

## FURTHER NOTES ON TREMATODA ENCYSTED IN FLORIDA MULLET<sup>1</sup>

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Welberry and Pacetti (1954) reported *Heterophyes heterophyes* from the stool of a Florida child. Since they did not mention finding adult trematodes their identification appears to have been made on ova contained in the stool. They have stated that the ova measured 30 x 17 microns, were operculate and contained a developed miracidium. This description agrees with that of the ova of *H. heterophyes*. Hutton (1957) pointed out that this identification was subject to error. Welberry and Pacetti (*loc. cit.*) suggested that the black mullet, *Mugil cephalus*, was the source of infection of the child mentioned above. Hutton (*loc. cit.*) reported examining Florida mullet (*Mugil cephalus* and *M. curema*) from various areas of the State. He found the metacercarial stage of two species of Trematoda. After carrying out feeding experiments with a variety of animals one species was identified as *Phagicola longa* (Ransom, 1920) Price, 1932. The other species was listed as a strigeid trematode. Hutton and Sogandares-Bernal (*in press*) reported the Brown Pelican, *Pelecanus occidentalis*, and the American Egret, *Casmerodius albus*, as natural definitive hosts for *Phagicola longa* (Fig. 1) in Florida. *Mugil cephalus*, *M. curema* and *M. trichodon* were listed as second intermediate hosts. We reported finding *Mesostephanus appendiculatoides* (Price, 1934) Lutz, 1935, (Fig. 2) from the same three species of mullet listed above. We were able to obtain adult worms from the intestine of laboratory-raised opossums, *Didelphis virginianus*, and one of two laboratory-raised Black-crowned Night Herons, *Nycticorax nycticorax*. The Brown Pelican was listed as a natural definitive host for *M. appendiculatoides*. *Cerithium muscarum*, a common Florida marine snail, contains a cyathocotyle cercaria which we believed to be the larva of *M. appendiculatoides*.

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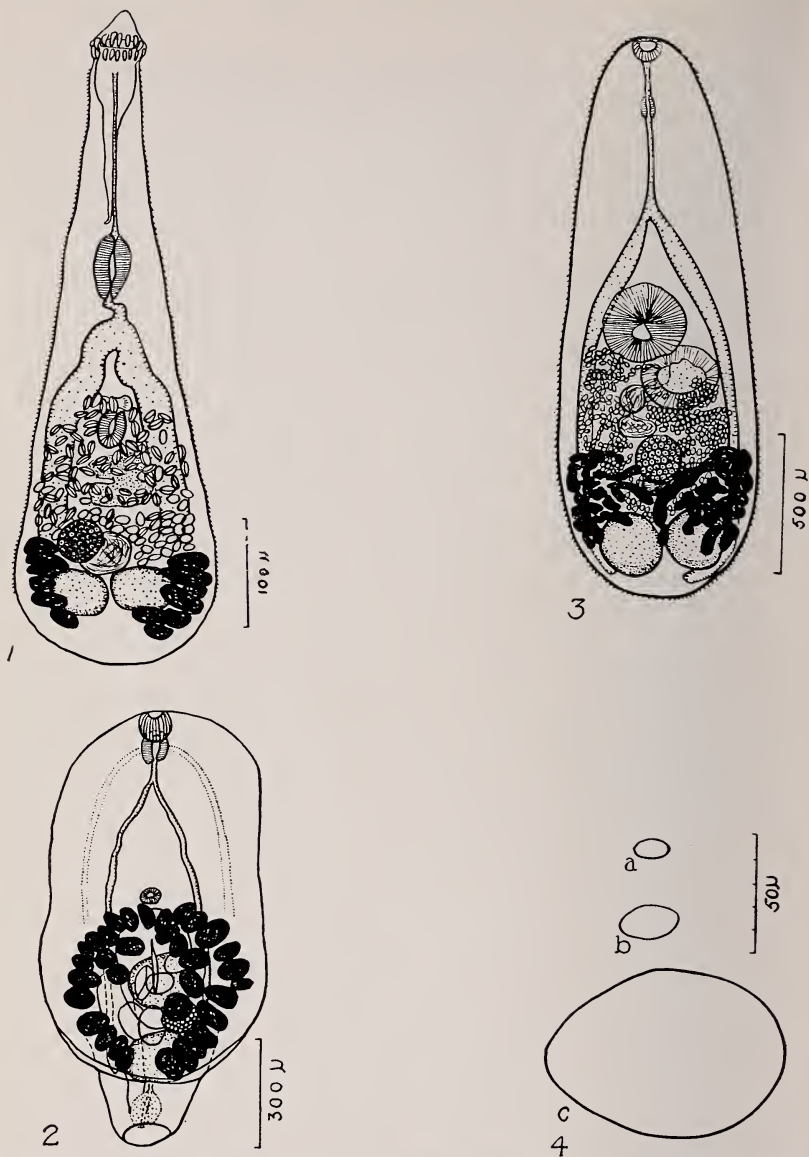


Figure 1. Adult, *Phagicola longa* (Ransom, 1920) Price, 1932, ventral view, from American egret.

Figure 2. Adult, *Mesostephanus appendiculatoides* (Price, 1934) Lutz, 1935, ventral view, from brown pelican.

Figure 3. Adult, *Heterophyes heterophyes* (Siebold, 1852) Stiles and Hassall, 1900, ventral view (modified from Witenberg, 1929).

Figure 4. Eggs:

a. *Phagicola longa*.

b. *Heterophyes heterophyes*.

c. *Mesostephanus appendiculatoides*.



Many workers will disagree with the placing of *Phagicola* and *Parascocotyle* in separate genera and it is possible that future work will show conclusively that *Parascocotyle* as well as *Phagicola* are not valid genera. However, until that time, since not one life cycle has been worked out for *Ascocotyle*, *Phagicola* or *Parascocotyle*, we choose to consider them as separate genera. From the phylogenetic standpoint *Parascocotyle* may be considered closely allied to *Phagicola* in that in both genera the vitellaria never extend beyond the ovary. However, the second row of oral spines in *Parascocotyle* may indicate an intermediate phylogenetic link between *Ascocotyle* and *Phagicola*.

During the years 1956, 1957 and 1958 the flesh and hearts of over 2400 specimens of Florida mullet were examined for larval trematodes. Numerous feeding experiments using a variety of reptiles, birds and mammals were carried out. At no time were any worms recovered that could have been *Heterophyes heterophyes*. On one occasion a single acanthocolpid metacercaria was found encysted in the posterior part of a mullet near the caudal peduncle. Hopkins (1954) reported the metacercariae of *Rhipidocotyle lepisostei* Hopkins as being abundant in the fin rays of mullets, *Mugil cephalus* and *M. curema*. Furthermore, he states: ". . . In very small mullets the encysted metacercariae are in the gill region or in the body cavity; in larger mullets most of the encysted metacercariae are inside of the rays of the fins, especially the caudal fin; very large mullets usually do not contain any metacercariae."

Table I shows a comparison of the egg sizes of *Heterophyes heterophyes*, *Phagicola longa* and *Mesostephanus appendiculatoides*. From the measurements given in this table it is evident that the eggs of *M. appendiculatoides* are approximately three times the size of those of *H. heterophyes* while the eggs of *P. longa* are slightly more than half the size of those of *H. heterophyes*. Because of the great size differences there seems to be little chance that the eggs of one of the above three species would be confused with either of the others. The available evidence indicates that it is very unlikely that *H. heterophyes* occurs in Florida waters because (1) the adult stage of the worm has never been reported in native Floridians, (2) numerous animals (mammals, birds and fishes) from Florida have been examined for trematodes by various workers



and the parasite has not been reported, and (3) our work indicates that the parasite does not occur in Florida mullets even though *Mugil cephalus*, a second intermediate host for *H. heterophyes* in endemic areas, is the most common mullet in Florida waters.

TABLE I

A COMPARISON OF THE EGG SIZES OF *HETEROPHYES HETEROPHYES*, *PHAGICOLA LONGA*, AND *MESOSTEPHANUS APPENDICULATOIDES*

Species	Measurements in Microns	According To:
<i>H. heterophyes</i> .....	26- 30 x 15-17	Dawes (1956)
<i>P. longa</i> .....	18 x 9	Witenberg (1929)
<i>M. appendiculatoides</i> .....	80-112 x 60-80	Price (1934)

There remains the possibility that even though *H. heterophyes* appears to be absent in Florida waters the parasite could complete its life cycle in native animals. Definitive hosts (man, dog, cats, etc.) and a second intermediate host (*Mugil cephalus*) are present. It remains to be determined if a suitable first intermediate host is present. A definitive host from an endemic area could transport the parasite into the State. If suitable snails are available in Florida waters and they come in contact with the ova of the parasite there is little doubt that the life cycle would reach completion, especially because of the ubiquity of Florida mullet.

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