

THREE NEW SPECIES OF *PSEUDOMURRAYTREMA* (TREMATODA: MONOGENEA) FROM GILLS OF CATOSTOMID FISHES*

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ABSTRACT: Three new species of Ancyrocephalinae, namely *Pseudomurraytrema alabarrum* sp. n., *P. etowanum* sp. n., and *P. swinglei* sp. n., are described from the gills of *Minytrema melanops* (Rafinesque), *Hypentelium etowanum* (Jordan), and *Moxostoma duquesnei* (LeSueur), respectively. A generic emendation is presented. Only one species has been reported in this genus previously. All fish hosts were collected in Lee County, Alabama.

The genus *Pseudomurraytrema* Bychowsky, 1957, was proposed to receive the species described by Mueller (1938) as *Murraytrema copulatum*. Price (1937) proposed *Murraytrema* from the species described as *Ancyrocephalus robusta* Murray, 1931. *Murraytrema* was erected primarily on the basis of three haptor bars. Bychowsky (1957) separated *Pseudomurraytrema* from *Murraytrema* on the basis of the ventral anchors articulating with the ventral median bar and the dorsal anchors each articulating with the corresponding dorsal bar. In *Murraytrema*, both pairs of anchors articulate with the outer ends of the lateral transverse bars.

Pseudomurraytrema also possesses characters of *Murraytrematoides* Yamaguti, 1958, but differs by the vagina being dextral rather than sinistromedian and also having two prostatic reservoirs and an accessory piece to the cirrus while *Murraytrematoides* has only one prostate and no accessory piece to the cirrus (Yamaguti, 1963). Both *Murraytrema* and *Murraytrematoides* parasitize marine teleosts while *Pseudomurraytrema* appears to parasitize only members of the freshwater family Catostomidae.

MATERIALS AND METHODS

The species described in this paper were collected as part of a survey of fish parasites conducted by the Southeastern Cooperative Fish Parasite and Disease Project. Fish hosts were collected by seine, electric shocker, and chemicals. The trematodes were collected using the freezing technique as recommended by Mizelle and Klucka (1953), except that the gills were placed in a vial prior to freezing.

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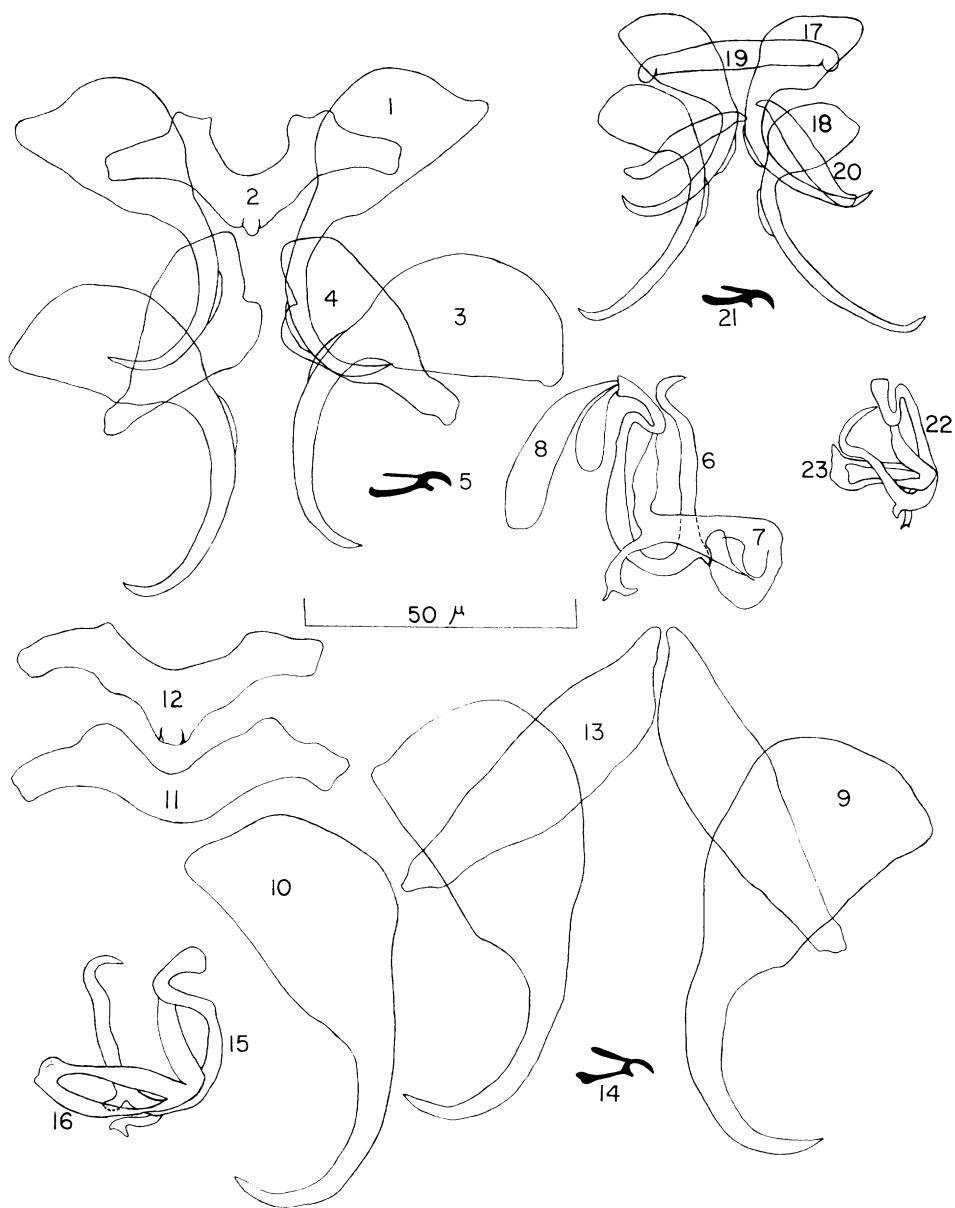
Putz and Hoffman (1963) used a 1:4,000 formalin solution to recover *Gyrodactylus* from the body of fish in the laboratory. This method was modified for field collecting as follows: (1) the gills were removed from the host fish, excess blood was rinsed from the gill surface, and they were placed in a vial of 1:4,000 formalin; (2) after 1 hr the vial was shaken vigorously to dislodge any worms still attached to gill filaments; (3) enough full-strength formalin was added to the vial to make a 5% solution; and (4) the vial was labeled (host, locality, etc.). The trematodes were then recovered in the same manner as used for the freezing technique. This method was field tested extensively during the past year and has proved very successful. The formalin method of collecting was equally effective on fish of all sizes up to a weight of about 10 lb. However, the greater amount of mucus from the larger fish sometimes interfered with recovery of gill worms.

Specimens were measured according to the procedure given by Mizelle and Klucka (1953). Measurements are expressed in microns and were made from specimens mounted in glycerine-jelly. Details of internal anatomy were determined from live and hematoxylin-stained specimens. Illustrations were prepared with the aid of a camera lucida.

Pseudomurraytrema Bychowsky, 1957, emended

Generic diagnosis

Dactylogyridae, Ancyrocephalinae: body elongate with smooth cuticle, with or without head organs, and with two pairs of eyespots. Haptor clearly demarcated from trunk, with two pairs of similar or dissimilar anchors, with a median and two submedian transverse bars, and with 14 hooklets. Intestinal crura simple, uniting posteriorly. Testis and ovary in equatorial zone. Testis globose to oval, dorsal to posterior part of ovary. Vas deferens looped around left limb of intestine. Two prostatic reservoirs opening into cirrus. Cirrus with accessory piece. Ovary globose to elongate with tapering elongate neck encircling right limb of intestine. Vagina dextral, opening submedian, submarginal, or lateral. Seminal receptacle an enlarged portion of the coiled uterus. Parasitic on gills of freshwater fishes.



FIGURES 1-8. *Pseudomurraytrema swinglei* sp. n. 1. Ventral anchor. 2. Ventral bar. 3. Dorsal anchor. 4. Dorsal bar. 5. Marginal hook. 6. Cirrus. 7. Accessory piece. 8. Prostatic gland.

FIGURES 9-16. *Pseudomurraytrema alabarrum* sp. n. 9. Dorsal anchor. 10. Ventral anchor. 11, 12. Ventral bar. 13. Dorsal bar. 14. Hook. 15. Cirrus. 16. Accessory piece.

FIGURES 17-23. *Pseudomurraytrema etowanum* sp. n. 17. Ventral anchor. 18. Dorsal anchor. 19. Ventral bar. 20. Dorsal bar. 21. Hook. 22. Cirrus. 23. Accessory piece.

***Pseudomurraytrema alabarrum* sp. n.**

(Figs. 9–16)

Host and locality: *Minytrema melanops* (Rafinesque), spotted sucker, Chewacla Creek, Lee County, Alabama.

Specimens studied: Twenty.

Type specimens: Type and paratype, USNM Helm. Coll. No. 60713.

Description

Relatively large dactylogyrid with smooth cuticle. Length 1,360 (1,070 to 1,700), width 184 (150 to 220) greatest about midlength. Eyespots four, members of both pairs about same size and same distance apart. With three pairs of head organs. Pharynx subcircular to ovate in dorsal view, with transverse diameter 66 (50 to 90). Intestinal crura simple, uniting posteriorly. Peduncle long and narrow. Haptor subpentagonal in outline, longer than broad, length 134 (115 to 150), width 120 (110 to 140). One pair of dorsal and one pair of ventral anchors, similar in size and shape. Each composed of: (1) a base without differentiated roots, (2) a solid shaft, and (3) a solid point. Dorsal anchor (Fig. 9) length 74 (64 to 85), width 30 (25 to 34). Ventral anchor (Fig. 10) length 75 (64 to 82), width 28 (24 to 30). Anchor wings not observed. Three haptor bars present, a median ventral bar and paired submedian dorsal bars. Ventral bar (Fig. 11) with medial rounded protuberance projecting dorsally in normal position which may or may not be seen projecting posteriorly in mounted specimens (Fig. 12). Median bar length 69 (62 to 80). Paired submedian bars (Fig. 13) similar in size and shape, winglike, length 73 (65 to 80). Width of submedian bars 17 (14 to 20). Hooks 14 in number, similar in size and shape (Fig. 14), small without inflated bases, length 14 (constant). Testis of moderate size, usually globose, dorsal to posterior border of ovary. Copulatory complex consisting of a basally articulating cirrus and accessory piece. Cirrus (Fig. 15) a U-shaped tapering tube with a prominent bend at the proximal end and a slight sickle-shaped bend at the distal end. An angular projection present about midway of the cirrus, closer to distal end. Two elongate prostatic glands emptying into cirrus, one about twice as long as the other. Length of cirrus 38 (37 to 40). Accessory piece (Fig. 16) variable, with three arms; measurements made of middle arm. Length of accessory piece 29 (27 to 30). Vas deferens encircling left intestinal limb. Ovary globular to elongate with tapering neck arising from anterior end and encircling right limb of intestine. Vagina dextrally submedian, opening posterior to cirrus. Vitellaria present as two broad confluent bands often obscuring internal organs.

Remarks

Pseudomurraytrema alabarrum sp. n. may be distinguished by the winglike shape of the paired dorsal bars.

***Pseudomurraytrema etowanum* sp. n.**

(Figs. 17–23)

Host and locality: *Hypentelium etowanum* (Jordan), Alabama hogsucker, Moore's Mill Creek, Lee County, Alabama.

Specimens studied: Twenty.

Type specimens: Type and paratype, USNM Helm. Coll. No. 60714.

Description

Moderate-sized dactylogyrid with smooth cuticle. Length 627 (450 to 800), greatest width 102 (60 to 130) about midlength. Eyespots four, members of posterior pair slightly larger and farther apart than anterior pair. Head organs grouped in three to five pairs. Pharynx subcircular to ovate in dorsal view, transverse diameter 40 (34 to 50). Gut indefinite. Peduncle short and moderately wide. Haptor oval in outline, slight cleft in anterior and posterior margin, broader than long, length 98 (60 to 130), width 123 (85 to 155). One pair of dorsal and one pair of ventral anchors, nearly similar in size and shape. Each composed of: (1) a base without differentiated roots, (2) a solid shaft, and (3) a solid short point. Anchors with short, inconspicuous wings about midway of shaft. Ventral anchor shafts (Fig. 17) bent at a more acute angle than dorsal anchor shafts. Ventral anchor length 43 (37 to 49); greatest width of ventral anchor base 13 (11 to 14). Dorsal anchor (Fig. 18) length 47 (41 to 54); greatest width of dorsal anchor base 13 (11 to 14). Three haptor bars present: a median ventral bar (Fig. 19) and paired smaller submedian dorsal bars (Fig. 20). Ventral bar length 39 (33 to 46), width of ventral bar 4 to 5. Paired submedian dorsal bars similar in size and shape; slightly sigmoid. Length of submedian bars 25 (22 to 28), width of submedian bars 4 to 5. Hooks 14 in number, similar in size and shape (Fig. 21), small without inflated bases. Length of hooks 13 (12 to 14). Testis of moderate size, usually globose, dorsal to posterior border of ovary. Copulatory complex consisting of a basally articulating cirrus and accessory piece. Cirrus (Fig. 22) a U-shaped tapering tube with a prominent bend at the proximal end and a sickle-shaped bend at the distal end. An angular projection about midway of cirrus. Two elongate prostatic reservoirs emptying into cirrus, one about one-third larger than other. Vas deferens not observed. Accessory piece (Fig. 23) variable, with three arms; measurements made of the broad middle arm which was the most constant. Length of cirrus 35 (32 to 48), length of accessory piece 23 (19 to 26). Ovary globular, with tapering neck arising at anterior end and encircling right limb of intestine. Vagina submedian, opening slightly to the right of and posterior to the cirrus. Vitellaria extend from pharynx to haptor; distributed as two broad lateral bands often confluent over entire body and obscuring internal organs.

Remarks

Pseudomurraytrema etowanum sp. n. may be separated from the other species in this genus by the smaller size and shape of the haptoral armament.

***Pseudomurraytrema swinglei*, sp. n.**

(Figs. 1–8)

Host and locality: *Moxostoma duquesnei* (Le-Sueur), black redbhorse, Chewacla Creek, Lee County, Alabama.

Specimens studied: Twenty.

Type specimens: Type and paratype, USNM Helm. Coll. No. 60712.

Description

Moderately large dactylogyrid with smooth cuticle. Length 855 (590 to 1,100), greatest width 94 (70 to 125) anterior to cirrus. Four eyespots present, members of posterior pair slightly larger and farther apart than anterior pair. Head organs not distinct. Pharynx ovate to subrectangular in dorsal view, with transverse diameter 40 (32 to 49). Intestinal crura simple, uniting posteriorly. Peduncle narrow and long, length 99 (85 to 120); width 120 (85 to 150). One pair of dorsal and one pair of ventral anchors, nearly similar in size and shape. Each composed of: (1) a base without differentiated roots, (2) a solid shaft, and (3) a solid short point. Anchors with short inconspicuous wings. Ventral anchors (Fig. 1) slightly smaller and with a hint of bifurcation in base. Length of ventral anchors 54 (48 to 57), width of ventral anchor base 18 (16 to 20). Dorsal anchor (Fig. 3) length 58 (55 to 62); width of dorsal anchor base 20 (18 to 21). Three haptoral bars present, a median ventral bar (Fig. 2) and paired submedian dorsal bars (Fig. 4). Ventral bar length 51 (41 to 56). Paired dorsal bars similar in size and shape, subtriangular, length 39 (36 to 42), greatest width 20 (16 to 25). Hooks 14 in number, similar in size and shape (Fig. 5), small without inflated bases, length 13 to 14. Testis of moderate size, globose, dorsal to posterior border of ovary. Copulatory complex consisting of a basally articulating cirrus and accessory piece. Cirrus (Fig. 6) a U-shaped tapering tube with a prominent bend at the distal end. Two elongate prostatic reservoirs emptying into cirrus, one about twice as long as the other (Fig. 8). Accessory piece (Fig. 7) variable, with

three arms, measurements made of middle arm. Length of cirrus 35 (34 to 37), length of accessory piece 27 (25 to 30). Vas deferens not observed. Ovary oval, with elongate tube arising at anterior end and encircling right limb of intestine. Vagina ventral, submedian, opening to the right of and posterior to the cirrus. Vitellaria present in anterior half of body, distributed as two broad confluent bands often obscuring internal organs.

Remarks

Pseudomurraytrema swinglei sp. n. may be distinguished from other members of this genus by shape of the paired dorsal bars.

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LITERATURE CITED

- BYCHOWSKY, B. E. 1957. Monogenetic trematodes, their systematics and phylogeny. Akad. Nauk SSSR, 1–509. Translated from Russian by W. J. Hargis, Jr., AIBS, Washington, D. C.
- MIZELLE, J. D., AND A. R. KLUCKA. 1953. Studies on monogenetic trematodes XIV. Dactylogyridae from Wisconsin fishes. Am. Midl. Nat. **49**: 220–235.
- MUELLER, J. F. 1938. Additional species of North American Gyrodactyloidea (Trematoda). Am. Midl. Nat. **19**: 220–235.
- PRICE, E. W. 1937. North American monogenetic trematodes—I. The superfamily Gyrodactyloidea. J. Wash. Acad. Sci. **27**: 114–130.
- PUTZ, R. E., AND G. L. HOFFMAN. 1963. Two new *Gyrodactylus* (Trematoda: Monogenea) from cyprinid fishes with synopsis of those found on North American fishes. J. Parasit. **49**: 559–566.
- YAMAGUTI, S. 1963. Systema Helminthum Volume IV. Monogenea and Aspidocotylea. Interscience Publishers, New York, London.