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ON SOME MONOGENETIC TREMATODES (FAMILY HETERAXINIDAE PRICE, 1962) FROM MARINE FISHES OF PURI, ORISSA

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ABSTRACT

Five new species of the monogenetic trematodes *Monaxine* and *Leuresthicola* from marine fishes from Puri, Orissa, are described. The host fishes are: *Pseudosciaena diacanthus* (Bleeker), *Caranx armatus* (Cur. & Val.), *Saurus indicus* (Day), *Pseudosciaena diacanthus* (Bleeker) and *Cybium guttatum* (Cuv. & Val.). The trematodes were collected from the gill filaments.

Key Words: Monogenetic Trematodes, Parasites, Marine Fishes, India.

RESUMEN

Se describen cinco nuevas especies de los tremátodos monogéneos *Monaxine* y *Leuresthicola*, parásitas de los peces *Pseudosciaena diacanthus* (Bleeker), *Caranx armatus* (Cur. & Val.), *Saurus indicus* (Day) y *Cybium guttatum* (Cuv. & Val.).

Palabras clave: Tremátodos Monogéneos, Parásitos, Peces Marinos, India.

Monaxine caballeroi sp. nov.
(Pls. 1-2 Figs. 1-5)

Four specimens were collected from the gill filaments of a marine fish, *Pseudosciaena diacanthus* (Bleeker) from Puri, Orissa.

Description: Body elongate, tapering anteriorly, 2.07 to 2.35 mm long, 0.40 to 0.49 mm wide. Opisthohaptor asymmetrical, with 30 to 35 clamps in a single row along posterior side, 0.02 to 0.05 mm long, 0.015 to 0.041 mm wide. Clamp skeleton *Microcotyle* type; lateral sclerites unjointed and median spring with accessory piece. Terminal anchors absent.

Prohaptoral suckers spherical, widely separated, 0.025 to 0.045 mm in diameter, opening into oral cavity. Oral apertures subterminal. Pharynx ovoid, muscular, 0.03 to 0.05 mm long, 0.025 to 0.035 mm wide. Oesophagus long, tubular. Intestinal crura branched, not confluent posteriorly.

Testes 22 to 29 in number, postovarian, intercaecal, arranged irreguraly in two longitudinal rows, extending distally to near anterior limits of opisthohaptor, 0.15 to 0.17 mm long, 0.13 to 0.17 mm wide. Genital atrium a little anterior to intestinal bifurcation, muscular, armed with four groups of spines, two groups lateral with 10 spines each, one group anterior with 8 to 10 spines and the other group posterior with 15 spines.

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Ovary flexed, pretesticular, median with its distal end directed forward, 0.20 to 0.32 mm long, 0.07 to 0.14 mm wide. Vaginal pore unarmed, lateral, postbifurcal. Vagina 0.15 to 0.20 mm long, 0.04 to 0.05 mm wide. Vitellaria follicular, extending from pharynx up to posterior end of body. Vitelline reservoir 'Y' shaped, anterior to ovary. Eggs with a long filament at opercular end and a shorter process at opposite end.

Host: *Pseudosciaena diacanthus* (Bleeker).
Location: Gill filaments.
Locality: Puri, Orissa.

Discussion: Price (1962) proposed a new family, Heteraxinidae, for those microcotyloid species in which the opisthohaptor is triangular, but with the sides of the triangle unequal. He divided the family into six subfamilies as follows: Heteraxininae Unnithan, 1957 for *Heteraxine* Yamaguti, 1928 (type *H. heterocerca* (Goto, 1894)), *Zeuxapta* Unnithan, 1957 (type *Z. seriolae* (Meserve, 1938), *Allencotyla* (type *A. mcintoshi*) *Heteraxinoides* Yamaguti, 1962 (type *H. triangularis* (Goto, 1894), *Karavolicotyla* (type *K. karavoli* (Unnithan, 1957)) and *Kannaphalus* Unnithan, 1957 (type *K. virilis* (Unnithan, 1957)); *Cemocotylinae*, for *Cemocotyle* Sproston, 1946 (type *C. carangis* (Mac Callum, 1913)) and *Cemocotylella* (type *C. elongata* (Meserve, 1938)); *Heteromicrocotylinae*, for *Heteromicrocotyle* (type *H. carangis* (Yamaguti, 1953)); Gonoplasiinae, for *Gonoplasius* Sandars, 1944 (type *G. carangis* (Sandars, 1944)) and *Cynoscionicola* (type *C. heteracantha* (Manter, 1938)); Lintaxininae for *Lintaxine* Sproston, 1946 (type *L. cokeri* (Linton, 1940)), *Megamicrocotyle* Tripathi, 1956 (type *M. chirocentrus* (Tripathi, 1956)) and *Bicotyle* Tripathi, 1956 (type *B. reticulata* (Goto, 1894)); and Monaxininae Unnithan, 1957 for *Monaxine* Unnithan, 1957 (type *M. formionis* (Unnithan, 1957)), *Leuresthicola* (type *L. olsoni*) and Crotalaxinae Unnithan, 1957 (type *C. serpentina* (Unnithan, 1957)).

The new form belongs to the genus *Monaxine* Unnithan, 1957 of which only two species viz., *Monaxine formionis* Unnithan, 1957 and *Monaxine bivaginalis* Ramalingam, 1961 are known. The description of *Monaxine bivaginalis* Ramalingam, 1961 is based on juvenile and immature specimens, hence its systematic position is rather doubtful.

The new form differs from *Monaxine formionis* in the extension of vitellaria from pharynx up to posterior end of body instead of from vaginal pore up to hind end of opisthohaptor, in having 22 to 29 testes instead of 19 to 22 testes, in having 30 to 35 clamps on one side instead of 70 to 76 clamps and in having vaginal pore lateral instead of middorsal in position. Accordingly, it is regarded as a new species with the specific name *Monaxine caballeroi* sp. nov.

The new species is named in honour of Professor Eduardo Caballero y Caballero. Mexico.

Monaxine hargisi sp. nov.
(Pl. 3. Figs. 1-3)

Eight specimens were collected from the gill filaments of a marine fish, *Caranx armatus* (Cuv. & Val) from Puri, Orissa.

Description: Body elongate, tapering anteriorly, 1.32 to 1.4 mm long, 0.31 to 0.37 mm wide. Opisthohaptor asymmetrical with 21 to 32 clamps in a single row along posterior side, 0.03 to 0.05 mm long, 0.03 to 0.04 mm wide. Clamp skeleton of *Microcotyle* type; lateral sclerites unjointed and median spring with bifid accessory piece. Terminal anchors absent.

Prohaptoral suckers spherical or ovoid, 0.03 to 0.04 mm in diameter. Oral aperture subterminal. Pharynx muscular,

ovoid, 0.05 to 0.06 mm long, 0.02 to 0.05 mm wide. Oesophagus long, tubular. Intestinal crura branched not confluent posteriorly.

Testes numerous, postovarian, intercaecal, irregularly arranged in longitudinal rows, 0.035 to 0.050 mm long, 0.030 to 0.045 mm wide, extending distally to near anterior limits of opisthohaptor. Genital atrium at hind end of intestinal bifurcation, muscular armed with similar type of spines in one group.

Ovary forming a double loop, median, with its distal end directed foward, 0.12 to 0.19 mm long, 0.05 to 0.07 mm wide. Vaginal pore unarmed, middorsal, postbifurcal. Vagina 0.04 to 0.06 mm long, 0.01 to 0.02 mm wide. Vitellaria follicular, extending from pharynx up to posterior end of body. Vitelline reservoir 'Y' shaped at anterior to ovary. Eggs not observed.

Host: *Caranx armatus* (Cuv. & Val).
Location: Gill filaments.
Locality: Puri, Orissa.

Discussion: The new form differs from *Monaxine formionis* in the extension of vitellaria from pharynx up to posterior end of body instead of from vagina up to opisthohaptor, in having numerous testes instead of 19 to 22 testes, in having 21 to 32 clamps instead of 70 to 76 clamps, in having genital pore postbifurcal instead of at intestinal bifurcation. The new form has a close resemblance with *Monaxine caballeroi* sp. nov. in the extension of vitellaria, but, however, differs from it in having vagina middorsal instead of lateral in position, in having similar type of spines in one group in the genital atrium instead of four groups of spines, in having numerous testes instead of 22 to 29 testes and in having 21 to 32 clamps instead of 30 to 35 clamps. Accordingly, it is regarded as a new species with the specific name *Monaxine hargisi* sp. nov.

The new species is named in honour of Dr. W. J. Hargis (Jr.) Oceonographic Institute of Florida State University.

Monaxine mizellei sp. nov.
(Pl. 4. Figs. 1-3)

Four specimens were collected from the gill filaments of a marine fish, *Saurus indicus* (Day) from Puri, Orissa.

Description: Body elongate, tapering towards extremities, 1.65 to 2.14 mm long, 0.3 to 0.34 wide. Opisthohaptor asymmetrical, unilateral, vertical, extending from ovarian region up to end of body, with 40 to 55 clamps in a single row on left side of body, 0.05 to 0.06 mm long, 0.02 to 0.03 mm wide. Clamp skeleton of *Microcotyle* type; lateral sclerites unjointed and median spring with bifid accessory piece. Terminal anchors absent.

Prohaptoral suckers spherical, widely separated, 0.02 to 0.03 mm in diameter, opening into oral cavity. Oral apertures subterminal. Pharynx ovoid, muscular, 0.02 to 0.03 mm long, 0.015 to 0.02 mm wide. Oesophagus long, tubular. Intestinal cura branched, not confluent posteriorly.

Testes 25 to 30 in number, postovarian, intercaecal, arranged irregularly in longitudinal rows, extending distally to near anterior limits of opisthohaptor, 0.25 to 0.35 mm long, 0.02 to 0.025 mm wide. Genital atrium a little anterior to intestinal bifurcation, muscular, armed with two groups of smaller spines of which one group is median and the other group outer.

Ovary preequatorial, pretesticular, looped, with its distal end directed forward, 0.3 to 0.5 mm long, 0.05 to 0.06 mm wide. Vaginal pore unarmed, lateral, postbifurcal. Vagina 0.11 to 0.15 mm long, 0.02 to 0.025 mm wide. Vitellaria follicular, extending from a little posterior to pharynx up to a little anterior to hind end of body. Eggs not observed.

Host: *Saurus indicus* (Day).
Location: Gill filaments.
Location: Puri, Orissa.

Discussion: The new species differs from all the know species of the genus *Monaxine*, in the extension of vitellaria from a little posterior to pharynx up to a little anterior to hind end of body. The new species can also be distinguished from *Monaxine hargisi* sp. nov. in having vagina lateral instead of middorsal. The new species has a close resemblance with *Monaxine caballeroi* sp. nov. in having lateral vagina and in the position of genital atrium but however, differs from it in having 25 to 30 testes instead of 22 to 29, in having 40 to 45 clamps instead of 30 to 35, in having opisthohaptor vertical instead of horizontal and continues from behind ovary up to end of body. Accordingly, it is regarded as a new species with the specific name *Monaxine mizellei* sp. nov.

The new species is named in honour of Dr. J. D. Mizelle, Zoological Laboratory, Oklahoma Agricultural and Mechanical College.

Monaxine pseudoscianae sp. nov.
(Pl. 5. Figs. 1-3)

Four specimens were collected from the gill filaments of a marine fish, *Pseudosciaena diacanthus* (Bleeker) from Puri, Orissa. Description: Body elongate, tapering anteriorly, 0.79 to 0.95 mm long, 0.11 to 0.14 mm wide. Opisthohaptor asymmetrical with 17 to 29 clamps in a single row along posterior side, 0.32 to 0.57 mm long, 0.038 to 0.05 mm wide. Clamp skeleton *Microcotyle* tipe, lateral sclerites unjointed and median spring with accessory piece. Terminal anchors absent.

Prohaptoral suckers spherical, opening into oral cavity, 0.02 to 0.03 mm in diameter. Oral aperture subterminal. Pharynx ovoid, muscular, 0.02 to 0.03 mm long, 0.015 to 0.02 mm wide. Oesophagus long, tubular, Intestinal crura branched, not confluent posteriorly.

Testes 14 to 19 in number, postovarian, intercaecal, arranged irregularly in longitudinal row, extending distally to near anterior limits of opisthohaptor, 0.02 to 0.04 mm long, 0.01 to 0.02 mm wide. Genital atrium at intestinal bifurcation, muscular, armed with a single type of 10 to 12 spines.

Ovary forming a double loop, in middle of body, with its distal end directed posteriorly, 0.15 to 0.125 mm long, 0.015 to 0.02 mm wide. Vaginal pore unarmed, lateral, postbifurcal. Vagina 0.05 to 0.07 mm long. 0.02 to 0.03 mm wide. Vitellaria follicular, extending from pharynx up to a little anterior to hind end of body. Eggs not observed.

Host: *Pseudosciaenae diacanthus* (Bleeker).
Location: gill filaments.
Locality: Puri, Orissa.

Discussion: The new species differs from all the known species of the genus *Monaxine* except *M. hargisi* sp. nov. in having single type of spines in the genital atrium. The new species differs from *M. hargisi* sp. nov. in having lateral vagina instead of middorsal It has a close resemblance with *M. caballeroi* sp. nov. and *M. mizellei* sp. nov. in having lateral vagina, but, however, differs from both these species in having 14 to 19 testes instead of 22 to 29 testes in *M. caballeroi* sp. nov. and 25 to 30 testes in *M. mizellei* sp nov. in having 17 to 29 clamps instead of 30 to 35 in *M. caballeroi* sp. nov. and 40 to 55 in *M. mizellei* sp. nov. and in the extension of vitellaria from pharynx up to a little anterior to hind end of body instead of from pharynx up to posterior end of body in *M. caballeroi* sp. nov. and from a little posterior to pharynx up to a little anterior to hind end of

body in *M. mizellei* sp. nov. Accordingly, it is regarded as a new species with the specific name *Monaxine pseudosciaenae* sp. nov.

Leuresthicola dollfusi sp. nov.
(Pls. 6-7. Figs. 1-3)

Only one specimen was collected from the gill filaments of a marine fish, *Cybium guttatum* (Cuv, & Val.) from Puri, Orissa. Description: Body slender, elongate, 9.1 mm long, 1.27 mm wide. Opisthohaptor with 19 clamps along longer side, but no clamp on shorter side, 0.1 to 0.25 mm long, 0.08 to 0.17 mm wide. Clamp skeleton *Microcotyle* type, without apical prolongation on median spring. Terminal anchors absent.

Prohaptoral suckers spherical, 0.12 mm in diameter. Oral aperture terminal, ventral. Pharynx ovoid, 0.23 mm long, 0.17 mm wide. Oesophagus with side branches. Intestinal crura diverticulate obscured by vitelline follicles.

Testes 12, postovarian, intercaecal, extending to near anterior limit of opisthohaptor. Cirrus unarmed covered with vitellaria. Genital atrium sac-like, armed with circle of numerous spines of single type near intestinal bifurcation.

Ovary elongate, folded upon itself, pretesticular with its distal end directed posteriorly, 0.45 mm long, 0.15 mm wide. Vagina absent. Vitellaria follicular, extending from oral aperture up to hind end of body. Eggs filamented at both poles, 0.3 to 0.4 mm long, 0.14 to 0.16 mm wide.

Host: *Cybium guttatum* (Cuv. & Val.).
Location: Gill filaments.
Locality: Puri, Orissa.

Discussion: The new species belongs to the genus *Leuresthicola* Price, 1961 of which only one species, *L. olsoni* Price, 1961, is known.

The new species differs from *Leuresthicola olsoni* in the extension of vitellaria from oral aperture up to hind end of body instead of vitellaria coextensive with intestine, in having 12 testes instead of numerous testes, in having 19 clamps instead of numerous clamps, in having genital atrium armed with single type of spines instead of armed with two different types of spines and in having ovary folded upon itself with its distal end directed posteriorly instead of ovary like a ? (question mark), with both ends directed backward. Accordingly, it is regarded as a new species with the specific name *Leuresthicola dollfusi* sp. nov.

The new species is named in honour of Dr. R. Ph. Dollfus.

Key to the species of the genus *Leuresthicola* Price, 1961.

1. Vitellaria coextensive with intestine; genital atrium armed with two different types of spines. . . . . *L. olsoni* Price, 1961.

2. Vitellaria extending from oral aperture up to hind end of body; genital atrium armed with a single type of spines . . . . . *L. dollfusi* sp. nov.

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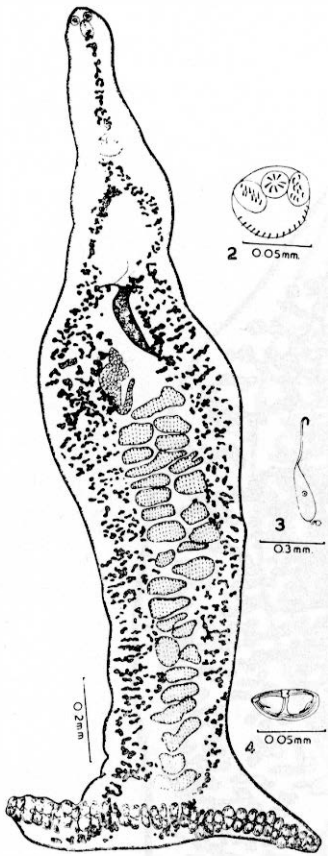
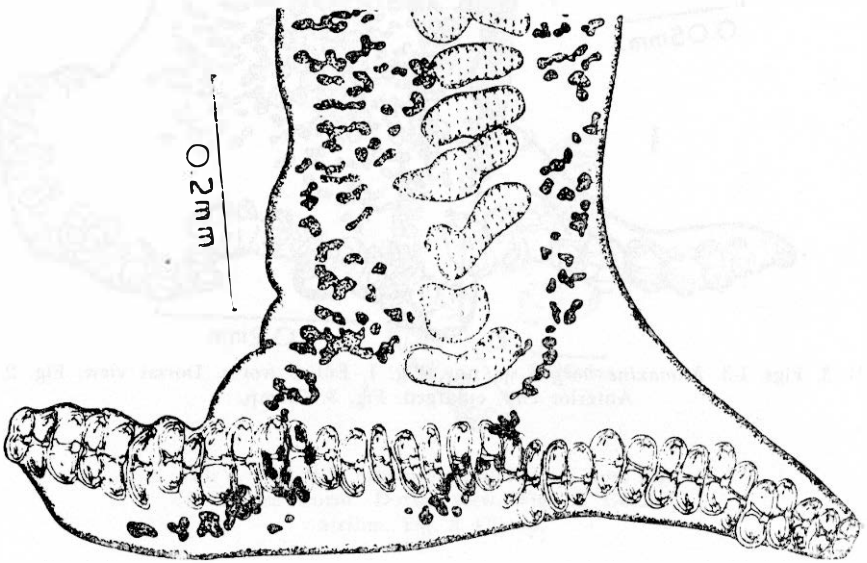
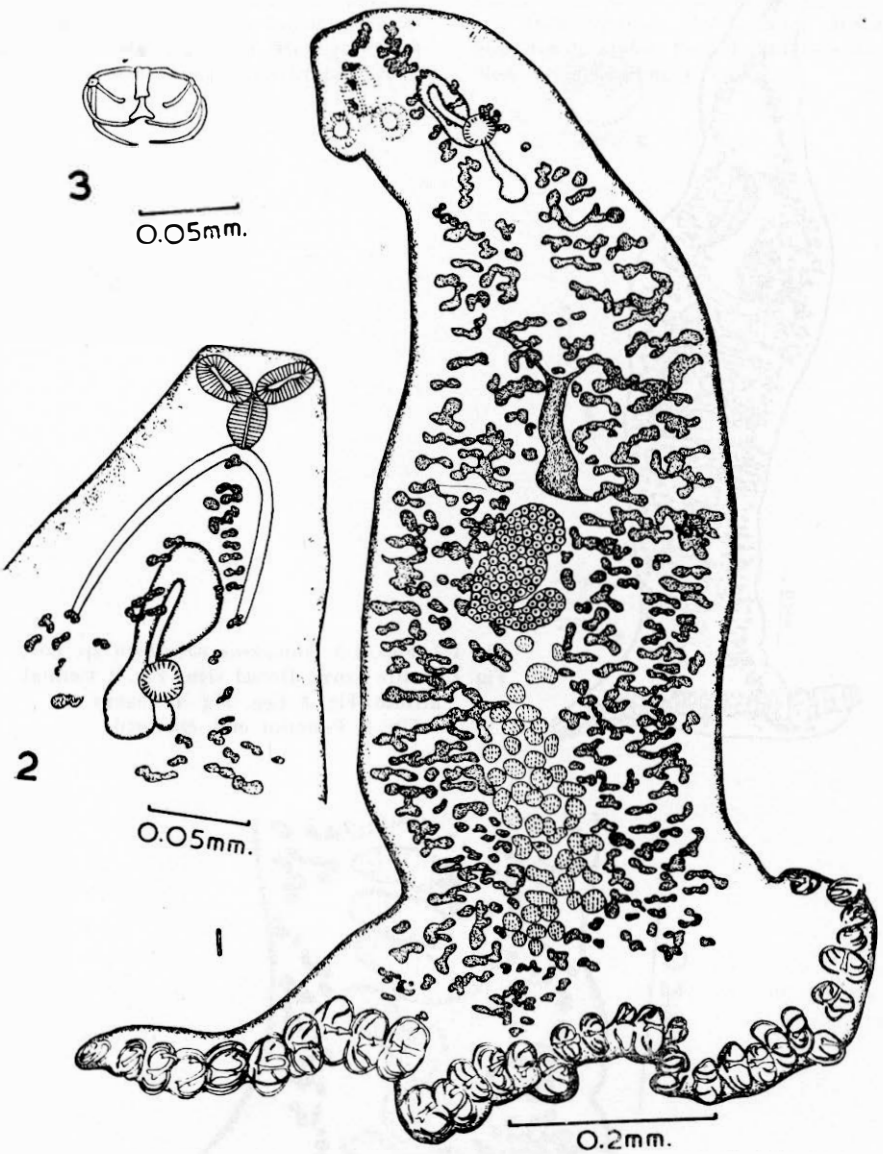


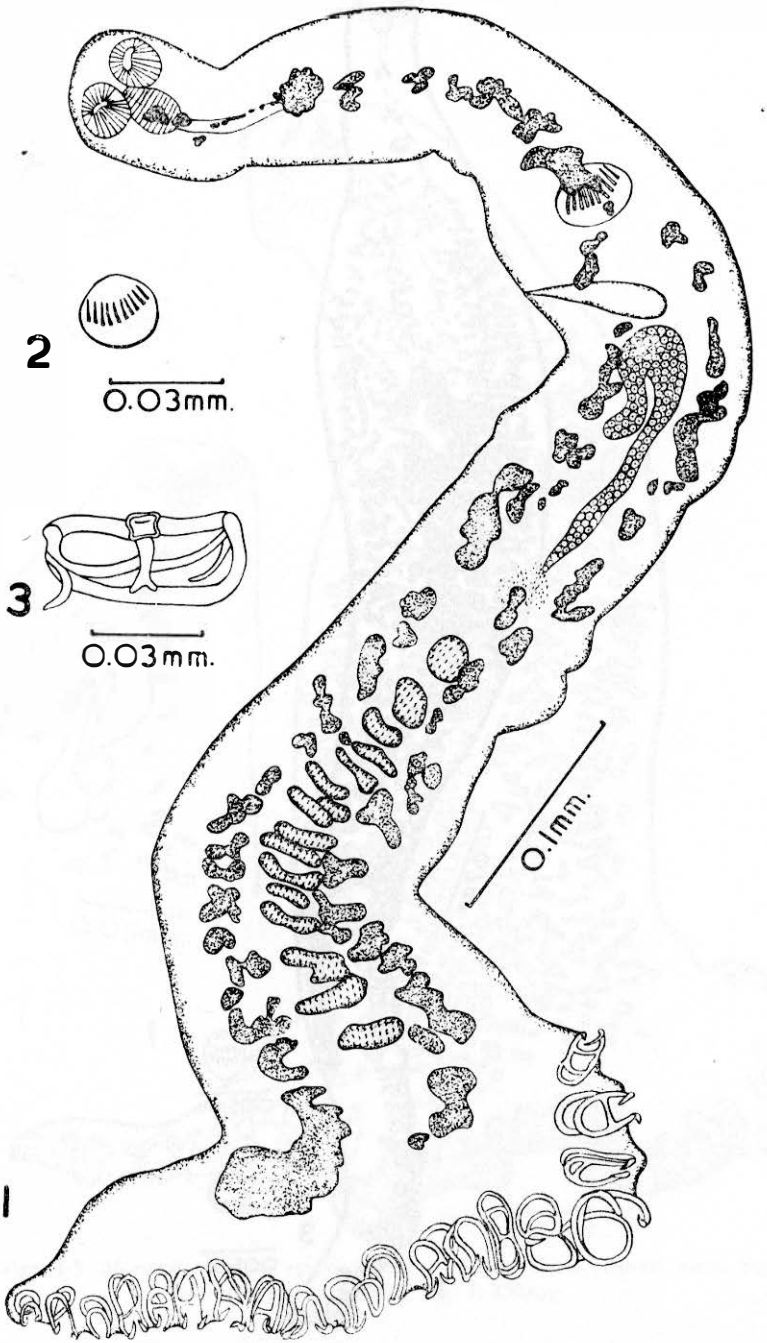
Pls. I-2. Figs. 1-5. *Monaxine caballeroi* sp. nov. Fig. I. Entire worm. Dorsal view. Fig. 2. Genital atrium. Fig. 3 Egg. Fig. 4. Clamp. Fig. 5. Posterior end, enlarged.



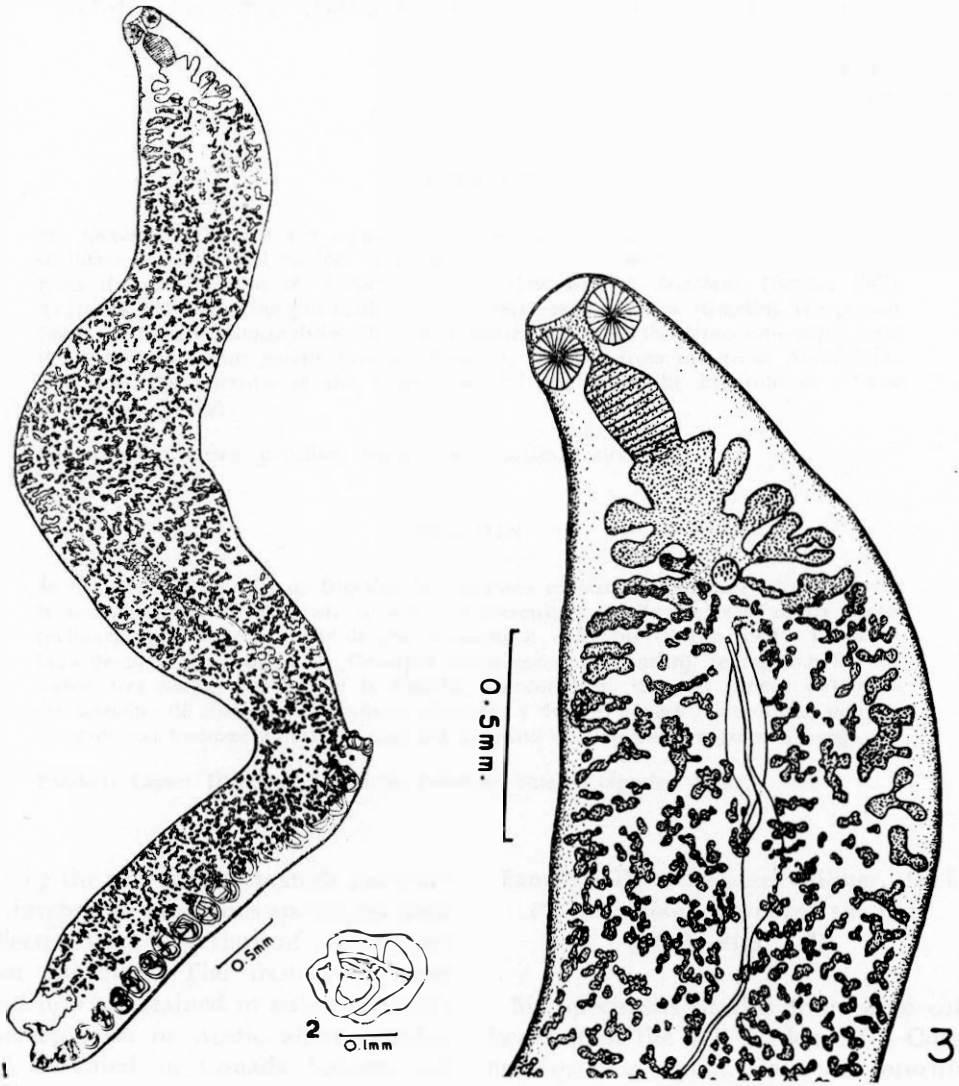


Pl. 3. Figs. 1-3. *Monaxine hargisi* sp. nov. Fig. 1. Entire worm. Dorsal view. Fig. 2. Anterior end, enlarged. Fig. 3. Clamp.

Pl. 4. Figs. 1-3. *Monaxine mizellei* sp. nov. Fig. 1. Entire worm. Dorsal view. Fig. 2. Genital atrium. Fig. 3. Clamp.



Pl. 5. Figs. 1-3. *Monaxine pseudosciaenae* sp. nov. Fig. I. Entire worm. Ventral view. Fig. 2. Genital atrium. Fig. 3. Clamp.



Pls. 6-7. Figs. 1-3. *Leuresthicola dollfusi* sp. nov. Fig. 1. Entire worm. Ventral view. Fig. 2. Clamp. Fig. 3. Anterior end, enlarged.