

***Abbreviata abbreviata* (Rudolphi, 1819) as a new nematode parasite for *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) recorded in Albania**

DANIEL JABLONSKI¹, BALÁZS VÁGI² & GÁBOR KARDOS³

¹Department of Zoology, Comenius University in Bratislava, Mlynská dolina B-1, 842 15, Bratislava, Slovakia.

²Lendület Evolutionary Ecology Research Group, Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, 1022 Budapest, Herman Ottó út 15, Hungary.

³Department of Medical Microbiology, Faculty of Medicine, University of Debrecen, H-4032 Debrecen Nagyerdei krt. 98, Hungary.

Corresponding author: Daniel Jablonski, e-mail: daniel.jablonski@balcanica.cz

Received 13 March 2015 | Accepted 11 April 2015 | Published online 13 April 2015.

Physalopterid nematodes parasitize the gastrointestinal tract of many vertebrates including amphibians, reptiles, birds and mammals (Anderson 2000). The genus *Abbreviata* was split from the genus *Physalopteris* by Travassos (1920), presently it is comprised of 47 species (Bain *et al.* 2014). The genus is characterized by two dentated pseudolabia with one externolateral, one internolateral and two double submedian teeth. Subgeneric classification is based on the number of uterine branches (Morgan 1946).

The genus has a worldwide distribution (Bain *et al.* 2014). Life cycles of *Abbreviata* species are poorly known, intermediate host are invertebrates (Anderson 2000). Coleopterans, othopterans and mantopterans were found to be suitable intermediate hosts by Kabilov (1980) in an experimental system; *A. antarctica* was shown to develop in the tropical cricket (King *et al.* 2013). Larval forms were also found in amphibians, reptiles and mammals (Bain *et al.* 2014); whether these observations represent intermediate, definitive or paratenic hosts is unknown. Some reports of unusual hosts can also be found (Von Linstow 1883), which may be pseudoparasitic occurrences when predators of definitive hosts swallow the helminths in the prey.

Nematodes in the genus *Abbreviata* are closely related (Anderson 2009), and more than one nematode species may occur in more than one host species. According to Morgan (1946) seventeen of that time accepted 27 species of the genus used reptiles as definitive hosts, nine used mammals, while *A. ranae* is found in various frogs and toads. Lizards are by far the most important hosts. Among species with reptile hosts, there are host-specific and euryxenous species (Jones 2014).

Abbreviata abbreviata (Rudolphi, 1819) is an Old World nematode species reported from the gastrointestinal tract of various lizards as well as snakes (originally described in Spain from an unknown lizard; for review see Yildirimhan *et al.* 2011). Regarding snakes it was reported from *Natrix natrix* (Kirin 2002), *Platycephalus najadum* (Biserkov 1995), *Vipera ammodytes* (Biserkov 1995; Yildirimhan *et al.* 2011), *V. ursinii/renardi*, *V. berus* and *Macrovipera lebetina* (Sharpilo 1976). So far known geographic range of this species of nematode parasite includes Algeria, Spain, Bulgaria, Crimea and Turkey (Yildirimhan *et al.* 2011).

Eastern Montpellier Snake, *Malpolon insignitus* (Geoffroy Saint-Hilaire, 1827) ranges from northeast Morocco throughout northern Africa (including Lampedusa Island) and Middle East, Cyprus, Anatolia to southeast Europe as far as western Iran and southern Russia. Here inhabits both natural and man-made secondary places, prefers sun-exposed and warm localities in the plains and foothills (De Hann 1999).

It was formerly known as a subspecies of *M. monspessullanus* and elevated to a full species status with two subspecies, *M. i. fuscus* and *M. i. insignitus* based on molecular analyses (Carranza *et al.* 2006). In the Balkans, subspecies *M. i. fuscus* (Fleischmann, 1831) occurs. This species is an active predator, feeds on lizards, snakes, small mammals, bird and their eggs, large insects and more rarely amphibians (De Hann 1999). According to our best knowledge, genus *Abbreviata* has not been reported from this snake species.

Herein, we report records of *A. abbreviata* from two specimens of *M. insignitus* from Albania representing a novel host species as well as a new locality (country) for the parasite. Two fresh road-killed adult female *M. insignitus* were collected at 28 June and 3 July 2014 in Albania. First specimen (1100 mm TL) was found in Tomorrit Mts. (40.59845°N, 20.14207°E, datum WGS 84, 716 m a.s.l.), the second one (1200 mm TL) near Lukovë village (39.97863°N, 19.93523°E, datum WGS 84, 271 m a.s.l.). The body cavity of both specimens was opened in the field and the digestive tract was removed. The esophagus, stomach, small and large intestine and lungs were opened and separately examined for helminths by eyes. Twelve and eight specimens of nematodes visible for the naked eye were found in the small intestine of the first and the second snake, respectively. Noticeable food remains were not detected in the digestive tract. Recorded specimens of nematodes were killed and fixed in 70% ethanol. Nematodes were cleared in a drop of glycerol and identified using a compound microscope. Its identification was based on keys given by Yamaguti (1961), Sharpilo (1976) and Anderson *et al.* (2009).

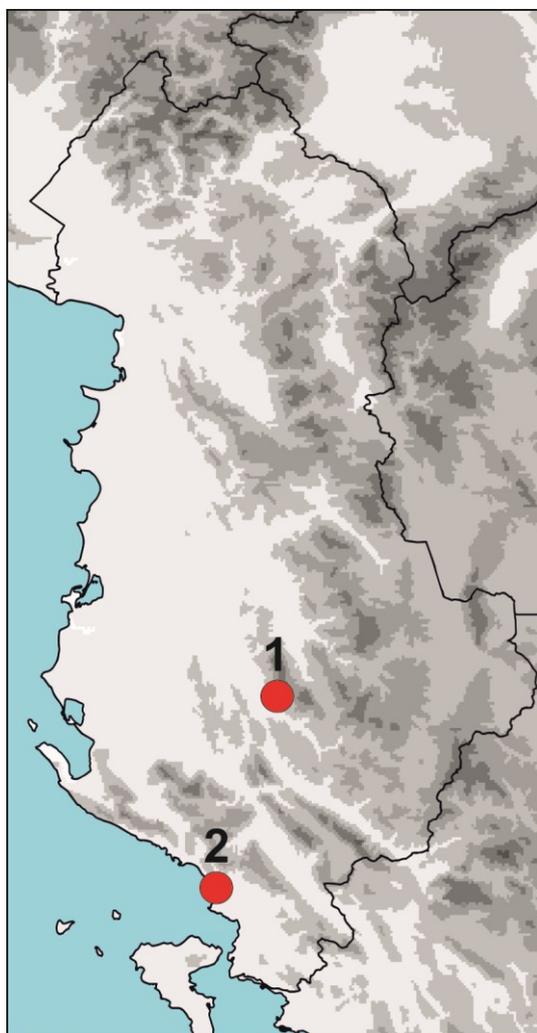


Figure 1. Map with records of *Abbreviata abbreviata* at road-kill specimens of *Malpolon insignitus* in Albania: 1 - Tomorrit Mts., 2 - Lukovë village.

These two observations may be interpreted as endoparasites of the snakes but possibly also as pseudoparasitic occurrences. As *M. insignitus* is a snake preying mostly upon lizards (De Hann 1999), helminths may originate from prey animals, implicating that the parasite is probably present in lizards (potentially *Lacerta trilineata*; cf. Yildirimhan *et al.* 2011) in the area. However, the presence of several individual helminths in both host snakes suggests that *A. abbreviata* may have been an endoparasite for the two snake specimens found. Speculatively, this species may be an accidental host, similarly to *Crotalus*

lepidus as suggested by Goldberg *et al.* (2002). In any case, detailed parasitological research is necessary for deeper evaluation of parasite fauna in reptiles of the Balkans and the relationships between them.

Acknowledgments

We would like to thank J. Sitko (Comenius Museum in Přerov, Czech Republic) for his help with determination of the nematode parasite species and D. Kirin (University of Plovdiv, Bulgaria) for comments. Financial support was provided by the Balassi Institute, Hungary (B2/ICS/11521/1).

References

- Anderson, R.C. (2000) *Nematode Parasites of Vertebrates. Their Development and Transmission*. 2nd Edition, CABI Publishing, Wallingford, Oxon, UK, 650 pp.
- Anderson, R.C., Chabaud, A.G. & Willmott, S. (2009) *Key to the Nematode Parasites of Vertebrates*. Archival volume, Cambridge University Press, UK, 463 pp.
- Bain, O., Mutafchiev, Y. & Junker, K. (2014) Order Spirurida. In: Schmidt-Rhaesa, A. (Ed.) *Handbook of Zoology: Gastrotricha, Cycloneuralia and Gnathifera*. Volume 2. Nematoda. De Gruyter: Berlin-Boston, pp. 661–732.
- Biserkov, V.Y. (1995) New records of nematodes and acanthocephalans from snakes in Bulgaria. *Comptes rendus de l'Académie Bulgare des Sciences*, 48 (11/12), 87–89.
- Carranza, S., Arnold, E.N. & Pleguezuelos, J.M. (2006) Phylogeny, biogeography, and evolution of two Mediterranean snakes, *Malpolon monspessulanus* and *Hemorrhois hippocrepis* (Squamata, Colubridae), using mtDNA sequences. *Molecular Phylogenetics and Evolution*, 40, 532–546.
- De Hann, C.C. (1999) *Malpolon monspessulanus* (Hermann, 1804) - Europäische Eidechsenarter. In: Böhme, W. (Ed.), *Handbuch der Reptilien und Amphibien Europas*, Vol. 3/IIA, Serpentes II: Colubridae 2. Wiebelsheim (AULA), Germany, pp. 661-756, 789-807.
- Goldberg, S.R., Bursey, C.R. & Holycross, A.T. (2002) *Abbreviata terrapenis* (Nematoda: Physalopteridae): An Accidental Parasite of the Banded Rock Rattlesnake (*Crotalus lepidus klauberi*). *Journal of Wildlife Diseases*, 38, 453–456.
- Jones, H.I. (2014) Physalopterine nematodes in Australian reptiles: interactions and patterns of infection. *Australian Journal of Zoology*, 62, 180–194.
- Kabilov, T.K. (1980) On the life cycle of the nematode *Abbreviata kazachstanica*. *Parazitologiya*, 14, 263–270.
- King, C., Jones, H.I. & Tay, A. (2013) Arthropod intermediate hosts of *Abbreviata antarctica* (Nematoda: Physalopteridae) in Australia. *Journal of Parasitology*, 99, 708–711.
- Kirin, D. (2002) New records of the helminth fauna from grass snake, *Natrix natrix* L., 1758 and dice snake, *Natrix tessellata* Laurenti, 1768 (Colubridae: Reptilia) in South Bulgaria. *Acta Zoologica Bulgarica*, 54, 49–53.
- Morgan, B.B. (1946) Host-parasite relationships and geographical distribution of the Physalopterinae (Nematoda). *Transactions of the Wisconsin Academy of Sciences and Letters*, 38, 273–292.
- Sharpilo, V.P. (1976) *Parasitic Worms of the Reptilian Fauna of the USSR*. Izdat, Naukova Dumka, Kiev, USSR, 287 pp.
- Travassos, L. (1920) Contribuições para o conhecimento da fauna helmintológica brasileira. X. Sobre as espécies do gênero *Turgida*. *Memórias do Instituto Oswaldo Cruz, Rio de Janeiro*, 12, 73–77.
- Von Linstow, O. (1883) Nematoden, Trematoden und Acanthocephalen, gesammelt von Prof. Fedtschenko in Turkenstan. *Archiv für Naturgeschichte*, 49, 274–314.
- Yamaguti, S. (1961) *Systema Helmithum III, The Nematodes of Vertebrates*. Interscience Publishers, New York and London, USA & UK, 1261 pp.
- Yildirimhan, H.S., Bursey, C.R. & Altunel, F.N. (2011) Helminth parasites of the Balkan green lizard, *Lacerta trilineata* Bedriaga 1886, from Bursa, Turkey. *Turkish Journal of Zoology*, 35, 519–535.