Neotropical Monogenea. 8. Revision of Uroleidoides
(Dactylogyridae, Ancyrocephalinae)

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Uroleidoides Mizelle and Price, 1964 represents the second genus of Monogenea proposed from Neotropical freshwater fishes. As frequently happens in investigations of new regions, subsequent workers realized difficulty in understanding morphologic limits of the taxon, with Mizelle et al. (1968) greatly expanding the generic bounds in their emended diagnosis. Kritsky and Thatcher (1983) listed 30 species of Uroleidoides (all Neotropical) from fishes repre-
senting four teleost orders. Based on this host occurrence and the fact that most Dactylogyridae exhibit relatively high host specificity, Gussev (1978) suggested that species currently assigned to Urocleidoides represent several genera and possibly subfamilies. Our collections from Brazil, Colombia, Peru, and El Salvador, made over a 15-year period (see also Kritsky and Thatcher, 1974, 1976), have provided a large number of species that fall into the broad generic definition proposed by Mizelle et al. (1968). Studies on the comparative morphology of this material have allowed the revision of Urocleidoides presented herein; a historical account of the genus is included.

**Historical Review**

Urocleidoides was proposed by Mizelle and Price (1964) for their new species, U. reticulatus, collected from the gills of Poecilia reticulata (Poeciliidae). The genus was characterized by possessing a sinistral vagina and an articulated cirrus and accessory piece and was considered to be intermediate to the North American Urocleidus Mueller, 1934 (as emended by Mizelle and Hughes, 1938) and Cleidodiscus Mueller, 1934. The generic revision by Mizelle et al. (1968) allowed inclusion of their new species: U. affinis from Creatochanes affinis (Characidae), U. carapace and U. gymnogaster from Gymnotus carapo (Gymnotidae), U. microstomus from Hemigrammus microstomus (Characidae), U. stictus from Hyphessobrycon stictus (Characidae), and U. virescens from Eigenmannia virescens (Gymnotidae). All subsequent reports on the genus have followed the generic boundaries established by the latter authors.

Mizelle and Kritsky (1969) described five additional species: U. amazonensis and U. catus from Phraatoccephalus hemiophterus, Pimelodidae; U. megorchis from Sorubim lima, Pimelodidae; R. robustus from Rhamdia sp., Pimelodidae; and U. variabilis from Symphysodon discus, Cichlidae. Within 5 years of the original proposal of the genus, the taxon contained species infesting fishes of the orders Atheriniformes, Cypriniformes, Perciformes, and Siluriformes.


Considerable diversity in the structure of the internal organ systems of species of Urocleidoides was indicated by Kritsky and Thatcher (1976), who presented whole-mount illustrations of their new species, U. lebedevi from Pimelodus goskopfi (Pimelodidae) and U. mamabevi from Cephalosilurus zungaro (Pimelodidae). In 1983, Kritsky and Thatcher listed 30 species in Urocleidoides, which included their transfer of Gusevia spiralis Kohn and Paperna, 1964 from Pterophyllum eimekei (Cichlidae) and G. minuta Kohn and Paperna, 1964 from Poecilia reticulata (Poeciliidae) into the genus. Kritsky and Thatcher (1983) considered Gusevia Kohn and Paperna, 1964 a junior synonym of Urocleidoides as emended by Mizelle et al. (1968).

In a series of papers, Lucký (1970, 1972, 1973) reported on the following ancyrocephalines from aquarium fishes in Czechoslovakia: Ancyrocephalus xiphophori from Xiphophorus maculatus (Poeciliidae); A. pterophylli and A. sp. from Pterophyllum eimekei (Cichlidae); A. kostoamarovi from Symphysodon discus (Cichlidae); and A. dyki from Poecilia reticulata (Poeciliidae). Investigators in the western hemisphere have not commented on these species even though they clearly show close resemblance to Urocleidoides spp.

**Materials and Methods**

Fish hosts were collected by hook-and-line, seine, or net from locations in Brazil and Peru during the period 1977–1984. Gills were removed, placed in finger bowls, and covered with a 1:4,000 formalin solution. After ½ hour, gills were agitated in this liquid and then removed from the bowl. Helminths were allowed to settle to the bottom and were subsequently removed with the aid of a small probe and dissecting microscope. They were immediately fixed and stored in AFA. Some were mounted unstained in Gray and Wess’ medium for study of sclerotized structures. Other specimens were
stained with Semichon’s carmalum, Mayer’s acid carmalum, or Gomori’s trichrome to determine internal structures. Illustrations were prepared with the aid of a camera lucida or microprojector. Measurements, all in micrometers, were made according to the procedures of Mizelle and Klucka (1953) except as described below. The measurements of the cirrus include: (1) the diameter of the proximal ring of the cirrus, depicted on the respective drawings as the interval between the solid straight lines, and (2) an approximation of total length of the cirrus obtained by using a Minerva curvimeter on camera lucida drawings. Dimensions of organs and other structures represent the greatest measurement in dorsoventral view; lengths of curved structures (bars, accessory piece) represent a straight-line measurement between extreme ends; the hook measurement represents the total hook length; greatest body width is that of the trunk region (excluding the haptor); and values for the ovary and testis represent the length followed by width, respectively. Average measurements are followed by ranges in parentheses. Haptoral terminology is that of Kritsky and Mizelle (1968) and Mizelle et al. (1968).

Numbering of hook pairs follows that recommended by Mizelle (1936). This sequencing is preferable because it is the only proposed method currently in use that considers both anteroposterior and dorsoventral positions of respective hook pairs in the adult haptor.

An ancyrocephaline distribution of haptoral hooks refers to the usual distribution of hook pairs in the Ankyrocephalinae described by Mizelle (1936). Direction of the cirrus coil (counterclockwise vs. clockwise) was determined using the procedure proposed by Kritsky et al. (1985). Type specimens were deposited in the collections of the Instituto Nacional de Pesquisas da Amazônia (INPA), the U.S. National Museum Helminthological Collection (USNM), and the University of Nebraska State Museum (HWML) as indicated in the respective descriptions.


**Urocleidoides Mizelle and Price, 1964**

**EMENDED DIAGNOSIS:** Dactylogyridae, Ankyrocephalinae. Body divisible into cephalic region, trunk, peduncle, and haptor. Segmentation thin, smooth. Cephalic lobes, head organs, cephalic glands present. Eyes present or absent. Mouth subterminal, midventral; pharynx muscular, glandular; esophagus present; intestinal caeca 2, confluent posterior to testis, lacking diverticula. Gonads interacaecal, overlapping or (?) tandem; testis dorsal or posterior to ovary. Vas deferens looping left intestinal caecum; seminal vesicle an inconspicuous dilation of vas deferens; copulatory complex comprising a coiled cirrus and accessory piece; cirrus coil counterclockwise; accessory piece serving as cirrus guide distally. Oviduct short, uterus delicate; vagina dextral or sinistral; seminal receptacle present. Vaginal sclerite present, sinistral. Vitellaria well developed. Haptor armed with dorsal and ventral pair of unmodified anchors, dorsal and ventral bars, seven pairs of hooks with ancyrocephaline distribution. Hook pairs 1, 5 usually reduced in size. Parasites primarily of gills of freshwater cypriniform fishes.

**TYPE SPECIES AND HOST:** Urocleidoides reticulatus Mizelle and Price, 1964 from the guppy, Poecilia (Lebistes) reticulata (Peters), Poeciliidae.

**OTHER SPECIES:** U. anops Kritsky and Thatcher, 1974 from Characidium caucanum Eigenmann, Characidae; U. curimatae Molnár, Hanek, and Fernando, 1974 from Curimata argentea (Gill), Curimatidae; U. eremitus sp. n. from Hoplias malabaricus (Bloch), Erythrinidae; U. paradoxus sp. n. from Rhytiodus microlepis Kner, Anostomidae.

**REMARKS:** Urocleidoides is herein restricted to species possessing a sinistral vaginal sclerite, overlapping (tandem?) gonads, counterclockwise cirral rings, unmodified anchors, and hooks (pairs 1, 5 usually reduced) with enlarged shanks. Ex-
cept for the type species, members of the genus have been reported only from fishes of the superfamily Characoidea (Cypriniformes), which appear to be their natural hosts.

Reports of the type species, *U. reticulatus*, from the atheriniform host, *Poecilia (Lebistes) reticulata* by Mizelle and Price (1964), Kohn and Paperna (1964), and Lucky (1972) may represent spurious infestations of the guppy. In the above reports, the hosts were obtained from aquaria in California, Israel, and Czechoslovakia, respectively, and the parasite has never been recorded from guppies collected from native habitats in Trinidad (listed as the type locality). The guppy, as well as many species of Characoidea, is a common aquarium fish kept in community-type tanks where interspecific transfer of monogeneans could easily occur. Because our examination of numerous guppies collected from the Arouca River in Trinidad during 1982 (hosts provided by Dr. M. Beverley-Burton) failed to show infestation by the parasite, we suggest that studies of the gill parasites of other characoid fishes commonly found in community-type aquaria may be necessary to demonstrate the natural host of *U. reticulatus*.

**Urocleidoides reticulatus**
Mizelle and Price, 1964

**SYNONYMS:** *Ancyrocephalus dyki* Lucky, 1972; *Gussevia minuta* Kohn and Paperna, 1964; *Urocleidoides minuta* (Kohn and Paperna, 1964) Kritsky and Thatcher, 1983.

**HOST:** Guppy, *Poecilia (Lebistes) reticulata* (Peters), Poeciliidae.

**TYPE LOCALITY:** Trinidad; aquarium fish descended from Trinidad stock in California.

**SPECIMENS STUDIED:** Three paratypes, HWML 22938; three cotypes (?) of *Ancyrocephalus dyki* Lucky, 1972, USNM 78794.

**REMARKS:** The original specimens on which this species is based are unstained and mounted in glycerine jelly, and details of the anatomy of the reproductive system could not be verified with certainty. Although Mizelle and Price (1964) state that the gonads are tandem (testis post-ovarian), the gonads in one specimen available for study appeared to be overlapping under phase contrast microscopy. However, we cannot state with certainty that this is the case and suggest that examination of living specimens or fresh material stained to show internal features will be necessary to verify this character. Nonetheless, the comparative morphology of the sclerotized structures of the haptor, vagina, and copulatory complex strongly suggests a close relationship of this species with others we presently include in the genus.

Examination of three cotype specimens (on one slide and mounted in Malmberg’s Ammonium Picrate Solution) of *Ancyrocephalus dyki* Lucky, 1972 has shown this species to be conspecific with *U. reticulatus*. Sclerotized structures of the haptor and copulatory complex of *A. dyki* are indistinguishable from those of the paratypes of the type species; details of the reproductive system could not be determined. Although type material of *Gussevia minuta* Kohn and Paperna, 1964 (*U. minuta* of Kritsky and Thatcher, 1983) was not available for study, this species is also undoubtedly a synonym of *U. reticulatus* based on the comparison of the original drawings provided by Kohn and Paperna (1964) and available type specimens of *U. reticulatus* and *A. dyki*.

**Urocleidoides anops**
Kritsky and Thatcher, 1974

**HOST:** *Characidium caucanum* Eigenmann, Characidae.

**TYPE LOCALITY:** Río Pance, Cali, Valle, Colombia.

**SPECIMENS STUDIED:** Holotype, USNM 72841.

**REMARKS:** *Urocleidoides anops* possesses a sinistral vaginal sclerite, counterclockwise cirral rings, unmodified anchors, and hooks with enlarged shanks. Kritsky and Thatcher (1974) state that the gonads were indistinct, and we were not able to determine their limits in the unstained holotype. Nonetheless, we consider this species a member of *Urocleidoides* because it possesses the primary characters distinguishing the genus as emended herein.

**Urocleidoides curimatae**
Molnar, Hanek, and Fernando, 1974

**HOST:** *Curimata argentea* (Gill), Curimatidae.

**TYPE LOCALITY:** Arouca River near D’Abadie, Trinidad.

**SPECIMENS STUDIED:** Two paratypes, USNM 73169.

**REMARKS:** Based on the presence of a sinistral vaginal sclerite and the morphology of the haptoral armament and copulatory complex, this species is considered a member of *Urocleidoides*. Molnar et al. (1974) consider the sclerite as the vagina in this species. However, our examination
of the paratypes confirms that it is a hook-shaped structure morphologically similar to those of *U. eremitus* and *U. paradoxus* spp. n. The type specimens are unstained and details of the internal anatomy could not be confirmed; the original authors state that the gonads are ovate and the testis is postovarian.

**Urocleidoides eremitus** sp. n.  
(Figs. 1–9)

**HOST**: Traira, *Hoplias malabaricus* (Bloch), Erythrinidae.

**TYPE LOCALITY**: Janaucá Lake near Manaus, Amazonas, Brazil (April 18, 1980).

**TYPE SPECIMENS**: Holotype, INPA PA260-1; paratypes, INPA PA260-2, PA260-3, USNM 78764, HWML 22940.

**DESCRIPTION** (based on 13 specimens): Body fusiform; cephalic margin with two terminal, two bilateral cephalic lobes poorly developed. Eyes 2–4, poorly developed, subequal; members of posterior pair usually farther apart than those of anterior pair; eye granules frequently dissociated, small, usually ovate; accessory granules (granules not associated with the eyes) present in cephalic region and anterior trunk. Pharynx subovate; esophagus moderately long. Peduncle broad; haptor hexagonal. Ventral anchor with large superficial root, small deep root, curved shaft, short point. Dorsal anchor with elongate superficial root, incipient deep root, slightly curved shaft, point moderate in length. Ventral bar with bulbous terminations, anteromedial indentation; dorsal bar broadly U-shaped, with terminations directed laterally. Hooks similar, each with delicate shaft and point, protruding thumb, dilated shank; hook pairs 1, 5 reduced in size; FH loop ½ shank length (pairs 2, 3, 4, 6, 7), ½ shank length (pairs 1, 5). Cirrus a coil of about 2½ rings, base with lateral flange, tube delicate; accessory piece flabellate. Vagina sinistral, a tortuous tube; vaginal sclerite a flexible rod with distal hook, subterminal short projection, proximal portion with longitudinal groove.


**REMARKS**: Based on the comparative morphology of the anchors and copulatory complexes, the closest relative of this species is apparently *U. reticulatus* Mizelle and Price, 1964. *Urocleidoides eremitus* differs from this species by possessing hook shanks inflated along their entire length and anchors with distinct angular unions of the points and shafts. The specific name is from Latin (eremitus = solitary).

**Urocleidoides paradoxus** sp. n.  
(Figs. 10–18)

**HOST**: Aracu pau de negro, *Rhytiodus microlepis* Kner, Anostomidae.

**TYPE LOCALITY**: Rio Solimões near Ilha Marchantaria, Manaus, Amazonas, Brazil (June 8, 1983); also collected from same host at Furo do Catalão, near Encontro das Águas, Manaus, Amazonas, Brazil (October 16, 1982).

**TYPE SPECIMENS**: Holotype, INPA PA261-1; paratypes, INPA PA261-2 to PA261-4, USNM 78765 and 78766, HWML 22944, 22945.

**DESCRIPTION** (based on 28 specimens, 20 measured): Body robust; cephalic margin usually expanded or with subterminal narrowing; two terminal, two bilateral cephalic lobes poorly developed. Eyes absent; accessory granules absent or widely scattered throughout trunk and cephalic region, variable in size, ovate. Pharynx spherical; esophagus short. Peduncle board, haptor hexagonal. Anchors similar; each with elongate superficial root, small deep root, elongate straight shaft, sharply recurved point. Ventral bar broadly V-shaped, ends slightly expanded; dorsal bar broadly U-shaped, with ends directed laterally. Hooks similar; each with delicate point and shaft, depressed thumb, inflated shank comprising two distinct parts; hook pairs 1, 5 reduced in size; FH loop ¾–½ shank length. Cirrus coiled, with about two rings; base with anteriorly directed process which may articulate with accessory piece, tube with large diameter sharply attenuated distally. Accessory piece grooved, with two proximal arms. Vagina dextral, a lightly sclerotized tube of varying diameter, possessing internal sclerotized ridges proximal to distal funnel; vaginal sclerite lying near left body margin, composed of grooved rod with sickle-shaped termination.

**MEASUREMENTS**: Body 353 (295–463) long.
Figures 1-9. *Urocleidoides eremitus* sp. n. 1. Ventral view of holotype. 2. Vaginal sclerite. 3. Copulatory complex. 4. Hook (pairs 1, 5). 5. Hook (pairs 2, 3, 4, 6, 7). 6. Ventral bar. 7. Dorsal bar. 8. Ventral anchor. 9. Dorsal anchor. All figures are drawn to the same scale (30 micrometers) except Figure 1 (100 micrometers).

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greatest width 83 (67–94) in anterior or posterior half. Pharyngeal diameter 19 (17–21). Haptor 59 (53–67) long, 75 (66–83) wide. Ventral anchor 38 (36–40), base width 18 (17–19); dorsal anchor 39 (37–40), base width 17 (16–18). Ventral bar 39 (37–40); dorsal bar 37 (35–40). Hook pair 1—21–22; hook pairs 2, 3, 4, 6–27 (25–30); hook pair 5—18–19; hook pair 7—31 (29–32). Cirrus 77 long, ring diameter 16 (14–17); accessory piece 26 (21–28) long. Testis 79 (73–85) × 29 (24–34); ovary 59 (52–66) × 24 (23–26). Vaginal sclerite (53–67) long, 75 (66–83) wide. Ventral anchor doxus = morphology of the anchors and bars and the abdominal anchor and bar are conspicuous, elongate dilatation of vas deferens; prostatic reservoir elongate, with proximal and distal terminations directed anteriorly. Cirrus comprising a base from which a coiled tube arises, tube with less than one to several rings, rings counterclockwise; accessory piece not articulated to cirrus, a fleshy rod serving as cirrus guide distally. Common genital pore midventral at level of intestinal bifurcation. Oviduct short; uterus delicate, extending anteriorly along midline; seminal receptacle near anterior end of ovary; vagina ventral, weakly sclerotized. Vitellaria well developed, coextensive with gut. Haptor armed with dorsal and ventral pairs of anchors, ventral and dorsal bars, seven pairs of hooks with ancyrocephaline distribution. Superficial root of dorsal anchor with conspicuous basal fold; hooks with inflated shank along entire length. Parasites of gills of siluriform fishes.

**Type species and host:** Vancleaveus janauacaensis sp. n. from Pterodoras granulosus (Valenciennes), Doradidae.

**Other species:** Vancleaveus fungulus sp. n. from Pseudopterygittoma tigrinum (Cuvier and Valenciennes) (type host) and P. fasciatus (Linnaeus), Pimelodidae; V. cicinnus sp. n. from Phractocephalus hemioliopterus (Bloch and Schneider), Pimelodidae; V. platyrhynchus sp. n. from Hemisorubim platyrhynchos (Valenciennes), Pimelodidae.

**Remarks:** Including the fact that members of *Vancleaveus* are parasitic on the gills of siluriform fishes, features distinguishing the genus include the combined presence of (1) a ventral vagina comprising a tube with an inconspicuous distal funnel, (2) overlapping gonads, (3) an elongate seminal vesicle, (4) a conspicuous, elongate prostatic vesicle, (5) dorsal anchors with conspicuous basal folds on the superficial roots, and (6) hooks with shanks inflated along their entire length. There are no other species in *Urocleidoides*, sensu Mizelle, Kritsky, and Crane (1968), that may be included in this genus. The genus is named for the late Dr. Harley J. Van Cleave who provided the first description of a monogenean from freshwater fishes of North America.

**Vancleaveus janauacaensis** sp. n.

**Diagnosis:** Dactylogyridae, Ancyrocephalinae. Body divisible into cephalic region, trunk, peduncle, and haptor. Segments faint, smooth. Head organs, cephalic lobes present; cephalic glands unicellular, comprising two bilateral groups posterolateral to pharynx. Eyes incipient or absent. Mouth subterminal, midventral; pharynx muscular, glandular; esophagus present; intestinal caeca 2, confluent posterior to testis, lacking diverticula. Gonads overlapping, intercaecal; testis dorsal to ovary. Vas deferens looping left intestinal caecum; seminal vesicle an elongate dilation of vas deferens; prostatic reservoir elongate, with proximal and distal terminations directed anteriorly. Cirrus comprising a base from which a coiled tube arises, tube with less than one to several rings, rings counterclockwise; accessory piece not articulated to cirrus, a fleshy rod serving as cirrus guide distally. Common genital pore midventral at level of intestinal bifurcation. Oviduct short; uterus delicate, extending anteriorly along midline; seminal receptacle near anterior end of ovary; vagina ventral, weakly sclerotized. Vitellaria well developed, coextensive with gut. Haptor armed with dorsal

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superficial root with conspicuous inner hump. Ventral bar broadly V-shaped with large posteromedial projection; dorsal bar with expanded ends, short anteromedial projection. Hooks similar, pair 5 somewhat reduced; each with recurved point, terminally flattened thumb, expanded shank; FH loop about ½ shank length. Gonads bacilliform. Cirrus with about 1½ rings, base with subrectangular flange; accessory piece variable, flattened distally. Vas deferens with expanded shank; FH loop 'A' shank length. Gonads bacilliform; cirrus appearing sigmoid, representing a loose coil of about one ring; accessory piece increasing in breadth distally with ornate termination. Seminal receptacle irregular, vagina midventral.


Remarks: Vancelleueus cicinnus sp. n. most closely resembles V. platyryhchi sp. n., from which it differs in the comparative size and morphology of the anchors and the position of the gonads. It differs from V. janauacaensis sp. n. by having a small sigmoid cirrus and a dorsal bar with a short median protuberance. Characters which separate it from V. fungulus sp. n. include the relative positions of the gonads and the presence of an elongate anteromedial projection on the ventral bar. The specific name is from Greek (cicinn/o = a curl of hair) and refers to the shape of the cirrus.

Vancelleueus fungulus sp. n. (Figs. 33–39)

Host: Caparari, Pseuodoplatystoma tigrinum (Cuvier and Valenciennes) (type) and sorubim, P. fasciatum (Linnaeus), Pimelodidae.

Type locality: Janauaçu Lake near Manaus, Amazonas, Brazil (April 7, 1978; April 23, 1980; June 7 and 8, 1983).

Type specimens: Holotype, INPA PA264-1; paratypes, INPA PA264-2 to PA264-5, USNM 78769 and 78770, HWML 22948.

Description (based on 41 specimens; 20 measured): Body elongate, fusiform; cephalic lobes 4, two terminal, two bilateral. Eyes absent; accessory granules small, subcircular, variable in size, scattered in cephalic area and anterior trunk. Pharynx subovate, with long axis oriented dorsoventrally; esophagus short. Peduncle elongate, broad; haptor circular to hexagonal. Ventral anchor with well-developed roots, curved shaft, short point; dorsal anchor with poorly developed
Figures 33–39. *Vancleaveus fungulus* sp. n. 33. Ventral view of holotype. 34. Hook. 35. Copulatory complex. 36. Ventral bar. 37. Dorsal bar. 38. Ventral anchor. 39. Dorsal anchor. All drawings are to the same scale (30 micrometers) except Figure 33 (100 micrometers).
roots, curved shaft, short point. Bars similar, each variable with medial anterior projection. Hooks similar, pair 5 slightly reduced; each with recurved point, depressed thumb, inflated shank; FH loop flabellate, ½ shank length. Testis bacilliform; ovary pyriform. Cirrus sigmoid or a coil of about one ring; accessory piece variable, originating proximal to base of cirrus. Seminal receptacle fungulate; vagina ventral, slightly dextral.


Remarks: Vancelaveus fungulus sp. n. is closely related to V. cicinnus sp. n. as shown by similarities of the copulatory complex, hooks, and bars. They are easily distinguished by the comparative morphology of the dorsal and ventral anchors, the positions of the gonads, and the nature of the peduncle. The specific name is from Latin (fungulus = a mushroom).

Vancelaveus platyrhynchi sp. n.
(Figs. 40–46)

Host: Braço de moça, Hemisorubim platyrhynchos (Valenciennes), Pimelodidae.

Type locality: Rio Solimões near Marchantaria Island, Manaus, Amazonas, Brazil (January 1984).

Type specimens: Holotype, INPA PA265-1; paratypes, INPA PA265-2 to PA265-4, USNM 78771, HWML 22949.

Description (based on 10 specimens): Body flat, robust; cephalic lobes poorly developed, usually two terminal, two bilateral. Eyes absent; accessory granules small, subovate, widely scattered in cephalic region and anterior trunk. Pharynx broad, elongate; haptor subcircular. Ventral anchor robust, with well-developed roots, angular bend near base of shaft and at junction of point and shaft; dorsal anchor with conspicuous superficial root, large basal fold, curved shaft, short point. Ventral bar with enlarged terminations, short anteromedial process; dorsal bar with flattened ends, anteromedial delicate keel. Hooks similar, each with inflated shank, delicate point

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Figures 40–46. *Vanceaveus platyrhynchi* sp. n. 40. Holotype (ventral view). 41. Hook. 42. Copulatory complex. 43. Ventral bar. 44. Dorsal bar. 45. Ventral anchor. 46. Dorsal anchor. Figure 40 is drawn to the 100-micrometer scale; all others to the 30-micrometer scale.
sp. n. from *Pterodoras granulosus* (Valenciennes), Doradidae; and *C. confusus*, *C. parvum*, *C. rarum*, and *C. sobrinus* sp. n. all from *Oxydoras niger* (Valenciennes), Doradidae.

**REMARKS:** *Cosmetocleithrum* gen. n. resembles the African genus *Cichlidogyrus* Paperna, 1960 in that members of both possess dorsal bars with two submedian projections. These genera are differentiated by the species of *Cosmetocleithrum* possessing (1) tandem gonads (overlapping in *Cichlidogyrus*), (2) undilated hook shanks (basally dilated or often modified in *Cichlidogyrus*), (3) a sinistral vagina (ventral, sinistroventral, or dextroventral in *Cichlidogyrus*), and (4) a vas deferens looping the left intestinal caecum (intercaecal in *Cichlidogyrus*). See the generic diagnosis of *Cichlidogyrus* provided by Yamaguti (1963).

Although these genera phenotypically appear to be related, caution must be taken in proposing that the finding of *Cosmetocleithrum* species suggests common ancestry of Neotropical and Ethiopian Monogenea. Because members of the African genus occur naturally only on fishes of the family Cichlidae (Order Perciformes) and species of *Cosmetocleithrum* occur on doradid hosts of the Order Siluriformes, it is likely that these taxa represent ecomorphs (White and Keller, 1984) whose morphologic resemblances have resulted from convergence owing to the tracking of similar ecological resources.

Although *Cosmetocleithrum* is clearly a part of the *Uroleloides* complex defined by Mizelle et al. (1968), there are no previously described species that could be included in the new genus. The generic name is from Greek (cosmet/o = adorned + cleithrum = bar) and refers to the characteristic dorsal bar.

*Cosmetocleithrum gussevi* sp. n.  
(Figs. 47-54)

**HOST:** Cuiú-cuiú, *Oxydoras niger* (Valenciennes), Doradidae.

**TYPE LOCALITY:** Janauaca Lake near Manaus, Amazonas, Brazil (June 3, 1978; May 6, 1983; August 1982).

**TYPE SPECIMENS:** Holotype, INPA PA267-1; paratypes, INPA PA267-2, PA267-3, USNM 78773, HWM L 22951.

**DESCRIPTION** (based on 20 specimens): Body robust; cephalic lobes poorly developed, two terminal, two bilateral. Eyes 2 or absent; eye granules small, subspherical; accessory granules scattered throughout cephalic area and anterior trunk. Pharynx subovate; esophagus short to absent. Peduncle short, broad; haptor hexagonal. Anchors similar; each with poorly developed roots, large base, short shaft, elongate point. Bars V-shaped; dorsal bar projections variable. Hooks similar; each with poorly developed roots, large base, evenly curved shaft and point. Ventral bar broadly V-shaped, with posteromedial rounded keel; dorsal bar with pointed posteromedial protuberance, posterior projections flattened. Hooks similar; each with tapered shaft and point, erect thumb, proximally tapered Shank; FH loop ¾ Shank length; hook pair 1 peduncular, hook pairs 5 and 6 apparently absent. Gonads subovate; seminal vesicle elongate. Cirrus a coil of 2-3 rings; accessory piece variable, usually Y-shaped. Vagina a sclerotized tube. Egg with moderately long proximal projection, end of projection flattened.

**MEASUREMENTS:** Body 1,012 (894-1,182) long, greatest width 160 (139-213) at level of testis in posterior half of trunk. Pharyngeal diameter 46 (40-52). Haptor 88 (86-92) long, 129 (117-151) wide. Ventral anchor 49 (44-53), base width 34 (28-38); dorsal anchor 46 (39-48), base width 31 (24-33). Hook (all pairs) 16 (15-17). Cirrus 122 long, ring diameter 24 (22-26); accessory piece 45 (41-48). Testis 237 (221-252) × 119-120; ovary 63 (59-67) × 43-44. Egg 97 × 58.

**REMARKS:** This species is unique in that adults lack hook pairs 5 and 6; all other species in the genus possess seven pairs of haptoral hooks. *Cosmetocleithrum gussevi* sp. n. is the type species for the genus and is named in honor of Dr. A. V. Gussev, U.S.S.R. Academy of Sciences, Leningrad, a friend, in recognition of his important studies on Monogenea.

*Cosmetocleithrum confusus* sp. n.  
(Figs. 55-62)

**HOST:** Cuiú-cuiú, *Oxydoras niger* (Valenciennes), Doradidae.

**TYPE LOCALITY:** Janauaca Lake near Manaus, Amazonas, Brazil (June 3, 1978; August 1982).

**TYPE SPECIMENS:** Holotype, INPA PA267-1; paratypes, INPA PA267-2, PA267-3, USNM 78773, HWM L 22951.

**DESCRIPTION** (based on 20 specimens): Body fusiform; two terminal, two bilateral cephalic lobes moderately developed. Eyes, eye granules absent. Pharynx ovate; esophagus elongate. Peduncle elongate, broad; haptor ellipsoidal. Anchors similar; each with poorly developed roots, large base, short shaft, elongate point. Bars V-shaped; dorsal bar projections variable. Hooks
Figures 47-54. *Cosmetocleithrum gussevi* sp. n. 47. Holotype (ventral). 48. Copulatory complex. 49. Hook. 50. Egg. 51. Ventral bar. 52. Dorsal bar. 53. Ventral anchor. 54. Dorsal anchor. All drawings are to the same scale (30 micrometers) except Figure 47 (200 micrometers) and Figure 50 (50 micrometers).
Figures 55–62. Cosmetocleithrum confusus sp. n. 55. Ventral view of holotype. 56. Copulatory complex. 57, 58. Ventral bars. 59. Hook. 60. Ventral anchor. 61. Dorsal anchor. 62. Dorsal bar. All figures are drawn to the same scale (30 micrometers) except Figure 55 (200 micrometers).
similar, each with tapered shaft and point, depressed thumb, slender Shank; FH loop ¼ Shank length; hook pair 1 peduncular. Testis ovate; ovary subspherical, closely appressed to anterior margin of testis; seminal vesicle elongate; prostatic reservoir narrow, elongate. Cirrus a loose, poorly defined coil of about 1–1½ rings; shaft delicate, base large. Accessory piece appearing as a hollow structure with sclerotized walls and truncate termination. Vagina lightly sclerotized, with wide lateral opening.


**Remarks:** *Cosmetodeithrum confusus* sp. n. is closely related to *C. parvum* and *C. sobrinus* spp. n. as shown by the comparative morphology of the copulatory complexes. It differs from *C. parvum* by possessing anchors with comparatively short shafts and poorly developed roots and by having a delicate cirral tube with enlarged base. It is differentiated from *C. sobrinus* by being significantly smaller, lacking anchor roots and the exaggerated baglike accessory piece.

*Cosmetodeithrum confusus* exhibits a great deal of variation in size of its sclerotized haptoral parts, although morphology is relatively stable. Variation in the distance between the ends of each haptoral bar reflects differences in the angles of the V-shaped structures (compare Figs. 57, 58). In individual specimens, differences in sizes between the ventral and dorsal anchors ranged from 1.4 to 6.5 micrometers, with the dorsal anchor always being the larger. No useful measurement of the cirral ring diameter could be made because the coil was extremely loose and frequently distorted as a result of coverslip pressure.

The specific name reflects the possible confusion of the accessory piece for the cirrus.

*Cosmetodeithrum bulbocirrus* sp. n.  
(Figs. 63–69)

**Host:** Bacú liso, *Pterodoras granulosus* (Valenciennes), Doradidae.

**Type Locality:** Janauacá Lake near Manaus, Amazonas, Brazil (February 9, 1979; August 1982; May 6, 1983).

**Type Specimens:** Holotype, INPA PA269-1; paratypes, INPA PA268-2, USNM 78774, HWML 22952.

**Description** (based on 20 specimens): Body fusiform; cephalic lobes poorly developed, two terminal, two bilateral. Eyes absent; accessory granules large, subspherical, present in anterior trunk and cephalic area. Pharynx subspherical to ovate; esophagus short. Peduncle short, broad; haptor subspherical. Anchors similar, each with elongate point, straight shaft, well-developed roots. Ventral bar broadly V-shaped, with expanded terminations; dorsal bar V-shaped, with medial narrow region, projections delicate usually directed laterally. Hooks similar, each with recurved point, erect thumb, slender Shank; FH loop ¾ Shank length; hook pair 1 peduncular. Testis ovate, ovary pyriform; seminal vesicle an indistinct dilation of vas deferens; prostatic reservoir gourd-shaped, with smooth wall. Cirrus a coil of about two rings, with terminal bulbous expansion; accessory piece a variable fleshy rod. Vagina unsclerotized, a tube with distal sphincter.


**Remarks:** This species is distinct from other species in the genus in that the dorsal bar projections are delicate and generally directed laterally. It most closely resembles *Cosmetodeithrum rarum* sp. n. in the morphology of the copulatory complex and anchors, but is readily separated from it by the comparative shapes of the bars and the terminal portion of the cirrus shaft. The specific name, *bulbocirrus*, refers to the terminal inflation of the cirrus shaft.

*Cosmetodeithrum parvum* sp. n.  
(Figs. 70–75)

**Host:** Cuiú-cuiú, *Oxydoras niger* (Valenciennes), Doradidae.

**Type Locality:** Janaucacá Lake near Manaus, Amazonas, Brazil (February 9, 1979; August 1982; May 6, 1983).

**Type Specimens:** Holotype, INPA PA269-1; paratypes, INPA PA269-2, PA269-3, USNM 78775, HWML 22953.

**Description** (based on 20 specimens): Body
Figures 63–69. Cosmetocleithrum bulbocirrus sp. n. 63. Ventral view of holotype. 64. Hook. 65. Copulatory complex. 66. Ventral bar. 67. Dorsal bar. 68. Ventral anchor. 69. Dorsal anchor. All figures are to the same scale (30 micrometers) except Figure 63 (100 micrometers).
bacilliform or fusiform; cephalic margin usually rounded or with two terminal, two bilateral incipient lobes. Eyes absent; accessory granules varying in size from minute to small, subovate, occasionally scattered throughout cephalic and trunk regions. Pharynx subspherical; esophagus moderately long. Peduncle short, frequently constricted; haptor subpyramidal. Anchors similar, each with elongate point, short shaft, small base, well-developed roots. Ventral bar V-shaped, with narrowed terminations; dorsal bar U-shaped, with elongate projections directed posteriorly. Hooks similar, each with tapered shaft and point, slightly depressed thumb, slender shank; FH loop \( \frac{3}{4} \) shank length; hook pair 1 peduncular. Testis elongate ovate, ovary pyriform; seminal vesicle indistinct. Cirrus a poorly defined coil of about one ring; accessory piece with proximal arm, hollow bulbous portion distally. Vagina a funnel with small irregular protruberances in lumen of expanded portion.


**Remarks:** *Cosmetocleithrum parvum* sp. n. most closely resembles *C. sobrinus* sp. n., from which it is distinguished by having a significantly smaller size, a smaller copulatory complex, and in the comparative morphology of the ventral and dorsal bars. The species name is from Latin (*parvus* = small).

**Cosmetocleithrum rarum** sp. n. (Figs. 76–81)

**Host:** Cuiú-cuiú, *Oxydoras niger* (Valenciennes), Doradidae.

**Type Locality:** Janauacá Lake near Manaos, Amazonas, Brazil (February 9, 1979; August 1982).

**Type Specimens:** Holotype, INPA PA271-1; paratypes, INPA PA271-2, USNM 78776, HWML 22954.

**Description** (based on one specimen): Body fusiform; cephalic lobes well developed, two terminal, two bilateral. Single eyespot present; granules variable in size and shape; accessory granules absent. Pharynx subspherical; esophagus short. Peduncle short, broad; haptor hexagonal. Anchors similar, delicate; each with well-developed base, evenly curved point and shaft, well-developed roots. Ventral bar with posteromedial round projection; dorsal bar V-shaped, projections elongate. Hooks similar; each with finely tapered shaft and point, erect thumb, narrow shank; hook pair 1 peduncular; FH loop \( \frac{3}{4} \) shank length. Gonads subovate; seminal vesicle conspicuous. Cirrus a coil of 2–3 rings, base small; accessory piece variable with ventral oblique groove. Vagina a funnel with small irregular protruberances in lumen of expanded portion.


**Remarks:** The delicate anchors with evenly curved points and shafts distinguish this species from all others in the genus. Based on the morphology of the copulatory complex, it most closely resembles *C. bulbocirrus* sp. n., but *C. rarum* lacks the terminal inflation of the cirrus shaft. The specific name is from Latin (*rarum* = rare) and refers to the fact that it was found only once in several collections of the host from the Manaos area in Brazil.
Cosmetocleithrum parvum

Cosmetocleithrum rarum

Cosmetocleithrum sobrinus


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each with delicate point, straight tapered shaft; depressed thumb, shank swollen near midlength; FH loop ¾ shank length. Cirrus a conspicuously extended coil of about one ring, appearing as a straight tube with proximal and distal ends bent ventrally; accessory piece large, globose, apparently hollow. Vagina a weakly sclerotized, irregular tube.


**Remarks:** *Cosmetocleithrum sobrinas* sp. n. is closely related to *C. parvum* sp. n. and *C. confusus* sp. n. as indicated by the morphology of their accessory pieces. It is a larger worm than either species and can be further separated from them in the comparative morphology of the cirrus, anchors, bars, and hooks. The specific name is from Latin (sobrinas = a cousin) and refers to the relationships with the above named species.

**Gussevia Kohn and Paperna, 1964**

**Emended diagnosis:** Dactylogyridae, Ancyrocephalinae. Body divisible into cephalic region, trunk, peduncle and haptor. Tegument thin, smooth. Head organs, cephalic lobes present; cephalic glands unicellular, comprising bilateral groups posterolateral to pharynx. Eyes present, frequently dissociated. Mouth subterminal, midventral; pharynx muscular, glandular; esophagus present; intestinal caeca 2, confluent posterior to gonads. Gonads overlapping, intercaecal; testis dorsal to ovary. Vas deferens looping left intestinal caecum; seminal vesicle a dilation of vas deferens; prostatic reservoirs indistinct or apparently absent. Cirrus comprising a base from which a coiled tube arises; tube with less than one to several clockwise rings. Accessory piece distally ornate or complex. Common genital pore midventral near level of intestinal bifurcation. Oviduct short; uterus delicate, extending anteriorly along midline; seminal receptacle usually conspicuous immediately anterior to ovary; vagina sinistral, ventral, or usually dextral; vitellaria well developed, coextensive with intestinal caeca. Haptor developed into anterior and posterior lobes, armed with dorsal and ventral pairs of anchors, 14 hooks, and ventral and dorsal bars. Ventral anchors lying on posterior haptoral lobe, modified in shape, possessing a conspicuous anchor filament. Hook pairs 1, 2, 3, 4, 6, 7 similar, with slender shanks, lying on anterior haptoral lobe; pair 5 modified, usually elongate, delicate, associated with ventral anchors. Parasites of the gills of Neotropical cichlid fishes.

**Type species and host:** *Gussevia spiralocirra* Kohn and Paperna, 1964 from *Pterophyllum scalare* (Lichtenstein) (=*P. eimekei* Ahl), Cichlidae.

**Other species:** *G. alti* (Molnar et al., 1974), *G. cichlasomatis* (Molnar et al., 1974), and *G. doboisi* (Molnar et al., 1974) combs. n. from *Cichlasoma bimaculatum* (Linnaeus); *G. obtusa* and *G. elephas* spp. n. from *Uaru amphicanthoides* (Heckel); *G. longihaptor* (Mizelle and Kritsky, 1969) comb. n., *G. undulata*, *G. arilla*, and *G. tucunarense* spp. n. from *Cichla ocellaris* Bloc and Schneider; and *G. alioides*, *G. dispar*, and *G. disparoides* spp. n. from *Cichlasoma severum* (Heckel).

**Other possible inclusions:** *Trinidadactylus cichlasomatis* Hanek, Molnar, and Fernando, 1974 from *Cichlasoma bimaculatum* (Linnaeus).

**Remarks:** Features which distinguish *Gussevia* from other genera in the Urocleidoides complex include the combined presence of (1) overlapping gonads, (2) a haptor with anterior and posterior lobes, (3) a modified ventral anchor with well-developed anchor filament, (4) a modified hook pair 5 usually delicate and lying on the posterior haptoral lobe with the ventral anchors, and (5) a cirrus coil with clockwise rings. All known species of *Gussevia* are parasitic on cichlid fishes, whereas *Urocleidoides* (as defined herein) species occur primarily on characid hosts; *Vancleaveus* and *Cosmetocleithrum* species are found only on hosts of the Order Siluriformes.

Kohn and Paperna (1964) proposed *Gussevia* for ancyrocephaline species characterized primarily by having a dextral vagina, a cirrus with a long spiral (coiled) tube, and accessory piece attached to the distal end of the cirrus (not basally articulated). Designating their new species, *G. spiralocirra*, as the type species, they included *G. minuta* Kohn and Paperna, 1964, from the guppy (*Poecilia reticulata*) and two species described previously by Jain (1958) from India, *G. rhynchodelli* (=*Urocleidus r.*) and *G. xenentodoni* (=*Urocleidus x.*). From their definition of the genus, their remarks, and the fact that *G. minuta*
(considered herein as a junior synonym of *Urocleidoides reticulatus* Mizelle and Price, 1964, type species of *Urocleidoides*) was included in their genus, it was obvious to Kritsky and Thatcher (1983) that the original authors had considered the configuration of *Gussevia* identical to that previously defined for *Urocleidoides* as emended by Mizelle et al. (1968). As a result, Kritsky and Thatcher (1983) considered the two genera synonymous, with *Urocleidoides* having priority; without comment, these authors transferred *G. spiralocirra* and *G. minuta* to this genus, *G. rhynchobelli* and *G. xenentodon* were excluded from *Urocleidoides* by Thatcher and Kritsky (1983), thus returning them provisionally to *Uroleidus*.

Mizelle and Kritsky (1969) proposed *Longihaptor* for what appeared as a unique species (*L. longihaptor*) from the gills of the aquarium fish *Cichla ocellaris*. The monotypic *Longihaptor* was characterized by having the ventral anchors situated on a conspicuous posterior haptoral lobe and adorned with a heavy anchor filament; modification of hook pair 5 was also considered a distinguishing character and the vagina was not observed in their specimens. These authors were concomitantly working with several *Urocleidoides* species, which enhanced the apparent distinction of the two genera. Collection of numerous species of *Ancyrocephalinae* for the present study, including *Gussevia spiralocirra* Kohn and Paperna, 1964 and other species from cichlids in South America, has shown that the group proposed by Mizelle and Kritsky (1969) is likely valid but that *Gussevia* has priority because its type species is clearly a member. Thus, *L. longihaptor* Mizelle and Kritsky, 1969 is transferred to *Gussevia* as a new combination. Based on comparison of type specimens, *Cleidodiscus bulbus* Rogers and Rawson, 1969, under study simultaneously with the work of Mizelle and Kritsky (1969), is considered a junior subjective synonym of *G. longihaptor* comb. n.

Our study of paratypes of *Urocleidoides alii*, *U. cichlasomatis*, and *U. doboisi*, all described by Molnar et al. (1974), confirms that these species are members of *Gussevia* as emended herein. Although paratypes of all three species are unstained and therefore unsuitable for study of internal features, they are clearly members of *Gussevia* based on the morphology and configuration of the haptor and its armament. Ventral anchors of all three species possess blunt points similar to those of *G. spiralocirra* Kohn and Paperna, 1964 and *G. alioiodes* sp. n. (Figs. 95, 119). Thus, the following new combinations are proposed: *G. alii* (Molnar et al., 1974) comb. n., *G. cichlasomatis* (Molnar et al., 1974) comb. n., *G. doboisi* (Molnar et al., 1974) comb. n.

In addition, *Trinidadactylus cichlasomatis* Hanek, Molnar, and Fernando, 1974 is likely a member of *Gussevia*. Our study of two paratype specimens has revealed that at least one of them possesses two pairs of anchors. The dorsal “hooklike structures,” described for this species and one of the characters used to establish the monotypic *Trinidadactylus*, apparently represent the point and shaft of one pair of anchors whose bases are difficult to observe in the cleared and unstained paratypes. Because two pairs of anchors were definitely observed only in one paratype, we hesitate to formally transfer this species to *Gussevia*; examination of fresh material will probably be necessary to determine the valid generic placement of this species.

*Gussevia spiralocirra*  
Kohn and Paperna, 1964  
(Figs. 89–96)

**Synonyms:** *Ancyrocephalus pterophylli* Lucký, 1970; *Urocleidoides spiralocirra* (Kohn and Paperna, 1964) Kritsky and Thatcher, 1983.

**Host:** *Cará bandeira*, *Pterophyllum scalare* (Lichtenstein), Cichlidae.

**Locality:** Rio Atacuari near its confluence with the Amazon River, East of Iquitos, Peru (March 1977).

**Specimens studied:** Vouchers, INPA PA272-1 to PA272-3, USNM 78778, HWML 22955; co-type (?), *Ancyrocephalus pterophylli* Lucký, 1970, USNM 78801.

**Redescription** (based on 24 specimens, 20 measured): Body robust, fusiform; cephalic lobes poorly developed, usually two terminal, two bilateral. Four eyes, equidistant, members of posterior pair larger; eye granules dissociated, variable in size, generally olate; accessory granules present in cephalic region and anterior trunk. Pharynx spherical; esophagus short. Peduncle broad; posterior haptoral lobe wide, poorly differentiated from anterior portion of haptor. Ventral anchor with equal, large roots; anchor point blunt, sharply recurved near termination. Dorsal anchor with large superficial root, evenly curved shaft and point. Ventral bar with enlarged ends, variable; dorsal bar rod-shaped, undulating. Hook pairs 1, 2, 3, 4, 6, 7 with enlarged thumb, slender or slightly inflated shank; hook pair 5 delicate.
Figures 89-96. *Gussevia spiralocirra* Kohn and Paperna, 1964. 89. Whole mount (ventral view). 90. Hook pair 5. 91A, B. Two forms of remaining hook pairs. 92. Copulatory complex. 93. Ventral bar. 94. Dorsal bar. 95. Ventral anchor. 96. Dorsal anchor. All figures are to the 30-micrometer scale except Figure 89 (100 micrometers).
with well-developed thumb; FH loop ½ Shank length. Gonads bacilliform; seminal vesicle lunate. Cirrus a coil of 3–4 rings, small base; accessory piece closely associated with terminal ring of cirrus, terminally ornate. Vagina sinistral, a tube opening into thick-walled “seminal receptacle.”


**Remarks:** *Gussevia spiralocteria* is the type species of the genus. Our specimens were morphometrically variable, with two semidistinct forms being present. In most specimens, the shanks of hooks 1, 2, 3, 4, 6, and 7 are slightly inflated (Fig. 91A), whereas those in other specimens possessed slender shanks (Fig. 91B). Although measurements of both forms overlapped, those of specimens with slender hook shanks tended to occupy the smaller values of the ranges for anchors and bars. All of our specimens possessed a sinistral vagina, whereas Kohn and Paperna (1964) report it as dextral in their specimens. We were not able to examine type specimens of this species; however, based on the comparison of our specimens with drawings provided by these authors, we consider our collection to be conspecific with this species. verification of the position of the vagina will depend on study of the type material deposited in the Museum of the Oswaldo Cruz Institute, Brazil.

Our examination of one cotype(?) of *Ancyrocephalus pterophylli* Lucký, 1970 has shown this species to be conspecific with our collection. The cotype is unstained and verification of the features of the internal organs was not possible. However, the shapes of the sclerotized structures of the haptor and copulatory complex fall within variation observed in our series. Thus, *A. pterophylli* is considered a junior subjective synonym of *Gussevia spiralocteria*.

**Gussevia spiralocteria** is closely related to *G. alii* (Molnar et al., 1974) comb. n., *G. aliioides* sp. n., *G. cichlasomatis* (Molnar et al., 1974) comb. n., and *G. dobosi* (Molnar et al., 1974) comb. n. based on the comparative morphology of the haptoal armament and copulatory complex. These species are easily differentiated by the number of rings in the cirral coil, the position of the vagina, and the morphology of the accessory piece.

**Gussevia elephas** sp. n. (Figs. 97–104)

**Host:** Cará bararua, *Uaru amphianthoides* (Heckel), Cichlidae.

**Type locality:** Rio Negro near Manaus, Amazonas, Brazil (June 27, 1983).

**Type specimens:** Holotype, INPA PA273-1; paratypes, USNM 78779, HWML 22956.

**Description** (based on one immature and six adult specimens, adults measured): Body foliform, robust; cephalic margin narrow, with two terminal and two bilateral cephalic lobes poorly developed. Eyes 4; members of posterior pair larger, slightly closer together than members of anterior pair; eye granules elongate ovate; accessory granules present in cephalic and anterior trunk regions. Pharynx spherical; gut obscured by dense vitellaria. Peduncle tapered; haptor (ventral view) shaped like the head of an African elephant, posterior lobe narrow. Ventral anchor with superficial root depressed on deep root, shaft expanded, point straight and aculate; dorsal anchor with well-developed roots, curved shaft, elongate point. Ventral bar with medial anterior depression; dorsal bar rod-shaped with slight terminal enlargements. Hook pairs 1, 2, 3, 4, 6, 7 similar, with delicate point, conspicuous thumb, slightly enlarged shank; hook pair 5 delicate; FH loop ¾ shank length. Gonads subovate; seminal vesicle coiled posterior to cirrus base. Cirrus a coil of about 1½ rings, enlarged base; accessory piece enclosing distal ½-ring of coil, with flabellate termination. Vagina dextral, a short delicate tube connecting with large medial seminal receptacle showing local regions of spermatozoa.

Figures 97-104. *Gussevia elephus* sp. n. 97. Ventral view of holotype. 98. Hook pair 5. 99. Remaining hook pairs. 100. Copulatory complex. 101. Ventral bar. 102. Dorsal bar. 103. Ventral anchor. 104. Dorsal anchor. All figures are to the same scale (30 micrometers) except the whole-mount drawing (100 micrometers).
Remarks: This species is most closely related to *G. obtusa* and *G. dispar* spp. n. They are easily distinguished by the comparative morphology of the haptoral armament, copulatory complex, and vagina. The haptor, shaped as the head of an African elephant, distinguishes this species from all others in the genus and is the characteristic from which the specific name is derived (Latin, *eleph/o* = elephant).

**Gussevia obtusa** sp. n.  
(Figs. 105–112)

Host: Cará bararuá, *Uaru amphiacanthoides* (Heckel), Cichlidae.

**TYPE LOCALITY:** Rio Negro near Manaus, Amazonas, Brazil (June 27, 1983).

**TYPE SPECIMENS:** Holotype, INPA PA274-1; paratypes, USNM 78780, HWML 22957.

**DESCRIPTION** (based on five specimens): Body fusiform; cephalic lobes poorly developed, usually two terminal, two bilateral. Four eyes, usually compact; members of posterior pair larger, closer together than members of anterior pair; eye granules small, ovate; accessory granules infrequent in cephalic and anterior trunk regions. Pharynx spherical; esophagus moderately long. Peduncle moderate; haptor deeply incised bilaterally forming well-developed anterior and posterior lobes. Ventral anchor with appressed roots, evenly curved shaft and point; tip of point bent, blunt. Dorsal anchor with well-developed roots, curved shaft, elongate point. Ventral bar with enlarged ends, medial swelling; dorsal bar rod-shaped, with tapered ends. Hook pairs 1, 2, 3, 4, 6, 7 with delicate point, enlarged thumb, slender shank; pair 5 delicate; FH loop ⅝ shank length. Gonads elongate; seminal vesicle pyriform. Cirrus a coil of 2–3 rings; accessory piece closely associated with terminal cirral ring, distal portion flabellate, clavate. Vagina dextral, comprising a terminal bulbous structure, moderately elongate tube opening into conspicuous seminal receptacle with local regions of spermatozoa.


Remarks: *Gussevia obtusa* most closely resembles *G. disparoides* sp. n. as shown by the comparative morphology of the bases of the anchors and of the copulatory complex. These species are distinguished by the presence of a smooth origin of the ventral anchor shaft from the base in *G. obtusa* (shaft with distinct proximal bend in *G. disparoides*), small terminal enlargements of the ventral bar in *G. obtusa*, and the comparative morphology of the distal portion of the vagina. The specific name from Latin (*obtus* = blunt) refers to the tip of the ventral anchor point.

**Gussevia alioides** sp. n.  
(Figs. 113–120)

Host: Cará roxo, *Cichlasoma severum* (Heckel), Cichlidae.

**TYPE LOCALITY:** Rio Solimões, near Marchantaria Island, Manaus, Amazonas, Brazil (January 2, 1984).

**TYPE SPECIMENS:** Holotype, INPA PA275-1; paratypes, INPA PA275-2, USNM 78781, HWML 22958.

**DESCRIPTION** (based on 19 specimens): Body robust, with narrow anterior trunk and cephalic regions; cephalic lobes poorly developed, usually two terminal, two bilateral. Eyes 4, subequal; members of posterior pair closer together; eye granules ovate, large; accessory granules scattered in cephalic area. Pharynx spherical; esophagus moderately long. Peduncle broad; posterior haptoral lobe well developed, large. Ventral anchor with large base, evenly curved shaft and point, tip of point recurved and blunt. Dorsal anchor with well-developed roots, slightly bent shaft, elongate point. Ventral bar with enlarged ends; dorsal bar usually straight, rod-shaped, with slightly enlarged ends. Hook pairs 1, 2, 3, 4, 6, 7 with delicate point, large thumb, slender shank having slight basal enlargement; hook pair 5 delicate, with large thumb; FH loop ⅝–⅞ shank length. Gonads pyriform; seminal vesicle a conspicuous dilation of vas deferens. Cirrus a coil of 4–5 rings; accessory piece closely associated with distal cirral ring, with elongate projection arising near midlength. Vagina midventral, with dextral loop of tube lying ventral to right intestinal caecum. Egg ovate to subspherical, with short irregular proximal filament.

**MEASUREMENTS:** Body 381 (321–441), greatest width 101 (85–126) in posterior half. Pharyngeal diameter 21 (19–23). Haptor 65 (58–77) long, 93...
Figures 105-112. *Gusseria obtusa* sp. n. 105. Holotype (ventral view). 106. Hook pair 5. 107. Hook of remaining pairs. 108. Copulatory complex. 109. Ventral bar. 110. Dorsal bar. 111. Ventral anchor. 112. Dorsal anchor. All figures are to the same scale (30 micrometers) except Figure 105 (100 micrometers).
Figures 113–120. *Gussevia alioides* sp. n. 113. Ventral view of holotype. 114. Hook of pairs 1, 2, 3, 4, 6, 7. 115. Hook pair 5. 116. Copulatory complex. 117. Ventral bar. 118. Dorsal bar. 119. Ventral anchor. 120. Dorsal anchor. All are drawn to the same scale (30 micrometers) except Figure 113 (100 micrometers).
Haptoral armament and copulatory complex. The name refers to the relationship of these species. Vagina in tral vaginal opening with a dextral loop of the bar (27-43). Hook pairs 1, 2, 3, 4, 6, 7-14 with 12(10-18); dorsal anchor 26 (23-28), base width 10 (9-11). Ventral bar 20 (17-24); dorsal bar 28 (19-32). Hook pairs 1, 2, 3, 4, 6, 7-11 with delicate point, erect thumb, slender shank; hook pair 5 delicate; FH loop extending to near proximal end of shank. Gonads elongate; seminal vesicle inconspicuous. Cirrus a coil of about 1½ rings, base with fleshy projection apparently following proximal ½ coil; accessory piece flabellate, enclosing terminal portion of cirrual tube. Vagina dextral, with sinuous tube.


Remarks: *Gussevia aliioides* sp. n. is the only described species in the genus having a midventral vaginal opening with a dextral loop of the vaginal tube. It is closest to *G. alii* (Molnar et al., 1974) as shown by the morphology of the haptoral armament and copulatory complex. The vagina in *G. alii* is dextroventral. The specific name refers to the relationship of these species.

*Gussevia tucunarense* sp. n.
(Figs. 121-128)

Host: Tucunaré, *Cichla ocellaris* Bloch and Schneider, Cichlidae.

Type locality: Rio Negro near Manaus, Amazonas, Brazil (June 12, 1978; June 27, 1983; December 1983).

Type specimens: Holotype, INPA PA276-1; paratypes, INPA PA276-2 to PA276-5, USNM 78782, HWML 22959.

Description (based on 28 specimens; 20 measured): Body fusiform; cephalic margin rounded or with poorly developed lobes, usually two terminal, two bilateral. Eyes 4, frequently dissociated, subequal, equidistant; eye granules large, subspherical; accessory granules present in cephalic and anterior trunk regions. Pharynx spherical; esophagus apparently short; gut obscured by dense vitellaria. Peduncle broad, posterior haptoral lobe reduced. Ventral anchor with truncate superficial root, well-developed deep root, angular bends at junctions of base and shaft and shaft and point; point tip obtuse, slightly recurved. Dorsal anchor with elongate superficial root, short deep root, bent shaft, elongate point. Ventral bar with slightly enlarged ends, anteromedial indented plate; dorsal bar rod-shaped with slightly enlarged terminations. Hook pairs 1, 2, 3, 4, 6, 7 with delicate point, erect thumb, slender shank; hook pair 5 delicate; FH loop extending to near proximal end of shank. Gonads elongate; seminal vesicle inconspicuous. Cirrus a coil of about 1½ rings, base with fleshy projection apparently following proximal ½ coil; accessory piece flabellate, enclosing terminal portion of cirrual tube. Vagina dextral, with sinuous tube.


Remarks: Based on the morphology of the ventral anchor, *G. tucunarense* sp. n. is closely related to *G. longihaptor* (Mizelle and Kritsky, 1969) comb. n., *G. arilla* sp. n., and *G. undulata* sp. n., all from *Cichla ocellaris*. Structures which best distinguish these species include the vagina, copulatory complex, and ventral anchor shafts and points. The specific name is derived from the local name of the fish host, tucunaré.

*Gussevia longihaptor* (Mizelle and Kritsky, 1969) comb. n.
(Figs. 129-136)


Host: Tucunaré, *Cichla ocellaris* Bloch and Schneider, Cichlidae.

Type locality: Amazon River Basin, Brazil (Mizelle and Kritsky, 1969).

Present locality: Rio Negro near Manaus, Amazonas, Brazil (June 27, 1983).


Redescription (based on three specimens): Body robust, fusiform; cephalic margin rounded or with two terminal, two bilateral cephalic lobes. Eyes 4, equidistant; members of posterior pair larger than those of anterior pair; eye granules variable in size and shape; accessory granules rare in cephalic area. Pharynx spherical; esophagus short to nonexistent. Peduncle tapered posteriorly, broad; haptoral lobe well developed. Ventral anchor with large superficial root, conspicuous deep root, short shaft, tip of point obtuse. Dorsal anchor with elongate superficial root, short deep root, curved shaft, acute point. Ventral bar with enlarged ends, small anteromedial plate; dorsal bar rod-shaped with slight terminal
Gussevia longihaptor

Gussevia disparoides

Gussevia arilla

Gussevia dispar

Gussevia undulata

enlargements. Hook pairs 1, 2, 3, 4, 6, 7 with erect thumb, delicate point and shaft, slender shank; hook pair 5 with poorly developed thumb, slender shank; FH loop $\frac{9}{6}$ shank length. Gonads elongate; seminal vesicle indistinct. Cirrus a coil of about 1½ rings, small base, tube dilated; accessory piece with short proximal portion giving rise to two terminal branches. Vagina not observed, apparently un sclerotized.


**Remarks:** This species was originally described as *Longihaptor longihaptor* by Mizelle and Kritsky (1969) from the gills of *Cichla ocellaris*, an aquarium fish in the United States. Examination of three paratype specimens of *L. longihaptor* and comparison of these specimens with ours confirms their conspecificity. Major differences in the depictions of the copulatory complex are due to the fact that Mizelle and Kritsky (1969) drew a specimen that had been severely flattened with the cirrus lying in lateral view. Nonetheless, these authors do depict an expanded cirrus tube with about 1½ coils. Similarly, examination of the paratype of *Cleidodiscus bulbus* described by Rogers and Rawson (1969 publication date: Aug. 21, 1969) confirmed that this species is conspecific with *L. longihaptor* (publication date: Apr. 16, 1969), and it is relegated to junior subjective synonymy because of a later publication date.

**Gussevia disparoides** sp. n.

(Figs. 137–144)

Host: Cará roxo, *Cichlasoma severum* (Heckel), Cichlidae.

**Type locality:** Rio Solimões near Marchantaria Island, Manaus, Amazonas, Brazil (January 2, 1984).

**Type specimens:** Holotype, INPA PA278-1; paratypes, INPA PA278-2, USNM 78784, HWML 22961.

**Description** (based on 11 specimens): Body fusiform, stout; cephalic margin rounded or with two terminal, two bilateral cephalic lobes. Eyes 4; members of posterior pair larger, closer together than members of anterior pair; eye granules subovate, variable in size; accessory granules few in cephalic region. Pharynx subovate; esophagus short to nonexistent. Peduncle broad, tapered posteriorly; posterior haptoral lobe with divergent arms. Ventral anchor with appressed roots, proximal bend of shaft, obtuse point; dorsal anchor with well-developed roots, short shaft, elongate point. Ventral bar with enlarged ends and short, acute anteromedial projection. Dorsal bar rod-shaped, with slightly enlarged ends. Hook pairs 1, 2, 3, 4, 6, 7 with curved shaft and point, erect thumb, slender shank; hook pair 5 similar except for elongate shaft; FH loop $\frac{1}{2}$–$\frac{3}{4}$ shank length. Gonads small, bacilliform; seminal vesicle pyriform. Cirrus a coil of about 2½ rings; accessory piece closely associated with distal ring of cirrus, with terminal lamellar projections. Vagina dextral with terminal fleshy funnel and winding tube.


**Remarks:** *Gussevia disparoides* sp. n. is closest to *G. dispar* sp. n., also from *Cichlasoma severum*. They are easily distinguished by the mor-
Gussevia arilla sp. n.
(Figs. 145–153)

Host: Tucunaré, Cichla ocellaris Bloch and Schneider, Cichlidae.

Type locality: Rio Negro near Manaus, Amazonas, Brazil (June 27, 1983).

Type specimens: Holotype, INPA PA279-1; paratypes, USNM 78785, HWML 22962.

Description (based on seven specimens): Body robust, tapered at both extremities; cephalic lobes poorly developed, two terminal, two bilateral. Eyes 4, equidistant; members of posterior pair larger or subequal in size to members of anterior pair; eye granules variable in size, subovate; accessory granules usually present in cephalic region. Pharynx spherical; posterior haptoral lobe with divergent arms. Ventral anchor with large truncate superficial root, well-developed deep root, straight shaft with proximal angular origin, straight point with obtuse tip. Dorsal anchor with elongate superficial root, small deep root, bent shaft, elongate point. Ventral bar with enlarged terminations, anteromedial flap with small indentation. Dorsal bar rod-shaped. Hook pairs 1, 2, 3, 4, 6, 7 with erect thumb, delicate point and shaft, shank with slight variation in diameter; hook pair 5 elongate, delicate, with poorly developed thumb; FH loop $\frac{1}{2}$ shank length. Gonads short, bacilliform; seminal vesicle indistinct. Cirrus a coil of $1\frac{1}{2}$ rings, base articulated to accessory piece. Accessory piece complex with proximal arm flared distally into a sheath wrapped around termination of cirral tube. Vagina dextra, with fleshy lobe ventral to lateral opening (Fig. 145); lobe with internal ridges imparting a cerebral appearance.


Remarks: G. arilla sp. n. is easily distinguished from all other known species in the genus by the characteristic fleshy lobe ventral to the dextral opening of the vagina. Based on haptoral morphology, it most closely resembles G. tucunarensis sp. n. The specific name is from Neolatin (arilla = a wrapper) and refers to the complex structure of the terminal portion of the accessory piece.

Gussevia dispar sp. n.
(Figs. 154–161)

Host: Cará roxo, Cichlasoma severum (Heckel), Cichlidae.

Type locality: Rio Solimões near Maranhata Island, Manaus, Amazonas, Brazil (January 2, 1984).

Type specimens: Holotype, INPA PA280-1; paratypes, USNM 78786, HWML 22963.

Description (based on six specimens): Body fusiform, gently tapered posteriorly; cephalic lobes poorly developed, two terminal, two bilateral. Eyes 4, subequal; members of posterior pair slightly closer together than members of anterior pair; eye granules variable in size, subovate to bacilliform; accessory granules present in cephalic and anterior trunk regions. Pharynx spherical, esophagus moderately elongate. Penicule narrow, elongate; haptor with small posterior lobe. Ventral anchor with truncate superficial root, knoblike deep root, short shaft, curved and acute anchor point. Dorsal anchor with elongate superficial root, small deep root, bent shaft, elongate point. Ventral bar with enlarged terminations, small anteromedial triangular projection. Dorsal bar rod-shaped with slightly enlarged terminations. Hook pairs 1, 2, 3, 4, 6, 7 with curved shaft and point, erect thumb, slender shank; hook pair 5 similar, with longer shank and small proximal enlargement; FH loop $\frac{3}{4}$ shank length. Gonads elongate; seminal vesicle stout, fusiform. Cirrus a coil of about $\frac{1}{2}$ rings; accessory piece with well-developed proximal arm flaring distally with folded lamellar projection. Vagina dextra, with terminal fleshy funnell, winding delicate tube. Egg ovate, with short anterior filament and posterior pointed elevation.


Remarks: Based on the structure of the vagina, bars, copulatory complex, hooks and dorsal anchor, this species most closely resembles *G. disparoides* sp. n. They are easily distinguished by the morphology of the ventral anchors and relative body shapes. The species name is from Latin (*dispars* = different) and refers to the unique ventral anchor.

*Gussevia undulata* sp. n.
(Figs. 162–169)

Host: Tucunaré, *Cichla ocellaris* Bloch and Schneider, Cichlidae.

Type locality: Rio Negro near Manaus, Amazonas, Brazil (June 27, 1983); also collected from the same host purchased at the Manaus Fish Market (December 1983).

Type specimens: Holotype, INPA PA281-1; paratypes, INPA PA281-2, USNM 78787 and 78788, HWML 22964.

Description (based on eight specimens): Body fusiform, tapered gently posteriorly; cephalic margin rounded or with two terminal, two bilateral cephalic lobes poorly developed. Four eyes, equidistant; members of posterior pair larger than those of anterior pair; eye granules elongate ovate to bacilliform; accessory granules present in cephalic and anterior trunk regions. Pharynx sub-spherical; esophagus short. Peduncle short, broad; haptoral lobe with divergent elongate arms. Ventral anchor with large truncate superficial root, small deep root, straight shaft originating at an angle from anchor base, undulating point with obtuse tip. Dorsal anchor with large superficial root, small deep root, curved shaft, sharply recurved elongate point. Ventral bar small, with slightly enlarged ends and anteromedial truncate process. Dorsal bar rod-shaped, with slightly enlarged terminations. Hook pairs 1, 2, 3, 4, 6, 7 with delicate point and shaft, erect thumb, slender shank; hook pair 5 apparently lacking thumb; FH loop nearly equals shank length. Gonads fusiform; seminal vesicle large. Cirrus a coil of about 1 ½ rings; base with lateral flange. Accessory piece with short proximal arm from which complex terminal branch arises, accessory piece flared distally. Vagina dextral, a short tube; posterior surface sclerotization present at vaginal opening.


Remarks: *Gussevia undulata* sp. n. is most closely related to *G. longihapto* (Mizelle and Kritsky, 1969) as shown by the comparative morphology of the ventral anchor, hooks, and bars. *Gussevia undulata* is separated from this species by having (1) an undulating ventral anchor point, (2) a complex accessory piece of the copulatory complex, (3) a slender cirral tube (expanded in *G. longihapto*), and (4) a sclerotized vagina. The specific name, from Latin (*undulata* = wavy), refers to the shape of the ventral anchor point.

Discussion


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**Literature Cited**


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FOR 1986

(Wed.) 15 Jan. National Institutes of Health, Bethesda, MD
(Wed.) 12 Feb. Naval Medical Research Institute, Bethesda, MD (with Food and Drug Administration)
(Wed.) 19 Mar. Walter Reed Army Institute of Research, Washington, D.C. (with Armed Forces Institute of Pathology)
(Wed.) 16 Apr. Johns Hopkins University, Baltimore, MD
(Sat.) 10 May University of Pennsylvania, New Bolton Center, PA

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