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Occurrence of *Procamallanus malaccensis* Fernando and Furtado 1963 in *Clarias* *batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia

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Abstract

Clarias batrachus (L.) and *C. macrocephalus* Günther from Pendang, Kedah, and the latter only from Tanjong Piandang Perak, were collected monthly between October 1982 and September 1984. The camallanid nematode, *Procamallanus malaccensis* was found in 16.4% and 15.2% of *C. macrocephalus* from Kedah and Perak, respectively. The mean intensity was similar, 3 and 3.6, respectively, per infected fish; the prevalence and mean intensity in *C. batrachus* from Kedah was 29.3% and 3.2, respectively. The prevalences and mean intensities of the nematode in the two catfish hosts were minimal in the first half of the year and increased to maximum in the second half, coinciding with the rainy season. As a whole, prevalences were least in the largest fish, and mean intensities increased as size of fish increased.

Introduction

The genus *Procamallanus* was first created by Baylis in 1923. Since then fifteen species of this genus have been reported, mainly from the Indian subcontinent. So far, three species of *Procamallanus* (*P. clarius* Ali 1956, *P. malaccensis* Fernando and Furtado 1963 and *P. parvulus* Furtado and Tan 1973) have been reported from Malaysia (Fernando and Furtado 1963; Furtado and Tan 1973).

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Information on the seasonal occurrence of helminths in freshwater fish in rainy tropical environments is lacking (Chubb 1977, 1978, 1980, 1982). Furtado and Tan (1973) reported the seasonal (May to November) occurrence of *P. clarius* and *P. parvulus* from *Clarias batrachus* (L.) from Selangor, Malaysia. Both prevalence and mean intensity increased from May to August and then decreased. They indicated an association of high infectivity of the camallanids with the drier season. Leong (1986) reported that the high infectivities of *Dactylogyrus* sp., *Bothriocephalus acheilognathi* Yamaguti 1934 and *Lamproglena minuta* Capart 1943 in *Puntius binotatus* were associated with the wet season. Maturation of parasites in rainy tropical environments has not been reported.

This report is on the seasonal occurrence of *Procamallanus malaccensis* in *Clarias batrachus* and *C. macrocephalus* Günther from Kedah and Perak, Malaysia.

Materials and Methods

About 40-60 each of *Clarias batrachus* and *C. macrocephalus* from Pendang, Kedah, and the same number of *C. macrocephalus* from Tanjung Piandang, Perak, were collected monthly.

Live fish were brought to the laboratory as soon as possible and examined for parasites within 12 hours. The total length, weight, length of intestine and the weight of gonads were separately measured for individual fish and recorded. The whole digestive tract was frozen immediately by pouring 95% ethanol in dry ice. By this process, the parasite was killed and frozen instantaneously and prevented from migration. The intestine was divided equally into five segments and each was slit longitudinally and examined for nematodes. The stomach was also cut open for parasites. The nematodes in both the stomach and the intestine were placed in 2% glycerine in 70% alcohol. Later, they were cleared in Lactophenol for identification and assessment of maturation. The female was considered mature if eggs were observed in the uterus.

Results

A total of 3,517 catfish belonging to *Clarias batrachus* (990), *C. macrocephalus* (1,179) from Kedah and only *C. macrocephalus* (1,345) from Perak was examined for parasites. All the nematodes recovered

from the catfish were found in the stomach. The prevalence and mean intensity of *P. malaccensis* were 29.4% and 3.2, respectively, in *Clarias batrachus* from Kedah. In *C. macrocephalus*, also from Kedah, the prevalence and mean intensity were 16.4% and 3, respectively, whereas in the same species from Perak, 15.2% of the fish were infected with a mean intensity of 3.6.

There appears to be a seasonal cycle in prevalence and mean intensity of infection of *P. malaccensis* in both *C. batrachus* and *C. macrocephalus* from Kedah as well as the latter fish species from Perak. For *C. batrachus* from Kedah and *C. macrocephalus* from Perak, both prevalence and mean intensity seemed to be lower in the first half of the year than in the second half (Figs. 1 and 2). Similarly,

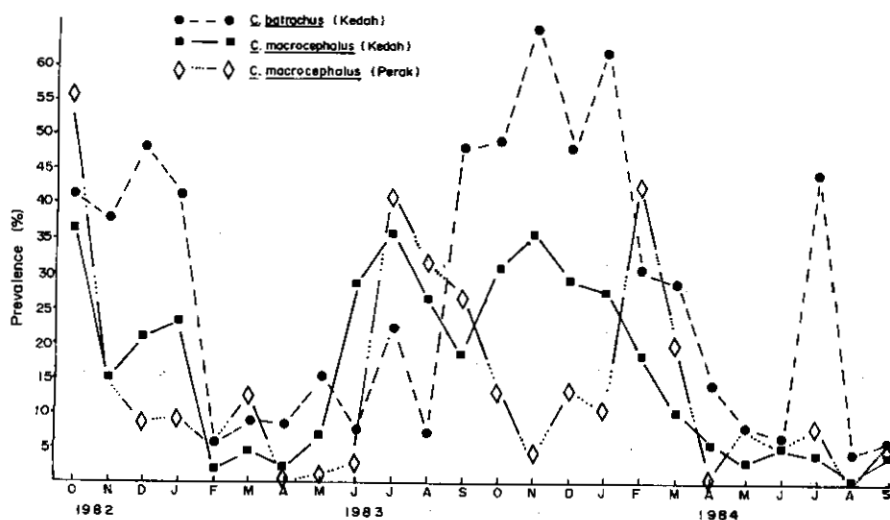


Fig. 1. The prevalences of *Procammallanus malaccensis* in *Clarias batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia, between October 1982 and September 1984.

the prevalence and mean intensity of *P. malaccensis* in *C. macrocephalus* from Kedah seemed to be lower between February and May than at other months (Figs. 1 and 2).

In each of the fish species, there was no significant correlation of the seasonal abundance (prevalence \times mean density) with either the seasonal total rainfall or the gonadosomatic index of the fish.

More male than female nematodes were recovered. In *C. batrachus*, a total of 941 nematodes were recovered, of which 740 were female and 81.1% were mature. Out of 586 nematodes from *C.*

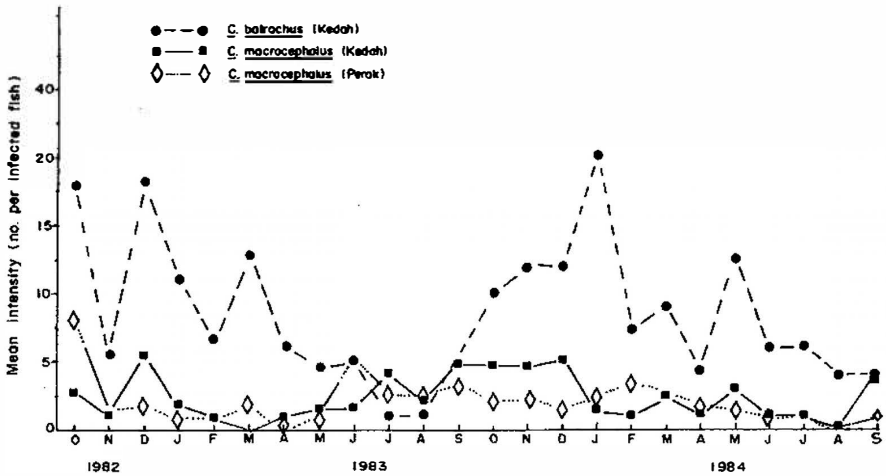


Fig. 2. The mean intensities of *Procamlanus malaccensis* in *Clarias batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia, between October 1982 and September 1984.

macrocephalus from Kedah, 471 were females with 83.4% mature, whereas in the same species from Perak, 550 out of 740 nematodes were females with 87.5% mature.

The maturation data of female *P. malaccensis* in catfish from Kedah and Perak are shown in Fig. 3. Although the seasonal pattern of maturation in both species of fish in the two study areas is not well defined, maturation seemed to be consistently lower between September and December. Seasonal maturation did not significantly correlate with total rainfall, abundance of nematodes or gonadosomatic indices of the fish hosts.

The catfish were arbitrarily divided into three length groups: 15.1-20, 20.1-25 and 25.1-30 cm. The prevalence of *P. malaccensis* in *C. batrachus* increased as the size of the fish increased and then decreased in the largest size group of the fish. For *C. macrocephalus* from both Kedah and Perak, the prevalence of the nematode decreased as the size of fish increased (Fig. 4). The mean intensities of *C. batrachus* for the three length groups were quite similar (Fig. 5). The mean intensity of infection of the nematode in *C. macrocephalus* from Kedah increased as the size of the fish increased and then decreased at the largest size group, whereas in Perak, it continued to increase with the size of the fish.

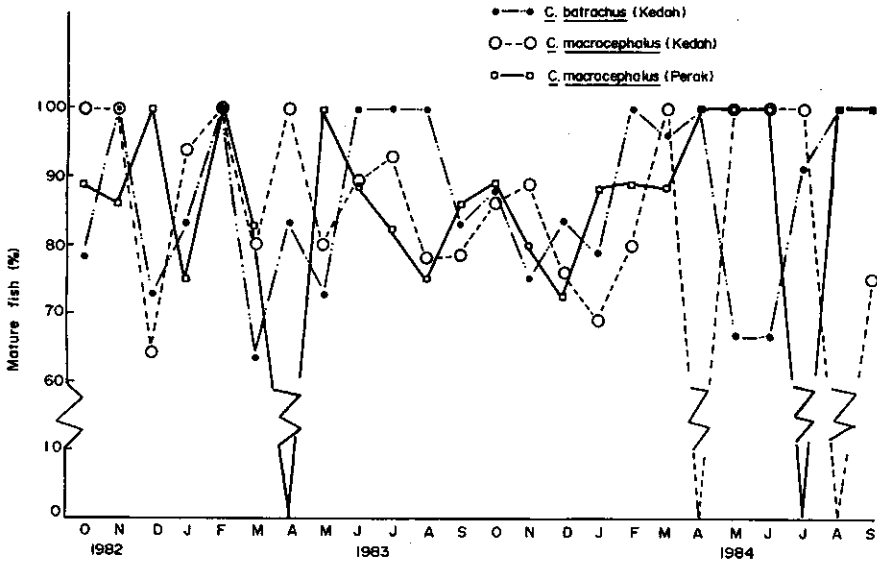


Fig. 3. The percentage of mature female *Procamlanus malaccensis* in *Clarias batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia, between October 1982 and September 1984.

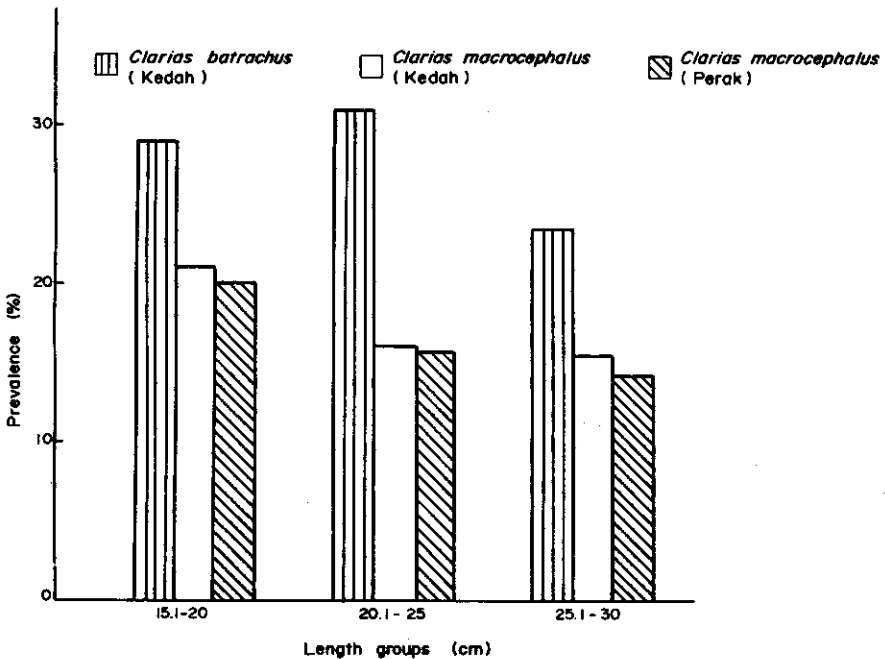


Fig. 4. The prevalences of *Procamlanus malaccensis* in various length groups of *Clarias batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia, between October 1982 and September 1984.

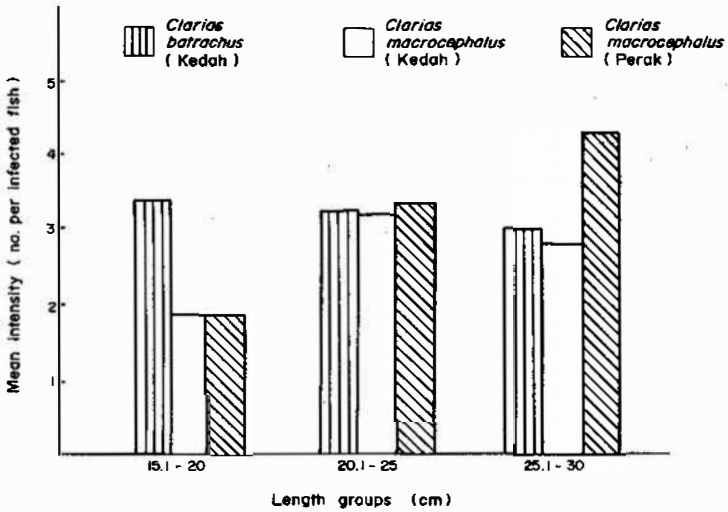


Fig. 5. The mean intensities of *Procamlanus malaccensis* in various length groups of *Clarias batrachus* and *C. macrocephalus* from Kedah and Perak, Malaysia, between October 1982 and September 1984.

Discussion

This is the first complete seasonal study of a camallanid nematode, *Procamlanus malaccensis*, from a rainy tropical environment. Fernando and Furtado (1963) first described the nematode from *Channa lucius* collected from Malacca, Malaysia. This is the first report of the nematode from *Clarias batrachus* and *C. macrocephalus* from Malaysia.

The patterns of seasonal prevalence and intensity showed a seasonal cycle, with greater occurrence in the second half of the year, during the rainy season. Although the maturation data indicated no definite seasonal trend, greater numbers of mature nematodes were found in the early part of the year. This indicates that the mature nematodes emerge from the fish host in the dry season during which the intermediate hosts are infected. During the dry season, water levels in the canal are usually low and this creates a greater chance of infection in the intermediate hosts. Thus, during the wet season, the infected intermediate hosts are dispersed to a greater area from which the catfish become infected.

In contrast to the greater infectivity of *P. malaccensis* associated with the wet season, Furtado and Tan (1973) indicated the high infectivity of two other camallanids, *Procamallanus clarius* and *P. parvulus* in *Clarias batrachus* from Selangor, Malaysia, to be associated with the drier season. This difference in seasonal infectivity between the two groups needs to be reexamined. However, many seasonal occurrences of parasites in the rainy tropical environment appear to be associated with the wet season of the tropics (Leong 1986; Zaman and Leong 1987a, 1987b).

Water temperature may not play a significant role in rainy tropical environment. Even in temperate climatic conditions where temperature shows marked seasonal variation and influences the growth of parasites, temperature may not have any direct effect on the maturation cycle or provide the stimulus for egg production (Kennedy and Hine 1969).

A greater number of small fish tended to be infected than large fish. This pattern may be a function of a change of diet as the fish grow. Furtado and Tan (1973) also suggested that the observed seasonal patterns of parasites in *Clarias batrachus* from Selangor, Malaysia, may be due to a change of its diet in different seasons. However, the mean intensities did not decrease as the fish grew in size, suggesting that the nematodes were accumulating in the fish host. One factor which may favor the retention of the nematode in the fish host is its habitat in the stomach where no other parasites were found. There was no interspecific interaction that could affect its establishment.

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