

OBSERVATION ON THE HELMINTHS IN SOME ECONOMICALLY IMPORTANT MARINE FISH IN PULAU PINANG

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INTRODUCTION

FISH is the cheapest protein available to a large proportion of the population in many parts of the world, including Malaysia. In many countries, such as Japan, Russia and Taiwan, a fairly large number of people are infected with parasites transmitted through eating raw, half cooked and/or contaminated fish.

Three types of diseases transmitted from fish to man are well-known. They are Clonorchiasis, Diphylobothriasis and anisakiasis. Clonorchiasis is a disease of the liver, caused by a trematode, *Clonorchis sinensis* (Cobbold, 1875). At least eighty species of fish belonging to ten families, but primarily the Cyprinidae, have been reported to be suitable second intermediate host (Komiya, 1966). This disease is fairly widespread in humans, especially in China, Japan, Korea, Vietnam, parts of India, Singapore and Malaysia (Bisseru and Lim, 1969).

Diphylobothriasis is caused by a cestode, *Dibothriocephalus Diphylobothrium*) *latum* (Linnaeus, 1758), living in the intestine of man. This disease is found mainly in temperate countries, especially those bordering the arctic region such as Russia, Norway and the northern region of Canada. In North America, the normal host is probably the brown bear.

Anisakiasis is also found mainly in temperate countries and is caused by a group of nematodes belonging to the family Anisakidae. The normal definitive hosts of *Anisakis* are marine mammals, such as dolphins. However, larvae are able to survive for a shortwhile and are suspected to be a

causative agent of eosinophilic granuloma in the gastro-intestinal tract.

Because of the high incidence of anisakine nematodes in some food fish in other parts of the world (Cannon, 1977a, b; Oshima, 1972; Young, 1972), a survey was initiated to determine if marine food fish sold in fish markets in Pulau Pinang were infected with this group of parasites. In addition, other parasites which may also be potentially infective to humans or harmful to the fish hosts were examined.

MATERIALS AND METHODS

All the fish examined for parasites were obtained from the Pulau Tikus Fish Market, Pulau Pinang. Each fish was weighed, sexed and the fork length were measured. The external surfaces were examined microscopically for ectoparasites. Gills and Viscera were removed and immediately examined for parasites using standard procedures.

Copepods were killed in warm 70% alcohol and nematodes were relaxed and killed in glacial acetic acid. Both were preserved in 5% glycerine alcohol. Trematodes, cestodes and acanthocephalans were relaxed, killed in water and preserved in acetic acid-formalin-alcohol (AFA).

RESULTS

A total of 104 fish belonging to 12 species in 6 families were examined for parasites. All the fish examined were infected with one or more type of parasites (Table 1). Ikan merah, *Latjunus malabaricus* and all three species of ikan kerapu, *Cephalopholis miniatus*, *Epinephelus areolatus* and *Epinephelus tawina* had a high intensity of infection.

Table 1

The prevalence (in %) and mean intensity (in parentheses) of major groups of helminths in some marine fish in Pulau Pinang.

Hosts	Copepods	Monogenea	Trematodes	Nematodes	Cestodes	Acanthocephalan	Overall infection
Family Carangidae							
<i>Megalaspis cordyla</i> (Ikan cincaru; 10)	40(1)	90(3.1)	100(16.5)	90(3.1)	30(4.7)	0	100(23.9)
<i>Selar crumenophthalmus</i> (Ikan selar; 17)	47(1.4)	47(3.5)	88(6.3)	88(15.7)	71(25.5)	12(2.0)	100(39.8)
Family Lutianidae							
<i>Latjunus johni</i> (Ikan merah; 4)	50(2.0)	50(18.5)	25(4.0)	50(1.0)	0	0	100(11.8)
<i>Latjunus malabaricus</i> (Ikan merah; 7)	100(125.9)	57(8.8)	29(1.0)	100(165.1)	0	0	100(291.1)
<i>Latjunus russelli</i> (Ikan tanda; 3)	67(5.5)	67(3.0)	67(13.0)	100(7.0)	33(1.0)	0	100(21.7)
Family Mugilidae							
<i>Liza subviridis</i> (Ikan belanak; 21)	19.1(1)	90.5(6.5)	23.8(1.4)	4.8(1.0)	0	0	100(6.5)
Family Scombridae							
<i>Rastrelliger kanagurta</i> (Ikan kembong; 16)	6.3(2.0)	6.3(1.0)	100(19.8)	100(6.3)	2.5(1.8)	0	100(26.7)
Family Serranidae							
<i>Cephalopholis miniatus</i> (Ikan kerapu; 2)	100(10)	100(3.5)	100(22)	100(47)	50(2.0)	0	100(115.5)
<i>Epinephelus areolatus</i> (Ikan kerapu; 3)	100(11.3)	100(34)	100(126)	100(13.3)	0	0	100(184.7)
<i>Epinephelus tavina</i> (Ikan kerapu; 7)	85.7(1.5)	100(104.9)	100(39.7)	14.3(2)	14.3(1)	0	100(147.0)
Family Stromateidae							
<i>Formio niger</i> (Ikan bawal hitam; 14)	86(3.1)	71(2.2)	93(33.9)	79(6.6)	7(2.0)	7(1.0)	100(41.1)
<i>Pampus chinensis</i> (Ikan bawal puteh; 10)	80(6.1)	80(1.6)	100(59.8)	10(2)	50(6.8)	0	100(69.6)

The most common parasitic groups recovered were monogenea, trematodes, nematodes and copepods. Monogenea were most abundant in ikan kerapu *Epinephalus tavina* (mean intensity of infection, 104.9, Table 1); trematodes in ikan kerapu *Epinephalus areolatus* (126); nematodes in ikan merah, *Latjunus malabaricus* (165.1) and copepods in *Latjunus malabaricus* (125.9).

DISCUSSION

Although the fish examined were heavily infected with parasites, most of the parasites found are probably non-infective to human beings if the fish is properly cooked before consumption.

The high intensity of parasites in the infested fish may cause the death of fish although there is no direct proof of mortality caused by parasites.

However, indirect effects such as inferior growth poor swimming performance or aberrant behaviour due to large parasite loads may increase host susceptibility to death from other causes (Smith, 1973; Smith and Margolis, 1970). Further, the high intensities of monogenea in ikan kerapu and copepods in ikan merah should be a concern for aquaculturists. Monogenea are a frequent cause of high mortality, especially among fry and fingerlings in aquaculture (Paperna, 1960).

However, the high intensity of nematodes in the coelom of some fishes (ikan merah and ikan kerapu) examined is of some concern. This is fairly significant because ikan kerapu is an important food fish. The Chinese prefer to eat this fish just lightly cooked. As a result of this, some of the nematodes in the flesh of the infected fish may not be killed and

could be a potential source of human infection. Preliminary observations revealed that the nematodes from the coelom of these fishes belonged to the family Anisakidae, tentatively three genera have been identified, namely, *Anisakis*, *Contracaecum* and *Porrocaecum*.

The family Anisakidae is a member of the suborder Ascarideria. The adult worms of the family are found in all classes of vertebrates. The life cycles are indirect involving a stage in a crustacean and one or two intermediate hosts such as various types of fish and squid. Species of public health importance normally develop to adulthood in the stomach of dolphins. However, man can become accidentally infected through consuming the larvae in one of the intermediate hosts.

The larval stages of anisakine nematodes have been recognised since the late 17th century. The first severe human case of *anisakiasis* was reported in 1960 (Van Thiel *et al.*, 1960), although it was detected (not reported) by Dr. Straub in 1955 in Netherlands. Since then, there has been a renewed interest in anisakine nematodes as a potential human health hazard. In countries like Japan, Norway and Russia, whose populations prefer to eat raw fish, cases of human anisakiasis have frequently been reported.

Studies have shown that the longer the infected fish is kept before consumption, the greater is the risk of acquiring an infection. Hauck (1977) showed that parasite loads were statistically largest in the flesh of frozen, brined and smoked Pacific herring (*Clupea harengus pallasi*) from Yaquina Bay, Oregon, U.S.A., whereas flesh of fresh herring had a lighter parasite load. This is due to migration of the larvae from the coelom to the musculature. It appears that the time interval between the fish being caught and human consumption could be an important factor in the chance of infection. This problem should be carefully examined in this country since several days may lapse between catch and consumption.

There is a lack of awareness regarding the possibility of anisakiasis in this country and in the region. The clinical symptoms are usually of short duration and often have been diagnosed as gastric disturbances of some kind. However, a deeper study of immunological aspects of the infection could result in the immuno-diagnosis of the disease. This could make anisakiasis more readily detectable in the future.

SUMMARY

A total of 104 marine fish were examined for parasites. Ikan merah, *Latjonus malabaricus* and

ikan kerapu, *Cephalopholis miniatus*, *Epinephelus areolatus* and *Epinephelus tavinna* had a high intensity of infection. Monogenea were most abundant in ikan kerapu *Epinephelus tavinna*; trematodes in ikan kerapu *Epinephelus areolatus*; nematodes in ikan merah *Latjonus malabaricus* and copepods in *Latjonus malabaricus*. The high intensity of infection was discussed with regard to aquaculture and public health hazard, especially the presence of anisakine nematodes.

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