

## FIRST OCCURENCE OF *Anguillicola crassus* IN HUNGARY

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Nematodes belonging to the genus *Anguillicola* Yamaguti, 1935, parasitize the swimbladder of eels. There are five members of the genus and of these, *Anguillicola globiceps* Yamaguti, 1935 and *A. papernai* Moravec and Taraschewski, 1988 do not occur in Europe.

Although the occurrence of *A. australiensis* Johnston et Mawson, 1940, in the European eel (*Anguilla anguilla*), was reported by Paggi *et al.* (1982) from Italy and then by Hartman (1987) from Germany, subsequent investigations by Moravec and Taraschewski (1988) have shown that the nematode described by the Italian authors is identical with the species *A. novaezelandiae* Moravec and Taraschewski, 1988, while that reported by Hartman from Germany can be identified with the species *A. crassus*.

*A. crassus* Kuwahara, Niimi and Itagaki, 1974 derives from Southeast Asia. Its original host is the Japanese eel (*Anguilla japonica*) the swimbladder of which is usually parasitized by 1-3 worms. The parasite feeds on blood and causes no visible damage in its original host. In the European eel (*A. anguilla*), however, it causes definite damage. One European eel may be parasitized by 5-30 worms. Infection leads to pathologic changes of the swimbladder, loss of appetite, reduced viability, and emaciation. This suggests that *A. anguilla* is more susceptible to *A. crassus* infection than *A. japonica* (Egusa, 1979). The development of *A. crassus* can be divided into four larval, a preadult and an adult stage (De Charleroy *et al.*, 1990). The developmental cycle involves a *Cyclops* intermediate host and a carrier, parathenic fish host. At 20°C the parasite's full developmental cycle is completed in less than 2 months; therefore, it is not surprising that it became widespread in Europe over a period

of a few years.

The appearance of *A. crassus* has been reported from different countries of Western, Northern and Southern Europe, among them Germany (Neumann, 1985), The Netherlands (Van Banning *et al.*, 1985), Belgium (De Charleroy *et al.*, 1987), Denmark (Koie, 1987), Italy (Canestri-Trotti, 1987), Sweden (Hellström *et al.*, 1988), France (Dupont and Petter, 1988), and the United Kingdom (Kennedy and Fitch, 1990). Although the appearance of *A. crassus* in Central Europe had been expected for several years, its introduction into Hungary was successfully prevented for a long time. This was due to the fact that from the Atlantic Coast of France and the United Kingdom only glass eels were introduced into Lake Balaton, and this young age group had not been infected by the swimbladder nematode. As *Erythemosa affinis*, a planktonic organism living in brackish water, is known to be an intermediate host of *A. crassus* (Kennedy and Fitch, 1990), a single import batch of eels from brackish water may have been sufficient for the parasite's introduction. On the other hand, no eels derived from freshwater were imported to Hungary before 1990.

Up to 1988, large numbers of eels from Lake Balaton were examined in the framework of a different project. No specimens infected by *A. crassus* were found. In 1933-1989 only random examinations were carried out but these also failed to detect *A. crassus* infection in eels.

*A. crassus* was first demonstrated in eels from Lake Balaton in September 1990, when mortality occurred among eels caught with an electric net and stored in basins before transportation. Examination of these eels revealed

*A. crassus* infection. Among eels that died and weak specimens which were easy to catch, the prevalence of infection was 100% (20 out of 20 examined fish were infected with 3-18 preadult and adult stages per fish).

The worms were fixed in formalin and treated with glycerol as clearing agent. According to the description of Moravec and Taraschewski (1988), based upon buccal capsule size and the number of teeth they were identified as *Anguillicola crassus*.

Cultured eels kept on an eel farm belonging to the water system of the Lake Balaton were also examined. No *A. crassus* infection has been demonstrated on that eel farm so far, presumably because the farm operates in a through-flow system which has so far prevented the excessive accumulation of infected cyclops.

We detected the parasite in eels from Lake Fertő, a large lake which Hungary shares with Austria. Eels have been introduced into that lake only from the Austrian side. Weaker specimens that were easy to catch showed *A. crassus* infection of 100% prevalence.

As *A. crassus* is a well-studied parasite, here we report only its first occurrence in Hungary. The role of possible local intermediate hosts (Cyclops) and fish species serving as parathenic hosts will be studied later.

#### Summary

*Anguillicola crassus* is reported for the first time from *Anguilla anguilla* in Hungary. The infected fish were caught from natural waters (Lake Balaton and Lake Fertő), and the intensity of infection in the sluggish, weak eels was 3-18 parasites per fish. Cultured eels kept on an eel farm belonging to the water system of Lake Balaton were not infected. Before 1990, only glass eels were imported into Hungary and this age group is known to be free of *A. crassus* infection. A possible means of parasite introduction may have been a transport batch containing one of the intermediate hosts, e.g. the planktonic crustacean, infected by *Anguillicola* larvae.

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