

**External morphology.** Body pigmentation light grey to pale brown in live specimens. Length from 83 mm to 92 mm; according to MRŠIĆ (1991), from 83 to 140 mm. Diameter 5–6 mm. Average number of segments from 234 to 248; according to MRŠIĆ (1991), from 234 to 280. Prostomium proepilobous; according to MRŠIĆ, epilobous or proepilobous). First dorsal pore at the intersegmental groove 9/10. The male aperture in segment 15. The female aperture in segment 14. The setal closely paired, with interchaetal ratio  $ab = 2cd$ ;  $dd > 1/2$ . The setal ab of segments 12, 13, 14, 15, 16 and 17 situated on glandular papillae. Clitellum saddle-shaped, on segments from 32 to 44; according to MRŠIĆ (1991), from  $1/2 \times 30$  to 44). Tubercula pubertatis in segments from 38 to 43; according to MRŠIĆ (1991), from 37 to 43 (Fig. 2).

**Internal anatomy.** Septa 5/6–8/9 strongly thickened and muscular; septa 9/10–10/11 slightly thickened. Hearts in segments 6–11, oesophageal. Crop in segments 15–16. Gizzard in segments 17–19. Testes in segments 10 and 11. Ovaries in segment 13. Two pair of seminal vesicles in 11 and 12

segments. Two pairs of spermathecae in 10 and 11 segments.

**Distribution.** *Allolobophora (s.l.) joncesapkarevi* is known from the Balkan Peninsula, only in the Republic of North Macedonia – village of Plešanci (Probištip) and Krstov Do (ŠAPKAREV 1972, MRŠIĆ 1991) (Fig. 1).

### *Allolobophora (s.l.) josapi* Blakemore, 2006

*Allolobophora dofleini udei* ŠAPKAREV 1991: 52.

*Serbiona josapi* BLAKEMORE 2008: 66.

*Allolobophora (s.l.) josapi* TRAKIĆ et al. 2016: 255; CSUZDI 2012: 97–99.

**Morphological description** (from ŠAPKAREV, 1991)

**External morphology.** Body pigmentation light grey to pale brown in live specimens. Average length from 82 mm to 155 mm, diameter from 4 mm to 7 mm. Average number of segments from 188 to 251. Prostomium is proepilobous. First dorsal pore at the intersegmental groove 9/10. Male aperture in segment 15. Female aperture in segment 14. Setal closely paired, with interchaetal ratio  $ab = 2cd$ ;  $dd > 1/2$ . Setal ab of segments 12, 13, 14, 15, 16 and 17 situated on glandular papillae. Clitellum saddle-shaped, on segments from 32 to 44–45. Tubercula pubertatis in segments from 37, 38 to 43, 44.

**Internal anatomy.** Septa 5/6–8/9 strongly thickened and muscular; septa 9/10–10/11 slightly thickened. Hearts in segments from 6–11, oesophageal. Crop in segments 15–16. Gizzard in segment 17–19. Testes in 10 and 11; ovaries in 13. Two pair of seminal vesicles in 11 and 12 and two pairs of spermathecae in 10 and 11 segments. Nephridial bladders U-shaped (recline), the curved (glandular) part oriented towards the anterior part of the body.

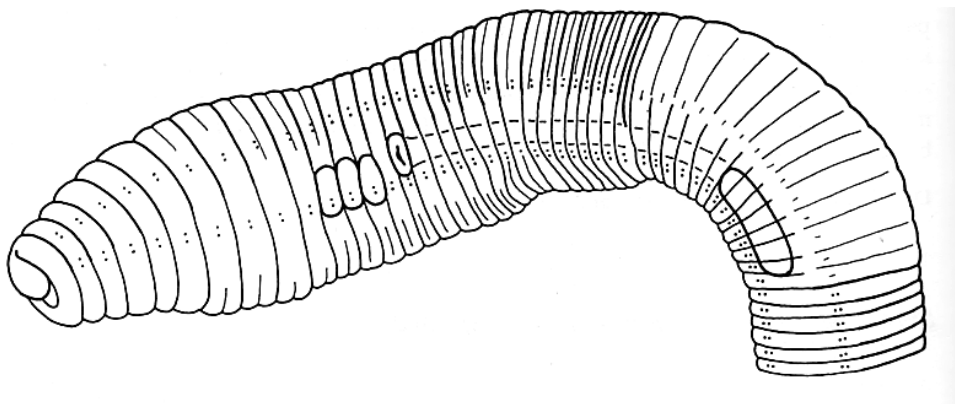
**Distribution.** *Allolobophora (s.l.) josapi* is known from the Balkan Peninsula, only in the Republic of North Macedonia – village of Plešanci, between Kratovo and Kriva Palanka and in Kriva Palanka (ŠAPKAREV 1991) (Fig. 1).

## Discussion

During the last 30 years, only a few articles (BLAKEMORE 2008, TRAKIĆ et al. 2016) mentioned these species. BLAKEMORE (2008) was adhering, to some extent, to the systematics proposed by MRŠIĆ (1991), with modification of certain genera (e.g., the genus *Serbiona*). He emphasized the “chaotic” situation in the systematics of earthworms, which might be explained by the frequent inaccuracies in the presented data in the works by various authors as well as by the limited availability of publications.



**Fig. 1.** Distribution of endemic species *Allolobophora* (*s.l.*) *joncesapkarevi* (triangle) and *Allolobophora* (*s.l.*) *josapi* (diamond).



**Fig. 2.** Schematic drawing of the anterior part of species *Allolobophora* (*s.l.*) *joncesapkarevi* (according to Mršić 1991).

In particular, due to the inaccessibility of publications and the impossibility of getting in touch with the retired Professor Jonče Šapkarev, some further confusion has arisen. BLAKEMORE (2008) mentioned the taxa *Serbiona joncesapkarevi* (replacement name for *All. udei*) and *Serbiona josapi* (replacement name for *All. dofleini udei*). The replacement of the names of these taxa, which were originally described as *All. udei* and *All. dofleini udei*, was initiated due to the availability of the older homonym *Allolobophora parva udei* Ribaucourt, 1886. According to the INTERNATIONAL CODE OF ZOOLOGI-

CAL NOMENCLATURE (ICZN 1999), the name of each species must be unique and, in a case of homonymy, the name of the younger homonym is not valid and has to be replaced. Therefore, BLAKEMORE (2004, 2006) proposed the replaced names for these two species. Currently, they are included in the database of earthworms (CSUZDI 2012) as members of genus *Allolobophora* Eisen, 1873.

Some previous molecular phylogenetic research suggested the Balkanic genera (*Serbiona*, *Karpatodinariona* Mršić & Šapkarev 1988, *Italobalkaniona* Mršić & Šapkarev 1988) could be joined

into a single genus *Cernosvitovia* Omodeo, 1956 (POP et al. 2005, DOMÍNGUEZ et al. 2015, SZEDERJESI et al. 2016, POPOVIĆ et al. 2022). We support that only the genus *Serbiona*, a younger synonym of the genus *Cernosvitovia*, can be confidently joined to it because its type-species *Serbiona robusta* (Rosa, 1895) was included in the mentioned molecular phylogenetic analyses (DOMÍNGUEZ et al. (2015).

Overall, *All. (s.l.) joncesapkarevi* is taxonomically indistinguishable from *All. (s.l.) josapi* and, therefore, the latter is herein considered a junior synonym of the former.

Acknowledgment: We would like to thank our colleagues from the Institute of Biology of the Faculty of Natural Sciences and Mathematics Ss. Cyril and Methodius University in Skopje helped because they sent us a very important article. This work was supported by the Serbian Ministry of Education, Science and Technological Development (Agreement No. 451-03-9/2021-14/200378 and 451-03-9/2021-14/200122).

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Received: 21.03.2022  
Accepted: 20.12.2023