

FSN-AQ 0007

OCCURRENCE OF ANISAKIDS NEMATODES ON FROZEN HAKE (*Merluccius capensis*) IN YENAGOA MARKET, BAYELSA STATE, NIGERIA

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This paper was prepared for presentation at the 25th Annual International Conference and Exhibition in Administrative Staff College of Nigeria (ASCON), Topo-Badagry, Lagos, Nigeria, 25th – 29th October, 2010.

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ABSTRACT

Samples of the frozen hake (Merluccius capensis) were obtained once a week as corresponding to supply in Yenagoa Market Bayelsa State, Nigeria. From every supply of 10 cartons, 10 pieces of hake were examined for the presence of Anisakids nematodes. The incidence was concluded after sampling continuously every week for 8 weeks between September-November 2009. The highest parasite burden (13.2 ± 2.28) was recorded in the second week and the lowest (8.5 ± 2.9) in the 7th week, the highest mean weight of fish sample calculated was 134.80 ± 19.16 gm in the 4th week and lowest in the 5th week with 118.30 ± 3.56 g. The mean length was highest (29.10 ± 1.90 cm) in the second week and lowest (26.40 ± 1.88 cm) in the 7th week. The percentage infection was 96.25% and very alarming since only 3 pieces were not infected as observed from all the samples examined.

Key words: zoonoses, fish infection, nematodes.

INTRODUCTION

Fish of any kind is in demand especially in developing countries due to the low supply/production that could not satisfy

the teeming population. Nigeria is a population of about 150M and there is a need to meet the protein requirement of this teeming population. In 2006, Nigeria imported frozen fish worth 7.5b Naira to supplement the local production. Nigeria imports over \$200 million worth of seafood products annually to supplement local production. According to the Commissioner for Agriculture and Cooperatives of Lagos State, South-Western Nigeria, Mr. Enock Ajiboso, "Nigeria imports 900,000 tons of fish for \$ 800 million each year to bridge the gap. Nigerians need 2.1 million tons of fish but they produce only 650,000 tonnes per year"(Sarnissa, 2009). This is because the price of freshwater fish available are out of reach of the poor masses ,making room for the supply of variety of frozen fishes including Hake (*Merluccius capensis*) . There is ready market for these products even when fresh fish is available. Since the price of fresh fish is often times beyond the reach of an average family budget. The smoked hake is a ready acceptable serving in most homes especially with vegetable soup hence found its usefulness in Nigerian markets and homes. Hake is imported into Nigeria from Norway, other principal grounds where Hakes can be obtained are on both sides of the Atlantic ocean, the Mediterranean Sea, the Pacific ocean off the United States , Chile and New Zealand . (Gupta and Gupta, 2006; Encarta, 2008).

Nematodes play important roles in the economy of nature, they have been able to exploit every conceivable aquatic and terrestrial habitat unnoticed. An estimated number of 500,000 species are free living in soil, plant and water. Anisakid nematodes have complex life – cycles that

include invertebrate and vertebrate hosts at various levels of the marine food chain. They are common parasites of only marine and anadromous fish, they have not been reported from fish in waters of low salinity. Although, Aloo (2007) reported *Contracaecum* sp a type of Anisakids found on *Oreochromis leucostictus* from Oloidi Bay, Kenya. The Anisakids larvae are of importance in fish borne parasitic zoonoses, in effect to most part of populations living in low and middle income countries and the population at risk is expanding because of growing international markets. These fish borne zoonotics are responsible for large numbers of human infections around the world. While many in developed countries will recognize meat-borne zoonoses such as *Trichinellosis* and *Cysticercosis*, far fewer are acquainted with the fish-borne parasitic zoonoses which are mostly helminthic diseases caused by Trematodes, Cestodes and Nematodes. Even when thoroughly cooked, Anisakis pose a health risk to humans cause it releases a number of biochemical substances into surrounding tissues .It may also often be consumed whole accidentally when it is embedded inside fish flesh which causes allergic reactions (Wikipedia, 2008) . Anisakis infection can be diagnosed as another intestinal disease. Clinical features of Anisakiasis may stimulate acute abdominal pain such as that found in patients with gastric ulcers, appendicitis and Crohn's disease. (Del Pozo, *et al.* 1999; Bouree, *et al.* 1995) .

MATERIALS AND METHODS

Yenagoa is the capital of Bayelsa State ,Nigeria , located at longitude 6° 10' 51.72° E and Latitude 4° 53' 17.74° N. Frozen Fish were supplied to Yenagoa

Markets from the neighbouring states such as Delta, Imo and Rivers States.

Samples of the frozen hake were obtained once a week as corresponding to supply. From every supply of 10 cartons, 10 pieces of hake were examined for the presence of Anisakids nematodes the incidence was concluded after sampling continuously every week for 8 weeks between September - November 2009. Hence 80 pieces of Hake were examined within the eight weeks. Anisakids was identified according to Olsen (1985) The length and weight of fish in relation to number of Anisakids nematodes present were recorded. The picture of the fish as frozen (Plate 1) and also as smoked (Plate 2) were taken at 100 iso with Samsung digital camera.

RESULTS

The highest parasite burden (13.2 ± 2.28) was recorded in the second week and the lowest (8.5 ± 2.9) in the 7th week, the highest mean weight calculated was 134.80 ± 19.16 g in the 4th week and lowest in the 5th week with 118.30 ± 3.56 g. The mean length was highest (29.10 ± 1.90 cm) in the second week and lowest (26.40 ± 1.88 cm) in the 7th week. The percentage infection (96.25%) was very alarming since only 3 pieces were not infected as observed from the samples. The nematodes detached from the fish body cavity as observed under the microscope is shown in Plate 3 ,while the parasite attached to the liver is shown in Plate 4.



Fig. 1: Frozen Hake as displayed in the Market



Fig. 2: Smoked Hake as displayed in the Market

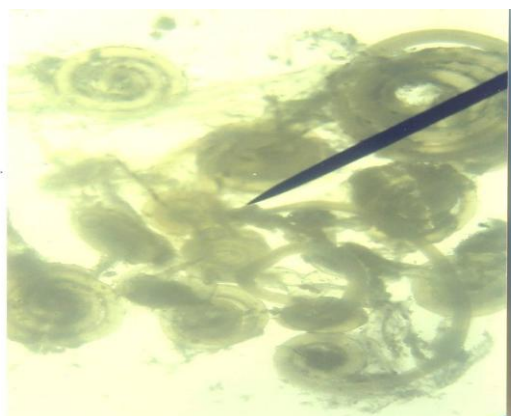


Fig. 3: Anisakids detached from Hake body cavity (x40)

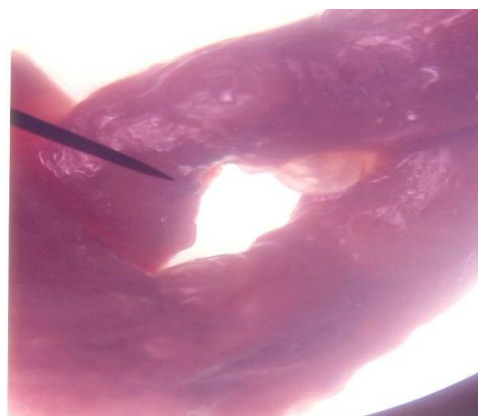


Fig. 4 Anisakids (with microscopic arrow) attached to Fish liver (x40)

DISCUSSION

Nematodes, also called roundworms, occur worldwide in all animals. They can infect all organs of the host, causing loss of function of the damaged area. Signs of nematodiasis include anemia, emaciation, unthriftiness and reduced vitality (Akbar and Ghosh, 2005). The length range of *M capensis* in this study was between 26.70 - 29.10 cm with parasite burden between 8.80- 13.20 the incidence was 96.25%. Valero et al reported 94.87% from the Atlantic off North West Africa and 58.33% from the Mediterranean off Southern Spain. Stocks of walleye pollock *Theragra chalcogramma* collected from: (i) the Sea of Japan (off Rebun Island and Kumaishi); (ii) the Pacific coast (off Shikabe and eastern Hokkaido); and (iii) Nemuro Strait off Hokkaido, northern Japan, were examined for Anisakid nematodes during December 1999 to February 2000, by Sakuraiy, (2002) The prevalence and abundance of *Anisakis*

simplex and *Contracaecum osculatum* larvae were compared among the various sampling sites for fish of the same size and age. Depending upon the species of nematode and the species of infected fish, adult and other life stages of nematodes can be found in almost any part of the fish, including the coelomic (body) cavity, internal organs, the swim bladder, deeper layers of the skin or fins, and external muscle layers. The incidence was highest in the viscera than in other organs. In this study the infection could not be analysed according to size because the cartons were already packed according to size, hence the difference in sizes were not significant. The infection variations between *Anisakis simplex* and *C. osculatum* in Japanese waters seemed to be due to differences in host growth rate, host feeding habit, and the distribution of marine mammal final hosts. The results indicated that these two larval nematodes are useful biological indicators for the population study of

walleye pollock in Japanese waters. The infection of *Contracaecum* sp. on *Oreochromis leucostictus* caused stuntedness and lack of fat deposits around the digestive caecum of the fish (Aloo, 2007). *Contracaecum* sp was found in family Siluridae, Anabantidae both in the fresh and brackish water environment and Clupeidae and Ascianidae in marine environment (Arthur and Ahmed, 2002). Mattiucci, *et al* (2004) found various species of Anisakids identified in Hake sample from the Mediterranean Sea and Atlantic Ocean. Other parasites like *Lernaeocera luci* was also discovered on Hake by Tirard, *et al* (1996) in the Mediterranean. Carvajal, *et al* (1979) recorded 86% infection rate of Anisakids nematodes on *Merluccius gayi* examined off Chile. Bouree, *et al* (1995) also reported 88% infection of Anisakids in cod and recommended a public health education to discourage eating raw or under processed fish.

CONCLUSION

Anisakids may be a new occurrence in our waters but could find a suitable host in any of the local fish species, since eggs from washings may survive hence influencing the parasite establishment and diversity. The direct consumption of hake also calls for thorough verification of imported fish food for human consumption for public health management and disease prevention.

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Table 1: Weight, Length and Parasite burden on frozen Hake (*Merluccius capensis*) sold in Yenagoa Market between September-November 2009

Parameter /week	1	2	3	4	5	6	7	8
Mean weight (gm)	127.8 ±17.76	122.3 ±9.36	123.5 ±11.70	134.8 ±19.16	118.3 ±3.56	132.2 ±13.84	130.3 ±16.16	127.7 ±11.56
Mean Length (cm)	27.58 ±1.62	29.10 ±1.90	28.98 ±1.78	26.70 ±1.30	28.20 ±1.84	27.80 ±1.84	26.40 ±1.88	26.70 ±1.76
Mean parasite burden	11.70 ±2.90	13.20 ±2.28	12.50 ±3.80	8.80 ±4.20	10.30 ±5.70	10.50 ±4.10	8.50 ±2.90	10 ±5.40