# *MICROPHALLOIDES VAJRASTHIRAE* N. SP. (DIGENEA: MICROPHALLIDAE) FROM THE SMALL INTESTINE OF CAT IN THAILAND

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## INTRODUCTION

*Microphalloides* was first described as metacercaria from the crab, *Helice tridens*, by Yoshida (1916), but he did not propose a name for it. Osborn (1919), studied Yoshida's description, proposed to place it in the genus *Microphallus*, and called it *Microphallus japonicus*. *In* 1938, Yoshida studied the adult of *Microphallus japonicus* recovered from the small intestine of experimental animals infected with the metacercariae from crabs, he found that *Microphallus japonicus* differed from other *Microphallus* by having vitellaria in the anterior half of the body, a large cirrus sac, and ovary on the left side of the body. Yoshida removed *japonicus* from *Microphallus* and placed it under his newly elected genus *Microphalloides*. The second species of *Microphalloides* was described from the small intestine of natural infected water rat, *Hydromys chrysogaster*, from Australia, *M. australiensis*, by Deblock and Pearson (1968). This is the third species of *Microphalloides* to be described and the first species to be reported from Thailand.

## MATERIALS AND METHODS

Four specimens of a small microphallid trematode were from those deposited in the collection of Professor Suvajra Vajrasthira. The specimens were recovered from the small intestine of a naturally infected cat from Nakhon Nayok Province, Central Thailand. These were stained with acetic carmine, mounted in permount, and were mounted dorsal side up. Remounting was not done as the wholemounts were 10 years old, and the specimens could be destroyed during the remounting process. The specimens were good enough to study most features in detail except around the genital opening.

## RESULTS

*Microphalloides vajrasthirae* new species

Body oval, broader posteriorly; 755(680-825) μ long and 725 (680-770) μ wide; covered with minute scales throughout the body, except around the mouth and around the excretory pore. Oral sucker spherical 82 (75-90) μ in diameter; mouth subterminal; prepharynx narrow 15(10-20) μ long; pharynx 55(45-65) μ long and 50(45-55) μ wide; oesophagus narrow 93(65-120) μ long; caecal bifurcation at 238(190-285) μ from the anterior end; caeca wide, end blindly at the level of the anterior border of ventral sucker (Fig. 1).

Ventral sucker 100(90-110) μ in diameter, slightly modified, median, post bifurcation in the posterior half of the body.

Testes opposite, ovoidal, located posterior to ovary near the broad posterior end of the body; right testis 192 (175-210) μ long and 110(90-134) μ wide; left testis 187(175-200) μ long and 125(110-140) μ wide. Sperm duct from each testis runs forward and joins dorsal to ventral sucker. Cirrus sac semi-circular, 358(330-385) μ long and 73 (55-90) μ wide, proximal end with sclerotized

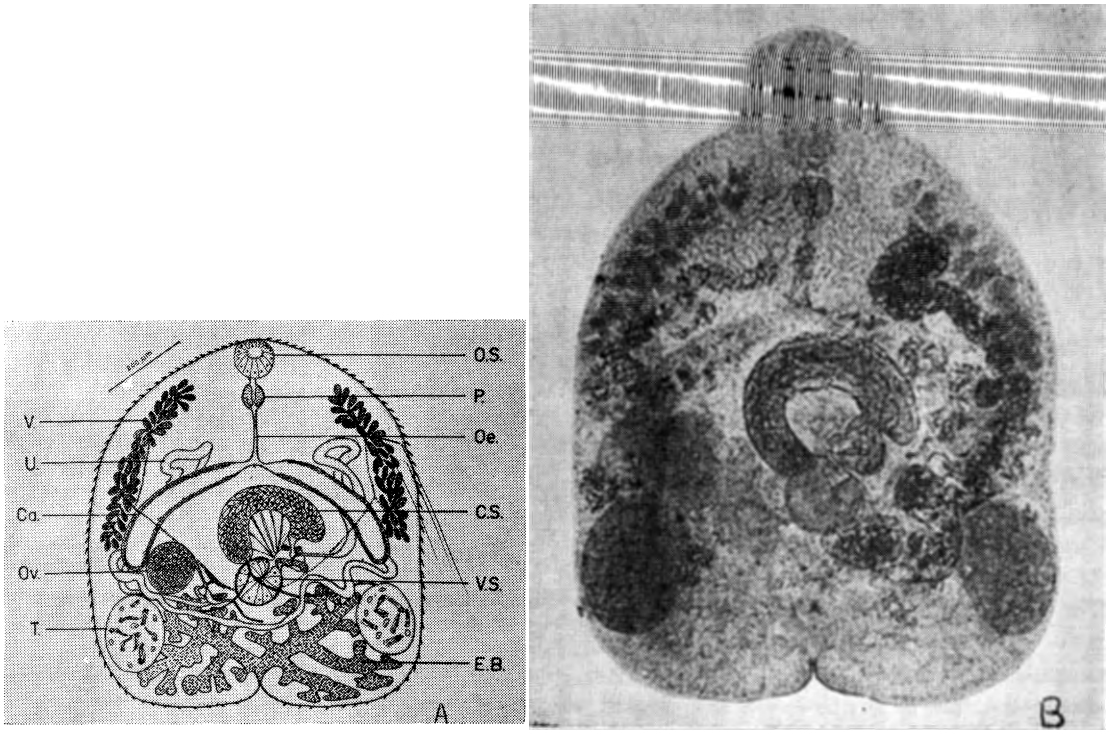


Fig. 1—A. Schematic drawing of adult, dorsal view; outline by Camera lucida, details of free hand.
B. Adult, dorsal view.

plate, lies transversely between caeca bifurcation and ventral sucker, and filled with prostatic gland cells; seminal vesicle not seen. Ejaculatory duct runs posterodorsal, joins with metraterm to form a short genital sinus which opens between two sclerotized bars in the genital sac (Fig 1). Genital sac large, antero dextral to ventral sucker, armed with two sclerotized bars which lie transversely parallel; first bar, close to ventral sucker, 73 (68-78) μ long and 23(20-26) μ wide; second bar 49 (42-55) μ long and 7(5-8) μ wide. The posterior wall of cirrus sac and the anterior wall of the genital sac are connected by a bundle of muscle fibres.

Ovary ovoidal, 120(110-130) μ long and 105(90-120) μ wide, lies sinistral to ventral sucker, anterior to left testis; oviduct arises antero-dextrally, runs posteriorly sinistral to ventral sucker, joins with common vitelline duct and duct of seminal receptacle at the level of posterior border of ovary, then opens into ootype; seminal receptacle small, 34 (29-39) μ long and 20(19-21) μ wide; Laurer's canal present, opens dorsally in the median line of the body in front of the excretory bladder (Fig. 3); uterus voluminous, fills middle part of the body from anterior to caeca to anterior border of excretory bladder; metraterm runs mediad, dextral to ejaculatory duct; vitelline follicles in two groups, one on each side of the body from the level of pharynx to the end of caeca. Egg numerous, small, operculated, 17(14-19) μ long and 10(8-11) μ wide (20, uterine).

Excretory bladder highly branched V-shaped, with about 3 primary branches on the anterior and posterior wall of each arm of the V; excretory pore terminal.

Host: Cat

Location: small intestine

Locality: Nakhon Nayok, Central Thailand

Deposition: Department of Helminthology, Faculty of Tropical Medicine, Mahidol University, Thailand. Holotype, TH30201; Paratype, TH30202.

## DISCUSSION

Among the three species of *Microphalloides*, it seems that *M. australiensis* is the smallest, *M. japonicus* and *M. vajrasthirae* are more or less the same size, but *M. japonicus* is slender than *M. vajrasthirae*. This may be due to the different methods of fixation. Eggs of the three species differ in sizes (Table 1), egg of *M. vajrasthirae* is the smallest of the three. The most striking feature for differentiation is the excretory bladder, in *M. australiensis* the excretory bladder is simple Y-shape with short stem, that of *M. japonicus* is V-shaped, with forked arms, and that of *M. vajrasthirae* is V-shaped and highly branched. *M. vajrasthirae* also differs from the other two species in having two sclerotized bars lying in parallel in the genital sac. *M. japonicus* and *M. australiensis* have two groups of sclerotized plates facing each other between the ends of the cirrus sac; one plate on the left in both species, one on the right in *M. japonicus* (Fig. B. of Yoshida, 1938), and three on the right in *M. australiensis* (Fig. 2 of Deblock and Pearson, 1968).

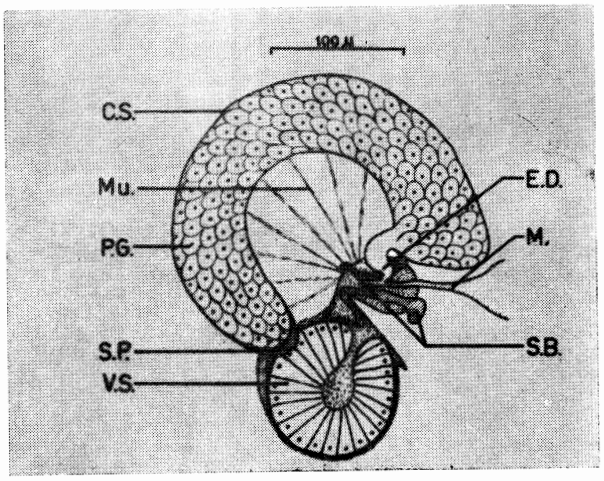


Fig. 2—Dorsal view of genital termination area.

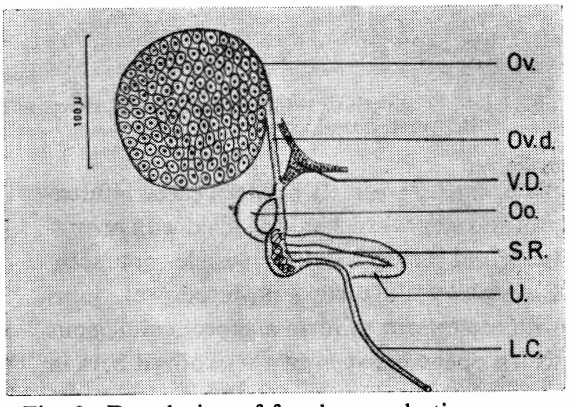


Fig. 3—Dorsal view of female reproductive organ.

*Key to Lettering*

Ca. – Caecum
C. S. – Cirrus sac
E. B. – Excretory bladder
E. D. – Ejaculatory duct
L. C. – Laurer's canal
M. – Metraterm
Mu. – Muscle
Oe. – Oesophagus
Oo. – Ootype
Ov. – Ovary
Ov. d. – Oviduct
O. S. – Oral sucker
P. – Pharynx
P.G. – Prostatic gland
S. B. – Sclerotized bar
S. P. – Sclerotized plate
S. R. – Seminal receptacle
T. – Testis
U. – Uterus
V. – Vitellaria
V. D. – Common vitelline duct
V. S. – Ventral sucker

Table 1
Comparison of the three *Microphalloides*.

| | *australiensis* (from Deblock and Pearson, 1968) | *japonicus* (from Yoshida, 1938) | *vajrasthirae* (present paper) |
|---|---|---|---|
| Body length (μ) | 400 - 550 | 600 - 900 | 680 - 825 |
| Body width (μ) | 160 - 200 | 300 - 400 | 680 - 770 |
| Egg length (μ) | 17 - 21 | 24 - 26 | 14 - 19 |
| Oral sucker:Ventral sucker | 1 | 0.6 | 0.8 |
| Excretory bladder | simple, Y-shaped, with short stem | V-shaped, with forked-arms | V-shaped, arms highly branched |

The seminal receptacle is clearly seen in *M. vajrasthirae*, although it is small, it has sperm inside. In *M. japonicus* and *M. australiensis*, a seminal receptacle is absent. The uterus of *M. japonicus* and *M. australiensis* is confined to the posterior half of the body, but in *M. vajrasthirae*, the uterus reaches into the anterior half of the body, in front of the caeca.

Key to species of *Microphalloides* Yoshida, 1938.

Excretory bladder simple, Y-shaped, with short stem..... *australiensis* Deblock and Pearson, 1968.

Excretory bladder V-shaped, forked arms ..... *japonicus* (Osborn, 1919)

Excretory bladder V-shaped, arms highly branched..... *vajrasthirae* n. sp.

## SUMMARY

Four specimens of a microphallid trematode were recovered from the small intestine of a cat from Nakhon Nayok, Central Thailand. The worm is assigned under the genus *Microphalloides* with new species name *vajrasthirae* in honour of Professor S. vajrasthira who provided the specimens for this study. This species is the third species in *Microphalloides*, and differs from other two species, *japonicus* and *australiensis* by having (i). genital sac armed with two sclerotized bars, (ii). highly branched V-shaped excretory bladder, (iii). small seminal receptacle, (iv). uterus extended to the anterior half of the body.

## ACKNOWLEDGEMENTS

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# RESEARCH NOTES

## EXPERIMENTAL INFECTIONS OF *CAPILLARIA PHILIPPINENSIS* IN MULTIMAMMATE RATS *(MASTOMYS NATALENSIS)*

The natural reservoir host for *Capillaria philippinensis* has remained an enigma since the parasite and disease, intestinal capillariasis, were first reported from the Philippines. A variety of animal specimens numbering in thousands have been examined in search for a natural host but adult worms have not been found except in humans. Experimentally, the parasite has been transmitted to monkeys (Cross *et al.*, 1972, *Trans. Roy. Soc. Trop. Med. Hyg.*, *66*: 819) Mongolian gerbils, and a few wild rats, (Cross *et al.*, 1978, *J. Parasitol.*, *64*: 208) by feeding the animals larvae from experimentally infected fish or by stomach tube passage of adult and larval worms from the intestines of infected gerbils (Cross *et al.*, 1972, *Trans. Roy. Soc. Trop. Med. Hyg.*, *66*: 819; Cross *et al.*, 1978, *J. Parasitol.*, *64*: 208; and Bhaibulaya *et al.*, 1979, *Int. J. Parasitol.*, *9* : 105). Bhaibulaya and Indra-Ngarm (1979, *Int. J. Parasitol.*, *9*: 320) have also reported experimental infections in fish-eating birds in Thailand and we have subsequently confirmed these findings by experimentally infecting fish-eating birds from Taiwan (Cross *et al.*, 1983, *Trans. Roy. Soc. Trop. Med. Hyg.*, in press).

The present communication is to briefly report experimental transmissions of the parasite to multimammate rats (*Mastomys natalensis*). Approximately 100 adult and larval parasites from gerbil intestines were introduced by stomach tube to five adult male multimammate rats and two Mongolian gerbils (*Meriones unquiculatus*) which served as controls. Two of the multimammate rats developed patent infections at 12 and 43 days and at necropsy at 43 and 76 days, 1775 and 195 adult and larval *C. philippinensis* were recovered from the rat intestines. No infections developed in two other rats and a single male worm was found in the remaining animal. One gerbil control was also negative, but in the other eggs were present in the feces at 12 days and when the animal was necropsied at 40 days 3,112 worms in all stages of development were recovered from the intestine.

Unfortunately, further studies could not be done but the preliminary findings indicate that another laboratory animal model is available for studies with *C. philippinensis*.

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