

PERESADKO L. V. 1980: New nematodes and acanthocephalans from the charadriiform birds in Western Siberia. In: Systematics and ecology of animals, Publ. House Nauka, Novosibirsk, pp. 10-23. (In Russian.)

PETROCHENKO V. I. 1956: Acanthocephalans of Domestic and Wild Animals. Vol. 1. Publ. House of Academy of Sciences of USSR, Moscow, 436 pp. (In Russian.)

PETROCHENKO V. I. 1958: Acanthocephalans of Domestic and Wild Animals. Vol. 2. Publ. House of Academy of Sciences of USSR, Moscow, 456 pp. (In Russian.)

PETROVA K. 1984: On the acanthocephalans from wild birds in Bulgaria. In: Fauna, Taxonomy and Ecology of Helminths on Birds. Publ. House of the Bulgarian Academy of Sciences, Sofia, pp. 185-187. (In Bulgarian.)

RYZHIKOV K. M., SHARPILO V. P., SHEVCHENKO N. N. 1980: Helminths of the Amphibian Fauna of USSR. Publ. House Nauka, Moscow, 280 pp. (In Russian.)

SCHMIDT G. D. 1981: *Plagiorhynchus formosus* Van Cleave, 1918, a synonym of *Plagiorhynchus cylindraceus* (Goeze, 1782) Schmidt and Kuntz, 1966. J. Parasitol. 67: 597-598.

SCHMIDT G. D., KUNTZ R. E. 1977: Revision of *Mediorhynchus* Van Cleave, 1916 (Acanthocephala) with a key to species. J. Parasitol. 63: 500-507.

STOIMENOV K. 1962: Contribution to the knowledge of the helminths of *Coloeus monedula* L. in North-Eastern Bulgaria. Izv. Tsentr. Khelminitol. Lab. 7: 169-173. (In Bulgarian.)

STOIMENOV K. 1963: Contribution to the knowledge of the helminths of *Corvus corone cornix* L. in North-Eastern Bulgaria. Izv. Tsentr. Khelminitol. Lab. 8: 175-180 (In Bulgarian.)

TSACHEVA K. 1965: Nematoda and Acanthocephala in *Sturnus vulgaris* L. in the vicinities of Sofia. Izv. Zool. Inst. Muz. 18: 185-187. (In Bulgarian.)

TSACHEVA K. 1967: Contribution to the knowledge of helminth fauna of wild birds in Thrace, Acanthocephala. Izv. Zool. Inst. Muz. 23: 175-181. (In Bulgarian.)

TSACHEVA-PETROVA K. 1971: Contribution to the knowledge of the helminth fauna of wild birds in Western Stara Planina (Nematoda-Acanthocephala). Izv. Zool. Inst. Muz. 33: 185-194. (In Bulgarian.)

VASILEV I. 1961: Turkey - a host of *Polymorphus magnus* Skrjabin, 1913. Izv. Tsentr. Khelminitol. Lab. 6: 45-46. (In Bulgarian.)

VASILEV I. 1962: Helminth fauna of the domestic goose (*Anser anser dom.*) in Bulgaria. Izv. Tsentr. Khelminitol. Lab. 7: 11-17. (In Bulgarian.)

VASILEV I. 1963: Contribution to the knowledge of the helminth fauna of *Gallus gallus* dom. in Bulgaria. Izv. Tsentr. Khelminitol. Lab. 8: 15-19. (In Bulgarian.)

VASILEV I. 1973: Contribution to the knowledge of the helminth fauna of the domestic ducks in Bulgaria II. Izv. Tsentr. Khelminitol. Lab. 16: 13-23. (In Bulgarian.)

VASILEV I., GEORGIEV B. 1956: Case of polymorphosis and streptocarosis of ducks in Bulgaria. Izv. Inst. Eksper. Veter. Med. 5: 175-182. (In Bulgarian.)

ZHELYAZKOVA-PASPALEVA A. 1962: Contribution to the knowledge of the helminth fauna of wild birds in Strandzha region. Izv. Tsentr. Khelminitol. Lab. 7: 137-152. (In Bulgarian.)

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SPREADING OF THE NEMATODE *ANGUILLICOLA CRASSUS* (DRACUNCULOIDEA) AMONG EEL POPULATIONS IN EUROPE

Anguillicola crassus Kuwahara, Niimi et Itagaki, 1974, a pathogenic swimbladder parasite of eels, was originally known only from East-Asian countries (Japan, China), parasitizing there the

Japanese eel, *Anguilla japonica* Temminck et Schlegel, and the introduced European eel, *A. anguilla* (L.) (Kuwahara, Niimi, Itagaki 1974: Jpn. J. Parasitol. 23: 275-279; Hirose,

Sekino, Egusa 1976: Fish Pathol. 11: 27–31; Egusa 1979: Rapp. P.-v. Réun. Cons. int. Explor. Mer 174: 51–58; Salati 1987: Riv. It. Piscic. Ittiop. 22: 115–117; Moravec and Taraschewski 1988: Folia Parasitol. 35: 125–146. Only some ten years ago it was introduced from there into Europe where it started to spread quickly over the countries of western and central Europe. First it was recorded in 1982 from eels (*A. anguilla*) from the Weser-Ems region in northern Germany (Neumann 1985: Fischer und Teichwirt 11: 322), but soon it occurred in many other German localities (river basins of the Elbe, Weser and Rhine, water bodies of Berlin) as well as in Holland, Belgium, Denmark, northern Italy and England (see Moravec and Taraschewski, op. cit.).

In 1987, Taraschewski et al. (Taraschewski, Moravec, Lamah, Anders 1987: Dis. aquat. Org. 3: 167–176) have stated that "since *A. crassus* does not appear to show a preference for a specific habitat it may soon become widely spread in Europe". This was fully confirmed by subsequent findings. In 1988, it was reported for the first time from France (Dupont and Petter 1988: Bull. Fr. Pêche Piscic. 308: 38–41), Sweden (Hellström et al. 1988: Svensk Veterinärtidning 40: 211–213), Poland (Koops and Hartmann 1989: J. Appl. Ichthyol. 1: 41–45), Sardinia in Italy (Arru, Leoni, Garippa 1988: XV Congr. Soc. Ital. Parassitol., Foggia 1–3 June 1988, Abstracts of papers, Session 8, 3 pp.) and even from Egypt (Koops and Hartmann, op. cit.). While reporting this parasite from several localities in Poland, Własow (1991: Komunikaty rybackie, no. 3, 21–22) mentions that it was recorded as well from Spain, Portugal and Greece.

During few recent years, many *Anguillicola* samples originating from farmed and wild eels from Germany, northern Italy and Sardinia were examined in the Institute of Parasitology, Czechoslovak Academy of Sciences, in České Budějovice; all these proved to belong to *A. crassus*. In 1991, this species was reported for the first time from Hungary where it caused a mass mortality of eels in Lake Balaton (Székely, Láng, Csaba 1991: Bull. Eur. Ass. Fish Pathol. 11: 162–163; Molnár, Székely, Baska 1991: Ibid, 11: 211–212);

according to recent information of Dr. K. Molnár, eels in L. Balaton remain heavily infected and practically all small-sized fishes of different species occurring in the lake harbour *A. crassus* infective larvae. *A. crassus* occurs as well in Neusiedler Lake in Austria (pers. comm. of Drs. R. Konecny and M. Rydlo) and in several lakes in Belorussia and in Vislinsk Bay near Kaliningrad (Königsberg) in Russia (pers. comm. of Prof. O. N. Bauer).

In June 1991, *A. crassus* was recorded for the first time from Czechoslovakia from the R. Elbe in Hřensko, North Bohemia, where 80 % of eels examined proved to harbour this parasite, the intensity of infection being 1–7 (average 4) nematodes per fish (Moravec, unpublished). This rate of infection is distinctly higher than that recorded by Peters and Hartmann (1986: Dis. aquat. Org. 1: 229–230) and Taraschewski et al. (op. cit.) in the Lower Elbe in Germany where the prevalence ranged within 2–27 % with the mean intensity of infection 1.4–2.0 nematodes per fish. Samples of eels taken from other Czechoslovakian localities in the R. Elbe basin in recent years did not reveal the presence of this nematode parasite.

Another *Anguillicola* species introduced into Europe is *A. novaezealandiae* Moravec et Taraschewski, 1988 originating from New Zealand; its occurrence in Europe is, however, restricted to Lake Bracciano near Rome, Italy (Paggi, Orechchia, Minervini, Mattiucci 1982: Parasitologia 24: 139–144; Moravec and Taraschewski, op. cit.). Records of the East-Asian species *A. globiceps* Yamaguti, 1935 in Europe are evidently based on misidentifications when *A. crassus* was mistaken for *A. globiceps* (see Moravec and Taraschewski, op. cit.).

A rapid spreading of *Anguillicola* nematodes among eel populations in Europe is mainly possible by a broad range of their intermediate and paratenic hosts and insufficient preventive measures during eel transfers.

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