

Earthworm (Clitellata: Lumbricidae) records from the Western Stara Planina Mts (Bulgaria)

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Abstract. The current study is a contribution to the knowledge of the earthworm diversity from the Sofia region (Bulgaria). During the investigation 10 earthworm species were collected altogether, belonging to five genera. Among them *Dendrobaena alpina alpina* (Rosa, 1884) and *Dendrobaena attemsi* (Michaelsen, 1902) proved to be the new records from Western Stara Planina Mts. *D. alpina alpina* is registered for the first time in the whole Balkan Mts., while *D. attemsi* is found for the first time in the Western parts of Balkan Mts.

Key words: earthworms, Lumbricidae, Sofia region.

Introduction

Stara Planina Mts is the longest mountain on the Balkan Peninsula. Balkan Mts is long 555km and wide from 20 to 60km. Western parts are bordered by Timok River by the west and Zlatishki pass to the east. Western Stara planina Mountains are divided to 20 smaller mountains: Sveti Nikola, Chiprovska, Berkovska, Koznitca, Ponor, Vracanska, Rgana, Golema planina, Murgash, Sofiiska planina and other smaller mountains. The highest peak is Midjur (2168m). Western Balkan Mts. has area of 4196.9 km², with average altitude of 849 m.

Exploration of earthworm fauna from Western Stara planina Mountains was launched by Černosvitov (1937). His work was continued by Plisko (1963), Szederjesi (2013) and Valchovski (2016). Recently, Stojanović *et al.*(2013) summarized the earthworm knowledge of Stara planina Mountains.

Material and Methods

Investigations were carried out during August 2021 and April 2022. Earthworms were collected by the diluted formaldehyde method (Raw 1959). The specimens were killed in 70% ethanol, fixed in 4% formalin solution and in 70% ethanol. Ten localities were investigated in the Sofia region: Seslavitci, Belidie han, Chepan, Opitsvet, Tsraklevtsi and Peturch village.

The specimens were deposited in the Institute of Soil Science, Agrotechnologies and Plant Protection “N. Poushkarov”, Sofia, Bulgaria. The earthworms were described and dissected under low power microscope. Identification of species was done in accordance to Mršić (1991).

Results

Family Lumbricidae Rafinesque-Schmaltz, 1815

Genus *Aporrectodea* Örley, 1885

Aporrectodea caliginosa (Savigny, 1826)

Material examined. 1 ex. Chepan planina Mt., NE Dragoman, 42°56'49.3"N, 22°57'34.2"E, 1190 m, dry stony slope with single lilac bushes, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Aporrectodea rosea (Savigny, 1826)

Material examined. 2 ex. Petarch village, 42°50'49.5"N, 23°06'37.7"E, 570 m, reed patch amongst hay meadows and crop fields, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 3 ex. Beledie Han, 42°53'54.2"N, 23°09'56.0"E, 820 m, mixed deciduous forest with lilac, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Aporrectodea trapezoides (Dugès, 1828)

Material examined. 1 ex. Chepan planina Mt., N Dragoman, 42°56'54.1"N, 22°56'16.1"E, 970 m, forest with beech, hornbeam and manna-ash, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Genus *Bimastos* Moore, 1891

Bimastos rubidus (Savigny, 1826)

Material examined. 1 ex. Beledie Han, 42°53'57.4"N, 23°09'57.5"E, 830 m, dry meadow with single bushes and trees, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 1 ex. Petarch vill., 42°50'59.8"N, 23°08'07.4"E, 545 m, Blato River, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Genus *Dendrobaena* Eisen, 1873

Dendrobaena alpina alpina (Rosa, 1884)

Material examined. 3 ex. Seslavtsi village, 42°47'45.5"N, 23°33'40.2"E, 1095 m, oak-beech-hazel forest, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Dendrobaena attemsi (Michaelsen, 1902)

Material examined. 1 ex. Seslavtsi village, 42°45'48.8"N, 23°29'33.4"E, 578 m, alfalfa field edge (ecotone), leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Dendrobaena byblica (Rosa, 1893)

Material examined. 1 ex. Beledie Han, 42°53'57.4"N, 23°09'57.5"E, 830 m, dry meadow with single bushes and trees, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Genus *Lumbricus* Linnaeus, 1758

Lumbricus rubellus Hoffmeister, 1843

Material examined. 4 ex. Seslavtsi village, 42°45'48.8"N, 23°29'33.4"E, 578 m, alfalfa field edge (ecotone), leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 3 ex. Beledie Han, 42°53'54.2"N, 23°09'56.0"E, 820 m, mixed deciduous forest with lilac, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 2 ex. Petarch village, 42°50'59.8"N, 23°08'07.4"E, 545 m, Blato River, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva. 2 ex. Petarch village, 42°51'13.3"N, 23°06'24.5"E, 560 m, meadow, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 1 ex. Seslavtsi village, 42°46'45.6"N, 23°32'26.2"E, 830 m, pasture-quarry ecotone, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 2 ex. Beledie Han,

42°53'57.4"N, 23°09'57.5"E, 830 m, dry meadow with single bushes and trees, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

***Lumbricus terrestris* Linnaeus, 1758**

Material examined. 1 ex. Petarch village, 42°50'49.5"N, 23°06'37.7"E, 570 m, reed patch amongst hay meadows and crop fields, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 1 ex. Beledie Han, 42°53'57.4"N, 23°09'57.5"E, 830 m, dry meadow with single bushes and trees, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 2 ex. Seslavtsi village, 42°46'45.6"N, 23°32'26.2"E, 830 m, pasture-quarry ecotone, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Genus *Octolasion* Örley, 1885

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

Material examined. 3 ex. Tsraklevtsi village, 42°56'25.1"N, 23°05'59.0"E, 880 m, hay meadow, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 4 ex. Beledie Han, 42°53'57.4"N, 23°09'57.5"E, 830 m, dry meadow with single bushes and trees, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva. 3 ex. Petarch village, 42°50'49.5"N, 23°06'37.7"E, 570 m, reed patch amongst hay meadows and crop fields, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva; 2 ex. Opitsvet village, 42°53'25.1"N, 23°03'13.3"E, 690 m, leg. T. Teofilova, N. Kodzhabashev, G. Hristov, K. Miteva.

Discussion

Two taxa are found for the first time in the explored region. *Dendrobaena alpina alpina* (Rosa, 1884) and *Dendrobaena attemsi* (Michaelsen, 1902) proved to be new records from Western Stara Planina Mts. Both taxa are Balkanic-Alpine, so their presence in the Western Balkan Mountains is not surprising.

According to the current study and literature data 16 earthworm species are registered on the territory of the Western Balkan Mountains, which is almost one third of the earthworm diversity in Bulgaria (Valchovski 2012). Considering the zoogeographical distribution types, the lumbricid fauna of the Western Balkan Mountains is dominated by peregrine species (9 taxa = 56.25%), followed by endemic (2 taxa = 12.5%) and Balkanic-Alpine species (2 taxa = 12.5%). Central-European, Trans-Aegean, Mediterranean, = earthworms take part with 1 taxon (6.25%).

References

- Černovitov, L. (1937) Die Oligochaetenfauna Bulgariens. *Mitteilungen aus den Königlichen Naturwissenschaftlichen Instituten in Sofia*, 10: 62–92.
- Dugès, A. (1828) Recherche sur la circulation, la respiration, et la reproduction des Annélides sétigères abranches. *Annales des Sciences Naturelles Paris*, 15: 284–336.
- Eisen, G. (1873) Om Skandinaviens Lumbricider. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 30 (8): 43–56.
- Hoffmeister, W. (1843) Beitrag zur Kenntnis Deutscher Landanneliden. *Archiv für Naturgeschichte*, 9: 183–198.
- Linnaeus, C. (1758) *Systema Naturae per Regna tria Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis*. 10th edition, volume 1. Holmiae, Laurentii Salvii, 824 pp.
- Michaelsen, W. (1902) Neue Oligochaeten und neue Fundorte altbekannter. *Mitteilungen aus dem Naturhistorischen Museum in Hamburg*, 19: 3–53.
- Moore, H. (1891) Preliminary account of new genus of Oligochaeta. *Zool. Anz.* 16: 333–334.
- Mršič, N. (1991) *Monograph on Earthworms (Lumbricidae) of the Balkans*. Slovenian Academy of Sciences and Arts, Ljubliana, 755 pp.

- Örley, L. (1881) A magyarországi Oligochaeták faunája. I. Terricolae. *Mathematikai és Természettudományok Köréből*, 16: 562–611.
- Örley, L. (1885) A palaearktikus övben élő Terrikoláknak revíziója és elterjedése. *Értekezések a Természettudományok Köréből*, 15: 1–34.
- Plisko, G. (1963) Materialien zur Kenntnis der Regenwürmer (Oligochaeta, Lumbricidae) Bulgariens. *Fragmenta Faunistica, Warsawa*, 10: 425–440.
- Rafinesque-Schmaltz, C. (1815) *Analyse de la Nature ou tableau de l'univers et des corps organisés*. Palermo, 223 pp.
- Raw, F. (1959) Estimating earthworm population by using formalin. *Nature*, 184: 1661–1662.
- Rosa, D. (1884) *Lumbricidi del Piemonte*. Unione Tipografico- Editrice, Torino, 55 pp.
- Rosa, D. (1893) Viaggio del Dr. E. Festa in Palestina, nel Libano e regioni vicin. II. Lumbricidi. *Bolletino dei Musei di Zoologia ed Anatomia Comparata della Reale Università di Torino*, 8 (160), 1–14.
- Savigny, J.C. (1826) Analyse des Travaux de l'Académie royale des Sciences, pendant l'année 1821, partie physique. *Mémoires de l'Académie des Sciences de l'Institut de France, Paris*, 5: 176–184.
- Stojanović, M., Tsekova, R. & Milutinović, T. (2013) Earthworms (Oligochaeta: Lumbricidae) of Bulgaria: Diversity and Biogeographical Review. *Acta Zoologica Bulgarica*, Suppl. 4: 7-15.
- Stojanovic, M., Tsekova, R., Pesic S., Milanovic, J. & T. Milutinovic, T (2013) Diversity and a biogeographical review of the earthworms (Oligochaeta: Lumbricidae) of the Balkan Mountains (Stara Planina Mountains) in Serbia and Bulgaria. *Turkish Journal of Zoology*, 37: 635-642.
- Szederjesi, T. (2013) New earthworm records from Bulgaria (Oligochaeta, Lumbricidae). *Opuscula Zoologica, Budapest*, 44: 77–83.
- Valchovski, H. (2012) Checklist of earthworms (Oligochaeta: Lumbricidae) from Bulgaria – a review. *Zootaxa*, 3458: 86–102.
- Valchovski, H. (2016) First record of endemic earthworm *Cernosvitovia rebeli* (Rosa, 1897) (Clitellata, Annelida) from western parts of Stara planina Mountains. *Zoonotes*, 98, 1-3.