

Two New Trematodes of Cephalogonimus from Amyda¹⁾

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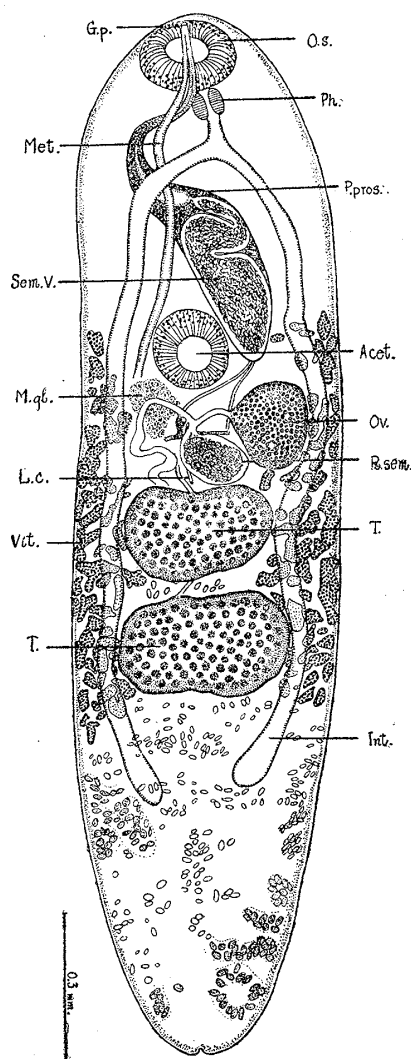


Fig. 1. *Cephalogonimus parvus*, dorsal view.

In the course of my researches on the helminth fauna of Manchoukuo, two species of trematode which are intestinal parasites of the mud turtle, *Amyda sinensis* (Wiegmann)²⁾, were placed at my disposal. Both of them belong to the genus *Cephalogonimus*, but have some differences in structure from all the known species.

In pursuing this study I am much indebted to Dr. Y. Ozaki, Hiroshima University, for his kind guidance. My thanks are also due to Mr. T. Ogata for his help in consulting literature.

Cephalogoniminae Looss, 1899.

Cephalogonimus Poirier, 1886.

Cephalogonimus parvus n. sp.

Habitat: Intestine of *Amyda sinensis* (Wiegmann).

Locality: Mukden, Manchoukuo. (1938).

Specimen: Nos. 51 (Type), 52, 58, 62. Deposited in author's collection.

An uncommon species; minute, whitish in life, which makes it easy to recognise when found together with other worms.

Description: Pressed material. The body, 1.35~2.16 mm long and 0.40~0.52 mm broad, is elongate with bluntly rounded anterior and tapering cone-shaped posterior extremities. The cuticle is provided with short spines which are densely set in the anterior region of the body. On the ventral surface the spines are most crowded at the level of the acetabulum; then they gradually become fewer in number toward the posterior end.

1) Researches on the Helminth Fauna of Manchoukuo, II.
2) syn. *Amyda maackii* (Brandt). Pope; The Reptiles of China. (1935)

On the dorsal surface they do not occur beyond the acetabulum. Their arrangement shows distinct regularity. Under the cuticle many well-stained gland cells are scattered about in the head region.

The oral sucker is of the shape of a somewhat transversely depressed ellipsoid, and lies on the ventral surface near the anterior end of the body, 0,14~0,19 mm by 0,12~0,16 mm. The acetabulum is nearly spherical, 0,12~0,16 mm by 0,13~0,18 mm, and situated at the second quarter of the body. The oral sucker exceeds the acetabulum in width, though slightly shorter, and is generally larger than the acetabulum.

A very short prepharynx follows the oral sucker. The pharynx is 0,06 mm wide. The rather long esophagus, which measures 0,09 mm, bifurcates into intestinal caeca which lie on the lateral side of the body and run backward beyond the testes. Toward the ends they increase in thickness slightly and curve somewhat inward, extending to the third quarter of the body length, about 0,47 mm from the hind end. The wall of the intestine is smooth.

The excretory system is similar to that of *Cephalogonimus japonicus* Ogata, 1934. The excretory pore is terminal, where the vessel shows some foldings, though no caudal vesicle is formed. The excretory trunk vessel is rather thick and extends forward on the median line of the dorsal side to the posterior testis, where it divides into two cornua which embrace the anterior testis and reach the posterior margin of the acetabulum, giving off many branchlets in their courses so as to present a dendritic figure. The trunk also receives three pairs of ramified branches, of which the last pair is the smallest while the first is the largest.

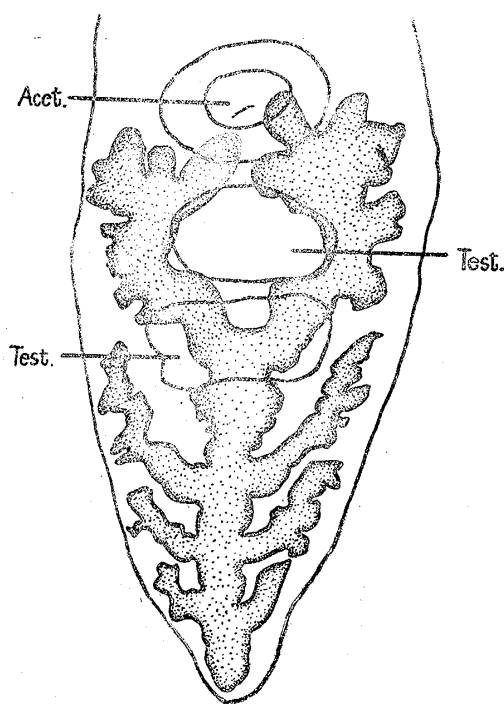


Fig. 2. Excretory system of *C. parvus*.

The genital pore opens on the middle line on a small process which lies on the dorsum of the oral sucker. The genital sinus is present, and rather vaguely differentiated from the metraterm by a slight constriction.

The two testes lie one directly behind the other; they are elongated horizontally and look somewhat like silk-worm cocoons. The anterior testis is located near the middle of the body, and measures 0,29 mm by 0,16 mm. The posterior testis is 0,33 mm by 0,18 mm, and somewhat larger than the former. They occupy the entire space between the intestinal caeca, and also between the dorsal and ventral body surfaces, but never fold over the intestine. The fine vasa efferentia, arising from the antero-median point of the testes, advance forward on the ventral side, and turn dorsad to open into the base of the cirrus sack. The cirrus sack is well developed and curved gently like an elongate S, and terminates at the level of the acetabulum on

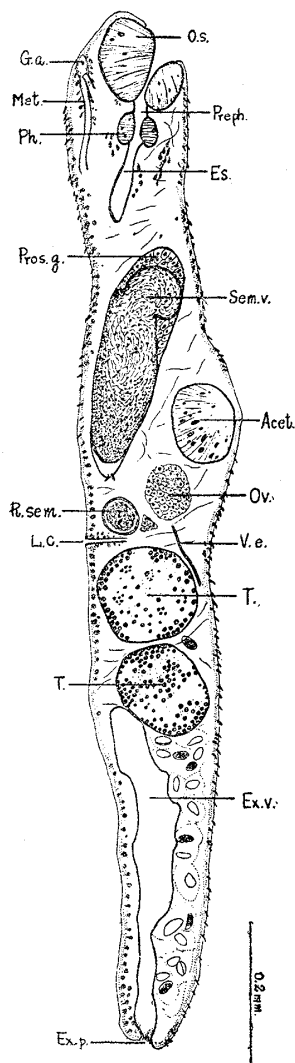


Fig. 3. Sagittal section
of *C. parvus*.

The vitellaria are composed of small follicles irregularly scattered on the ventral side of the intestine both on its inner and outer sides. They extend from the level of the acetabulum to the hind level of the hind testis, never reaching the end of the intestine. The vitelline ducts on both sides go toward the center of the body at the height of the ovary, and join together to form a yolk reservoir, which opens into the oviduct just in front of the ootype. The egg is brown, ellipsoidal, measuring $29.4 \sim 31.5 \mu$ by $15.7 \sim 17.5 \mu$

its right side. Sections show that the cirrus-sack begins as a thin tube from the genital sinus, and goes underneath the left intestinal caecum to the ventral side, where it is thickened, measuring, 0.14 mm in maximum breadth, and curved dorsally again. The posterior end extends to the level of the center of the acetabulum. The seminal vesicle is very large and occupies the whole space of the posterior half of the cirrus sack; its anterior part is tubular and has a convolution. A thin pars prostatica follows this convolution, being defined by a weak constriction and compactly surrounded by prostate cells.

The ovary lies anterior to the anterior testis and displaced to the right side in contact with the right intestinal wall. It is irregularly oval, measuring 0.18 mm by 0.15 mm . From its left side near the middle, originates a short oviduct which runs toward the dorsal and left side, then it curves ventro-posteriorly and enlarges to become the ootype which is enclosed by many cells of Mehlis' gland. Just in front of the ootype, the oviduct receives the receptaculum seminis and the Laurer's canal. The receptaculum seminis is situated dorsally on the median line in the center of the body, postero-sinistrally to the ovary. It is large, measuring, 0.11 mm by 0.09 mm , and of irregular ovoid shape. The Laurer's canal takes a backward course beneath the receptaculum seminis and opens dorsally just on the dorsum of the anterior margin of the first testis. Following the ootype, the coil of the uterus runs postero-ventrally, and extends to the posterior end of the body. Its course is not obvious, but seems to be asymmetrically disposed. The metraterm lies on the left side of the body just on the dorsum of the cirrus sack, and continues to the genital sinus.

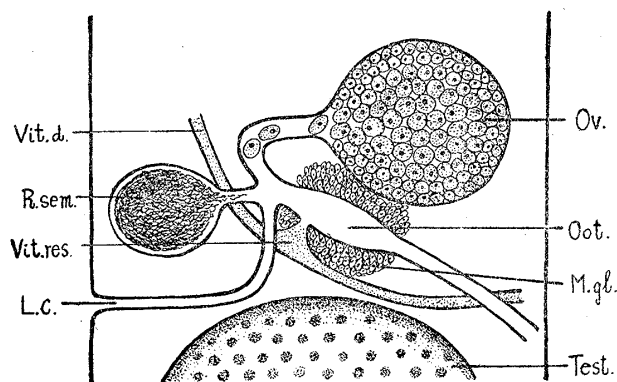


Fig. 4. Female genital complex of *C. parvus*,
side view.

in life, and $24.5\sim 31.5\ \mu$ by $14.0\sim 17.1\ \mu$ in the fixed state without filament.

Remarks: This species is closely allied to *C. magnus* Sinha, 1932 (syn. *C. gangeticus* Pande, 1932) in its general structure, but differs from it in the feature of the excretory system. Especially the absence of the caudal vesicle is the characteristic which distinguishes the species from *C. magnus*. The importance of the presence or absence of a caudal vesicle for specific distinction has already been pointed out by Nickerson (1912). On the other hand, *C. parvus* resembles *C. japonicus*, especially in the den-

dritic figure of the excretory vesicle, but it is easy to distinguish them by the differences in the size of the oral and ventral suckers, in the position of the base of the cirrus sack, and in the size of the posterior testis.

Bhalerao (1936), after studying the structural variation of the allied forms, has come to the conclusion that *C. amphiumae* Chandler, 1923, *C. magnus* and *C. gangeticus* are one and the same species. To me *C. amphiumae* seems to be an independent species, although *C. gangeticus* may be identical with *C. magnus*.

Cephalogonimus manchuricus n. sp.

Habitat: Intestine of *Amyda sinensis* (Wiegmann).

Locality: Mukden, Manchoukuo. (1936-1938).

Specimen: Nos. 2, 59, 60 (Type), 61. Deposited in author's collection.

When alive, this worm is brownish and distinctively larger than the former species.

Description: Pressed material. The body is oblong, with conical anterior and posterior extremities and almost parallel sides. It measures $3.85\sim 4.71$ mm in length and $0.85\sim 0.98$ mm in width at the level of the anterior testis. The cuticle is provided with spines.

The oral sucker is circular, subterminal, and $0.22\sim 0.27$ mm in diameter. The acetabulum is located near the end of the first third of the body, namely halfway from the cephalic end to the posterior testis, and is distinctly larger than the oral sucker, measuring $0.31\sim 0.33$ mm in diameter. The prepharynx is very short, the pharynx is $0.09\sim 0.13$ mm wide, while the esophagus is $0.05\sim 0.09$ mm long. The intestinal caeca run straight backward parallel to the sides of the body, and stretch over the posterior testis, but never extend to the point midway

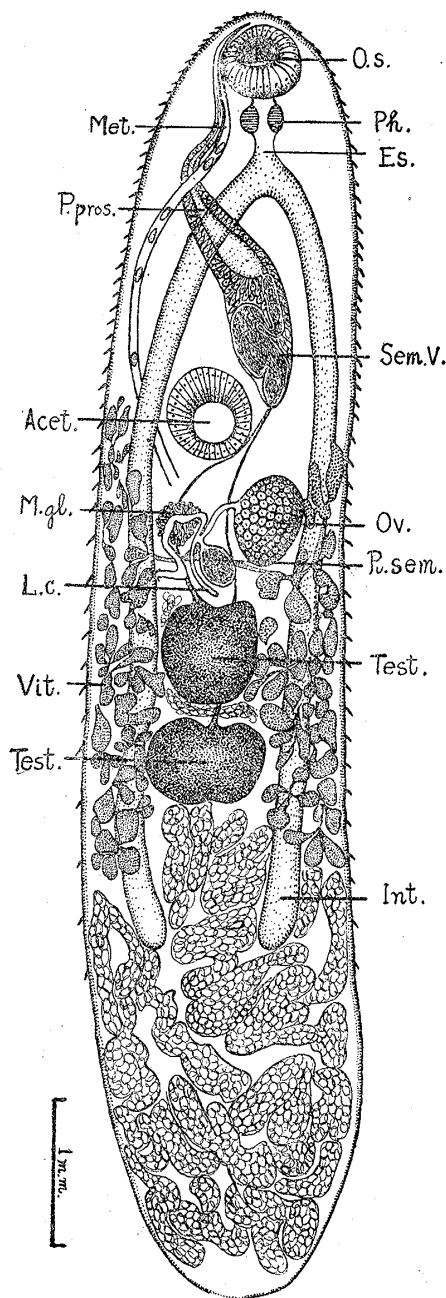


Fig. 5. *Cephalogonimus manchuricus*
dorsal view.

between this and the posterior end of the body. The posterior part of the intestinal caeca is somewhat enlarged and bends more or less inward. The excretory pore opens at the posterior extremity, and there is no caudal vesicle.

The genital pore opens on the antero-dorsal side of the body, right above the oral sucker. The two testes, lying directly one behind the other on the median line, are equal in size, or the posterior one is a little larger than the anterior. Both are irregular in shape, but look more or less like a silk-worm cocoon. The anterior testis is globular in some cases, and is situated at the middle of the body or a little in front of the middle, measuring 0,32~0,85 mm in breadth and 0,20~0,38 mm in length. The posterior testis, lying immediately behind the anterior, is 0,39~0,63 mm wide and 0,19~0,34 mm long.

From the antero-central margins of both testes start the thin vasa efferentia, which extend forward to penetrate into the base of the cirrus sack. These tubes, unlike those of *Cephalogonimus lenoiri* Poirier 1886, are not united to form a distinct vas deferens before they enter the cirrus sack. The cirrus sack is fairly slender and fusiform, starting as a thin tube from the genital pore. It passes by the left side of the oral sucker, and extends under the left intestinal branch near its bifurcation to the right or rarely to the left side of the acetabulum. The posterior part of the cirrus sack increases in thickness and its conical hind end reaches the centrum of the acetabulum. Thus the whole figure of the cirrus sack forms a gentle curve and an elongate S, and has the widest breadth of 0,19~0,32 mm. The seminal vesicle, which occupies the whole posterior part of the cirrus sack, is very voluminous. Its anterior region becomes narrow and after folding upon itself, connects with the tubular portion of the pars prostatica which is surrounded compactly by many prostate cells. The pars prostatica diminishes in thickness as it advances forward to the genital opening. Other parts of the cirrus sack, i. e. the ductus ejaculatorius and the cirrus, are not differentiated.

The ovary is oval and located on the dextro-posterior side of the acetabulum just inside the right intestinal branch, measuring 0,31~0,38 mm in length and 0,19~0,28 mm in width. From the center of the left margin of the ovary arises the short oviduct, which runs obliquely backward. The receptaculum seminis is located on the median line of the body, somewhat behind the ovary, and oval in shape, 0,16~0,17 mm long and 0,12~0,16 mm wide. The Laurer's canal opens on the dorsal surface just above the anterior testis. The ootype is surrounded by the Mehlis' gland cells. The uterus proceeds posteriad from the ootype passing under the testes. It is convoluted very irregularly and occupies the whole post-testicular region. The descending and ascending uteri are not so symmetrically arranged as those of *C. lenoiri*, the terminal parts run forward on the back of the cirrus sack to open on the genital sinus.

The aciniform yolk-glands are composed of rather large follicles, extending forward as far as the level of the acetabulum. Posteriorly they reach the level halfway between the posterior border of the posterior testis and the end of the intestine, being disposed on the ventral, dorsal and outer sides of the caecum. The vitelline ducts start from the level of the posterior margin of the ovary, and advance inward to meet each other to form a triangular yolk reservoir.

The egg has no filament and is 24,5~25,6 μ by 16,1~17,5 μ when alive, and

21~28 μ by 14~18 μ in pressed preparation.

Remarks: *Cephalogonimus manchuricus* is related more closely to *C. lenoiri* and *C. vesicaudus* Nickerson, 1912, than to any other described species, in possessing an oral sucker smaller than the acetabulum. But it differs from *C. vesicaudus* in its tandem position of testes and in the absence of caudal vesicle. It is also distinct from *C. lenoiri*³⁾ in its conical extremities of the body, the short esophagus, and in the asymmetrical arrangement of the uterus.

ABBREVIATION

Acet.	Acetabulum.	Oot.	Ootype.
Es.	Esophagus.	Ph.	Pharynx.
Ex. p.	Excretory pore	P. pros.	Pars prostatica.
Ex. v.	Excretory vesicle.	Preph.	Prepharynx.
G. a.	Genital atrium.	Pros. g.	Prostate gland.
G. p.	Genital pore.	R. sem.	Receptaculum seminis.
Int.	Intestine.	Sem. v.	Seminal vesicle.
Met.	Metraterm.	Test.	Testis.
M. gl.	Mehlis' gland.	V. e.	Vasa efferentia.
L. c.	Laurer's canal.	Vit.	Vitelline follicle.
O. s.	Oral sucker.	Vit. d.	Vitelline duct.
Ov.	Ovary.	Vit. res.	Vitelline reservoir.

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3) Unfortunately the original description of *C. lenoiri* has been inaccessible to me; but the diagnosis and the figure of the species given by Caballero and Sokoloff in their paper "Quinta contribucion al conocimiento de la parasitologia de *Rana montezumae*" were very useful and precise enough to enable me to find fundamental differences between the two species.