Occurrence of *Eustrongylides excisus* Jägerskiöld, 1909 Larvae (Nematoda: Dioctophymatidae) in Pikeperch (*Sander lucioperca*, L.) in Lake Eğirdir

Seçil METİN[1*], Behire Işıl DİDİNEN[1], Yunus Ömer BOYACI[1], Ayşegül KUBİLAY[1], Nesrin EMRE[2], Hakan DİDİNEN[1], Yılmaz EMRE[3]

[1]Suleyman Demirel University, Egirdir Fisheries Faculty, Isparta-Turkey
[2]Mediterranean Fisheries Research Production and Training Institute, Antalya-Turkey
[3]Akdeniz University, Faculty of Sciences, Department of Biology, Antalya- Turkey

*Sorumlu yazar: secilekici@sdu.edu.tr

Abstract

This study was conducted to determine the occurrence of *Eustrongylides excisus* larvae,which was found as endoparasite in pikeperch *Sander lucioperca* (Linnaeus, 1758) in Lake Egirdir. Parasitological examinations were performed in 35 pikeperch (82-195 g) during February and April 2013. Parasite was detected in abdominal cavity, peritoneum, muscle, adipose tissue, liver, spleen, swim bladder and stomach of fish. The prevalence of *Eustrongylides excisus* larvae were investigated. Prevalence of this parasite were determined as 100 % in this period. The mean intensity of *E. excisus* larvae was found to 34.4 in February and 23.46 in April.

Key words: Lake Egirdir; *Sander lucioperca; Eustrongylides excisus* larvae

Eğirdir Gölü'ndeki Sudak Balıkları (*Sander lucioperca*, L.)' nda *Eustrongylides excisus* Jägerskiöld, 1909 Larvalarının (Nematoda: Dioctophymatidae) Varlığı

Özet

Bu çalışmada Eğirdir Gölü'ndeki sudak balıkları (*Sander lucioperca* (Linnaeus, 1758)'nda *Eustrongylides excisus* larvaları tespit edilmiştir. Şubat-Nisan 2013 tarihleri arasında 35 adet sudak balığında (82-195g) parazitolojik incelemeler yapılmıştır. Parazit, balıkların karın boşluğu, periton, kas, yağ doku, karaciğer, dalak, yüzme kesesi ve midede bulunmuştur. Bu periyotta, parazitin prevalansı % 100 olarak belirlenmiştir. *E. excisus'*un balıklardaki ortalama yoğunluğu şubat ayında 34.4, Nisan ayında ise 23.46 olarak bulunmuştur.

Anahtar kelimeler: Eğirdir Gölü, *Sander lucioperca, Eustrongylides excisus* larvası

INTRODUCTION

The Lake Eğirdir is located within the Lake District and it is the second largest fresh water resource lake of Turkey. The lake covers an area of 482 km^2 and is 915 m above sea level. It is located at latitude 37º 50' 41"- 38º 16' 55" N and 30° 57' 43" 30º 44' 39" E longitude in southwestern Turkey. The length of the lake is 50 km, the coast length is 150 km, the maximum width is 16 km with a minimum width of 3 km, and a maximum depth of 13-14 m with an average depth between 8 and 9 m (Sener et al., 2012). The pikeperch, *S. lucioperca*, was introduced to natural fish fauna in Lake Eğirdir in 1955 (Kucuk et al., 2009).

E. excisus larvae ocur mainly in the musculature of predatory fishes, mainly perch and *E. excisus* larvae are highly pathogenic for fish. There are many studies that were performed *E. excisus* in perch from different countries (Lee, 1977; Sattari et al., 2002; Sattari et al., 2005; Shukerova et al., 2010; Colak, 2013; Soylu, 2013). *E. excisus* was reported in *Gobius fluviatilis* from lake Uluabat and Manyas (Ozturk et al., 2001, 2002), *Silurus glanis* and *Abramis brama* from Durusu (Terkos) Lake (Soylu, 2005; Karatoy and

Soylu, 2006), *Aphanius mento* in Kırkgöz Stream (Aydoğdu et al., 2011), *Perca fluviatilis* and *S. lucioperca* in lake Sıgırcı (Colak, 2013; Soylu, 2013) and *Carassius gibelio, Cyprinus carpio, S. lucioperca* and *Atherina boyeri* from lake Egirdir in Turkey (Akcimen et al., 2014).

Fish parasites such as *Eustrongylides* sp. are highly important because they are capable to infect carnivorous organisms and humans who feed on them (Mohammad et al., 2011).

The aim of this paper is to distinguish the presence of *Eustrongylides excisus* larvae in *Sander lucioperca* in Lake Egirdir Turkey. In addition, it is very important to increase public awareness concerning the consumption of such fishes.

MATERIAL AND METHODS

The samples of 35 pikeperch, *Sander lucioperca* (L.) at February and April 2013 were taken from Lake Egirdir for parasitological examination. The weight of fish varied between 82 to 195 g. They were transported to the laboratory of the Egirdir Fisheries Faculty in Isparta and examined as soon as possible capture. The fish were immediately examined for parasites. Both external and internal organs were thoroughly inspected for parasites according to standard protocols (Hoffman, 1999). All nematodes were identified and counted. The living nematodes were fixed with 4 % formalin and cleared in glycerin. Prevalence, mean intensity and range of intensity fish were calculated (Bush et al., 1997). Nematodes were identified using selected identification keys (Markewich,1951; Yamaguti, 1961; Morovec 1994).

RESULTS AND DISCUSSION

One nematode species (*E. excisus*) were identified in all the fish examined. The prevalence of this parasite were determined as 100 % in february and april 2013. The maximum mean intensity levels (34.4 parasite numbers/fish) reached in february (range: 3-110), the lowest mean intensity was detected in april, 23.46 parasite numbers/fish (range 4-48). *E. excisus* larvae was found during the current study and has been identified by various authors many time different in fish in a wide geographical area. For examples, Colak (2013) also reported the prevalence and mean intensity of this parasite were 91.6 % and 18.4 for *Sander lucioperca*, 95.1 % and 46.2 for *Perca fluviatilis*. Similarly, Soylu (2013) determined the prevalence (100 % in autumn and winter, decreasing in spring to 87.5 %) and mean intensity (106.1 in autumn, decreasing to 17.6 individuals) of *E. excisus* in *Perca fluviatilis*. However, mean intensity and prevalence of this parasite were found relatively low in some fish species, such as *Aphanius mento* (Aydoğdu et al., 2011), *Abramis brama* (Karatay and Soylu, 2006), *Percottus glenii* (Mierzejewska et al., 2012), *Rutilus frisii kutum* (Mohammad et al., 2011), *Acipenser stellatus, A. gueldenstaedtii, A. nudiventris* (Noei et al., 2011), *Gobious fluviatilis* (Ozturk et al., 2002), *Neogobius fluviatilis, N. kessleri, N. caspius, Barbus capito, Aspius aspius* (Sattari et al., 2005).

In relation to where the interference in host fish; *E. excisus* larvae was found abdominal cavity, peritoneum, muscle, adipose tissue, liver, spleen, swimbaldder wall and lumen, stomach wall and lumen of pikeperch, *S. lucioperca* (L.) (Figure 1). Although some larvae were coiled and encapsulated, most were free in the abdominal cavity or had migrated into surrounding tissues and were not encapsulated. Capsulated larvae were found generally in abdominal muscle and in the mesentery of the intestinal wall. Capsules were round, pink, and 5–12 mm in diameter. Soylu (2013) also reported *E. excisus* capsulated larvae were found in same localization in *Perca fluviatilis*. Novakov et al.

(2013) noted the presence of encapsulated *E. excisus* larvae in the stomach wall in *S. glanis*. In the present study, capsulated or attached parasite larvae were also determined in the stomach wall.

Common clinical signs in infected pikeperch were abdominal swelling, haemorrhagie in jaw, pectoral and abdominal fin base, gills, anus, muscle and liver, yellow gelatinous exudate in pyloric caeca and intestine, hemorrhage in liver, spleen and muscle (Figure 1).

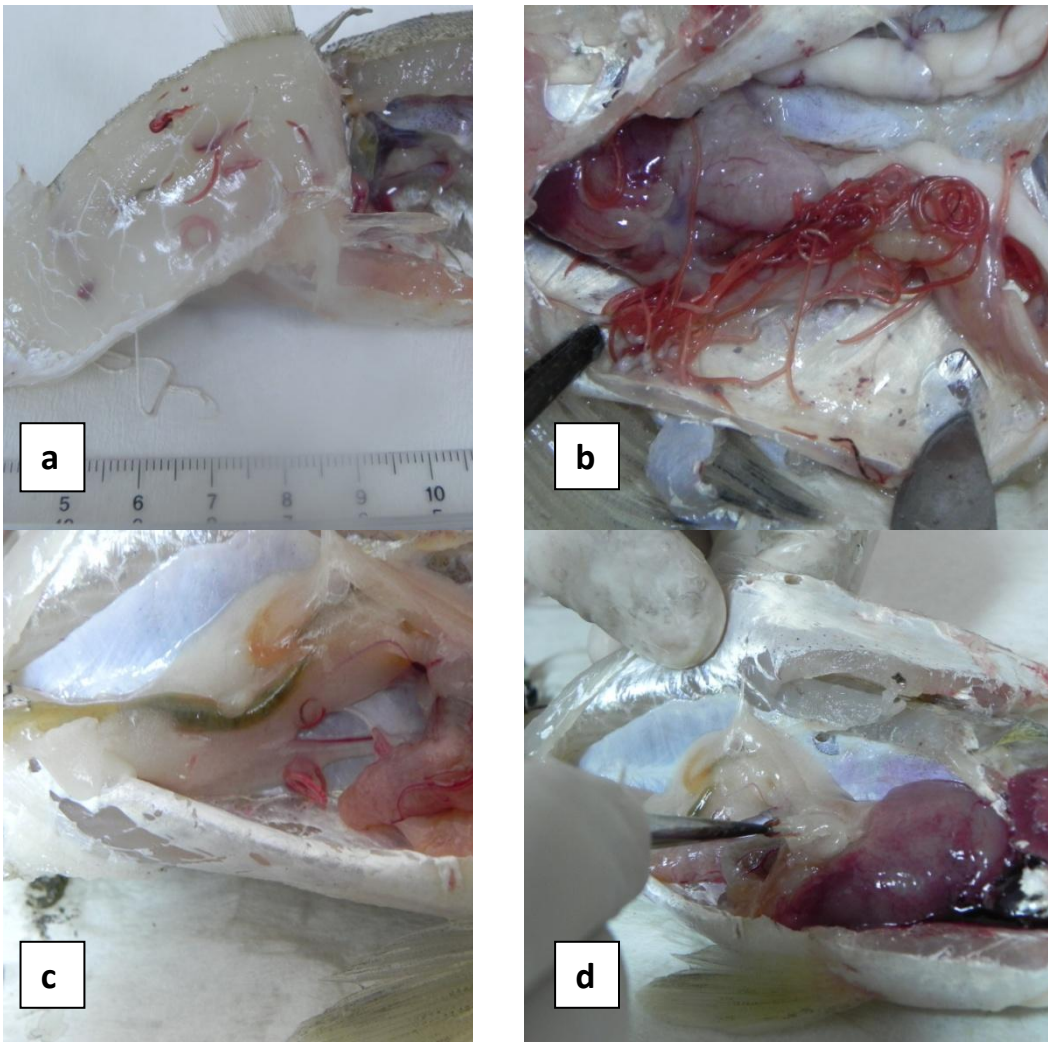

Figure 1. *Sander lucioperca* from Edirgir Lake heavily infected with *Eustrongylides excisus*, specimens with worms in muscle (a), among visceral organs (b) and in stomach wall (c), liver haemorrhages (d)

CONCLUSION

In conclusion, *E. excisus* larvae has been determined in pikeperch in the Lake Egirdir, Turkey. Additionally, results of the present study indicate that high prevalence and mean intensity of *E. excisus* have negative impact on the marketability of *Sander lucioperca* in Lake Egirdir. *Eustrongiloides* spp. has zoonotic importance, since larval forms of these

nematodes are potentially harmful to mammalian hosts (Novakov et al., 2013). For this reason, consumption of raw or poorly cooked fish should be avoided.

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