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A CASE REPORT ON FISH EUSTRONGYLIDOSIS (PH: NEMATODA) IN ZANDER (*SANDER LUCIOPERCA*)

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Abstract

This is a case report out of a series of epidemiological studies within fish populations inhabiting the Danube Delta area, of which aim is to gather data on Eustrongylides spp epidemiology, with emphasis on the relationship between host, agent and environment-associated factors, as well as on food safety potential hazards. This investigation has been carried out on zander (Sander lucioperca) between August-November 2016, into a fish processing plant which currently produces fillets for internal and external markets. The fish had been gathered by industrial fishing from the Razelm-Sinoe area. Following the investigation it resulted that the disease prevalence was over 90 %, with an average of 5-7 larvae/fish fillet (min. 3, max. 10 larvae per fish). Main sites of location are: muscle, gonads, intestine and peritoneum. Most of the larvae were encysted (parasitic nodules of 0.5-1.0 cm in diameter). The study results indicate that there is an increasing consumer's risk associated with the existence of Eustrongylides spp. *larvae in fish destined to human consumption, as well as there is a potential of releasing the nematode into new areas, including on fishery farms. Hence, communication of the risk associated to the existence of Eustrongylides* spp. *within the Danube Delta area, and recommendation of specific biosecurity measures to help prevent the nematode from releasing/establishing into fishery farms in Europe should be called upon.*

Key words*: case report, Eustrongylides spp, zander, pike perch.*

INTRODUCTION

Larval infestations with *Eustrongylides* spp. (Ph: Nematoda, Cl: Adenophorea) have been reported in marine, brackish and freshwater fish species, worldwide. Fish eustrongylidosis is caused by the larvae of a nematode of the Order Dioctophymatida. Although a total of 19 Eustrongylides species have been described based on the morphology of the adult and larval stages (Moravec, 1994; Molnar, 2006) three species are commonly being referred to into literature: *E. tubifex*, *E. ignotus* and *E. excisus*. It is generally accepted however, that these nematodes have a complex life cycle, requiring a definitive host (wading birds) and intermediate hosts, *i.e.* oligochaetes or annelid worms (for earlier larval stages (L) – to ensure development from L1 to L2, or only for L2) and finfish (either for both L3 and L4, or just for L4), (Anderson, 2000; Arthur et al., 2002). *E. ignotus* may be able to complete its life cycle without a tubifex worm, whereas some fish species may act as definitive hosts of the nematode (Ibiwoye et al., 2005). Amphibians (frogs), reptiles (alligators, caimans, grass and dice snakes) and humans are occasional hosts of the nematode.

Infestations with *Eustrongylides* in fish are alleged to generate economic loss through impairment of reproduction, alteration of flesh coupled with sensorial devaluation of the meat, commercially displeasing appearance and faster deterioration of the fish or fish products, which all lead to marketer/consumer rejections. Although *Eustrongylides* is pathogenic also to humans, fish eustrongylidosis is currently among the least studied fish-borne parasitic zoonoses in Europe. Humans become infested by consumption of raw or undercooked infested and/or contaminated fish or fish products. An increasing number of reports of eustrongylidosis in humans have been recorded in Africa, Asia, U.S. and Europe, with more frequent reportings in fish meal-based, less developed countries (Ibiwoye et al., 2005). To our knowledge, in Europe, with few exceptions (*i.e.* the case report on *Eustrongylide*s in fish caught in Trasimeno lake, Italy) (Branciari et

al., 2016), case reports communicated in Romania, Serbia, Bulgaria (Kirin et al., 2002; Novakov et al., 2013), and Moldavia showed *Eustrongylides* as sourcing from the Danube River and the Danube Delta. Fish with eustrongylidosis have been occasionally found by local fishermen - who named the nematode "*the wire worm*", but also on public markets. The parasite has been subjected to public warnings by mass media, on the health-associated risks should the fish is consumed.
Also, there are reports of additional fish species and environments affected by *Eustrongylides*, worldwide. The parasite is commonly found in areas of denser, polluted human habitats.
In the absence of adequate measures to mitigate the spread of this parasite, it is expected that the number of infections in both humans and animals would become more prevalent in the future.

MATERIALS AND METHODS

To assess the disease occurrence in zander, we used point prevalence (the proportion of animals in a population that are diseased, classifying each animal as either diseased or not). Zanders found infested with the Eustrongylides larvae during the study were classified as *diseased*.
The study was conducted during August-November 2016, into a plant processing fish fillet for the national and UE markets.
There were two harvests per month, with batches of about 500 kg/month, collected from the Razelm-Sinoie area, through industrial fishing. The observations were conducted on each of the fish caught, as a routine action into the processing plant. The total sample size used in the study was of cca 3600 zanders. Each zander weighted between 400 and 700 g, with body lengths of less than 40 cm.
All fish were cut open for filleting, those found infested/diseased being retained for study (fish necropsy and parasitological exams).

RESULTS AND DISCUSSIONS

The fish under investigation displayed generally a good body condition. Discrete haemorrhages in musculature, peritoneum and viscera (gonads, intestines and liver) as well as red or brownish parasitic nodules in the organs and tissues were common findings in most cases (Figures 1 - 4). On each zander fillet there were between 3 and 10 *Eustrongylides* encysted and free larvae. Most of the larvae were encysted, forming brownish parasitic nodules with a diameter of 0.5-1.0 cm (Figures 1 - 3) supposedly accounting for the discreteness of the lesions found in the investigated zander.

Figure 1. Encysted larva in muscle (zander fillet)

Figure 2. Encysted larvae in fillets
(lighten background to distinguish the cysts in fillets)

During the last 20 years the number of case reportings referring to fish eustrongylidosis has increased, especially within industrial fisheries and among fishermen.
There is a progressive risk that the parasite to escape from natural environments to fishery farms, by introducing infested fish from natural waters into farms, using contaminated water/feed with eggs/larvae, or by infested wading birds that may have access to fish farms.

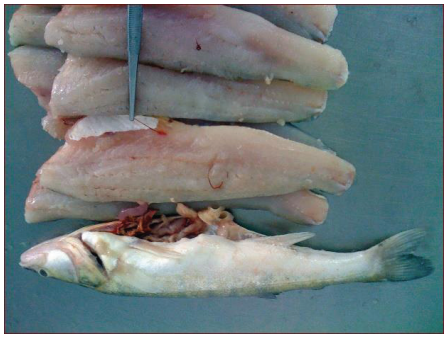

Figure 3. Free and encysted *E.* spp larvae in muscle

Figure 4. *E.* spp larvae in intestines of zander

The technological importance of the problem lays in the fact that Eustrongylides larvae establish into viscera (including gonads) and muscle of common fish species destined to human consumption, such as perch, pike, catfish, rapacious carp, perch, rudd, roach, carp, bleak and eel, thus affecting the spawn production and causing losses through meat impairment. It has been argued that the incidence of eustrongylidosis in fish (by population) and the intensity of infestations (by individual) vary according to the species and the individual resistance to infestation, but also to climatic conditions.

To diagnose infested fish, a prior necropsy is necessary. The sole reliable control measure of the fish destined to the public consumer is a randomized control of fish batches at the reception within the processing and storage units.

In fish processing facilities, the larvae are mechanically extracted, usually manually, with tweezers. The measure - possible only were evisceration and filleting take place as part of the processing technique, is appropriate providing the frequency and intensity of the parasites are low; the method proves unfeasible, demanding and time consuming at high infestation rates.

CONCLUSIONS

Given the scarcity of scientific data required to apply efficient measures of prevention and control within fish and human populations, as expected, the parasitic disease is becoming a considerable problem by its zoonotic potential (by transmission to human consumers, under certain conditions) and epizootologically (including crossing from one species of animals to another). Therefore, there is a clear requirement for provisions of evidence-based data followed by dissemination of practical information, mainly towards the public health and industrial sectors.

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