SJIF Impact Factor: 5.464

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 5.
Issue: 2.
Page N. 65-70
Year: 2021

Original Article www.wjahr.com

RESEARCH FOR ENDOPARASITES AT LIZA GRANDISQUAMIS, EARTHING AT LANDREAH - CONAKRY LANDING

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Received date: 09 January 2021 **Revised date:** 29 January 2021 **Accepted date:** 19 February 2021

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ABSTRACT

The Mugilidae are present in the coastal waters of the Republic of Guinea. They are species of economic and food interest. This advantage means that they are also often fished and landed at the artisanal ports of Conakry. In the majority of cases, these fish species are carriers of parasites harmful to the health of consumers. The objective of this study was to assess the parasite load and identify the endoparasites most found in the Liza grandisquamus species landed at the Landréah landing stage in Conakry. Classical methods of parasitological analysis of fish were used. After surveys with fishing professionals (fishermen and fishmongers), the sampling was carried out because of one trip per month to the landing stage, each month 30 individuals were taken, ie 90 fish in total. The results of the survey show that 48% of fishermen and 52% of fishmongers recognize the existence of parasites in the fish encountered. Parasitological analyzes showed the presence of 45% of nematode larvae, followed by 40% of cestodes and 15% of trematodes. The analysis focused on male and female fish from Sangaréyah bay. The presence of pathogenic parasites in these estuarine waters can affect fishery resources and public health.

KEYWORDS: Research, Endoparasites, *Liza grandisquamus*, Landing stage, Conakry.

INTRODUCTION

Marine organisms, especially fish, are infested with parasites from the coastal environment. Fish are an important part of the human diet, so it is not surprising that many studies have been conducted on parasite contamination of different species of edible fish (Cohen, 2004; Falaise, 2017; FAO, 2008).

Estuaries, transition zones between fresh and salt water, are home to various habitats colonized by many species of fish, during one or more phases of their biological cycle (reproduction, growth, adult life, etc.). These habitats can perform different functions: nursery, shelter, feeding and post larval development (Chai and *al.*, 2005; Falaise, 2017).

Several groups of parasites are able to affect fish. For more than two centuries, their biological cycles, their pathological effects and their impacts have been the subject of in-depth studies. Several authors have carried out systematic studies on larvae of nematodes found frequently in the intestine, liver, stomach, and in the muscles of cod, herring and various marine fish. Statistics on the carriage of these parasites based on the size and fishing grounds of cod show that older individuals are more parasitized than juveniles and those from Iceland are more parasitized (9.4%) than those from the North Sea (5.2%), the coasts of Norway (2.3%), the Baltic Sea (0.9%) and the Barents Sea (0.2%) (Abattouy and *al.*, 2011; Benardi, 2009; Pariselle and Pouyaud, 2003; Stromnes and Andersen, 1998, Deardvrff and Overstreet, 1981).

The Republic of Guinea has a continental shelf extending an average width of 80 miles from the coast. This continental shelf, due to its topography, hydrology and vegetation over more than 300 km of coastline, conceals significant biological resources (plankton, crustaceans, molluscs, fish, etc.); this status makes it one of the richest in fish species in the West African sub-region (Domain and Bah, 1993).

The exploited biological resources constitute nearly 60% of animal proteins consumed in Guinea. The result is a

progressive recognition of the value of biological diversity. Therefore, this richness must be well protected for future generations.

The objective of this study was to assess the parasite load and identify the endoparasites most found in the Liza grandisquamus species landed at the Landréah landing stage in Conakry.

MATERIAL AND METHODS

Equipment

Study zone

The Landing area is located in the Landréah1 district, municipality of Dixinn, Conakry Governorate. It is bounded to the north by the landing stage of Landréah port 3, to the east by the Gamal Abdel Nasser University of Conakry (UGANC) and the September 28 Stadium, to the south by the ministerial city, to the west by the Atlantic Ocean.

Description of the used fishing gear

The capture devices used by artisanal fishing at the Landréah landing stage are those classified by the terminology established by Nedelec, J.C. in 1982. The most used were as follows:

- Drifting net with ethmalose (mesh 50 to 80 mm; length: 100 to 1000 m; drop: 4 -7 m);
- Small-meshed gillnet for mules, captains and jaws (mesh: 20-50 mm; length: 100-500 m; drop: 1-4 m);
- Large-meshed gillnets with otoliths, captain, jaws, barracudas (mesh size 80-110 mm; length: 200-1000 m; drop: 4-7 m);
- Encircling mullet gillnets (mesh size: 40-50 mm; length: 100-800 m; drop: 4-9 m);
- Encircling ethmalose gillnets (mesh size: 60-65 mm; length: 300-1300 m; drop: 7-9 m) (Nedelec, 1982).

Regarding boats, there are six main types of canoes on the Guinean coast. The simplest, the monoxyles, are made from a hollowed-out tree trunk (the “kourous” and the “gbankenyi”). The canoes with frames are more complex in construction and have a keel, frames and planks (salans, boaty, yolis and flimbotes).

Sources of fish samples

The fish samples analyzed were caught in the bay of Sangaréyah, precisely in the islands of Loos, in the estuary of Sonfoniyah, in Menyengbé and in Tayaki (figure 1).

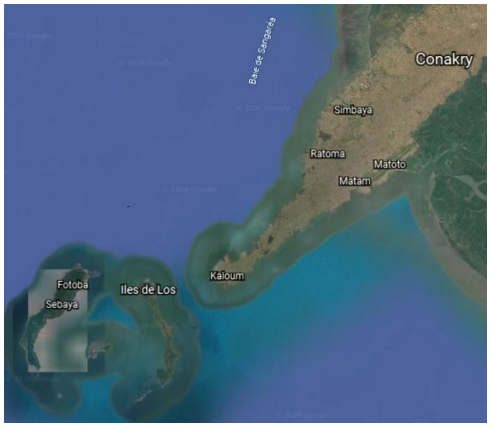

Figure 1: Fishing area (source: Google Earth https://earth.google.com/web/@9.54837584,-13.724 24309,-25. 28935065a,53875. 16601088d, 35y,0h,0t 0r)

METHODS

Sampling

The choice of fish focused on a species of economic and food interest, Liza grandisquamus, belonging to the pelagic environment. The sample was taken successively once a month, for 3 months at the landing stage. A total of 30 fish per month for a set of 90 units was obtained.

All the samples were analyzed at the Ichthyology and Parasitology Laboratory of the Hydrobiology Department of the Scientific Research Center of Conakry-Rogbanè (CERESCOR).

Biological study of fish

The fish species sampled were identified using the marine fish determination key. The length measurements (total and standard) of the fish were made using a ichthyometer and the weight at the using a scale. After evisceration of the fish, the sex, the stage of sexual maturity were determined and the stomach contents analyzed in order to know the variation of the parasitic infestations (Blache and *al*., 1970; Lévêques, 1992; Paggi and *al*., 2000).

Search for endoparasites in organs

The parasites were looked for in the organs (liver, digestive tract, gonads, kidneys and gills). After dissection of the fish, using scissors and scalpels, the organs were isolated using forceps and tweezers, then placed in Petri dishes containing water, then observed with a binocular magnifying glass. The parasites encountered were isolated using needles or collected from the bottom of the glass, by placing the whole organ in Petri dishes containing saline solution for 15 minutes to 24 hours at room temperature. Enumeration was done after decanting the cloudy solutions. They were stored in vials containing a solution obtained from a mixture of glycerin (5 parts) and 70% ethyl alcohol (95 parts).

Search for endoparasites in muscles

The skin and scales on the back of the fish were removed near the dorsal fin on an area equivalent to the palm of

the hand. The samples were taken from under the red muscle layer by coring with a saw in the bare area. The flesh carrots (100g minimum) were grouped together by batch in a closed container labeled with the indications of the batch (origin, station name), the species, the weight category, the number of carrots and the date of production sampling, if possible. The right dorsal lateral fillet has been homogenized if the quantity is too large, a proportion of the dorsal musculature must be chosen. It is imperative to take an equivalent amount of tissue from each fish, for example the whole fillet. If the total amount of tissue thus obtained is too large to be conveniently handled, then the sample will be subdivided. Portions not used for analysis were stored at –20 ° C for possible confirmation of results.

Identification of the species of parasites encountered

The fresh smears of the organs and the parasites were observed between slide and coverslip using a "Leïca 498E" brand microscope. The parasites previously fixed in the 70% alcohol solution were placed first in distilled water for a few minutes and then in glycerin. The samples stored in the preservation solution (glycerin + 70 ° alcohol) were examined after evaporation of this solution on the slide. The measurements were made using an eyepiece micrometer. The keys of determinations of the parasite species were used for the identification (Blache and *al*., 1970).

Data processing

During this study, we used excel software for the processing of our data and the method of Bush and al, 1997 to measure the average parasite intensity employer, which is the average number of parasites of a given species per host infected.

Observation and count data were ordered according to size, then processed statistically for a 95% confidence limit on the basis of a normal distribution of the number of parasites infesting the different organs of the fish. The geometric mean, the minimum and maximum infestation values as well as the overall infestation of each fish and all its organs by type of parasite encountered were evaluated. Excel 2013 software was used for statistical data processing.

RESULTS AND DISCUSSION

The results of the biological analysis did not show any organic anomaly on Liza grandisquamis (Table 1).

On the other hand, the analysis of the stomach contents showed that the small and medium sized fish fed on small invertebrates living in polluted waters (shrimps, copepods, small fish, molluscs, etc.). As a result, it remains established that fish would become contaminated during their biological cycle (Bouchriti and *al*., 2015). For Mugilidae, it would be the silt and phytoplankton that were the source of contamination.

In the internal organs of fish, several helminths (nematodes, cestodes and trematodes) have been found (Tables 2 and 3). The endoparasites detected were in the embryonic or larval state, in free or encysted form.

Table 1: Biological parameters of *Liza grandisquamus* sampled at the Landréah landing stage.

Population	Number of samples	Size (in centimeter)		Weight (in grams)		Sexual stage
Maximum	**Maximum**	**Minimum**	**Maximum**	**Minimum**		
Means	19	25.55	21.35	275	188	V, VI
Great	19	41.00	30.21	450	320	VII

Table 2: Average intensity of parasites according to size.

Cut	Average intensity of parasites			
	Acanthocephalus	**Cestodes**	**Trematodes**	**Nematodes**
Small	00	0-2	0-3	0-10
Means	00	0-5	0-9	0-19

Great	00	3-15	7-25	9-75

Table 3: Average intensity according to the size and the parasitized organs.

Organs Cut	Different organs and flesh														
	Gills			Stomach			Intestines			Gonads			Chair		
	N	C	T	N	C	T	N	C	T	N	C	T	N	C	T
Small	0-2	00	00	0-17	0-5	00	0-20	0-3	0-1	0-2	0-1	0-3	00	00	00
Means	1-4	0-2	0-3	1-18	0-7	0-10	1-15	0-3	0-3	0-2	00	00	00	00	00
Great	3-18	00	0-15	3-45	0-3	0-17	3-29	0-5	0-7	0-5	0-1	0-3	00	00	00

Caption: *N = nematodes; C = cestodes; T = trematodes*

Liza grandisquamus depending on the stage of sexual maturity, the period and site of the parasite was, in many cases, infested with 2, 3 to 5 types of parasites at a time. Nematodes were the most abundant among the parasites encountered and their incidence was 9 to 75, followed by trematodes and cestodes, with an incidence of infestation of 7 to 25 and 3 to 15 respectively. The most parasitized fish were those of large size (Figures 2, 3 and 4).

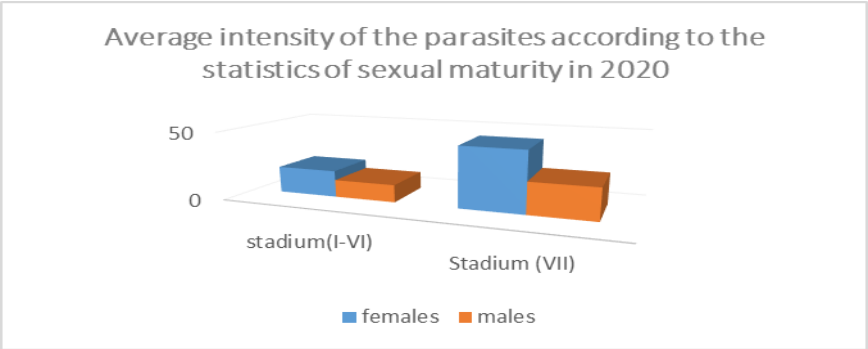

Figure 2: Average intensity of parasites according to stages of sexual maturity in 2020.

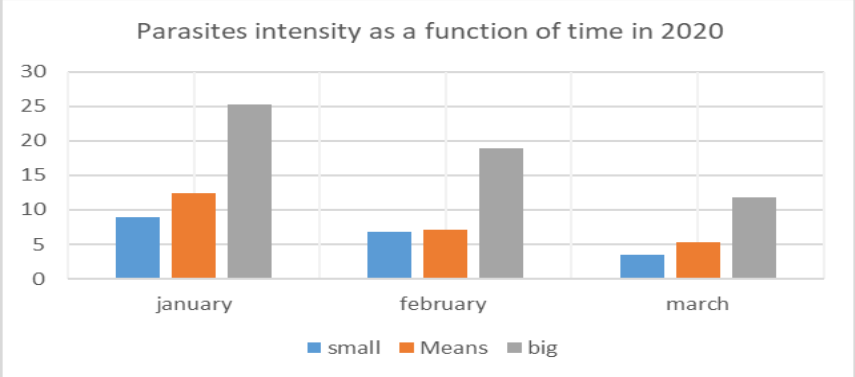

Figure 3: Parasite intensity as a function of time in 2020.

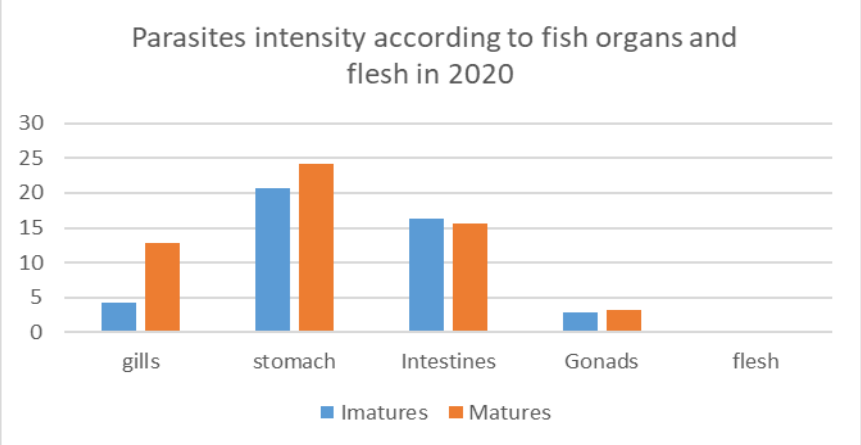

Figure 4: Intensity of parasites according to organs and flesh of fish in 2020.

Studies have been carried out on parasitism in fish in several countries in order to assess the level of carriage. The whole fish, the various internal organs or only the fillets were the samples sampled. Most often, the targeted fish were either caught or found once landed from local fishermen.

Overall, our results indicate a variation in the infestation rate depending on the organs and the size of the individuals. The parasites found were most often localized in the gonads, intestine, stomach, flesh and gills. Of 90 fish sampled, 95% were infested with 1, 2 or 3 parasites at a time. The most found species were from the group of nematodes such as *Contracaecum osculatum* (Rudolphi and Hartwich (1974); *Contracaecum gibsoni* n. Sp. (Hartwich (1974); *Oesophagostomum spp.* (Railliet and Henry 1905); *O. aculeatum*, (Railliet and Henry 1905); *O. bifurcum* (Railliet and Henry 1905), *O. stephanostomum* (Railliet and Henry 1905) and *Contracaecum overstreeti* n. Sp. (Rudolphi, 1819, Anisakidae. For the cestodes it was notably *Reighardiidae shipleyi* (Heymons, R. 1926), *Spirometra theileri* (Baer, 1926); *Reighardiidae mabuyae* (Heymons, R. 1922), *Spirometra proliferum* (Ilima, 1905) *Spirometra mansoni* (Cobbold, 1882); *Diphyllobothrium latum* (Rudolphi, 1819); *Diphyllobothrium erinacei* (Rudolphi, 1819); *Dibothriocephalus latus*; *Spirometra mansonoides* (Muller, 1819) and *Spirometra erinacei* europali (Rudolphi, 1819); Concerning the trematodes, only the Schistosoma were found: *Schistosoma haematobium* (Rudolphi, 1819); *Schistosoma Mansoni*; *Schistosoma japonicum* and finally *Schistosoma intercalatum*. 1819) and *Spirometra erinacei* europali (Rudolphi, 1819).

Our results corroborate with those of Yuwalee Seesao in 2015, who observed that Anisakidae and several other species of parasites infected 28.62% of fish in the viscera. (Seesao, 2015). Likewise, Barcala, E. and *al*., in 2018 reported the presence of anisakidae and raphidascarides in commercial fish from the Balearic Sea (western Mediterranean). Anisakis pegreffii (80.43%), A. physeteris (8.69%), Hysterothylacium fabri (6.52%) and A. simplex (4.35%) were detected based on molecular analyzes of larvae. This confirms the carriage of these parasites by coastal fish (Barcala and *al*., 2018).

It has been reported that the host-fish coexistence, with a great diversity of parasites, is remarkable. Dmitrieva, E.V. and *al*., in 2012 reported the cohabitation of 6 species in Liza carinata and at least 14 species were reported on M. cephalus. On Liza subviridis, Soo and Lim, in 2012, found a large number of parasites belonging to several species (Soo and Lim, 2012).

Similar differences in the richness of monogenian species have been reported in cichlid hosts in West Africa by several authors. These authors had drawn a parallel between the species richness of the parasites and the genetic diversity of the hosts, both of which were shaped by fluctuations in host populations by bottleneck or vicarious events (El Hafidi and *al*., 2013).

Following these ecological and morphological changes, research has shown that in the case of African mugilids studied in Senegal, only the population of Liza bandialensis, which was endemic in a very limited area, underwent numerous bottleneck events. Which led to a reduction in its size, and consequently, to the loss of all its monogenic parasites (El Hafidi and *al*., 2013).

One study has shown that Digenial parasites in Chinese marine waters have a variety of different levels of host specificity. The majority of parasites detected have a single host fish, with some having two or three final hosts (Liu and *al*., 2010).

The presence of pathogenic parasites in estuarine waters can affect fishery resources and public health. The role of fishery products in the transmission of zoonotic parasitic diseases to humans has been well established (Falaise, 2017). The spectrum of the parasites involved is wide and includes nematodes, trematodes and cestodes. Within nematodes, it is the Anisakidae family that would be the most implicated in human infestations with essentially two genera: Anisakis and Pseudoterranova (Barcala and *al*., 2018; Chaia and *al.*, 2005).

There are few studies relating to parasitism in Liza grandisquamis. In many cases, infestation has been shown to be related to the ecological environment and fish species in marine waters. The endoparasites found in this study likely represent only a proportion of the digene fauna and other associated marine fish parasites. Efforts should be made to identify and list all endoparasites in fish from the Guinean coast with the aim of setting up a database allowing the formulation of measures to protect the health of consumers.

CONCLUSION

The results of the parasitological analysis in Liza grandisquamus landed at the artisanal port of Landréah indicate the carriage of helminths (nematodes, cestodes and trematodes). The endoparasites detected were present in the larval and embryonic state, in free or encysted form. The presence of pathogenic parasites encountered in fish from estuarine waters is capable of affecting fishery resources and public health. To prevent the degradation of the estuarine environment and reduce the effects of parasite infestation, an approach focused on controlling waste and wastewater and protecting the marine and coastal environment should be adopted.

ACKNOWLEDGMENTS

We thank all those who contributed to the realization of this study. Our thanks also to the Management of the Scientific Research Center of Conakry Rogbané (CERESCOR) for supporting this work.

BIBLIOGRAPHY

1. Abattouy, N., Valero, A., Benajiba, M.H., Lozano, J., Martín-Sánchez, J. Anisakis simplex s.l. parasitization in mackerel (Scomber japonicus) caught in the North of Morocco-Prevalence and analysis of risk factors. *Int. J. Food Microbiol*, 2011; 136–139.
2. Barcala, E., Ramilo, A., Ortega, N., Picó, G., Abollo, E., Pascual, S., Muñoz, P. Occurrence of Anisakis and Hysterothylacium larvae in commercial fish from Balearic Sea (Western Mediterranean Sea). Parasitol. Res., 2018; 117: 4003–4012. https://doi.org/10.1007/s00436-018-6110-5.
3. Benardi, C. Preliminary study on prevalence of larvae of Anisakidae family in European sea bass (Dicentrarchus labrax). *Food Control*, 2009; 433–434.
4. Blache, J., Cadenas, J., Strauch, A. Key to the determination of marine fish reported in the Eastern Atlantic between the 20th North parallel and the 15th South parallel, ORSTROM. ed., 1970.
5. Bouchriti, N., Triqui, R., Lamane, H., Hamouda, A., Karib, H. Parasitism in the fishery products sector in Morocco: elements of risk assessment and management. *Rev. Mar. Sci. Agronom. Vet.*, 2015; 3: 12–18.
6. Chai, J.Y., Darwin, M.K., Lymbery, A. J.Fishborne parasitic zoonoses: Status and issues. *Int. J. Parasitol.*, 2005; 1233–1254.
7. Chaia, J.-Y., Darwin, M.K., Lymberyc, A.J. Fish-borne parasitic zoonoses: Status and issues, p. *Int. J. Parasitol*., 2005; 35: 1233–1254.
8. Cohen, S. Parasitic risks associated with the consumption of raw fish. (Veterinary doctorate thesis). National Veterinary School of Alfort, Creteil., 2004.
9. Deardvrff, T.L., Overstreet, R.M. Larvae hydrothylacium (thynascaris, nematode: Anisakidae) from fishes and Invertebrates in gulf of Mixico. volume 48, number 2. *Proc. Helminthol. Soc.*, Wash, 1981.
10. Domain, F., Bah, M.O. Sedimentological map of the Guinean continental shelf. Explanatory note n ° 108, French Institute for Scientific Research for Development in cooperation with the national center of fisheries sciences of boussoura C.N.S.H.B. ed. Paris, 1993.
11. El Hafidi, F., Diamanka, A., Rkhami, O.B., Pariselle, A. New species of Ligophorus (Monogenea, Ancyrocephalidae), parasite of Liza spp. (Teleostei, Mugilidae) off the northwest coast of Africa. *ZOOSYSTEMA*, 2013; 35: 2015–2025.
12. Falaise, P. Fish parasites, agents of zoonoses (Thesis: 2017 - TOU 3 - 4072). National Veterinary School of Toulouse, Toulouse, 2017.
13. FAO. Fisheries and Aquaculture Statistical Yearbooks, Fisheries and Aquaculture Department, FAO, based on information available as of December 31, 2008.
14. Lévêques, C. Fauna of the freshwater fish and salmon of West Africa. Paris, France, 1992.
15. Liu, S., Peng, W., Gao, P., Fu, M., Wu, H., Lu, M., Gao, J., Xiao, J. Digenean parasites of Chinese marine fishes: A list of species, hosts and geographical distribution. *Syst. Parasitol*, 2010*;* 75: 1–52. https://doi.org/10.1007/s11230-009-9211-9
16. Nédélec, C. Definition and Classification of Fishing Gear Categories = FAO Fisheries Technical, Food and Agriculture Organization of the United Nations, ISBN 92-5-101219-9. ed. 51 S., Abb. Rome, 1982.
17. Paggi, L., Mattiucci, L., Gibson, D.I., Berland, B., Nascetti, G., Cianchi, R., Bullini, L. *Pseudoterranova decipiens* species A and B (Nematoda, Ascaridoidea): nomenclatural designation, morphological diagnostic characters and genetic markers. *Syst. Parasitol*., 2000; 45: 185–197.
18. Pariselle, U., Pouyaud, I. Richness in parasitic species of closely related hosts: historical scenario and "genetic" hypothesis, in, C. and Jourdan, J., (eds.). Taxonomy, ecology and evolution of metazoan parasites, in: Taxonomy, Écologie et Évolution Parasites Métazoaires, Livre Hommage à Louis Euzet. PUP, Perpignan, 2003; 147-166.
19. Seesao, Y. Characterization of Anisakidae in marine fish: development of an identification method by high-throughput sequencing and prevalence study, 2015.
20. Soo, O.Y.M., Lim, L.H.S. Eight new species of Ligophorus Euzet & Suriano, 1977 (Monogenea: Ancyrocephalidae) from Mugilids off Peninsular Malaysia, 2012; 24.
21. Stromnes, E., Andersen, K. Distribution of the whaleworm (Anisakis simplex, Nematoda, Ascaridoidea) L3 larvae in the three species of marine fish; saithe (Pollachius virens L.), cod (Gadumorhua L.) and redfish (Sebastes marinus L.) from Norwegian waters. *Parasitol. Res.*, 1998; 84: 281–285.