

Some Parasitic Copepoda from Sri Lanka (Ceylon) with a Synopsis of Parasitic Crustacea from Ceylonese Freshwater Fishes

by

C. H. FERNANDO and GEORGE HANEK*

INTRODUCTION

Material collected during 1965-1971 by one of us (C.H.F.) yielded a number of records of parasitic Copepoda. This includes three species of the family Ergasilidae, namely *Ergasilus ceylonensis* Fernando and Hanek, 1972, *E. mendisi* Fernando and Hanek, 1972 and *Paraergasilus brevidigitus* Yin, 1954; one subspecies of the family Dichelesteiidae, namely *Lamproglena chinensis sprostoni* Kirtisinghe, 1964, and one subspecies of the family Lernaeidae, namely *Lernaea cyprinacea chackoensis* Gnanamuthu, 1951. Some of these were recovered from the fish hosts, whilst on a number of occasions *Ergasilus* spp. and on one occasion *Lernaea* sp. was recovered from zooplankton, indicating that these are quite common on fishes.

We have taken this opportunity of giving a synopsis of parasitic Crustacea collected from Ceylonese freshwater fishes. In addition to the species mentioned above, one species of Branchiura namely *Argulus foliaceus* L. and one species of Isopoda, namely *Alitropus typus* Milne Edw. have been recorded so far. It is interesting to note that some of the species, e.g. *Paraergasilus*, *Lernaea*, and *Argulus* recovered from Ceylonese fishes have been introduced with fishes imported for stocking freshwater lakes. In future introductions of foreign fish species great care should be taken that these fish are parasite free.

MATERIALS AND METHODS

Branchial material of fishes, collected using gill nets during 1965-1971, was preserved in 10% formalin and examined at a later date. Methods as those given in Fernando and Hanek (In Press) were used for Ergasilidae. Drawings were made using a camera lucida. All species presented herein have been deposited in the collection of the Department of Biology, University of Waterloo, Waterloo, Ontario, Canada.

RESULTS

Ergasilus ceylonensis Fernando and Hanek, 1972 (Fig. 1)

Detailed description, measurements, and distribution are given in Fernando and Hanek (In Press). In addition various larval stages of this species were found in zooplankton samples collected from Magalla Wewa, Nikaweratiya and from Nuwara Wewa, Anuradhapura. This species was reported as *Ergasilus* sp. by Fernando (1969).

* Department of Biology, University of Waterloo, Waterloo, Ontario, Canada.

Ergasilus mendisi Fernando and Hanek, 1972 (Fig. 2)

Detailed description, measurements, and distribution are given in Fernando and Hanek (In Press). Larval stages of this species were found in zooplankton samples collected from Nuwara Wewa, Anuradhapura.

Paraergasilus brevidigitus Yin, 1954 (Figs. 3-5)

This species, generally found infesting the nasal cavities and the gills, has been described from the gills of *Mylopharyngodon piceus* by Yin (1954) in China. Since then Smirnova (1962) reported this species from Amur wild carp, Amur River basin, and Hanek and Dulmaa (1970) found this species infesting the nasal cavities of *Leuciscus waleckii* in Mongolia. A single female of this species was found in zooplankton from Kantalai tank. Its morphology is the same as that described by Yin (1954), except in the structure of swimming foot V. This unisegmented appendage which Yin (1954) described as having 2 setae, bears 3 setae instead as previously reported by Smirnova (1962) and Hanek and Dulmaa (1970). Measurements of our specimen are as follows:— Total length 0.55 mm. maximum width 0.18 mm. Antennae I clearly 5-segmented, 0.081 mm. long; first segment being longest, 0.026 mm. long, second, third, and fourth 0.014 mm. long each, and fifth segment smallest, 0.013 mm. long. Antenna II (Fig. 5) 3-segmented with three clawlike setae, 0.13 mm. long; basal segment inflated, second segment expanded centrally, two times as long as the third segment, clawlike setae 0.026 mm. long each. Swimming feet V (Fig. 4) unisegmented with three setae; segment 0.029 mm long, terminal setae 0.039 mm. long, two remaining setae 0.013 mm. long. This finding represents the first record of this genus from Ceylon. It is possible that it was introduced with imported species of Chinese carp.

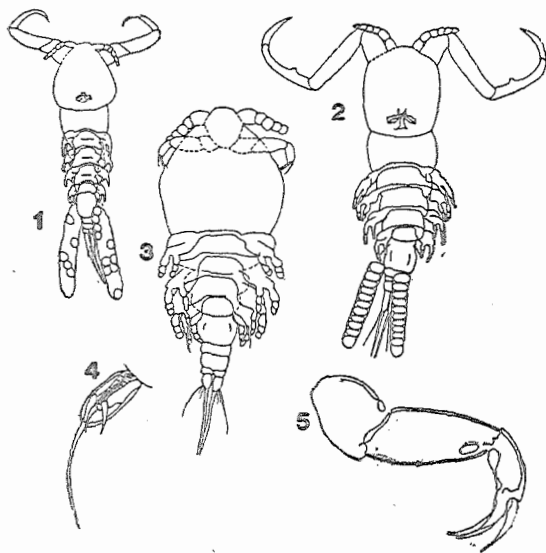


Fig. 1.—*Ergasilus ceylonensis* Fernando & Hanek.

Fig. 2.—*E. mendisi* Fernando & Hanek.

Fig. 3.—*Paraergasilus brevidigitus* Yin.

Fig. 4.—Swimming Foot V of *P. brevidigitus*.

Fig. 5.—Antenna II of *P. brevidigitus*

Lamproglena chinensis sprostoni Kirtisinghe, 1964 (Fig. 6)

Kirtisinghe (1964) described this subspecies from the gills of *Opiocephalus striatus* bought in Colombo market. Apparently the same subspecies was reported from the same host by Mendis and Fernando (1962). They noted; '*Lamproglena* induces a distorted growth of the tip of the gill filaments of the host causing an enlargement of the connective tissue and a degeneration of the blood capillaries in the filaments'. Our present material, collected from the gills of *Opiocephalus striatus* from Topawewa, Polonnaruwa, is in full agreement in morphological features with that of Kirtisinghe (1964).

Lernaea cyprinacea chackoensis Gnanamuthu, 1951, (Fig. 7)

Gnanamuthu (1951) described this subspecies from the skin of *Osphronemus goramy* and *Catla catla* in Madras, India. Since then, Mendis and Fernando (1962) have found this subspecies infesting *Cyprinus carpio*. They noted : ' From time to time there have been outbreaks of this parasite of fishes in the Fisheries Research Station ponds in Colombo. Some mirror carp brought to Colombo from Ceylon Fishing Club's hatchery in Nuwara Eliya were also found to harbour the parasite '. Kirtisinghe (1964) found this parasite on the body of *Osphronemus goramy* in freshwater ponds and lakes in Colombo. The present material consists of five females found deeply penetrated into the gill tissue of *Heteropneustes fossilis* (Bloch) collected from Parakrama Samudra, Polonnaruwa, and of three females also found deeply penetrated into the gill tissue of *Glossogobius giuris* (Hamilton-Buchanan) collected from Kiribbanare Wewa. Our material fits the original description in all respects. The measurements of eight females ranging as follows : Total length (except egg sacs) 6.0-7.2 mm. width 0.5-0.7 mm. Length of unbranched anteriorly process 0.28-0.31mm. length of branched laterally extending processes 0.69-0.72 mm., egg sacs 1.3-1.6 mm. long by 0.22-0.25 mm. wide, egg size 0.07-0.08 mm. These records extend the range of hosts for this parasite to *Heteropneustes fossilis* and *Glossogobius giuris*. This species was also found in zooplankton in Nuwara Wewa, Anuradhapura.

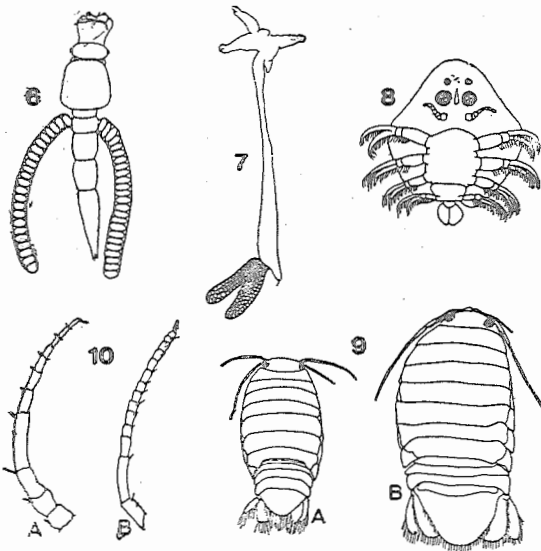


Fig. 6.—*Lamproglena chinensis sprostoni*.

Fig. 7.—*Lernaea cyprinacea chackoensis*

Fig. 8.—*Argulus foliaceus*

Fig. 9 (A & B) and 10 (A & B) *Alitropus typus*

Argulus foliaceus L. (Fig. 8)

Mendis and Fernando (1962) have reported this parasite from the Fisheries Reserach Station experimental ponds in Colombo. This parasite has been introduced to Ceylon with the mirror carp (Mendis and Fernando, 1962) and ' with the mirror carp and trout that were stocked in the lakes and streams in and around Nuwara Eliya (Kirtisinghe, 1964) '.

Alitropus typus Milne Edw. (Figs. 9A, 9B, 10A, 10B)

Mendis and Fernando (1962) reported this parasite from the gill chambers of *Rasbora daniconius* and *Wallago attu* collected from Angunuwila tank and from Kala-Oya respectively. They note : ' This species was also found free living in the Battulu Oya, Nedimala (Dehiwela) and the Fisheries Department ponds at Narahenpitiya '. They also noted that ' this species is a facultative ectoparasite and lives in freshwater, close to the sea and in lagoons, from where it has probably migrated '. Ingle and Fernando (1963) recorded this species from Ceylon and discussed its systematic position.

DISCUSSION

Of the seven species of parasitic Crustaceans recorded from Ceylon only four appear to be endemic. Three of the species, namely (*Paraergasilus brevidigitus*, *Lernaea cyprinacea chackoensis*, and *Argulus foliaceus* have been introduced with fish imported for stocking freshwater lakes in Ceylon. Fernando (1965, 1971) has listed all the fish species introduced into Ceylonese freshwater so far. This include Chinese carps and the common carp, which seems to have been responsible for carrying the parasites into local waters. Fernando and Furtado (1963) reported another possible parasite introduction of the Cestode *Bothriocephalus gowkongensis* Yeh, 1955 with the Chinese carp *Ctenopharynydon idellus*. Fernando and Indrasena (1969) have listed many references to the introduction of this latter species to Eastern Europe.

The Ceylonese freshwater fauna is generally poor in species adapted to large water bodies, since there are no natural lakes (Fernando, 1971). There are, therefore, many niches open for species already adopted to such habitats. For these reasons it is very important that future fish introductions should be carefully screened and the fish rendered parasite free before introduction. Some methods for treating infested fish before introduction are given by Bauer and Uspenskaya (1959), Ergens (1962), and Molnar (1970).

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REFERENCES

- BAUER, O. N., and A. V. USPENSAYA, 1959. New treatments of the fish diseases. *Tr. sovesc. ichtiol. kom. AN SSSR*, vyp. 9. (In Russian).
- ERGENS, R. 1962. Direct control measures for some ectoparasites of fish. *Prog. Fish-Cult.* 24 : 133-134.
- FERNANDO, C. H., 1965. The development of Ceylon's fisheries. XI. The role of inland waters in relation to the development of Ceylon's fisheries; and a note on the pearl oyster fishery. *Bull. Fish. Res. Stn. Ceylon* 17 : 291-297.
- FERNANDO, C. H., 1969. A guide to the freshwater fauna of Ceylon. *Suppl. 3. Bull. Fish. Res. Stn. Ceylon* 20 : 15-25.
- , 1971. The role of introduced fish in fish production in Ceylon's freshwaters. *Symposium: The scientific management of animal and plant communities for conservation, Norwick, 1970*, 295-310.
- , and J. I. FURTADO, 1963. A study of some helminth parasites of freshwater fishes in Ceylon. *Z. Parasitenk.* 23 : 141-163.
- , and G. HANEK, (in Press). Two new species of the genus *Ergasilus* Nordmann, 1832 (Copepoda : Ergasilidae) from Ceylon. *Crustaceana*
- , and H. H. A. INDRASENA, 1969. The freshwater fisheries of Ceylon. *Bull. Fish. Res. Stn. Ceylon* 20 : 101-134.
- GNANAMUTHU, C. P. 1951. *Lernaea chackoensis* n. sp : a copepod parasitic on two Madras fishes. *Parasitology*. 41 : 143-147.

- HANEK, G., and A. DULMAA, 1970. Parasitic copepods of some fish species from Mongolia. *Folia Parasitologica (Praha)* 17 : 77-80.
- INGLE, R. W. and C. H. FERNANDO, 1963. On some fresh and brackish water crustaceans from Ceylon. *Crustaceana*. 6 : 101-109.
- KIRTISINGHE, P. 1964. A review of the parasitic copepods of fish recorded from Ceylon with descriptions of additional forms. *Bull. Fish. Res. Stn., Ceylon* 17 : 45-132.
- MENDIS, A. S. and C. H. FERNANDO, 1962. A guide to the freshwater fauna of Ceylon. *Bull. Fish. Res. Stn. Ceylon* 12, 160 pp.
- MOLNAR, K. 1970. An attempt to treat fish Bothriocephalosis with Devermin. *Acta Vet. Acad. Sci. Hungar.* 20 : 325-331.
- SMIRNOVA, T. S., 1962. In Bychowsky, B. E. *et al.* Key to parasites of freshwater fish of the U.S.S.R. *Publ. House AN U.S.S.R., Moscow-Leningrad*, 919 pp.
- YIN, WEN-YING, 1954. *Paraergasilus*, a new genus of parasitic copepods new to China, with two species from pondfishes. *Acta Zool. Sinica* 6 : 23-32.