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Two Records of large specimens of Fire Salamander *Salamandra salamandra* (Linnaeus, 1758) (Amphibia: Caudata) in Bulgaria

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Abstract. Two particularly large specimens of Fire Salamander have been registered in southwestern Bulgaria in late winter/early spring. Both of them are adult females with total body length 231 mm, and 219 mm. The two specimens recorded are the largest ones found in Bulgaria so far. Their dimensions are impressive for the entire range of the species. Both specimens have been found during the day in a sunny and dry weather, which has not been registered by other researchers in the cold half of the year in Bulgaria. The winter activity of the species has been confirmed.

Key words: *Salamandra salamandra*, large, winter, diurnal, activity.

Introduction

In Bulgaria the Fire Salamander – *Salamandra salamandra* (Linnaeus, 1758) is represented by two subspecies – *Salamandra salamandra salamandra* (Linnaeus, 1758) and *Salamandra salamandra beschkovi* Obst, 1981. The nominate form is widespread in the low and medium mountain areas of the country with the exception of Strandzha Mts. and Sakar Mt. (Beshkov & Nanev 2002; Petrov 2007; Stojanov *et al.* 2011). *S. salamandra beschkovi* is known only from its type locality – the Sandanska Bistritsa river valley, north of the town of Sandanski and according to Beshkov (1993) it is with unclear taxonomic statute. Probably it is a site-modification of *S. salamandra salamandra* (Böhme *et al.* 2003).

The total body length of adults in Bulgaria is at an average of 150-170 mm to 180 mm (Stojanov *et al.* 2011). In 1941 Buresch & Zonkov reported the largest known until then specimen of Fire Salamander from Bulgaria with a length of 193 mm. Later Beshkov & Zonchev (1963) indicated 196 mm length of the largest specimen measured by them (n = 200) in a survey of Vitosha Mts. Stojanov *et al.* (2011) reported specimens larger than 200 mm, without specifying the exact size. The largest measured specimen from Bulgaria (kept in the collections of the National Museum of Natural History – Sofia) has a total length of 210 mm (Beshkov & Zonchev 1963). For the whole range of the species, the individuals in some populations (*S. salamandra crespoi* Malkmus, 1983 – in Portugal) reach up to 250 mm, but usually are substantially less than 200 mm (Arnold & Ovenden 2002).

According to Arnold & Ovenden (2002) the species as a whole is strictly nocturnal and frequently active after rain. The Fire Salamander in Bulgaria spends much time hiding beneath rocks or logs or in crevices and is mainly active at night. It is terrestrial species that comes out to the ground exclusively during rain (sometimes during slight snowfall). It is

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usually active from April to November but in warm and rainy weather can be observed also in winter months (Beshkov & Nanev 2002; Stojanov *et al.* 2011). According to Beshkov & Zonchev (1963) the Fire Salamander in Vitosha Mt. has no rhythmic annual and diurnal cycle activity, and it is determined to a great extent by the specific meteorological conditions. In case of prolonged warm rains all individuals come to the surface. Again, according to them, during the warm half of the year, if it is cool and cloudy, individual specimens can be seen in the daytime in dry days. The species is largely cold-resistant and is registered several times during the winter in different parts of Bulgaria. Original data about winter activity (December, January or February) of adults are contained in the works of Beshkov & Zonchev (1963) and Pulev & Sakelarieva (2009), and of larvae – in the publication of Pulev *et al.* (2015).

Two particularly large specimens of Fire Salamander have been registered in southwestern Bulgaria in late winter/early spring.

A gravid adult female was recorded at 2:00 pm on 24.02.2015 at the left valley margin of Chetirka river, 1700 m W/SW of the village of Pokrovnik (N41°58′42″ E23°01′42″ alt. *ca* 415 m). The weather was sunny and comparatively warm for the end of February – the air temperature was 12.5°C. The specimen stood still on dry leaves at the edge of the shadow in a ditch (without water) in sparse oak forest (Fig. 1 A). The measured total body length (L. tot.), with the tail, was 231 mm (L. corp. 127 mm; L. cd. 104 mm) – after a methodology used by Dobrev (2007). The thickness of the body at its widest part was 46 mm (Fig. 1 B).

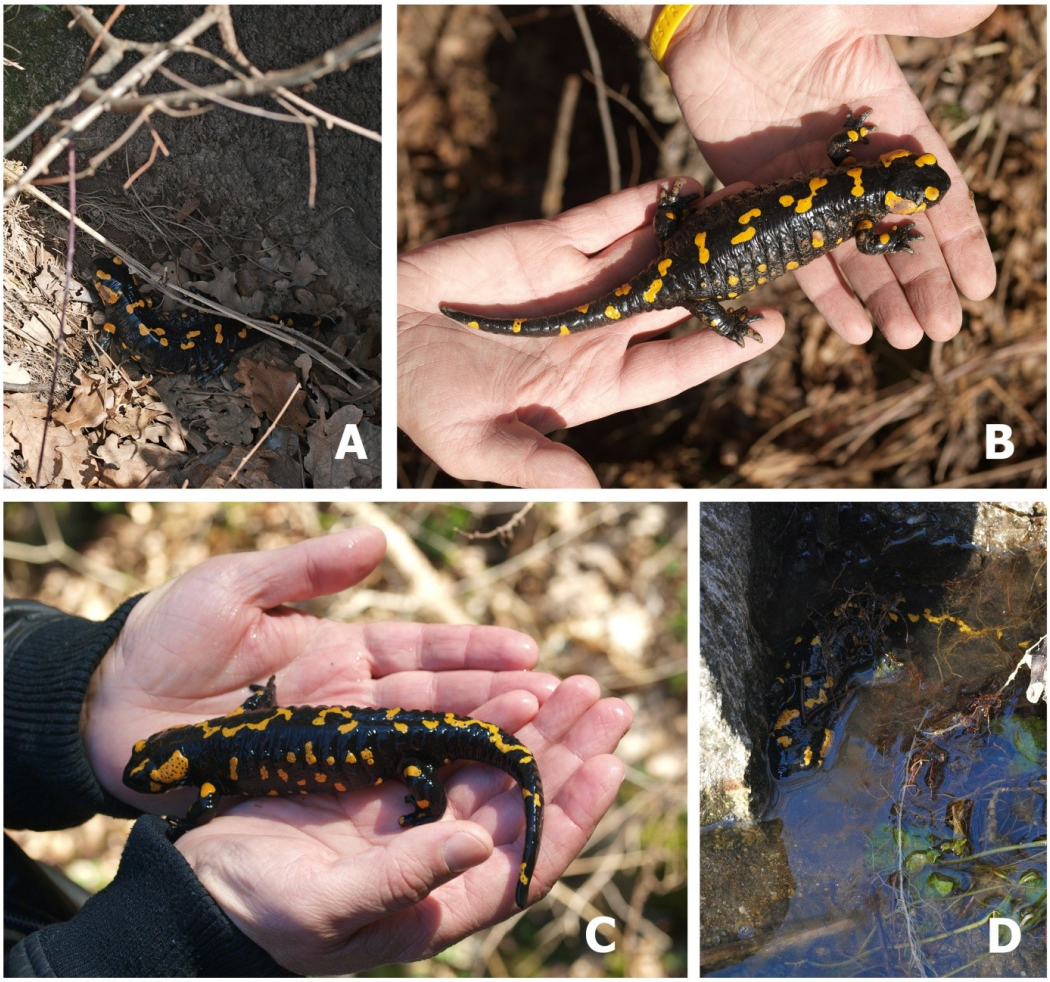

Fig. 1. The observed adult female specimens of Fire Salamander (*Salamandra salamandra*) and their microhabitats. A&B – Chetirka River, 24.02.2015; C&D – Sheytanski Andak Stream, 03.03.2015.

Another large gravid female was found at 5:15 pm on 03.03.2015 in Sheytanski Andak (Dyavolski Dol) stream, 850 m away from its mouth (N42°02′16″ E23°07′12″ alt. *ca* 518 m) in a sunny windy and warm weather, air temperature 10.5°C, and water temperature 5.5°C. The specimen stood still, almost completely submerged in the water, in a shady spot in broad-leaved mixed forest (Fig. 1 D). Probably the specimen registered in this micro-habitat (shallow small pool with a width of about 40 cm, slow water flow and aquatic plants) had prepared for the birth of larvae. The total body length (L. tot.) was 219 mm (L. corp. 117 mm; L. cd. 102 mm), and its thickness - 41 mm (Fig. 1 C).

The two specimens recorded are the largest ones found in Bulgaria so far. Their dimensions are impressive for the entire range of the species. Most likely reaching such and larger sizes in *Salamandra salamandra* is possible in the southern periphery of the range, due to the better conditions for individual development (and hence a longer period of activity).

It is confirmed the winter activity of the species in Bulgaria in a little warmer weather than usual in the days the specimens have been recorded. This activity can be associated with the great cold tolerance of the species - the lowest air temperatures when active salamanders have been registered are 6-7°C (Beshkov & Zonchev 1963; Pulev & Sakelarieva 2009).

Both specimens have been found during the day in a sunny and dry weather, which has not been registered by other researchers in the cold half of the year in Bulgaria. Another record of daily activity in a sunny and dry weather in the late autumn has already been reported by Pulev & Sakelarieva (2009). This gives us reason to suppose that during the late autumn, winter and early spring the salamanders are active mainly during the day if the daytime temperatures are higher, regardless of humidity and rainfall. Another representative of the Bulgarian herpetofauna that is with typical nocturnal activity (the Kotschy's Gecko) was also registered in winter only during the day (Mollov *et al.* 2015).

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Dinarda dentata (Gravenhorst, 1806) (Coleoptera: Staphylinidae: Aleocharinae) new to Bulgaria and an additional site for *Lomechusoides strumosus* (Fabricius, 1793) in Bulgaria

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Abstract. First record of the myrmecophilous species *Dinarda dentata* (Gravenhorst, 1806) is reported for Bulgaria. A second site for *Lomechusoides strumosus* (Fabricius, 1793) and a correction to a previous record is provided.

Key words: myrmecophiles, Staphylinidae, *Dinarda*, *Lomechusoides*, Bulgaria.

Introduction

The genus *Dinarda* belongs to the subtribe Dinardina (tribe Oxypodini) whose members are known to be obligate myrmecophiles. Wasmann (1914) showed that there were four closely related species in central Europe, namely *dentata, maerkeli, hagensii* and *pygmaea*. Hölldobler & Wilson (1990) provide a useful summary of the groups known biology: the larvae are found in the kitchen middens of hosts and feed on dead ants and debris. Adult *Dinarda* are able to "steal" food from ants by tapping the ant's labrum, which elicits the regurgitation of liquefied food. The ant may then mount an attack on the beetle which is able to calm the ant by producing an abdominal secretion. Both adults and larvae possess these "calming" glands but lack the "adoption" glands found in the Lomechusini.

To date two species of *Dinarda* are known from Bulgaria, namely *D. maerkeli* Kiesenwetter, 1843 (Ilieff & Lapeva 1997, Lapeva-Gjonova 2013) and *D. hagensii* Wasmann, 1889 (Zerche 1988); and a further, as yet unidentified species of *Dinarda* from a *Formica sanguinea* nest (Hlaváč *et al.* 2007). Below I present the first records of *Dinarda dentata* (Gravenhorst 1806) for Bulgaria.

Dinarda dentata:

Materials and Methods

The nests of *Formica* ants were searched for by looking under good-sized slabs of stone; myrmecophilous beetles were collected by hand from directly below such capping stones. Where beetles were observed disappearing into the soil of the subterranean part of the nest the soil was sieved and this too yielded beetles. It was found that if beetles did escape, replacing the capping stone and leaving the nest for half an hour would significantly increase the chance that specimens would again appear just below the stones. Voucher specimens of ants were collected (and retained) from each nest that yielded beetle specimens.

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The specimens were preserved dry; the *Dinarda* were identified by examining external morphology and by carrying out a detailed examination of genitalia (this included measurement of dimensions). The specimens were also compared with British material in the author's personal collection. The determinations were made with reference to Zerche (1989); the four common Central European species can be distinguished on size, shape of pronotum, the form of the spermatheca and the dimensions of the aedeagus. Further, *D. maerkeli* lacks microsculpture on the five visible tergites whereas in the case of *D. dentata* and *D. hagensii* it is clearly visible. To distinguish *D. dentata* from *D. hagensii* is less straightforward and requires careful examination of the genitalia.

The ants were identified using Collingwood (1958) and Brian (1977).

Results

A male and a female specimen of *Dinarda dentata* were collected from separate sites and these represent the first records of this taxon from Bulgaria. In each case voucher specimens of the host ant were also collected and were determined as belonging to the species *Formica sanguinea* (Latreille, 1798). The details of these records are given below:

Dinarda dentata (Gravenhorst, 1806), 1 male;

Stara Planina Mt., Etropole district, near Boikovets village, near Ravni Del, N42.823722 E23.857222, 1320 m alt, 23 April 2015, from a nest of *Formica sanguinea* (Latreille, 1798), leg. T.Harrison.

Dinarda dentata (Gravenhorst, 1806); 1 female;

Stara Planina Mt., Etropole district, near Boikovets, Maniakov Kamak, N42.855472 E23.870444, 1448 m alt, 24 April 2015, from nests of *Formica sanguinea* (Latreille 1798), leg. T.Harrison.

Dinarda dentata has a wide distribution in Europe and is known from Western Siberia, Asia Minor and the Caucuses (Hlaváč et al. 2011); it is likely to be widely distributed in Bulgaria. It is a myrmecophile specific to the host ant, *Formica sanguinea* but it has, on rare occasions, been found with *Formica fusca* Linnaeus, 1758; *F. rufibarbis* Fabricius, 1793; *F. cinerea* Mayr, 1853; *F. aquilionia* Yarrow, 1955 and *F. exsecta* Nylander, 1846 (Päivinen et al. 2003) and it is anticipated that in Bulgaria it will be found in many *F. sanguinea* nests, particularly if they are examined in early Spring and mid Autumn.

Lomechusoides strumosus:

Materials and Methods

The author previously reported the first Bulgarian record of a specimen of *Lomechusoides strumosus* (Fabricius, 1793) from a *Formica* nest at a site in the Stara Planina mountains; but samples of the host ant were not collected (Harrison & Lapeva-Gjonova, 2014). On a return visit to this site on 23 April 2015 the original nest was rediscovered; made possible by the large dimensions of the nest and its distinctive appearance. Pieces of wood and soil were removed from the nest and sieving this material yielded myrmecophilous beetles. These were collected together with voucher specimens of worker ants.

On the following day a second site, 3.5 kilometres distant from the first, was visited and several *Formica* nests were found under stones in a small pasture surrounded by montane beechwoods. Myrmecophilous beetles were collected by hand from directly under the stones containing nests, and sieving soil taken from the nests yielded additional specimens. Again voucher specimens of worker ants were collected.

Specimens belonging to the genus *Lomechusoides* were identified on the basis of external morphology alone, using Schilow (1981), Hlaváč (2005) and Jászay & Hlaváč (2013), while specimens of the ants collected were identified using Collingwood (1958) and Brian (1977).

Results

The specimens collected included three males and three females of *Lomechusoides strumosus* and in every case were found to be associated with the ant, *Formica sanguinea* . Unfortunately, the designated location given for the site of the first Bulgarian record of *L. strumosus* in Harrison & Lapeva-Gjonova (2014), was incorrect even though the coordinates provided were correct. The location name "Maniakov Kamik Peak" should be replaced with "near Ravni Del". A corrected and updated record is given below:

Lomechusoides strumosus (Fabricius, 1793),
1 male on 10 October 2014 (original record)
1 female on 23 April 2015 (subsequent record)

Stara Planina Mt., Etropole district, near Boikovets village, near Ravni Del, N42.823722 E23.857222, 1320 m alt, from a nest of *Formica sanguinea* (Latreille, 1798), leg T.Harrison.

The site visited on 24 April 2015 happened to be the actual location known as Maniakov Kamak and the relevant record for this site is given below:

Lomechusoides strumosus (Fabricius, 1793),
3 males and 2 females on 24 April 2015

Stara Planina Mt., Etropole district. near Boikovets village, Maniakov Kamak, N42.855472 E23.870444, 1448 m alt, 24 April 2015 from nests of *Formica sanguinea* (Latreille, 1798), leg T. Harrison.

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New animal remains from Pliska, the medieval capital (10 c. AD) of Bulgaria, (Shumen Region, NE Bulgaria)

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Abstract. A total of 9 taxa (5 birds and 4 mammals) have been identified, among them two endangered avian species - *Otis tarda* and *Falco peregrinus*.

Key words: Subfossil birds, Holocene fauna, Great Bustard, Peregrine falcon, Medieval hunting birds, Falconry.

Introduction

Pliska is the first capital of the (Trans-Danubian) Bulgarian state. It has been a subject of intensive archeological researches since 19th century (Angelov, 1981; Mladjov, 1998). Unfortunately, the archeozoological explorations are still at its beginning. A research of Boev (1995) reports on the material, collected in 1984-1987 by a team led by Assoc. Prof. Dr. Pavlina Petrova. He established 7 avian taxa (29 collected bones of MNI 13): *Gallus gallus domestica, Anser anser* (incl. *A. anser domestica*), *Phasianus colchicus*, *Anas platyrhynchos* (incl. *A. pl. domestica*), *Corvus corax*, *Anser albifrons*, and *Gypaetus barbatus*.

Materials and Methods

Recently (February, 2016) a new sample of animal finds been handed for examination by Assoc. Prof. Dr. Nikolay Nachev (Shumen University "Konstantin Preslavski"). This material originates from the pits of kitchen debris around the Capital Palace, from a depth of 0.40-1.20 m. It has been collected during the excavations in 2015 by a team, led by the archeologist Assoc. Prof., Dr. Konstantin Konstanitinov (Shumen University "Konstantin Preslavski"). All finds are dated 10th century A. D.

The animal remains have been identified through the comparative osteological collections of the Vertebrate Animals Department of the National Museum of Natural History, Bulgarian Academy of Sciences. They are kept at the same department.

Results

A total of 9 taxa have been established, 3 (4) of them domestic mammals (Table 1). Two of the wild bird species deserve to be mentioned, the Peregrine falcon, and the Great bustard. Both species are rare at recent fauna of Bulgaria and are listed in the Bulgarian Red Data Book. *F. peregrinus* is endangered (Stoyanov *et al.*, 2011), while *O. tarda* is critically endangered (Zehtindzhiev *et al.*, 2011).

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Table 1. Composition and representation of the examined animal remains from Pliska (10th c. Ad. D.).

№	Taxa	English name	Number of bones	MNI
		Birds (Aves)		
1	*Gallus gallus domestica* (Linnaeus, 1758)	Domestic chicken	10	2 ad.; 1 juv.
2	*Anser anser* (Linnaeus, 1758)	Graylag goose	2	1 ad.
3	*Otis tarda* Linnaeus, 1758	Great bustard	1	1 ad.
4	*Falco peregrinus* Tunstall, 1771	Peregrine falcon	1	1 ad.
5	*Columba livia* Gmelin, 1789	Rock Dove/ feral pigeon	1	1 ad.
		Mammals (Mammalia)		
6	*Equus africanus asinus* Linnaeus, 1758	Donkey	1	1 ad.
7	cf. *Sus scrofa domestica* Linnaeus, 1758	Pig	2	1 juv.
8	cf. *Capra aegagrus hircus* Linnaeus, 1758)	goat	4	1
9	Ovicaprinae gen. indet.	sheep/goat	1	1
	Total		*23*	*11*

Domestic chickens belonged to two breed at least. The majority of them could be referred to the s. c. bantam fowl – small non-meat sooner decorative (?) breeds, slightly larger (0.450-0.900 kg; Boev, 1986) than large domestic pigeons. The other one was much larger, similar to most of the modern widely spread meat breeds.

The only find (a complete carpometacarpus) of an adult (?) male individual of Peregrine falcon may belong to a bird used for falconry. It is the first species' subfossil record in Bulgaria.

Although almost disappeared in Bulgaria today, the Great Bustard, always was among the most valuable hunting birds for meat (Boev, 2003). Even in the middle of the 20th century it has been considered a hunting species (game) (Petrov, 1950): "The hunting [of bustard] is very difficult because it is extremely cautious and timid bird. Its hearing and vision are well-developed and the birds lift and fly away long before landing again.".

The finds of *Anser anser* (a complete ulna and proximal tarsometatarsus) completely fit to the compared bones of wild birds of that species. Usually the bones of the domestic geese are slightly larger than these of the wild birds.

Conclusions

In spite of the limited material, the obtained data complete the scanty available information on the wildlife in Bulgaria 1000 years ago. To a certain extent, they also enlighten the everyday mode of life of the inhabitants of the town.

Acknowledgments. The author thanks to Assoc. Prof., Dr. Konstantin Konstanitinov and Assoc. Prof. Dr. Nikolay Nachev for the handed material for examination.

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The second record of *Panorpa thrakica* Willmann, 1976 (Insecta, Mecoptera, Panorpidae)

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Abstract. The author presents the first record of *Panorpa thrakica* Willmann, 1976 from Bulgaria which is also the second published record of this species. Moreover, this is the second record of any species of the *Panorpa aspoecki* group outside of Turkey. Two males (one of them dissected) were captured in 1976 in Izgrev (Strandzha Plain, near to Velikovo, Bulgaria), where the other member of the *P. aspoecki* group (*P. schweigeri* Willmann, 1975) was recorded as well.

Key words: scorpion-fly, new record, Bulgaria, distribution.

Introduction

The members of the *Panorpa aspoecki* group are characterized by body color totally black, well developed wing color pattern, and specific male genitalia. All members of this group were described and known from Turkey exclusively, since Dvořák (2014) reported *Panorpa schweigeri* Willmann, 1975 from Kalovo as the first record of this group from Bulgaria.

In this paper, the record of the second species of the *P. aspoecki* group (*Panorpa thrakica* Willmann, 1976) from Bulgaria is presented.

Material and Methods

Panorpa thrakica, Bulgaria, Strandzha Pl., Izgrev env., 15.05.1976, 2 ♂♂ (Fig. 1), K. Spitzer leg., L. Dvořák det. et coll. The identification was confirmed by examination of male genitalia, especially the parameres.

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Fig. 1. *Panorpa thrakica*, ♂ from Izgrev (Bulgaria). Photo: Pavel Krásenský.

Results and Discussion

As Dvořák (2014) stated, no identification keys for the *Panorpa aspoecki* group are currently available, so browsing through the series of Willmann's papers is necessary. *Panorpa thrakica* has one unique feature among all members of this species group: male ventral parameres are falcate and with a single apical projection (Willmann 1976) (Fig. 2-3).

So far, *P. thrakica* has been reported from its type locality (Turkey, Thrakia, 35 km W of Tekirdag) only (Willman 1976, 1977). Here I present the second record of this species and the first record from Bulgaria.

Fig. 3. *Panorpa thrakica*, male genitalia. Photo: Zbyněk Kejval.

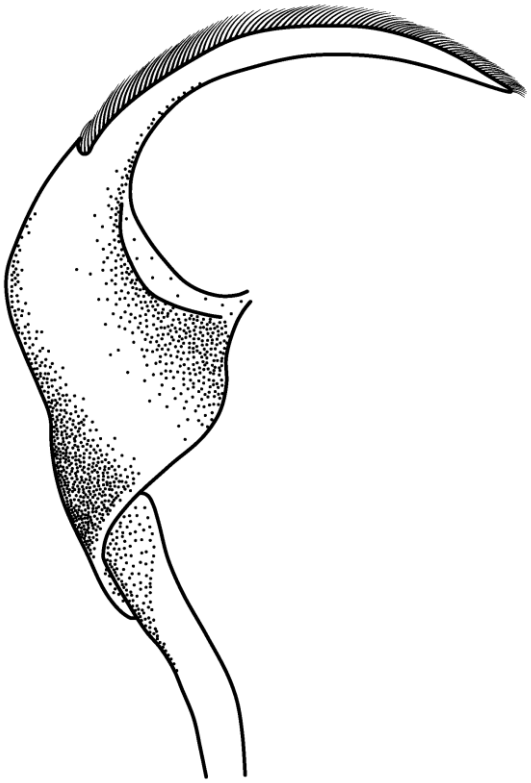

Fig. 3. *Panorpa thrakica*, ♂ ventral paramere. Orig.: Milan Boukal.

It is an interesting fact, that both species of the *P. aspoecki* group (*P. thrakica* and *P. schweigeri*) were found in Strandzha Plain near Bulgaria/Turkey border (Dvořák, 2014 and this paper). Evidently, the other Pontic species could be found in this south-easternmost part of Bulgaria as Dvořák (2014) already predicted.

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Home range, movements and activity patterns of an exceptionally large male Brown Bear (*Ursus arctos* L.) in the area of the Bulgarian-Greek border (Western Rhodope Mts.)

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Abstract. The movements and activity patterns of an exceptionally large brown bear (*Ursus arctos* L.) were investigated in the area of the Bulgarian-Greek border (Western Rhodope Mts.) after footprints and other signs of its life activities during a field work in the period 2012-2016. Its minimum home range in spring was estimated to at 140-150 km^2. Different parts of its home range were occupied seasonally.

Key words: *Ursus arctos*, Bulgaria, home range, footprints.

Introduction

The brown bear (*Ursus arctos* L.) is endangered and protected in Bulgaria (Spiridonov, Spassov, 2015). The monitoring of the brown bear in Bulgaria is based on the identification of signs of life activities (especially footprints) (Gunchev 1989, Gubar 1990, Spassov *et al.* 2000, Spassov *et al.* 2015). The data published below represent results from the bear field investigations (2012-2016) in the region of Adjilarska Reka hunting husbandry (Kozhari village) and the adjacent territories on the Bulgarian/Greece border in Western Rhodopes (biotope: 80-100-year old spruce forest). This work was supported by PUDOOS, Contract No 9190/20.05.2013.

Results

During November 2015 (in mild weather) 10 bears were living simultaneously in Adjilarska Reka Hunting husbandry and the adjacent territories on a surface of ca. 70 km^2 (after the footprints detections and the camera-trap visual information): A mother with three cubs from the same year; another one with two yearlings; a dominant male with a scar on the muzzle (see below); another (young?) bear with white spot on the flank, and a second large male, about 7/8 years old (16 cm width of the fore paw footprint). All these bears come on a game supplementary feeding station (Fig. 1). The very large old male, which had seriously wounded a pack-horse 7 years ago, was recorded for the first time by us at the mentioned feeding station on 17 Mar 2014 (because of its size and scars on the head this bear is easy to recognize): The data from the camera-trap show the presence of an old male with scars from battles with other males on the head and on the muzzle (Fig. 1). It seems very well fed for the season (weight probably much more than 250-260 kg at this moment and at least 300 kg in autumn, after footprint estimate), which is most probably due to its winter feeding on the Greek territory where it had last year oak nuts and grass. On the

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feeding stations the bears also forage very well on corn. The registered (two times- in 2014 and in 2015) footprints of its paws in a shallow snow on the boundary of the 189-forest section has been really enormous. Its presence was documented on a mountain ridge, moving towards the feeding station: front paw width – 18 cm (and 19 cm on snow), length of hind one 29/30 cm. In close proximity was detected a fresh mark on a spruce (18.04.2014). Its presence was detected several times along the mountain ridge of the border between Bulgaria and Greece (W of front paw footprint detected on 24.04.2016 was 18 cm on muddy ground). Its marking with nails on century-old spruce (detected just on the border) were established at a height 2.5 m, and hair from rubbing of the head to 210 cm (Fig. 2). Five mark trees were found on its regular route along the border on a distance of about 4-4.5 km, approximately between border pillars No. 158 and No. 164. The trees have a diameter (at chest height) - 30-93 cm (the average diameter of mark trees in northern part of European Russia is 20-30 cm, see: Rukovsky 1984). The marks from nails were from at least two different bears, after the color of remaining stuck hair from the head, reaching from 210 till 250 cm. According our observations the large diameter of the home range of the noted above old dominant male exceeds considerably 20 km (reaching probably till 30 km). Its minimum home-range, calculated after the witness and our observations, is ca. 140-150 km^2 in spring (core territory?), roughly between Trigrad, Jrebevo, Buinovo, Kojari, Kesten and the border (from Bulgarian side); its part in Greek territory is about 50-60% of the whole one. Its total home range could be much than three times larger (in N. Greece the size of the adult males' home range varied individually in spring from 105 to 181km^2, the total home range - from 102 km^2 to 507 km^2 (n=4) (Kanellopoulos *et al.* 2006). Different parts of the home range of this male (the belt of oak, the belt of beech in Greece and the belt of conifers) are occupied, after our collection of data, seasonally. The availability of 2-3 points for supplementary game-feeding is one of the main factors which determine the individual territory and movements of the bears on the Bulgarian part of the mentioned territory.

Fig.1. Dominant male (supposed age of at least 15 years old) with scars of battles with rivals. Hunting Forestry Adjilarska (photo from a kamera-trap, D. Bukovsky, 17.03.2014 at a game-feeding station).

Fig 2. A century-old bear marking tree just on the Bulgarian/Greek border. The tree is marked also with white paint as a border pillar (photo N. Spassov).

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Newly registered tracks of Raccoon dogs (*Nyctereutes procyonoides*) indicate the presence of resident population in the region of Bolata dere (NE Bulgaria)

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Abstract. The Raccoon dog (*Nyctereutes procyonoides* Gray, 1834) is an invasive species which was first recorded for the Bulgarian fauna in 1968. To date, data concerning the distribution of the species in Bulgaria are rather scarce and often provided by non specialists (mostly local fishermen and hunters). The present note includes information concerning the presence of Raccoon dogs in the region of Bolata dere (NE Bulgaria). Faeces and footprints were found in the springs of 2014 and 2015. Apparently, the predators are resident inhabitants of the site, so that particular population could be used for field surveys on the biology of the Raccoon dogs in Bulgaria.

Key words: Bulgarian fauna, zoology, monitoring, Canidae, invasive species, predator

Introduction

The Raccoon dogs belong to an aberrant branch in the evolution of the canids, which had its phylogenetically split from the other dogs about 10 million years ago, or even earlier (see Wayne 1993). One of the Raccoon dog species - *Nyctereutes procyonoides* (native to the Far East), was artificially introduced to the western regions of the Soviet Union in the thirtieth year of the nineteenth century (for overview see Koneva & Durnev 2012). According to these authors, the populations of the Raccoon dog had increased dramatically in short period of time. The predator become invasive in Europe and currently inhabits 24 of the European countries, including Bulgaria (see FACE 2014). In Bulgaria the species was reported for the first time by Peshev & Yordanov (1968). There are few publications in the scientific literature on the distribution of the Raccoon dog in the country (see Georgiev 2010). The present study reports on the results of two years monitoring on the limnic water basins near the Black sea cost in the regions of Shabla, Balchik and Kavarna (NE Bulgaria).

Materials and Methods

The field studies were performed in the springs of 2014 and 2015 (from 15-th of March to 15-th of June). The shores of Shabla lake, Ezeretz lake, Durankulak lake, Balchishka Tuzla water basin, Shablenska Tuzla water basin and Bolata lake were investigated for marks indicating for presence of Raccoon dogs. That interval of the year was selected, because the Raccoon dogs are active in that period, but the presence of humans in the region is minimal. The research was provided in irregular intervals of 10 to 14 days between the visits. The terrain was inspected for footprints, faeces and hairs. All markers were documented by a Kodak Zx5 camera. The coordinates of the found indicators were

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recorded by using portable GPS devices "Garmin Etrex 10" and "Garmin Etrex 30" (Garmin International Inc., Kansas, USA). Figure 1 is based on a "Google Earth" image from 05.08.2013.

Results and Discussion

During the period of the field research, markers of Raccoon dog's presence were found only in the region around the fresh water basin located in the "Bolata dere". On 10-th of April 2014, in the reed belt northern from the lake were found faeces of *N. procyonoides* (coordinates 43°23'24.82"N; 28°28'14.40"E). Later in that spring (on 18-th of May), south of the lake, was found a print of Raccoon dog's limb (coordinates 43°23'0.98"N; 28°28'17.16"E). The size of the print (length x bright) was 4.5 x 5.4 cm.

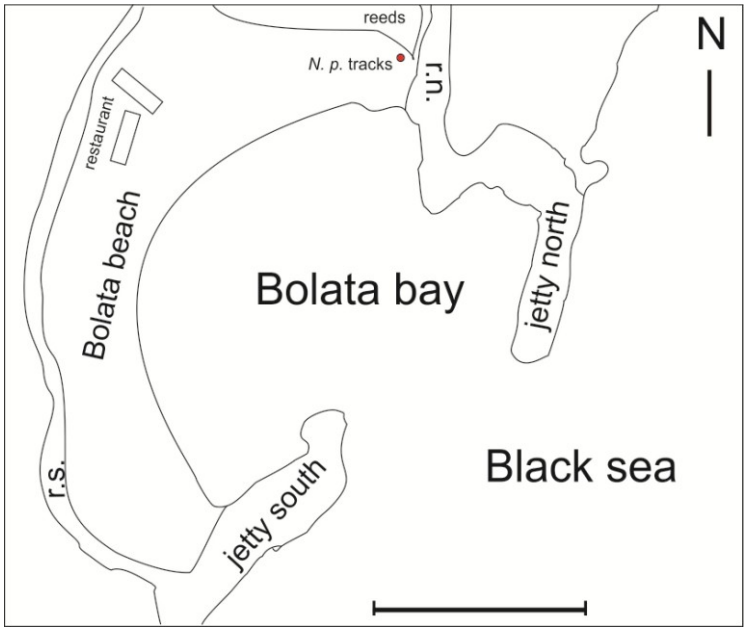

Figure 1. Schematic map of Bolata bay. The red dot indicates the position of the footprints of a Raccoon dog found on 16.04.2015. Abbreviations: *N. p.* tracks – *Nyctereutes procyonoides* tracks; r.n. - road north, r.s.- road south. Scale bar – 60 m.

In the next year, on the 16-th of April, were documented fresh tracks of a Raccoon dog (Figure 1). The four footprints (coordinates 43°22'58.96"N; 28°28'16.28"E) are presented on Figure 2. The left trace was not well preserved, so the right prints were measured (length x bright): fore limb right – 4.8 x 5.8; hind limb right 4.2 x 5.0 cm; stride length – 36 cm.

Data concerning the distribution of the Raccoon dog in Bulgaria are scarce, probably due to the lack of profound field research. My investigations and literature research indicate that the invasive predator is presumably rather rare in the country. According to Markov (2012), Bulgaria is inhabited by around 39 000 (precise citation 39 343) Golden jackals (Canis aureus L., 1758). The number of the jackals was growing since 1962 and in the moment, the country holds the largest population of that species in the world. I propose that in the last years, the competitive Golden jackal had diminished dramatically the Raccoon dog populations in Bulgaria.

Figure 2. Tracks of a Raccoon dog at the shore of Bolata dere; Scale bar – 10 cm.

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First attempt to understand the effect of pingers on static fishing gear in Bulgarian Black Sea coast

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Abstract. Acoustic deterrent devices (pingers) were used on static fishing gear called dalyans in an attempt to reduce bycatch of small cetaceans and/or to reduce depredation in the Bulgarian Black Sea coast. Between April and July 2015 dalyans were equipped with harbour porpoise pingers in the northern part of the coast. Observations were carried out on regular bases on active (with pingers) and on control dalyans (without pingers). The preliminary results were positive in reducing damages on fishing gear.

Key words: pingers, damages, fisheries, dolphins, Black Sea.

Introduction

The interaction between dolphins and fisheries is a worldwide concern as it affects both the survival of wild dolphin populations and the livelihood of the fishermen (Bearzi *et al.* 2003, Bordino *et al.* 2002, Brotons & Grau 2008, Northridge 1984, Read 2003). The past two decades large research efforts are directed towards seeking ways of limiting the harmful effects of these relations (Kraus 1997).

This global problem also occurs in the Black Sea with the three species of cetaceans found there - bottlenose dolphin (*Tursiops truncatus* Montagu, 1821), short-beaked common dolphin (*Delphinus delphis* Linnaeus, 1758), and harbour porpoise (*Phocoena phocoena* Linnaeus, 1758).

One of the possible solutions is the use of acoustic deterrent devices (pingers) on fishing gears (Brotons *et al.* 2008). Their effectiveness is tested for the first time in the Bulgarian Black Sea coast during this study.

Materials and Methods

Surveys were carried out during the spring-summer season (from April to July) of 2015 in the northern Bulgarian Black Sea coast on traditional static fishing gears called dalyans.

Dalyan is one of the main stationary gear used for passive commercial fishing in Bulgaria. A pair of dalyans – active and control were monitored on each of the two survey sites (dalyans Kavarna and dalyans Balchik) 13 km apart from each other.

The active dalyans were equipped with 10 kHz Porpoise Pingers ("Future Oceans"). Pingers were installed according to producer's recommendations and in compliance with the specifics of the dalyans.

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Observations were carried out every month for a four days average from a vantage point located on a high cliff on the coast. Fishermen also were taking notes about dolphin's presence and behavior near the dalyans during the survey period.

Results and Discussion

During the study period 37 separate observations of dolphins were made near the active dalyans. The total number of observed animals is 60 (min 1, max 4, avg. 1,6 individuals at each observation). The average distance, which the animals' keep from the nets equipped with pingers, is avg. 174 m (range 0-400 m) for dalyan Kavarna and 129 m (range 0-250 m) for dalyan Balchik.

The most frequently observed species is the harbour porpoise. Only in July exceptionally, around dalyan Balchik the most observed species is the bottlenose dolphin, which caused a lot of damages on this dalyan.

In the same time, in the area of dalyan Kavarna the frequency of observations of harbour porpoise is even higher but there is only one attack (Fig. 1).

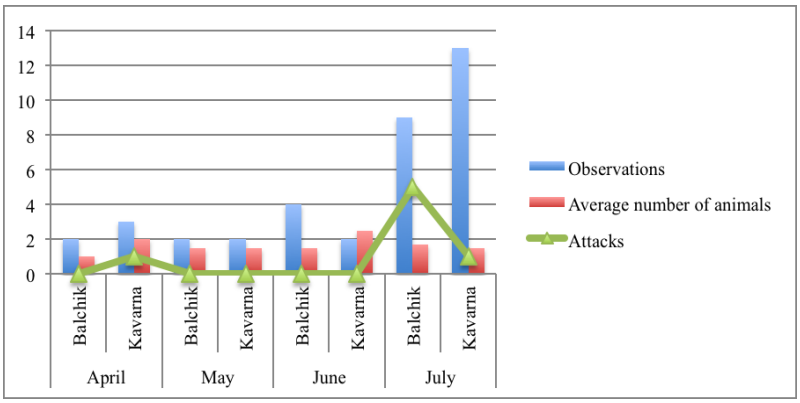

Fig. 1. Correlation between the numbers of observations and attacks on active dalyans.

The frequency of attacks on dalyans with and without pingers is analyzed. The results show that the control dalyans have more attacks by dolphins in comparison with active dalyans during the study period. In both cases, the frequency of attacks is lowest at the beginning of the season in April and is highest in July (Fig. 2).

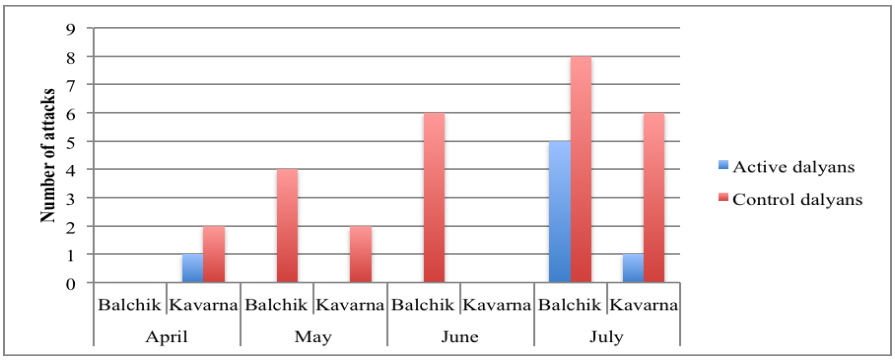

Fig. 2. Comparison of number of attacks on active and control dalyans.

The damages on control dalyans are severe, the fishermen declare meters of torn nets and loss of catch. Attacks on active dalyans are less frequent and without serious damages on the gear - only several small holes on the nets and no catch loss.

No bycatch of dolphins occurred during the study period in all experimental gear.

The preliminary results show that pingers have significant effect against damages caused by dolphins on the studied fishing gear but do not keep the animals far away from their habitats. The pingers used do not affect the target fish catch. As this is first experimental trial, observations will continue to establish if the results are consistent.

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A new record of the Blotched snake *Elaphe sauromates* Pallas, 1811 (Serpentes: Colubridae) from an urbanized habitat in Bulgaria

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Abstract. The current paper reports a new location of the Blotched snake (*Elaphe sauromates*) in south-east Bulgaria. On 14.05.2016 we found a dead adult specimen in the east part of the town Aytos. To date the species was not recorded for the locus. This is the first record of the Blotched snake in urbanized area and we provide a discussion concerning the distribution and the habitat preferences of *E. sauromates* in Bulgaria.

Key words: Blotched snake, distribution, habitat.

Introduction

The Blotched snake (*Elaphe sauromates*) is widespread in Southeast Europe and part of Southwest Asia. In Europe, the range of the species is limited in the eastern part of the Balkan Peninsula, southern Ukraine and parts of southern Russia (see Sillero *et al.* 2014). In the legislation of the European Union the species is considered of high conservation status - Appendix II and IV at the Council Directive 92/43/EEC. In Bulgaria, the Blotched snake occurs sporadically in the Danubian plain, the Thracian lowland, the Sarnena Sredna Gora, the Eastern Rhodopes, the Sakar and Strandzha mountains, and along the Black Sea coast (see Stojanov *et al.* 2011). In the Bulgarian Red book of endangered species E. sauromates is listed as "threatened" (Beschkov 2015), hence all information, concerning the distribution and the biology of the species, as well as the human attitude to the snakes have to be considered as valuable for its conservation. In the current article we report a new locality of the species and discuss on the habitat use of the Blotched snake in Bulgaria.

Results and Discussion

On 14.05.2016 on the road in the eastern part of the Aytos town we found a dead Blotched snake with total length of 124 cm (Fig. 1). The coordinates of the locality are: N42°41′35.6″, E27°16′1.2″, 82 m a.s.l., UTM-grid 10x10 km NH22. According to the nature of land cover it represents urban area located in the town boarders.

It is possible that the snake was hit by a car, but having in mind that the body was not smashed and was located rather near the curbstone, one can propose that the animal was killed other way.

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Fig. 1. Photos of the dead specimen of *E. sauromates*, the exact locality of the finding and the position of the locality on the territory of Bulgaria (in UTM-grid 10×10 km).

The Blotched snake was not reported for the region of Aytos town. The nearest known records for the species are located around 20 km in south-east and in west, south-west directions (see Fig. 1; Stojanov *et al.* 2011, Beschkov 2015). The detection of the species near Aytos is not rather surprising and the new locality represents a connection link between the populations at the sea coast and these in the inland regions. The vicinity of Aytos and large parts of the Thracian lowland as a whole, are still insufficiently explored. This is due mostly to the fact that these areas are occupied by vast farmland, making them unattractive for herpetologists. The new record of *E. sauromates* is located in precisely that kind of area, which shows that in assessing the conservation status of the species (and in particular the fragmentation of their habitat), in addition to the existing threats, special attention should be paid and the level of knowledge on a particular region.

The habitat preferences of the Blotched snake in Bulgaria have not been studied purposefully. According to up to date summary publications (Beshkov & Nanev 2002, Stojanov *et al.* 2011), in Bulgaria the species can be found in open areas with steppe vegetation, sparse deciduous forests and shrubs, and often in very wet places along the banks of rivers and marshes. Reports on finding *E. sauromates* in highly urbanized areas

are lacking to date, so our record is unique for the Bulgarian scientific literature. We have to note, that relatively near to the spot of the finding (about 150 m to the west and to the south) are located agricultural lands which offer much more suitable habitats for the Blotched snakes rather than these of the town. We can accept that the found specimen entered the town accidently and according to current data highly urbanized territories should not be included in the list of preferred and suitable habitats of the species. However we have to stress that further records have to be considered as a basis for reassessment of the knowledge about the habitat use and habitat preferences of the Blotched snakes.

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The first report of *Hadena tephroleuca* (Boisduval, 1833) (Lepidoptera: Noctuidae) in Bulgaria

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Abstract. Single female specimen of *Hadena* (*Pinkericola*) *tephroleuca* (Boisduval, 1833) was collected in Belassitsa Mts. in SW Bulgaria at an altitude of 1857m at light. This is the first record of this species in Bulgaria. Collected specimen is illustrated here and is deposed in the collection of the National Museum of Natural History, Sofia (NMNHS).

Key words: Bulgaria, Noctuidae, *Hadena tephroleuca*.

Introduction

The only data in the literature for this species on the Balkan Peninsula are summarized in Beshkov (2000) as follows: "*Hadena tephroleuca* is wrongly included for Bulgaria in Nowacki & Fibiger (1996: 282). It has never been found in Bulgaria, but it is not impossible that it will be discovered here. From the Balkan Peninsula, *H. tephroleuca* is known from Greece, Nestos, Paranestion, near the Bulgarian/Greece border (Hacker 1989: 582) and from Albania (Beshkov & Misja 1995: 356). In both of these articles it is recorded as *Hadena tephroleuca asiatica* (F. Wagner, 1931). Careful examination of the Albanian *tephroleuca* and comparison with specimens from Turkey and Alps have shown that the population in Albania belongs to *Hadena tephroleuca tephroleuca* (Boisduval 1833). In the Balkan Peninsula, *Hadena tephroleuca* is known also from the Durmitor Mts. in Montenegro (Carnelutti *et al.* 1991: 93)". According to Hacker (1996) the subspecific identity of the Balkan population is unclear. In Hacker *et al.* (2002) is accepted the opinion of Beshkov & Misja (1995) that the population of the Balkan Peninsula belongs to the nominante subspecies, but was expressed opinion, that some more material is needed to verify this statement. Recently *H. tephroleuca tephroleuca* was found also in Republic of Macedonia, Galichitza (Petrina Planina) Mts., below Bulgarska Tchuka summit, 1803 m, 41°00'09"N; 20°50'50"E, 19.06.2008, S. Beshkov leg. at L.T. (black light), one male specimen and another locality nearby but with different altitude: above "Dvata Yavora", below Bulgarska Tchuka summit, 1640 m, 41°00'09"N; 20°51'12"E, 19.06.2008, S. Beshkov leg. at lamps, one male specimen (Beshkov 2009).

Results

A single female specimen of *Hadena* (*Pinkericola*) *tephroleuca* (Boisduval, 1833) was collected at light in SW Bulgaria, Belassitsa Mts., 41.325881 N 23.1772556 E, 1857 m. a.s.l., 27.07.2013, very close to Creek border, J. Junnilainen & Antti Aalto leg. (Fig. 1). Coordinates and altitude are taken from Google Earth. This specimen, as well as the whole

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population of the Balkan Peninsula is identified as the nominotypical *Hadena tephroleuca tephroleuca* (Boisduval, 1833). In Belassitsa Mt. with highest top Radomir (2029 m) the collecting locality is below Kongura Top, near the road from Petrich Town along Belassitsa Chalet, Kongura Chalet, Varshiloto place to Kongura Top and ahead below the mountain summit and the borderline to Greece. On this steep and narrow road below Kongura Top there are several curves with enough places for parking and lamp collecting. For lamp collecting were used three basic ground light traps (160 W Mixed lamp, funnel and container) without any screen because night was rather windy and later also cold. Traps were working full night but only one *H. tephroleuca* was found. With this finding the number of Bulgarian Quadrifid Noctuoidea (sensu Noctuidae Europeae Vol. 13), but not counting Lymantiinae and Arctiinae reach 710 species.

Fig. 1. *Hadena* (*Pinkericola*) *tephroleuca tephroleuca* (Boisduval, 1833) female, SW Bulgaria, Belassitsa Mt, 41.325881 N 23.1772556 E, 1857m, 27.07.2013, J. Junnilainen & Antti Aalto leg., in coll. NMNHS, Photo: S. Beshkov.

Discussion

This is the first finding of this species in Bulgaria, although it was expected in the country in the border area to Greece, but more likely in Rhodopi Mts. In the Balkan Peninsula *Hadena tephroleuca* is very rare, at night rarely can be collected more than 1-2 specimens using several traps. Senior author collected several times in this area of Belassitsa Mt., but failed to find *Hadena tephroleuca* there. Without any doubt it is a very rare species there, on the border of its range. Perhaps it will be found also in the Greek and Macedonian parts of the Belassitsa Mountains.

Collecting place is located in steep mountain slopes with *Juniperus sibirica*, *Vaccinium myrtillus* and *Vaccinium vitis-idaea* above *Fagus* forest; Typical for Belassitsa Mt. is absence of coniferous forest. Habitat there is: EUNIS: F2.2A2 Balkano-Hellenic dwarf bilberry heaths. It is interesting to note that apart from the montane types of insects, the ridge of the mountain is inhabited by many species connected with the oak belt, which have flown across the mountain by the help of air currents (Abadjiev & Beshkov 2007). Parts of

these insects are mosquitoes which reach mountain crest from Lake Kirkini in South down in Greece.

From the Bulgarian part of Belassitsa Mts. 824 Macrolepidoptera species are known from the different altitudes and different habitats. From the pseudo-subalpine zone of the mountain are known following interesting and rare Lepidoptera species, for some of which Belassitsa is distal point of their range: *Polyommatus eroides* (Frivaldszky, 1835), *Charissa pullata* ([Denis & Schiffermüller], 1775), *Caradrina suscianja* von Mentzer, 1981, *Caradrina gilva* (Donzel, 1837), *Coranarta cordigera* (Thunberg, 1788), *Hadena drenowskii* (Rebel, 1930), *Hadena caesia bulgarica* Boursin, 1959, *Mythimna anderreggii pseudocomma* (Rebel & Zerny, 1931), *Standfussiana lucernea illyrica* (Rebel & Zerny, 1931), *Chersotis anatolica* (Draudt, 1936), *Euxoa conspicua* (Hübner, [1823-1824]), *Euxoa vitta hercegovinensis* Schawerda, 1938.

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First earthworm (Oligochaeta: Lumbricidae) record from Sithonia Peninsula (Greece)

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Abstract. The paper deals with the earthworm diversity of Chalkidiki Peninsula, Greece. *Aporrectodea longa* (Ude, 1885) proved to be new species for the fauna of Greece and also represents the first earthworm record from Sithonia Peninsula. According to the literature and authors data 14 earthworm taxa are registered from the explored region. The paper underlines lumbricid richness of Chalkidiki Peninsula and provides information about the zoogeographical position of the earthworm species present.

Key words: earthworms, Greece, Lumbricidae.

Introduction

Chalkidiki is a peninsula in Northern Greece. It includes three smaller peninsulas: Kassandra, Sithonia, and Mount Athos. Sithonia, also known as Longos, is located south of the central part of Chalkidiki. The Kassandra Peninsula lies to the west and the Mount Athos Peninsula at the east.

Sithonia is surrounded by the Singitic Gulf to the west and the Toronean Gulf to the east. The mountain Itamos or Dragoudelis is in the center of the peninsula.

The earthworm fauna of Greece is well explored. Michaelsen (1902) launched researches in the country. His work was continued by Černosvitov (1934), Tzelepis (1943), Karaman (1972) and Zicsi (1973). Michalis had the major contribution of exploration of the earthworm fauna of Greece (1975, 1977, 1982, 1995). Zicsi & Michalis (1981) summarized the earthworm knowledge of the country. Recently, Szederjesi & Csuzdi (2012) and Szederjesi (2015) added new species and records to the earthworm fauna of Greece.

Materials and Methods

The field investigations were carried out during the summer of 2016. Earthworms were collected by the diluted formaldehyde method (Raw 1959) complemented with digging and hand-sorting. The specimens were killed in 96% ethanol, fixed in 4% formalin solution and in 96% ethanol, then transferred into 75% ethanol. The material was deposited in the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov", Sofia, Bulgaria in the private earthworm collection of Hristo Valchovski (PCHV).

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Results and Discussion

Class Oligochaeta
Family Lumbricidae Rafinesque-Schmaltz, 1815
Genus Aporrectodea Örley, 1885

Aporrectodea longa (Ude, 1885)
Allolobophora longa Ude, 1885: 136.
Aporrectodea (*Aporrectodea*) *longa*: Mršić & Šapkarev 1988: 29.
Aporrectodea longa: Valchovski 2014: 3.

Material examined: PCHV/80, six ex., Chalkidiki, Sithonia Peninsula, Porto Koufo, meadow near a lake southeast of the village, 4 m a.s.l., 39° 57' 25N 23° 55' 55E, 16.06. 2016, leg. Hristo Valchovski.

Remark. New for the earthworm fauna of Greece. This is the first finding of *Ap. longa* from Greece. The records of Karaman (1972) and Michalis (1972) were misidentifications of *Ap. caliginosa trapezoides*.

The earthworm fauna of Chalkidiki Peninsula is well known except the Sithonia Peninsula. Many lumbricid records were published from Athos Peninsula by Michalis (1977). Earthworm data from Kassandra Peninsula and the Northern part of Chalkidiki Peninsula were presented by Zicsi & Michalis (1981) and Michalis (1982). On the basis of present and literature data we establish list of earthworm species with zoogeographical types from Chalkidiki Peninsula: *Aporrectodea longa* (Ude, 1885), *Aporrectodea rosea* (Savigny, 1826), *Aporrectodea trapezoides* (Dugès, 1828), *Dendrobaena alpina* (Rosa, 1884), *Dendrobaena attemsi* (Michaelsen, 1902), *Dendrobaena auriculata* (Rosa, 1897), *Dendrobaena byblica* (Rosa, 1893), *Dendrobaena michalisi* (Karaman, 1972), *Dendrobaena veneta* (Rosa, 1886), *Eisenia fetida* (Savigny, 1826), *Eiseniella tetraedra* (Savigny, 1826), *Octodrilus complanatus* (Dugès, 1828), *Octodrilus transpadanus* (Rosa, 1884), *Octolasion lacteum* (Örley, 1881).

The earthworm fauna of Chalkidiki Peninsula is dominated by the peregrine lumbricids. From the 14 species 7 taxa (50%) belong to the Peregrine distribution type: *A. longa*, *A. rosea*, *A. trapezoides*, *D. veneta*, *E. fetida*, *Ei. tetraedra* and *O. lacteum*. Mediterranean species take part with two taxa = 14.29% - *D. byblica* and *Oc. complanatus*. The Balkanic-Alpine *D. alpina*, *D. attemsi* (2 taxa = 14.29%) and Eastern-Alpine *D. auriculata* (1 taxon = 7.14%) species are typical European elements. The Trans-Aegean *Oc. transpadanus* and Endemic species *D. michalisi* (1-1 taxon= 7.14-7.14%) are less numerous.

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Vitrea neglecta Damjanov et L. Pintér 1969 – genital anatomy of a specimen from Greece

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Abstract. Two live specimens and few shells of the Pristilomatid snail *Vitrea neglecta* Damjanov et L. Pintér 1969 were collected at the entrance of the Angitis Springs cave, foothills of Falakro Mts., North Greece. Genital anatomy of one dissected specimen from this population confirms the presence of this species in Greece.

Key words: Pristilomatidae, Balkans, distribution.

The species *Vitrea neglecta* Damjanov et L. Pintér 1969 (Gastropoda: Pristilomatidae) was recorded in several localities in Greece (Riedel, 1992; Welter-Schultes, 2012). The genital anatomy of this species in Greece was never studied and all records were based on shell morphology determinations. According to Riedel (1992) the genitalia and especially the structure of the sarcobellum is of taxonomical importance for sure species identification.

On 07.05.2016 at the entrance of the Angitis Springs cave (N41 13 15.9 E23 53 34.4, 129 m a.s.l., Falakro Mts., N Greece) two live specimens of *Vitrea* cf *neglecta* were collected (Fig. 1). One was after dissected in the laboratory and the structure of the genitalia perfectly fitted with this one described for this species from its type locality in Bulgaria by Irikov (2001) (Fig. 2).

Associated molluscs at the locality and the surrounded area: *Alinda biplicata* (Montagu, 1803), *Helix philibinensis* Rossmässler, 1839, *Lindholmiola spectabilis* Urbański, 1960, *Macedonica ypsilon* Nordsieck, 1977, *Oxychilus glaber* (Rossmässler, 1838), *Pomatias elegans* (O. F. Müller, 1774), *Xerolenta obvia* (Menke, 1828).

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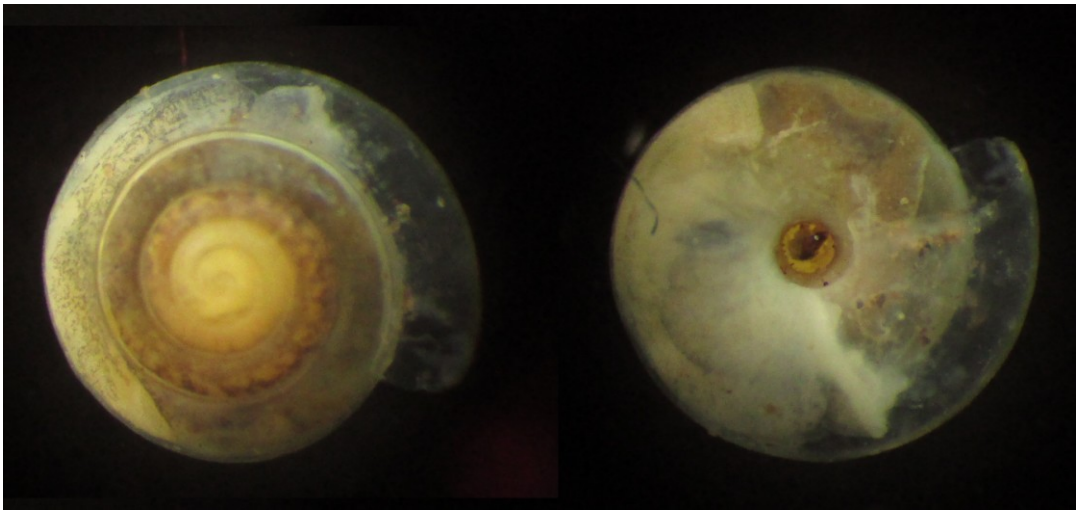

Fig. 1. Shell and soft body of the studied specimen of *Vitrea neglecta* from the area of Angitis Springs (Falakro Mts., N Greece). The patches of black-grey pigmentation on the mantle are visible.

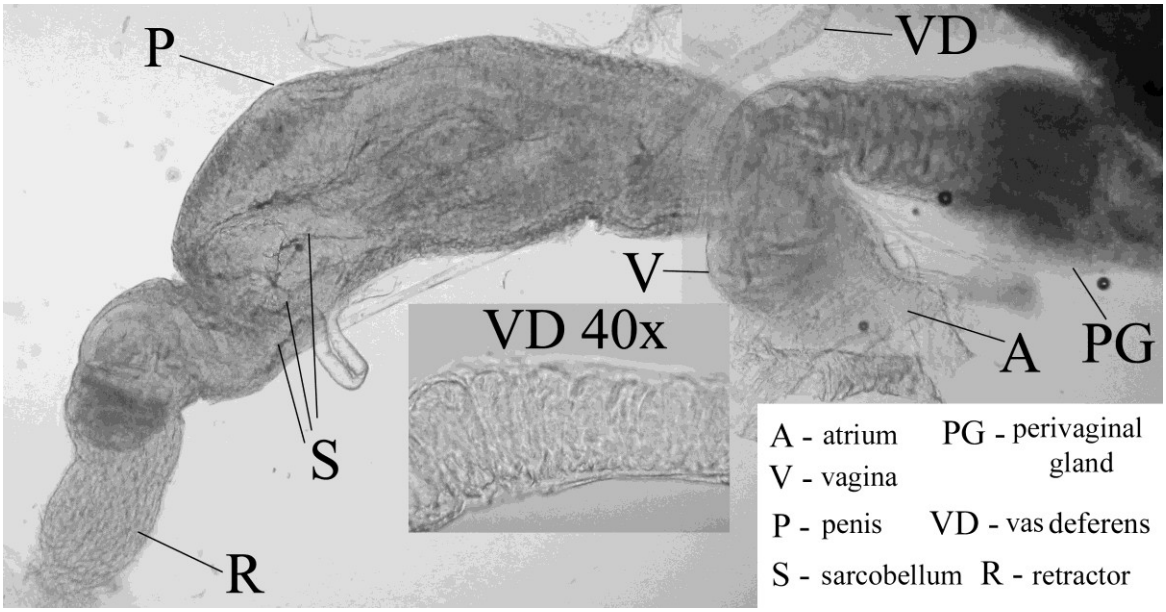

Fig. 2. Light microscope photograph (20x) of a part of the genital system of the studied specimen of *Vitrea neglecta* from the area of Angitis Springs (Falakro Mts., N Greece) with close view of the internal structure of vas deferens at the area of its thickening (photographed in glycerin).

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New data on the distribution of *Pilemia tigrina* (Mulsant, 1851) (Cerambycidae: Lamiinae) in Bulgaria

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Abstract. Single male specimen of *Pilemia tigrina* (Mulsant, 1851) was collected in 2014 in Vrachanska Planina Mts., under Milanovo Vill. Additional locality of the species, based on collection material, is also reported – near Ivanovo Vill., Shumen region.

Key words: Cerambycidae, *Pilemia tigrina*, Bulgaria

Introduction

Three species of the genus *Pilemia* Fairmaire, 1864 (Cerambycidae: Lamiinae) have been reported for Bulgaria: *Pilemia hirsutula* (Frolich 1793), *P. serriventris* (Holzschuh, 1984) and *P. tigrina* (Mulsant, 1851) (Migliaccio *et al.* 2007). From these, *P. serriventris* and *P. tigrina* represent *tigrina* – group in Bulgaria (Holzschuh 1984). *Pilemia serriventris* is Bulgarian endemic species with several known localities in SE part of the country (after Migliaccio et al. 2007), while *P. tigrina* have been reported from two localities only - Iskarski Prolom Gorge at Cherepishki Manastir Monastery (Nedelkov 1905, as *Phytoecia tigrina*) and near Sofia (Kantardjieva-Minkova 1934). The species *P. tigrina* is included in Annexes II and IV of the Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Council of Europe 1992) and listed in species checklist for Bulgaria for reporting under the Article 17 of the Habitats Directive. In this regard the data on the distribution of the species in Bulgaria are extremely scarce. In this paper, new data on the distribution of the species in the country are presented.

Results

During the processing of the entomological material, collected in 2014 from Vrachanska Planina Mts. (W Stara Planina Mts.), a single male of *Pilemia tigrina* (Mulsant, 1851) was identified. Collection data of the specimens are as follow: Vrachanska Planina Mts., roadside verge between Lakatnik and Milanovo Vill., 2 km S Milanovo Vill., 43°05.77' N; 23°23.97' E, 590 m a.s.l., 23.iv.2014, D. Gradinarov leg. The specimen was collected from the host plant (labeled as "Boraginaceae"), in the afternoon (15:30 pm), after weak rainfall. The new locality of the species is within NATURA 2000 ecological network (site "Vrachanski Balkan", BG0000166) and in the territory of Vrachanski Balkan Nature Park.

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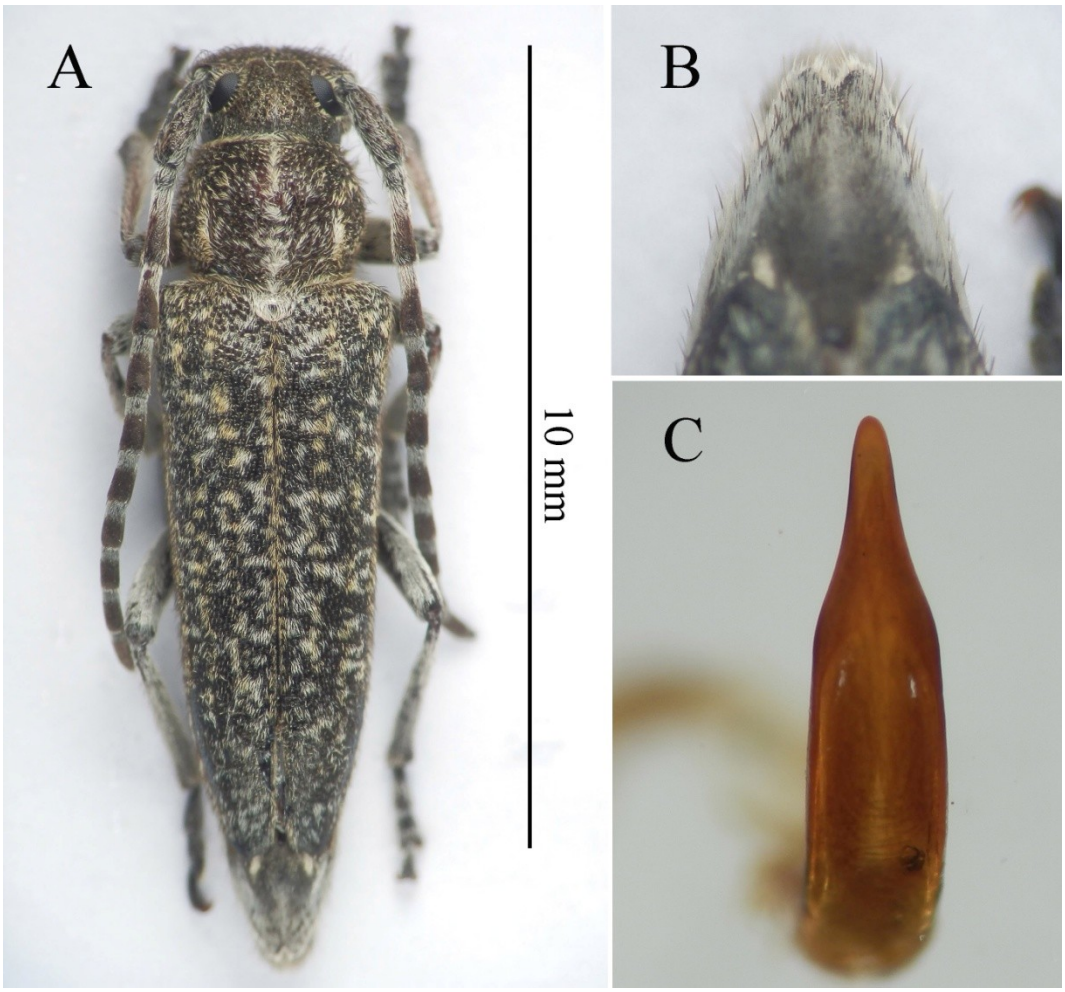

Fig. 1. *Pilemia tigrina* (Mulsant, 1851) male, Vrachanska Planina Mts., 23.iv.2014, D. Gradinarov leg. A: Dorsal view; B: Pygidium, dorsal view; C: Apex of penis.

Identification of the species was performed according Holzschuh (1984). The main distinguishing traits of the species are presented in Fig. 1 (A, B, C). The specimens is deposited in the Zoological collection of Sofia University "St. Kliment Ohridski", Faculty of Biology (BFUS).

Discussion

The first report of *P. tigrina* in Bulgaria is from Iskarski Prolom Gorge, Cherepishki Manastir vicinity (Nedelkov 1905). The distance between this locality and a new one in Vrachanska Planina Mts. is less than 20 kilometers, with no significant difference in altitude. Most likely the both localities concern the same geographical population of the species, but they belong to two separate NATURA sites - "Iskarski prolom – Rzhana" (site code BG0001042) and "Vrachanski Balkan" (site code BG0000166). The real distribution of the species in Bulgaria seems to be considerably wider. Two specimens (male and female) of *P. tigrina*, collected by Czech entomologist Jan Sobota in Bulgaria, are preserved in the collection of Dr. M. Danilevsky (M. Danilevsky, personal communication). The locality is denoted as "Ivanovo", the date and the name of the collector are designated on the label ("3.5.1986 Dr.J.Sobota"). It became possible to specify the exact localities of collected

material - these are the hills near Ticha Dam Lake, Shumen region (Dr. Jan Sobota, personal communication). So, the species seems to be distributed in NE Bulgaria as well.

The conclusion about the rarity of *P. tigrina* in Bulgaria may resulted from the host plant patchy distribution – most probably *Anchusa barrelieri* (All.) Vitman (Tibor 2005) as well as an insufficient data on biology and life cycle of the species. The present record of *P. tigrina* from Vrachanska Planina Mts. indicates that the species can occupy roadside habitats and become active relatively early in the spring (in the second half of April), even in mountain areas. In this regard, the only well-documented finding of *P. tigrina* in Moldova is also from roadside habitat, in early May (Csathó 2014).

Acknowledgements. The author is grateful to Dr. Mikhail Danilevsky (A.N. Severtzov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia) for the confirmation of the species identification and for the additional information on this species distribution in Bulgaria. The author would like to thank Dr. Jan Sobota (Hradec Kralove, Czech Republic) as well for providing the locality data for NE Bulgaria specimens.

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Cadmium (Cd) affects the gill structure and respiration rate of Common Carp (*Cyprinus carpio* L.)

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Abstract. The main purpose of the present study was to provide some preliminary data on the effects of Cd, which is considered as priority toxic substance in surface waters according to Directive 2008/105/EO on the gill structure and respiration rate of common carp (*Cyprinus carpio* L.) under ex situ conditions. We observed significant histological changes, which were grouped as proliferative and degenerative ones, as well as increase in the respiration rate index in the treated with Cd fish, compared with the control. In general, the tested fish species proved to be sensitive to Cd exposure in terms of the studied parameters.

Key words: cadmium, fish gills, respiration rate.

Introduction

Cadmium (Cd) is a major metal present in the earth's crust and is usually associated with other metals such as zinc, copper and lead. It is a non-essential trace metal, which has no known essential role in living organisms; exhibit extreme toxicity even at very low (trace) exposure levels and have been regarded as the main threats to all forms of life (Järup 2003).

Biota such as fish are used as indicators of trace metal contamination of aquatic environments because they are large and easily identified; have longer life-span and high position in the aquatic food chains; and have been recommended as valuable biological indicators in aquatic environmental pollution assessment (Kumolu-Johnson *et al.* 2010; Naigaga *et al.* 2011).

The aim of the present study was to give some preliminary data on the effects of Cd, which is considered as priority toxic substance in surface waters according to Directive 2008/105/EO on the histology of the gill structure and respiration rate of common carp (*Cyprinus carpio* L.) under ex situ laboratory conditions.

Materials and Methods

Ten Common Carps of the same size-group (10.5 cm ± 1.5; 20 gr ± 0.5) were used in the experiment. All animals were collected in the spring of 2015 from one of the basins at the Institute of Fisheries and Aquaculture in Plovdiv, Bulgaria where fish are usually reared under strict toxicant-free conditions. After transportation the fish were acclimatized for a week. The water was kept oxygen saturated, the animals were maintained under a natural light/dark cycle (12:12 hours) and they were not fed prior or during the experiment.

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After acclimatization the fish were divided into two groups in 50 l tanks – control, untreated and test variants, which were treated with soluble Cd ($Cd(NO_3)_2.xH_2O$) for 72 hours (acute exposure). The metal concentration represented the maximum permissible levels set by the national and EU law. According to the Bulgarian legislation based on the EU Directive, the maximum permissible concentration of Cd in inland surface waters is 0.45 µg/l. This means that for 50 L tanks in our experiment 22.5 µg were applied. No fish mortality was recorded during the exposure period.

The physico-chemical characteristics of the aquarium water (pH, temperature, conductivity and oxygen level), were measured once at the start of the experiment (0 h), as well as on the 72nd h according to a standard procedure (APHA 2005).

To study the gill histological structure a standard histological technique was performed (Suvarna *et al.* 2012). The histological alterations were studied using a light microscope and photographed.

To measure the respiration rate the method of Stroganov (1962), whith modification by Tsekov (1989) was applied. The respiration rate was calculated according the formula: I = Q2/G, where I – respiration rate index; G – weight of the animals, in grams, Q2 – oxygen consumed by the animals between the two measurements (the difference between the oxygen levels before and after the 1-hour Q2 = Q-Q1 hour). Q was calculated by the following formula: Q = V x q, where: Q – total oxygen level in the tank; V – volume of the water in the tank, l; q – level of dissolved oxygen in 1 liter of water (mg/l). The oxygen levels were measured, using oximeter "Oxi 315i/SET". The fish were weighted, using digital scale "WTW".

Results

The physico-chemical properties of the water showed relatively constant values in the control and experimental tanks. These for the control groups were as follows: pH – 8.1 ± 0.5; conductivity – 435 µS/cm ± 1.5, temperature – 20.5 ˚C ± 1.5 and oxygen level – 6.8 mg/l ± 0.5, and these for the experimental tank - pH – 7.9 ± 0.3; conductivity – 461 µS/cm ± 3.5, temperature – 20.5 ˚C ± 1.5 and oxygen level – 6.5 mg/l ± 1.5, respectively. Therefore, we think that the changes, which we observed in the fish were not due to physico-chemical properties, but due to the Cd exposure.

We found histological alterations associated with proliferative changes in the gill epithelium, resulting in epithelial lifting, edema, hypertrophy and hyperplasia of squamous epithelium and glandular cells, proliferation of epithelial covering the secondary lamellae, as well as degenerative changes in the gill epithelium and changes affecting the circulatory system (Fig. 1). The proliferative changes prevailed over the degenerative and those in the circulatory system. The most common of proliferative changes were lamellar lifting, proliferation of squamous epithelium, and this covering the secondary lamellae. Similarly to Fernandes & Mazon (2003), we consider that the presence of lamellar lifting increases the distance between the gill surface water and violates the absorption of oxygen. Therefore, the frequency of respiration increases as well. On one hand, high presence of proliferative changes is an indicator of enhanced compensatory-adaptive mechanisms that represent the body's response due to the negative effects of the toxicant in order to increase the distance between the circulatory system of the body and the effects of Cd in our case. This in turn is an indicator of activation process of mitotic division concerning the epithelial cells of the body. On the other hand, degenerative changes indicate the process of cell death, in parallel with those of cell division. The changes in the circulatory system were expressed in vasodilation, which was localized mainly in the venous sinus and placed in the basal part of the secondary lamellae.

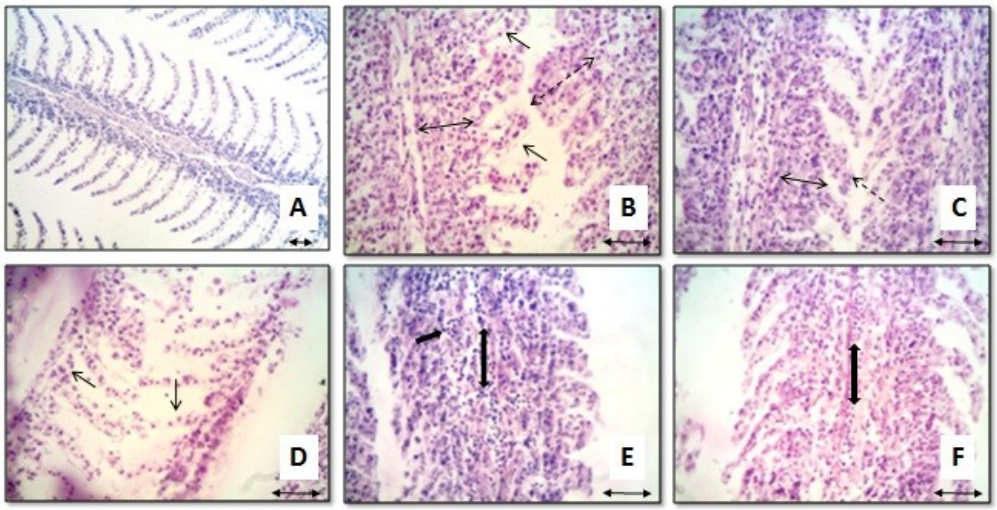

Fig. 1. Histological alteration in common carp gills (H&E) after Cd exposure. A - normal gill histological structure, x200; B - lamellar lifting (→), proliferation of filamentous epithelium (↔), fusion of secondary lamellae (↔), x400; C - proliferation of filamentous (↔) and secondary lamellae epithelium (↔), x400; D - degenerative changes, x400; E - vasodilatation in blood vessels of secondary lamellae (➡) and gill filament (↔), x400; F - vasodilatation in gill filament blood vessels, x400.

The results from the respiration rate measurements are presented in Table 1. At the beginning of the experiment (0 hour) we found that the respiration rate index in fish from the test tank was higher than the control, which remained unchanged until the end of the experiment (after 72 h of exposure).

Table. 1. Index of respiration rate of common carp after Cd exposure at the beginning (0 hour) and the end of the experiment (72nd hour).

Test variant	Water volume, l	Weight, g (G)	Total oxygen level (mg/l)				Total (Q_2)	Index of respiration rate (I)
			Beginning		End			
			q	Q	q_{1h}	Q_{1h}		
Beginning (0 hour)								
Control	30	102.95	7.9	237.00	7.7	231.00	6.00	0.058
Test	30	152.43	7.8	234.00	7.4	222.00	12.00	0.079
72nd hour								
Control	30	128.78	6.0	180.00	5.5	165.00	15.00	0.116
Test	30	139.74	8.0	240.00	7.4	222.00	18.00	0.129

Similarly to us Todorova *et al.* (2015) studied the respiration rate of Common Carp under Ni exposure, as well as its combination with Cd, Pb and Zn, and found that the results for the fish exposed to single Ni2+ were higher in comparison with the control group. This result indicated that the Ni2+ ions impacted the fish respiratory system. Data for the respiration rate of the fish exposed to Ni2+ and its combination with Cd, Pb and Zn for the fish exposed to Ni+Cd and Ni+Pb showed a lower rate compared to the control. Furthermore, those for the fish exposed to Ni+Zn showed similar results to the control, showing that this metal combination is the least stressful. Dobreva *et al.* (2008) also studied the respiration rate of *Carassius gibelio* after 96-hour Cu exposure, but found that the respiration rate was weaker compared to the control (lower values of oxygen uptake). Both observed reactions could be related to interference with the respiratory processes caused by disruption of oxygen access in the fish body.

Overall, in our experiment the fish reacted immediately to the Cd presence with changes of the respiration rate, which probably led the observed gill alterations. One explanation for such changes is most likely that the organism tries to deliver more oxygen to all tissues and organs triggered by the stress caused by the metal. Thus, we suggest that further research in this field should be carried out, including concentrations less than the maximum permissible ones set by law.

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First record of endemic earthworm *Cernosvitovia rebeli* (Rosa, 1897) (Clitellata, Annelida) from western parts of Stara planina Mountains

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Abstract. The current study deals with earthworm biodiversity of Western Stara planina Mountains. Endemic earthworm species *Cernosvitovia rebeli* (Rosa, 1897) proved to be new record for the lumbricid fauna of the Western Stara planina Mountains. This is the western occurrence of this rare species on the territory of Bulgaria. The paper proved information about ecology, habitats and distribution of *Cernosvitovia rebeli*.

Key words: Lumbricidae, earthworms, Bulgaria.

Introduction

Western Stara planina Mountains is situated in the eastern parts of Balkan Peninsula. The mountains are bordered by Targovishki Timok River and Visochicha River by the west and Zlatishki pass to the east. Western Stara planina Mountains is 190 km long and about 15 to 50 km wide, with highest peak Midžor at 2.169 meters a.s.l. The mountains' land area covers 4.196 km^2. Western Stara planina Mountains are divided to 20 smaller mountains.

Exploration of earthworm fauna from Western Stara planina Mountains was launched by Černosvitov (1937). His work was continued by Plisko (1963), Mršić (1991), Stojanović (1996) and Szederjesi (2013). Recently, Stojanović *et al.* (2013) summarized the earthworm knowledge of Stara planina Mountains.

Material and Methods

The field investigations were carried out during the autumn of 2016. Earthworms were collected by the diluted formaldehyde method (Raw, 1959) complemented with digging and hand-sorting. All the specimens were killed in 96% ethanol, fixed in 4% formalin solution and in 96% ethanol, and then transferred into 75% ethanol. The material is deposited in the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov", Sofia, Bulgaria in private earthworm collection of Hristo Valchovski (PCHV). Identification of species was done in accordance to Mršić (1991).

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Results and Discussion

Family Lumbricidae Rafinesque-Schmaltz, 1815
Genus *Cernosvitovia* Omodeo 1956

***Cernosvitovia rebeli* (Rosa, 1897)**

Allolobophora rebeli Rosa, 1897: 2.
Octolasium rebeli: Černosvitov 1934: 77.; 1937: 89; Mihailova 1966: 194.
Cernosvitovia rebeli: Valchovski 2012: 91; Szederjesi 2013: 78.

Distribution: Balkan endemic species (Mršić 1991).
Habitat: forests, pastures, foothills (Mihailova 1966).

Material examined: PCHV/62 two ex., Svoge County, Lukovo village, beech forest, 925 m a.s.l., 42 o 52' 24N 23 o 25' 06E, 01.09. 2016, leg. H. Valchovski.

Current record is first from the western parts of Stara planina Mts. Till now *Cernosvitovia rebeli* was registered from central parts of Stara planina Mts. (Rosa 1897; Černosvitov 1934). Also this endemic species was found on the territory of Bulgaria from Strandja Mts. (Černosvitov 1937, Szederjesi 2013) and eastern parts of Rhodope Mts. (Mihailova 1966; Szederjesi 2013). Recently *Cernosvitovia rebeli* was found from Sredna Gora Mts. (Valchovski & Velizarova 2016). On the Balkan Peninsula *Cernosvitovia rebeli* was registered with single locality from Greece (Michalis 1982), Serbia (Stojanović *et al.* 2008), Albania (Szederjesi & Csuzdi 2012a) and Romania (Csuzdi & Pop 2007).

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New earthworm (Clitellata: Lumbricidae) records from Vitosha Mts. (Bulgaria)

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Abstract. The paper deals with earthworm diversity from Vitosha Mountain (Bulgaria). During the investigation 10 earthworm species were collected altogether, belonging to 7 genera. Among them, two taxa are reported for the first time from the explored region. *Aporrectodea caliginosa* (Savigny, 1826) and *Lumbricus terrestris* Linnaeus, 1758 are proved to be new records from the territory of Vitosha Mountain.

Key words: Earthworms, Lumbricidae, Vitosha Mts.

Introduction

Vitosha is a mountain in western parts of Bulgaria, in south of Sofia town. It is situated between Stara Planina (Balkan Mountains) and Rilo-Rhodopes massif. The mountain is 19 km long and 17 km wide, actually consists of concentric denudational plateaus rising in tiers one above the other. The mountain has an area of 278 sq. km. Vitosha is separated into four main parts whose main ridges gather at a crown known as Cherni Vrah. This is the highest point of the mountain at 2.290 m a.s.l.

The first exploration of earthworm diversity in Vitosha Mountain was launched by Černosvitov (1934; 1937). His work was continued by Plisko (1963) and Šapkarev (1986). Recently Stojanović *et al.* (2012) recorded new records from Vitosha Mountain.

Material and Methods

The field investigations were carried out during the summer of 2016. Earthworms were collected by the diluted formaldehyde method (Raw 1959) complemented with digging and hand-sorting. The combination of both methods provides a more complete sampling of species, because the formalin method alone is not efficient in collecting species living in horizontal burrows. All the specimens were killed in 96% ethanol, fixed in 4% formalin solution and in 96% ethanol, then transfered into 75% ethanol. The material is deposited in the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov", Sofia, Bulgaria in private earthworm collection of Hristo Valchovski (PCHV). Identification of species was done in accordance to Mršić (1991).

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Collecting localities:
1. Bistritca village, mixed forest, 1.046 m a.s.l., 42° 35' 12N 23° 20' 27E.
2. Ianchovska River, beech forest, 1.400 m a.s.l., 42° 35' 00N 23° 18' 46E.
3. Aleko hut, subalpine meadow, 1.820 m a.s.l., 42° 34' 50N 23° 17' 45E.

Results and Discussion

During the investigation from Vitosha Mountain ten lumbricid earthworm species were collected altogether, belonging to seven genera. The collected specimens are to be found in Table 1.

Tab.1. Earthworm species from Vitosha Mts.

Species	**Locality (specimens)**
Aporrectodea caliginosa (Savigny, 1826)	1 (2)
Aporrectodea rosea (Savigny, 1826)	1 (4)
Dendrobaena alpina (Rosa, 1884)	3 (4)
Dendrobaena attemsi (Michaelsen, 1902)	3 (1)
Dendrodrilus rubidus rubidus (Savigny, 1826)	2 (1)
Eisenia lucens (Waga, 1857)	2 (1)
Eiseniella tetraedra (Savigny, 1826)	1 (2)
Lumbricus rubellus Hoffmeister, 1843	2 (2)
Lumbricus terrestris Linnaeus, 1758	1 (3)
Octolasion lacteum (Örley, 1881)	2 (3)

Two taxa are found for the first time from Vitosha Mts. *Aporrectodea caliginosa* (Savigny, 1826) and *Lumbricus terrestris* Linnaeus, 1758 are proved to be new records for the explored region. *Lumbricus terrestris* is peregrine species, registered from many parts of South Bulgaria (Valchovski 2014) and Balkan Peninsula (Mısırlıoğlu *et al.* 2016). *Eisenia lucens* is widely distributed in deciduous forests in the country (Valchovski 2012).

According to current study and literature data there are 19 earthworm species and subspecies found at Vitosha Mts. The zoogeographical distribution of the lumbricid fauna of Vitosha Mts. is dominated by peregrine species (10 taxa = 52.63%). There are and Endemics (2 taxa = 10.52%), Balkanic-Alpine (2 taxa = 10.52%) and Trans-Aegean species (2 taxa = 10.52%). The Central-European, Mediterranean, Holarctic earthworms take part only with 1 species (5.26%).

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Earthworm (Clitellata: Lumbricidae) records from the Rila Mountains (Bulgaria)

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Abstract. The current study is a contribution to the knowledge of the earthworm diversity from the Rila Mountains (Bulgaria). During the investigation 13 earthworm species were collected altogether, belonging to eight genera. Among them *Aporrectodea handlirschi* (Rosa, 1897) and *Aporrectodea caliginosa* (Savigny, 1826) proved to be new records from the territory of the Rila Mountain.

Key words: earthworms, Lumbricidae, Rila Mountains.

Introduction

Rila is a mountain range in southwestern Bulgaria and the highest mountain range of Bulgaria and the Balkans, with its highest peak being Musala at 2.925 m a.s.l. The Rila Mountain has an area of 2.400 sq. km. The dome of the mountain rises over the surrounding mountain valleys, with the Borovets Saddle connecting the main Musala Ridge with the Shipochan and Shumnatitsa ridges that connect to the Ihtiman Sredna Gora Mountains through the Gate of Trajan pass. The Yundola Saddle and the Avramovo Saddle link the Rila Mountain with the Rhodopes Mountains to the east, while the connection with the Pirin Mountains is the Predel Saddle, the one with the Verila Mountain is the Klisura Saddle. The climate is typically alpine, with 2.000 mm of precipitation on Musala Peak yearly, of which about half is snow.

Exploration of the earthworm diversity in the Rila Mountain was launched by Černosvitov (1934, 1937). His work was continued by Plisko (1963), Šapkarev (1986) and Zicsi & Csuzdi (1986). Recently Uzunov (2010), Stojanović *et al.* (2012), Milutinović *et al.* (2013), Szederjesi (2013) and Valchovski & Szederjesi (2016) registered new records form the Rila Mountains.

Material and Methods

Investigations were carried out during March, April and May 2016. Earthworms were collected by the diluted formaldehyde method (Raw 1959) complemented with digging and hand-sorting. The combination of both methods provides a more complete sampling of species, because the formalin method alone is not efficient in collecting species living in horizontal burrows. The specimens were killed in 70% ethanol, fixed in 4% formalin solution and in 70% ethanol. Five localities were investigated in the Rila Mountains: Kostenets waterfall, Resilovo, Sapareva Banya, Rila Monastery and Kirilova Polyana.

The specimens were deposited in the Institute of Soil Science, Agrotechnologies and Plant Protection "N. Poushkarov", Sofia, Bulgaria in private earthworm collection of Hristo

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Valchovski (PCHV). The earthworms were described and dissected under low power microscope. Identification of species was done in accordance to Mršić (1991).

Results and Discussion

Family Lumbricidae Rafinesque-Schmaltz, 1815

Genus *Allolobophoridella* Mršić, 1990

***Allolobophoridella eiseni* (Levinsen, 1884)**

Material examined. Bulgaria: Kostenets waterfall, mixed forest, 896 m, 42º 15' 06''N 23º 48' 17''E, 19.03.2016, 3 ex., (H. Valchovski leg.) (PCHV/61); Bulgaria: Rila Monastery, decidous forest, 1275 m, 42º 08' 43''N 23º 21' 49''E, 21.05.2016, 1 ex., (H. Valchovski leg.) (PCHV/77).

Genus *Aporrectodea* Örley, 1885

***Aporrectodea caliginosa* (Savigny, 1826)**

Material examined. Bulgaria: Sapareva Banya, near a brook in mixed forest, 830 m, 42º 17' 01''N 23º 15' 34''E, 01.05.2016, 7 ex., (H. Valchovski leg.) (PCHV/71); Bulgaria: Resilovo, torrent west of the village, 676 m, 42º 16' 17''N 23º 12' 12''E, 01.05.2016, 2 ex., (H. Valchovski leg.) (PCHV/70).

***Aporrectodea handlirschi* (Rosa, 1897)**

Material examined. Bulgaria: Kostenets waterfall, mixed forest, 870 m, 42º 15' 05''N 23º 48' 22''E, 19. 03.2016, 2 ex., (H. Valchovski leg.) (PCHV/61).

***Aporrectodea rosea* (Savigny, 1826)**

Material examined. Bulgaria: Kostenets waterfall, mixed forest, 870 m, 42º 15' 05''N 23º 48' 22''E, 19. 03.2016, 1 ex., (H. Valchovski leg.) (PCHV/61).

***Aporrectodea trapezoides* (Dugès, 1828)**

Material examined. Bulgaria: Kostenets waterfall, mixed forest, 870 m, 42º 15' 05''N 23º 48' 22''E, 19. 03.2016, 2ex., (H. Valchovski leg.) (PCHV/61).

Genus *Dendrobaena* Eisen, 1873

***Dendrobaena alpina* (Rosa, 1884)**

Material examined. Bulgaria: Rila Monastery, decidous forest, 1275 m, 42º 08' 43''N 23º 21' 49''E, 21.05.2016, 3 ex., (H. Valchovski leg.) (PCHV/ 77).

***Dendrobaena attemsi* (Michaelsen, 1902)**

Material examined. Bulgaria: Kostenets waterfall, mixed forest, 870 m, 42º 15' 05''N 23º 48' 22''E, 19. 03.2016, 2 ex., (H. Valchovski leg.) (PCHV/61).

***Dendrobaena hrabei* (Černosvitov, 1934)**

Material examined. Bulgaria: Kirilova polyana, near a brook in coniferous forest, 1485 m, 42º 09' 16''N 23º 24' 07''E, 21.05.2016, 1 ex. (H. Valchovski leg.) (PCHV/78).

***Dendrobaena octaedra* (Savigny, 1826)**

Material examined. Bulgaria: Kirilova polyana, near a brook in coniferous forest, 1485 m, 42º 09' 16''N 23º 24' 07''E, 21.05.2016, 3 ex. (H. Valchovski leg.) (PCHV/78).

Genus *Dendrodrilus* Omodeo, 1956

***Dendrodrilus rubidus rubidus* (Savigny, 1826)**

Material examined. Bulgaria: Resilovo, torrent west of the village, 676 m, 42º 16' 17''N 23º 12' 12''E, 01.05.2016, 1 ex., (H. Valchovski leg.) (PCHV/70).

Genus *Lumbricus* Linnaeus, 1758

***Lumbricus rubellus* Hoffmeister, 1843**

Material examined. Bulgaria: Resilovo, mixed forest above the monastery, 820 m, 42° 15' 51''N 23° 12' 43''E, 01.05.2016, 4ex., (H. Valchovski leg.) (PCHV/70); Bulgaria: Rila Monastery, decidous forest, 1275 m, 42° 08' 43''N 23° 21' 49''E, 21.05.2016, 2 ex., (H. Valchovski leg.) (PCHV/77).

***Lumbricus terrestris* Linnaeus, 1758**

Material examined. Bulgaria: Resilovo, torrent west of the village, 676 m, 42° 16' 17''N 23° 12' 12''E, 01.05.2016, 1 ex., (H. Valchovski leg.) (PCHV/70); Bulgaria: Sapareva Banya, near a brook in mixed forest, 830 m, 42° 17' 01''N 23° 15' 34''E, 01.05.2016, 1 ex., (H. Valchovski leg.) (PCHV/71); Bulgaria: Rila Monastery, decidous forest, 1275 m, 42° 08' 43''N 23° 21' 49''E, 21.05.2016, 1 ex., (H. Valchovski leg.) (PCHV/77).

Genus *Octolasion* Örley, 1885

***Octolasion lacteum* (Örley, 1881)**

Material examined. Bulgaria: Kirilova polyana, near a brook in coniferous forest, 1485 m, 42° 09' 16''N 23° 24' 07''E, 21.05.2016, 3 ex. (H. Valchovski leg.) (PCHV/78); Bulgaria: Rila Monastery, decidous forest, 1275 m, 42° 08' 43''N 23° 21' 49''E, 21.05.2016, 2 ex., (H. Valchovski leg.) (PCHV/77).

Two taxa are found for the first time in the explored region. *Aporrectodea handlirschi* (Rosa, 1897) and *Aporrectodea caliginosa* (Savigny, 1826) are proved to be new records for Rila Mountains. The Trans-Aegean *Aporrectodea handlirschi* is distributed in the southern parts of Bulgaria, so its presence in the Rila Mountains is not surprising. Also one of the most common peregrine species *Aporrectodea caliginosa* is recorded form the lower parts of the explored region.

According to the current study and literature data 23 earthworm species and subspecies are registered on the territory of the Rila Mountains, which is almost half of the earthworm diversity in Bulgaria (Valchovski 2012). Considering the zoogeographical distribution types, the lumbricid fauna of the Rila Mountains is dominated by peregrine species (11 taxa = 47.82%), followed by endemic (4 taxa = 17.39%) and Balkanic-Alpine species (3 taxa = 13.04%). Central-European, Trans-Aegean, Mediterranean, Holarctic and Palearctic earthworms take part with 1-1 taxon (4.34%).

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