TREMATODES FROM FISH IN THE BHUMIPOL DAM, TAK PROVINCE, THAILAND

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Abstract. Three hundred and eighty-nine fish of 33 species, collected in Bhumipol Dam were examined for helminths between January and November, 1996. The fish were caught by seine or obtained from fishermen. Four species of fish, *Cirrhinus marginipinnis, Mystus nemurus, Pristolepis fasciatus*, and *Xenentodon cancilla*, were infected with five species of trematodes: *Allocreadium handiai* Pande, 1937, *Bucephalopsis karvei* Bhalerao, 1937, *Phyllodistomum simile* Nybelin, 1926, *Haplorchoides* sp, and *Asymphylodora* sp. This report is a systematic evaluation of the trematodes recovered.

INTRODUCTION

Bhumipol Dam is in Sam Ngao District, Tak Province, about 350 km south of Chiang Mai Province, on the Ping River. It was constructed in 1947, and its original purpose was many fold: to supply a hydroelectric station and agriculture with water, flood prevention in the rainy season, fish cultivation, and to promote tourism. The fish in the dam derived from artificial introduction or natural sources, the adjacent rivers, and water bodies. This paper provides a systematic evaluation of the trematodes recovered and the classification of trematodes found in the reservoir.

MATERIALS AND METHODS

The test material was collected between January - November 1996, at Dhumipol Dam. Fish were caught by seine or obtained from fishermen. After identification, they were examined immediately for helminths. A total of 389 fish of 33 species were examined. Specimens were routinly processed, stained in borax carmine and Delafield hematoxylin, and mounted in permount. Drawings were prepared by camera lucida and the details filled in through microscopic observation. All measurements are in millimeters unless otherwise stated. All specimens are deposited in the Parasitic Collection, Parasitology Research Laboratory, Department of Biology, Faculty of Science, Chiang Mai University, Thailand.

RESULTS

Among the 389 fish of 33 species, 4: *Cirrhinus marginipinnis, Mystus nemurus, Pristolepis fasciatus*, and *Xenantodon cancilla*, were infected (1.02%).

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Systematic survey of species

Allocreadium handiai Pande, 1947 (Fig 1).

Diagnosis was based on 4 mature and 1 specimen having one egg. Body elongate 3.9-4.6 in length and 0.91-1.56 in width. Tegument aspinose. Many gland cells in anterior body part in front of ventral sucker. Oral sucker 0.35-0.40 × 0.32-0.45 in size, pharynx measuring 0.11-0.15 × 0.16-0.20, esophagus short 0.07-0.09 in length, ceca simple, end at posterior extremity. Ventral sucker in first third of body, small, spherical, measuring 0.25-0.40 in diameter. Testes somewhat elongate oval, anterior testis 0.35-0.50 × 0.30-0.75, posterior testis 0.35-0.70 × 0.25-0.50 in size. Cirrus sac lying on left side, before ventral sucker, measuring 0.48-0.56 × 0.20-0.28, involving vesicula seminalis and prostatic cells. Ovary slightly left side, measuring 0.10-0.31 × 0.10-0.20, seminal receptacle 0.038-0.041-0.032. in size. Vitelline follicles well-developed, extending from posterior end of body up to lower part of ventral sucker, penetrating post-testicular space. Uterine coils from genital pore to anterior testis. Genital opening median, midway between bifurcation and ventral sucker. Eggs 0.048-0.052 × 0.023-0.026 (Fig 1).

Host : *Pristolepis fasciatus*
Site : intestine
Prevalence : 18.1%
Mean intensity : 2.5
Abundance : 0.4

Comments. This species was described by Pande in 1937 from *Ophiocephalus punctatus* of India. Later it was reported from the same fish by Coil and Kuntz (1960) from East Pakistan. Srivastava (1960) described another new allocreadid species (*Allocreadium ophiocephali*) from the same host fish of India. Mehra (1966), while revising the families of Allocreadioidea,

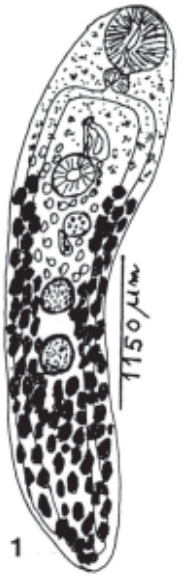

Fig 1- *Allocreadium handiai* Pande, 1947, ventral view.

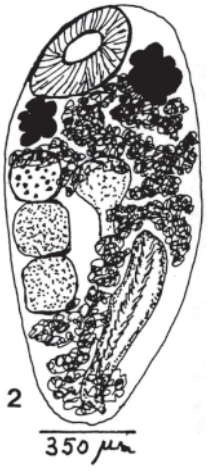

Fig 2- *Bucephalopsis karvei* Bhalerao, 1937, ventral view.

came to the conclusion that *A. ophiocephali* may be regarded as a synonym for *A. handiai*. Recently, Kakaji (1969) agreeing with Mehra's opinion (1966), regarded *A. ophiocephali* as a synonym for *A. handiai*. Our findings represent a new host locality record.

Bucephalidae Poche, 1907

Bucephalopsis karvei Bhalerao, 1937 (Fig 2)

Diagnosis based on 3 mature specimens. Body ovoid with broadest part anteriorly, 1.2-1.3 in length and 0.58-065 in width. Tegument spinose, posteriorly less numerous. Ventral sucker large, measuring 0.22-0.25×0.24-0.27. Pharynx in posterior body half, measuring 0.08-0.10×0.09-0.11, esophagus very short, intestine saccular, measuring 0.15-0.20. Testes mostly tandem, anterior testis 0.15 in diameter, posterior testis 0.11-0.12×0.18-0.20. Genital bursa elongate, located on left side, anteriorly reaching pharyngeal level, measuring 0.31-0.38×0.13-0.15, involving oval seminal vesicle and large pars prostatica; distal part forming genital atrium with openings of cirrus and uterus. Ovary oval 0.20-0.25×0.18-0.20 in size, between testes. Vitellaria locating two compact, lateral groups with 10-12 vitelline follicles in each, behind ventral sucker. Eggs 0.012-0.017×0.011-0.014 (Fig 2).

Host : *Xenentodon cancila*
Site : intestine
Prevalence: 28.5
Mean intensity : 3.5
Abundance : 0.9

Comments. This species was described by Bhalerao in 1937, from *Belone cancila* of India. Srivastava (1938) described another species, *Bucephalopsis belonea*, from *Belone strongylura* of India. Gupta (1956), while describing additional *Bucephalopsis* species, agreed with Nagaty (1937) that *B. belonea* is a synonym for *B. karvei*. Rupta (1958) depicted the morphological variability of *B. karvaei*; although the gonads show considerable variability, the position of the ovary is always before the anterior testis. The position of the ovary is the same in *B. belonea* (= *B. karvei*). Scholz (1991) reported specimens of *B. karvei*, in which the ovary was situated between the testes, which was regarded as an abnormality. Our samples show the usual position of the ovary (before anterior testis).

Gorgoderidae Looss, 1901

Phyllodistomum simile Nybelin, 1926 (Fig 3)

Diagnosis based upon two gravid specimens. Body spatulate in shape, 1.6-1.9 in length and 1.0 in width, greatest width at level of posterior part of testes. Tegument smooth, aspinose. Oral sucker terminal with lip, 0.20-0.22 in size, pharynx absent, esophagus short, 0.5-1.0 in length, intestinal ceca simple, broad, terminating near posterior end of testes or a little beyond. Ventral sucker 0.31-0.35×0.30-0.35 in size at level of junction of neck and broad portion of body. Genital organs just behind ventral sucker. Ratio of oral and ventral sucker 1:1.5. Testes symmetrical or a little tandem in position and lobed. Right testis 0.25-0.40×0.20-0.25 with 6-8 loculi, left testis 0.40-0.42× 0.20-0.25 with 6-8 loculi. Cirrus sack absent, seminal vesicle free in parenchyma. Genital opening just behind

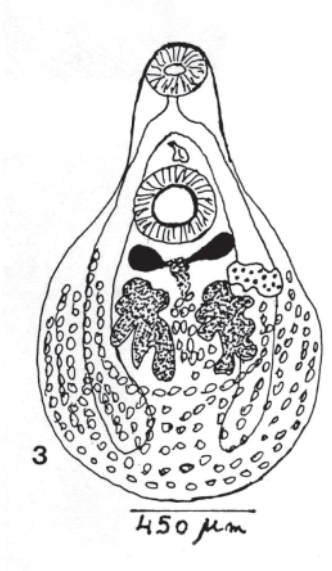

Fig 3- *Phyllodistomum simile* Nybelin, 1926, ventral view.

bifurcation, 0.4 from anterior end. Ovary oval, just in front of left testis, 0.15-0.17×0.10 in size. Vitelline glands consist of two follicles, spherical, entire, right 0.06-0.07×1.0-1.25, left 0.75×0.10). Uterus in form of loosely scattered coils between ventral sucker and posterior extremity, occupying extracecal areas. Female genital opening near genital pore, but separate from male genital opening. Eggs 0.026-0.030×0.018-0.020.

Host : *Cirrhinus marginipinnis*
Site : bladder
Prevalence : 16.6
Mean intensity : 2.0
Abundance : 0.3

Comments. *Phyllodistomum simile* was described by Nybelin in 1926 from the freshwater fishes, *Thymallus thymallus* and *Neogobius kessleri*, of Sweden. *Ph. folium* of Olfers (1816) and Luhe (1909) (in part) was regarded by Nybelin (1926) as synonyms for this species. On the other hand, Kakaji (1969) suppressed *Ph. simile* to a synonym of *Ph. folium* with some reservations (he recongnized morphological discrepancies between the two species in question) but regarded them as specific variations. *Ph. folium* at this time seemingly was a polytypic species, an assembly of closely-related forms. Recently, Pigulevsky (1953), on the basis of a large collection of these forms, divided the *Ph. folium* species-group into four separate species, and *Ph. simile* was treated as a valid species. *Ph. simile* seems to be a rare species, distributed in northern Europe and Asia. *Mystus nemurus* is a new host and Thailand is a new locality record.

Heterophyidae Odhner, 1914
Haplorchoides sp

Diagnosis based only on one incomplete specimen. Body elongate 0.71×0.26 in size. Tegument spinose, posteriorly with less dense arrangement. Oral sucker 0.030-×0.045 in size, pre-pharynx 0.08 long, pharynx 0.025 in diameter, esophagus 0.05 long, ceca simple tubular ending at posterior extremity. Testis oval, 0.10× 0.12 in size, medially in posterior third of body. Ovary transverse oval, 0.050-0.090, in middle of body. Seminal receptacle lateral to ovary, 0.04 in diameter. Vitelline follicles dispersed in posterior body part. Eggs 0.022-0.024×0.012-0.016, filling the posterior part of the body.

Host : *Mystus nemurus*
Site : intestine

Comments. The single and incomplete specimen did not enable closer identification or analysis of its relationship with other species of the genus. Among the neighboring countries *Haplorchoides mehrai* Pande *et* Shukla, 1976 was reported by Scholz (1991).

Monorchiidae Odhner, 1911
Asymphylodora sp

One immature and incomplete specimen was available and thus some morphological data (body 0.85 in length and 0.4 in width, testes 0.25x0.19 in size and ovary measuring 0.05x0.01) could be measured. It was found in the intestine of *Cirrhinus marginipinnis*.

DISCUSSION

In the last several decades numerous rivers were impounded to form water reservoirs (dams) for different purposes in cold, temperate and tropical belts alike. These newly-established man-made water bodies became entirely new aquatic environments. Therefore, numerous observations and reports have focused on the recruitment of the parasitic fauna of their fish. Reorganization of the parasitic fauna in such reservoirs has been well documented (Bauer and Stolyarov; 1958; Dogiel, 1958; Becker *et al*, 1978; Si and Leong, 1997) and there are several more or less accepted generalizations that influence and regulate formation of the parasitic community. Especially, observations that include data on parasites of the pre- and post-impoundment conditions (Bauer and Stolyarov, 1958) are informative. In general, it can be said that the parasitic fauna of a given area are a consequence of historically- and ecologically-determined time and space interactions. In a newly established water body, the initial period is characterized by a transitional, on stable situation, which later will be stabilized, with a

dynamic balance coming into being in the framework of the given environment, followed by a potential biodiversity of parasitic species.

Our observations are only a case report on trematodes of Bhumipol Dam, which is located along the Ping River, which is the source of its water supply and re-population of its invertebrate and vertebrate fauna. Although the parasites of fish of the Ping River were not studied prior to the establishment of this dam, our results contribute to knowledge of the presently found trematodes for a significant number of fish species. Among the infected fish, the prevalence was low: *Cirrhinus marginipinnis* (6.0% in both cases of trematodes found), *Mystus nemurus* (2.2), *Pristolepis fasciatus* (5.5%) and *Xenentoda cancila* (3.2%), with a limited number of trematodes (5 species). A comparison of our results with a similar examination in a neighboring area, the Perak River, Malaysia (Si and Leong, 1997) showed very similar results; 2 out of 6 fishes were infected with a low prevalence of 4 trematodes.

Further examinations are worth carrying out to trace the formation of biodiversity among the parasitic fauna of this reservoir, together with its environmental recruitment.

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