



**Emendation of the subfamilies Caiguirinae and Pygidiopsinae (Digenea)
with a redescription of *Caiguiria anterouteria* (Digenea: Heterophyidae)
and reassignment of *Pygidiopsis crassus* to *Caiguiria***

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Abstract

During a study of members of the genus *Pygidiopsis* from wading birds from the Texas gulf coast, specimens of *Caiguiria anterouteria* from the United States National Parasite Collection and from the Senckenberg Museum, Frankfurt and specimens of *Pygidiopsis macrostomum* from the Natural History Museum, London were examined. These specimens demonstrated ranges of characteristics that called in to question their assignment to either *Pygidiopsis* or *Caiguiria*. Species of *Pygidiopsis* are divided into 4 distinct morphological groups based on the presence or absence of spines on the oral sucker, the distribution of the vitellaria and the anterior extent of the uterus. The subfamily Caiguirinae is emended to include those species with an unarmed oral sucker and vitelline follicles that reach the level of the acetabulum anteriorly, and *C. anterouteria* is redescribed based on existing museum specimens consistent with the holotype specimen. The genus *Caiguiria* is emended to include species where the vitelline follicles reach the level of the acetabulum anteriorly but do not extensively invade the posttesticular space. *Pygidiopsis crassus* is assigned to *Caiguiria* as *Caiguiria crassa* n. comb., and the subfamily Pygidiopsinae is emended to include those species where the vitelline follicles extend from the level of the acetabulum posteriorly in to the posttesticular space and where the uterus is confined to the hindbody. The validity of *Pygidiopsis pelecani* and *Pygidiopsis piclaumoreli* is discussed.

Key words: *Caiguiria*, *Caiguiria crassa* n. comb., Caiguirinae, Digenea, emendation of taxa, Heterophyidae, *Pygidiopsis*, Pygidiopsinae, species redescription

Introduction

The genus *Pygidiopsis* Looss (Heterophyidae [Leiper]: Pygidiopsinae Yamaguti) was erected by Looss (1907) with the description of *Pygidiopsis genata* Looss from the great white pelican, *Pelecanus onocrotalus* Linnaeus, from Egypt. There are 11 additional species that have historically been assigned to the genus (Table 1).

TABLE 1. Nominal species of *Pygidiopsis* including their type hosts, and type localities and references. An asterisk (*) indicates experimental infections. A single cross (†) indicates that this species was originally described as *Ascocotyle plana* Linton.

<i>Pygidiopsis</i> spp.	Current host species designation	Original host designation	Locality	Reference
<i>ardea</i> Køie	<i>Ardea cinerea</i> Linnaeus (grey heron)		Denmark	Køie, 1990
<i>australis</i> Ostrowski de Núñez	Chicks and mice*		Argentina	Ostrowski de Núñez, 1996
<i>crassus</i> Ostrowski de Núñez	<i>Gallus gallus domesticus</i> (Linnaeus) (domesticated red junglefowl)*	as <i>Gallus domesticus</i> (Linnaeus)	Argentina	Ostrowski de Núñez, 1995
<i>genata</i> Looss (type species)	<i>Pelecanus onocrotalus</i> Linnaeus (great white pelican)		Egypt	Looss, 1907
<i>macrostomum</i> Travassos	<i>Rattus norvegicus</i> (Berkenhout) (Norway rat)		Brazil	Travassos, 1928
<i>marivillai</i> Refuerzo & Garcia	<i>Haliaeetus leucogaster</i> (Gmelin) (white-bellied sea eagle)	as <i>Haliaeetus</i> (sic) <i>leucogaster</i>	Philippines	Refuerzo & Garcia, 1937
<i>pelecani</i> Wang	<i>Pelecanus rufescens roseus</i> Gmelin (pink-backed pelican)		China	Wang, 1982
<i>phalacrocoracis</i> Yamaguti	<i>Phalacrocorax carbo</i> (Linnaeus) (common cormorant)		Japan	Yamaguti, 1939
<i>piclaumoreli</i> Dollfus & Capron	<i>Sterna hirundo</i> Linnaeus (common tern)		Senegal	Dollfus & Capron, 1958
<i>pindoramensis</i> Travassos	<i>Piranga olivacea</i> (Gmelin) (scarlet tanager)	as <i>Ardetta erythromelas</i> Gmelin	Brazil	Travassos, 1929
<i>plana</i> † (Linton)	<i>Butorides virescens</i> Linnaeus (green heron)		North America	Linton, 1928
<i>summa</i> Onji & Nishio	<i>Gavia arctica</i> (Linnaeus) (black-throated loon)	as <i>Colymbus arcticus pacificus</i> Linnaeus	Japan	Onji & Nishio, 1916

Nasir and Díaz (1971) erected the subfamily Caiguirinae Nasir and Díaz based on specimens retrieved from a kitten experimentally infected with metacercaria from naturally infected guppies, *Poecilia reticulata* (Peters) (as *Lebistes reticulatus* Peters) from San Juan de Macarapana, Venezuela and specimens collected from a naturally infected black-necked stilt, *Himantopus mexicanus* (Müller) (as *Himantopus himantopus* Müller) from Laguna de Los Patos, Venezuela. Caiguirinae was distinguished from Pygidiopsinae and *Caiguiria anterouteria* Nasir and Díaz from species of *Pygidiopsis* based on the presence of uterine coils in the preacetabular region. The original description of *C. anterouteria* by

Nasir and Díaz (1971) reflected a wide range of variability in measurements and in the characteristics typically used to separate species in other groups of digeneans (i.e. shape of the body, length of the ceca, distribution of the vitelline follicles, structure of the excretory vesicle). These authors documented this variability by contrasting the morphological differences between their holotype specimen (see their Figure 1a) from experimental infections with metacercariae from the guppy and their paratype (see their Figure 1) from a naturally infected black-necked stilt. Rietschel and Werding (1978) redescribed *C. anterouteria* from specimens (Senckenberg Museum, Frankfurt, Germany [SMF] 3583-84) collected from *Himantopus mexicanus* (as *Himantopus himantopus*) from Isla de Salamanca, Columbia and also demonstrated a wide range of variability within the species (see their Figures 1 and 2). Rietschel and Werding (1978) assigned *P. macrostomum* to *Caiguiria* because they thought that the type specimen of *P. macrostomum* was not fully developed and would have ultimately developed uterine coils that reached anteriorly in to the preacetabular region as described for *C. anterouteria*.

During a study of members of the genus *Pygidiopsis* from wading birds from the Texas gulf coast, specimens of *C. anterouteria* from the United States National Parasite Collection (USNPC) and from the SMF and specimens of *P. macrostomum* from the Natural History Museum (NHM), London, UK were examined. These specimens demonstrated wide ranges of characteristics that called in to question their assignment to either *Pygidiopsis* or *Caiguiria*. The purpose of this study was to reevaluate the wide range of heterogeneity previously reported for key characteristics for *C. anterouteria* and reexamine available specimens of species of both *Caiguiria* and *Pygidiopsis* to validate their generic placement.

Materials and methods

The following specimens were examined from the USNPC, Beltsville, Maryland, U.S.A.; the NHM, London, UK; and the SMF: *Caiguiria anterouteria* USNPC 068108.00, 071427.00, 071428.00, 072784.00, SMF 3583-84; *Ascocotyle plana* (*P. plana*) USNPC 007940.02; *P. ardeae* USNPC 080756.00, NHM 1989.3.17.1-2; *P. genata* USNPC 069662.00, 089888.00, 089889.00, 089890.00, NHM 1932.7.30.84, 1932.7.30.85, 1935.4.16.298, 1932.3.3.65; *Pygidiopsis macrostomum* NHM 1997.6.9.1; *P. pindoramensis* USNPC 083037.00; and *Pygidiopsis* sp. NHM 1962.11.30.55-64 (*Gavia artica* [Linnaeus], as *Colymbus articus* Linnaeus), 1962.12.4.4 (*Ardea cinerea*), 1935.12.30.54-59 (*Phalacrocorax aristotelis* [Linnaeus]), 1936.8.5.111-122 (*Gavia stellata* [Pontoppidan], as *Colymbus stellatus* Pontoppidan). Drawings were done with the aid of a drawing tube. Measurements are in micrometers (μm) and are given with the mean followed by the range in parentheses unless otherwise stated.

TABLE 2. Dimensions of *Caiguiria anterouteria*, *Caiguiria crassa*, *Caiguiria macrostomum*, and *Caiguiria* sp. An asterisk (*) indicates length (L) and width (W); an (+) indicates secondary lateral branches off excretory stem.

PARASITE	<i>Caiguiria anterouteria</i> (holotype)	<i>Caiguiria anterouteria</i>	<i>Caiguiria crassa</i> (as <i>C. anterouteria</i>)	<i>Caiguiria crassa</i> (as <i>C. anterouteria</i>)	<i>Caiguiria macrostomum</i> (as <i>Pygidiopsis macrostomum</i>)	<i>Caiguiria</i> sp. (as <i>C. anterouteria</i>)
SOURCE	Nasir & Díaz (1971) USNPC 71427	Fischthal & Nasir (1974) USNPC 94594,94595	Nasir & Díaz (1971) USNPC 71428	Fischthal & Nasir (1974) USNPC 94594,94595	Zdzitowiecki & Rutkowska (1980) NHM 1997.6.9.1	Rietschel & Werding (1978) SMF 3583, 3584
n	1	3	1	2	8	10
Body L*	650	690 (625–765)	500	560 (460–660)	725 (650–760)	445 (390–500)
Body W*	275	225 (175–275)	500	390 (370–410)	275 (270–280)	325 (300–350)
Forebody L	310	320 (210–410)	215	240 (220–260)	365 (330–400)	175 (135–205)
Forebody W	145	165 (120–200)	420	200 (195–205)	175 (155–185)	195 (150–235)
Oral sucker L	91	115 (110–125)	100	56 (53–58)	83 (75–93)	60 (50–80)
Oral sucker W	99	110 (110–120)	90	68 (none)	90 (83–100)	65 (55–75)
Prepharynx L	44	70 (65–75)	8	7 (1–13)	53 (33–70) n=7	9 (6–20) n=4
Pharynx L	59	70 (65–75)	45	45 (none)	56 (48–60)	48 (38–58)
Pharynx W	47	40 (36–45)	48	44 (43–45)	51 (48–55)	43 (33–53)
Oral sucker W / pharynx W	1:2.1	1:2.8 (none)	1:1.9	1:1.6 (1.5–1.6)	1:1.8 (1.7–2.0)	1:1.5 (1.4–1.7)
Esophagus L	46	45 (35–55)	18	33 (23–43)	64 (50–83)	25 (15–50) n=8
Acetabulum L	81	85 (75–90)	70	65 (55–70)	75 (70–80)	70 (55–75)
Acetabulum W	88	80 (75–90)	83	65 (60–75)	79 (73–88)	75 (60–90)
Acetabulum W / Oral sucker W	1:0.9	1:0.8 (none)	1:0.9	1:1.0 (0.9–1.1)	1:0.9 (0.8–1.0)	1:1.1 (1.0–1.4)
Gonotyl L	44	45 (40–50)	48	34 (33–35)	53 (40–63) n=7	40 (30–50) n=8
Gonotyl W	18	25 (20–30)	30	39 (35–45)	22 (18–25) n=7	25 (20–30) n=8
Gonotyl folds	(6–7)	(6–7)	(6–7)	(6–7)	(9–10)	(9–10)
Pars prostatica L	65	55 (45–65)	63	75 n=1	66 (58–73) n=4	60 (50–70) n=3
Pars prostatica W	16	15 (10–20)	13	10 (none) n=2	16 (13–20) n=5	12 (10–15) n=3
External seminal vesicle L	not observed	185 (165–220)	285	275 (200–345)	268 (203–313) n=3	170 (155–190) n=3

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TABLE 2 (continued)

PARASITE	<i>Caiguiria anterouteria</i> (holotype)	<i>Caiguiria anterouteria</i>	<i>Caiguiria crassa</i> (as <i>C. anterouteria</i>)	<i>Caiguiria crassa</i> (as <i>C. anterouteria</i>)	<i>Caiguiria macrostomum</i> (as <i>Pygidiopsis macrostomum</i>)	<i>Caiguiria</i> sp. (as <i>C. anterouteria</i>)
SOURCE	Nasir & Diaz (1971) USNPC 71427	Fischthal & Nasir (1974) USNPC 94594,94595	Nasir & Diaz (1971) USNPC 71428	Fischthal & Nasir (1974) USNPC 94594,94595	Zdzitowiecki & Rutkowska (1980) NHM 1997.6.9.1	Rietschel & Werding (1978) SMF 3583, 3584
n	1	3	1	2	8	10
External seminal vesicle W	not observed	35 (30–45)	48	45 (35–60)	57 (48–65) n=4	61 (55–70) n=3
Right testis L	70	95 (85–105)	68	65 (50–75)	92 (80–103)	80 (60–100)
Right testis W	60	90 (80–95)	130	123 (120–125)	103 (88–115)	95 (75–120)
Left testis L	60	100 (95–115)	68	55 (45–60)	86 (75–98)	80 (70–95)
Left testis W	65	70 (65–80)	110	120 (110–130)	103 (88–118)	90 (80–105)
Ovary L	65	70 (65–75)	55	75 (55–95)	57 (50–63)	60 (55–70)
Ovary W	62	70 (60–85)	93	95 (85–105)	63 (53–75)	90 (70–115)
Seminal receptacle L	83	65 (35–90)	57	60 (58–65)	73 (63–88) n=6	70 (55–80) n=8
Seminal receptacle W	83	60 (50–75)	105	59 (58–60)	78 (63–100) n=6	85 (55–110) n=8
Vitelline follicle L	30 (25–38) n=5	35 (20–45) n=10	25 (15–40) n=5	26 (18–33) n=10	27 (20–43) n=24	21 (18–30) n=8
Vitelline follicle W	26 (20–38) n=5	35 (20–55) n=10	70 (55–85) n=5	30 (25–38) n=10	59 (33–75) n=24	48 (30–73) n=8
Vitelline follicles per side	(10–12)	(10–11)	(8–9)	(10–11)	(7–9)	(7–8)
Posttesticular space L	117	100 (65–125)	63	75 (65–85)	55 (40–69)	40 (20–65)
Egg L	22 (21–23) n=5	21 (18–22) n=8	19 (18–20) n=5	19 (18–21) n=10	18 (17–20) n=32	17 (15–20) n=50
Egg W	10 (9–10) n=5	10 (9–12) n=8	10 (8–10) n=5	9 (8–10) n=10	11 (8–13) n=32	9 (8–10) n=50
Excretory vesicle	Y-shaped +	Y shaped +	Y shaped +	Y shaped +	Y shaped +	Y shaped

Results

Our examinations of the type materials of Nasir and Díaz (1971) and other specimens of *C. anterouteria* suggested that the original description was based on a mixture of *C. anterouteria*, represented by their holotype specimen (USNPC 71427) and *P. crassus* (later described by Ostrowski de Núñez, 1995), represented by their paratype specimen (USNPC 71428). Because of this observation, it became necessary to redescribe *C. anterouteria* based on specimens consistent with the holotype specimen and the corresponding Figure 1a from Nasir and Díaz (1971) as well as to emend *Caiguirinae*, *Pygidiopsinae* and *Caiguiria*. Table 2 provides a comparison of the holotype and vouchers of *C. anterouteria* deposited by Nasir and Díaz (1971) and Fischthal and Nasir (1974), *P. crassus* as represented by the original paratype of *C. anterouteria* deposited by Nasir and Díaz (1971) and voucher specimens deposited by Fischthal and Nasir (1974) they identified as *C. anterouteria*, voucher specimens of *P. macrostomum* deposited by Zdzitowiecki and Rutkowska (1980) (NHM 1997.6.9.1), and voucher specimens of an unidentified species similar to *P. crassus* deposited by Rietschel and Werding (1978) they identified as *C. anterouteria*.

Family Heterophyidae (Leiper, 1909)

Subfamily Caiguirinae Nasir and Díaz, 1971

Emended Diagnosis: The original description of the subfamily by Nasir and Díaz (1971) should be emended to include an unarmed oral sucker.

Genus *Caiguiria* Nasir and Díaz, 1971

Emended Diagnosis: The original description of the genus by Nasir and Díaz (1971) should be emended to include that the vitelline follicles reach the level of the acetabulum anteriorly not extensively surpassing the testes posteriorly in to the posttesticular space.

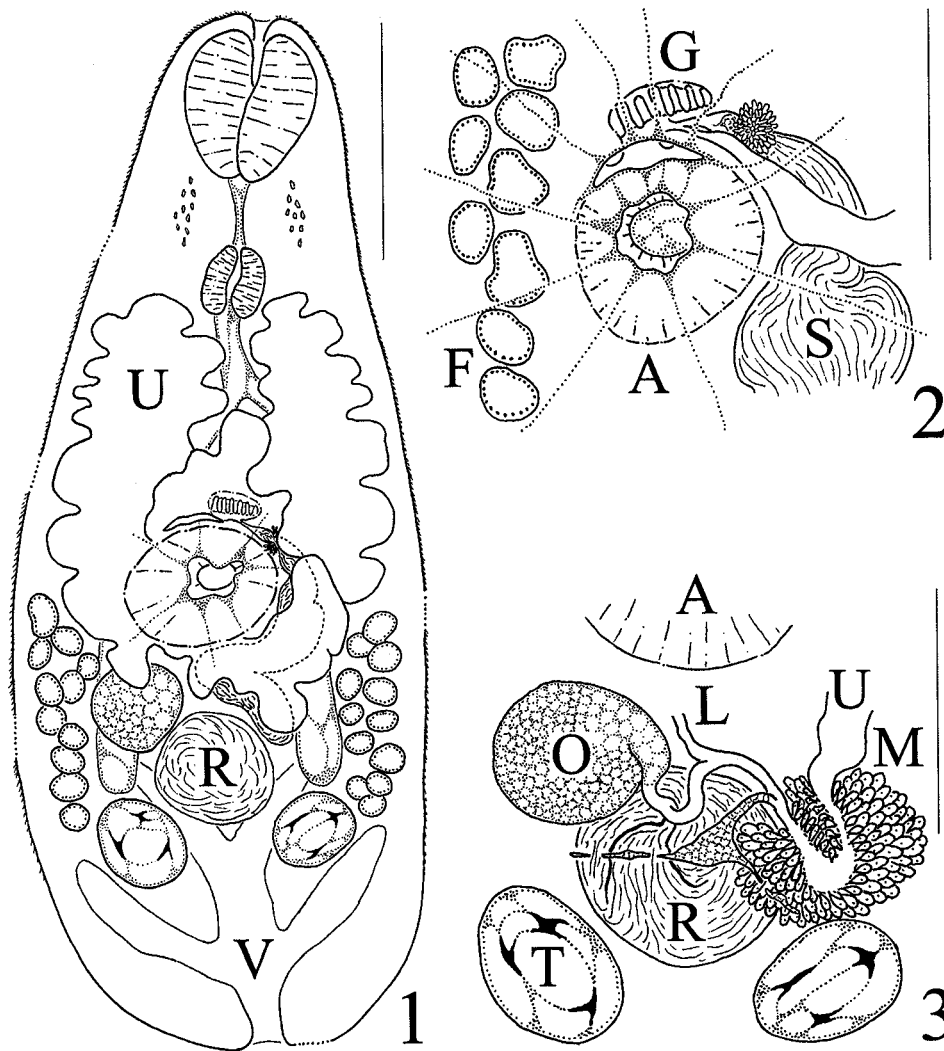
Caiguiria anterouteria Nasir and Díaz, 1971 (Figs. 1–3)

Type-host: Experimental infection of domestic cat with metacercariae from guppy, *Poecilia reticulata* (Peters).

Other hosts: *Tringa melanoleuca* Gmelin; greater yellowlegs.

Site: Small intestine.

Type-locality: San Juan de Macarapana, Venezuela; 8° 49'N, 64° 19'W; altitude = 37m.



FIGURES 1–3. 1, *Caiguiria anterouteria* from experimental infections of kittens by Nasir & Díaz (1971) from Venezuela, ventral view of holotype; 2, Male genital complex of *C. anterouteria*; 3, Female genital complex of *C. anterouteria*. Abbreviations: A, acetabulum; F, vitelline follicles; G, gonostyl; L, Laurer's canal; M, Mehlis' gland; O, ovary; R, seminal receptacle, S, seminal vesicle; T, testis; U, uterus; V, excretory vesicle. Scale bars: 1, 146 μm ; 2, 90 μm ; 3, 120 μm .

Other Localities: Laguna de Los Patos, Venezuela; 10° 28'N, 64° 10'W; altitude = 4m.

Deposited Specimens: Deposited by Nasir and Díaz (1971), Holotype USNPC 071427.00; deposited by Fischthal and Nasir (1974), voucher specimens USNPC 068108.00, 072784.01, 072784.02.

Description. Based on 4 adult specimens. With characteristics of genus as emended. Body small, fusiform to oval, spinose, 680 (625–765) long by 240 (175–275) wide; forebody 350 (210–410) long; remnants of cercarial eyespots present near anterior end. Mouth subterminal; oral sucker unarmed, 110 (90–125) by 105 (95–120); prepharynx 60 (45–75) long; pharynx 65 (55–75) by 40 (35–50); esophagus shorter than prepharynx, 50 (35–55) long; cecal bifurcation approximately 2/3 the distance down forebody; ceca moderately long, terminating about 2/3 the distance to posterior extremity. Ratio of widths of oral sucker and pharynx 1:2.6. Acetabulum smaller than oral sucker, 80 (75–90) by 85 (75–95). Ratio of sucker widths 1:0.8. Testes smooth, side by side, removed from posterior end by a short distance leaving a posttesticular space that occupies posterior 1/6 of body. Right testis 90 (70–105) by 80 (60–95); left testis 90 (60–115) by 70 (65–80). Male terminal genitalia simple, composed of a reduced pars prostatica 60 (45–65) by 15 (10–20) and an ejaculatory duct. Cirrus absent. Prostate cells present, surrounding narrow isthmus just behind pars prostatica immediately followed by large seminal vesicle extending posteriorly from the midacetabular region to the midovarian level, 185 (110–220) by 35 (20–45). Acetabulogenital complex immediately preacetabular, composed of a transversely elongate genital atrium that receives separately a simple metraterm, proximal end of ejaculatory duct and gonotyl before opening ventrally at anterior margin of acetabulum through a large, slit-like genital pore. Gonotyl highly folded, slightly sinistral to midline of body, situated in an oval chamber, 45 (40–50) by 20 (15–30). Ovary smooth, situated a short distance anterior to right testis, 70 (65–75) by 70 (60–85). Seminal receptacle spherical, 80 (35–95) by 70 (50–85), very extensive in fully developed specimens, occupying the anterior aspect of the intertesticular region. Laurer's canal present, opening not observed. Vitelline follicles relatively large, 10 to 12 per side, individual follicles often subdivided, distributed from level of posterior margin of acetabulum to anterior margin of testes, rarely overlapping testes but not extensively invading posttesticular space. Uterus extensive, largely postacetabular but having uterine loops on each side extending anteriorly to the level of pharynx in fully developed specimens, many loops overreaching ceca laterally approaching body wall, but not extending posteriorly to ovary. Eggs 21 (18–23) by 10 (9–12) (n=20). Excretory vesicle Y-shaped with 1 pair of additional lateral branches in posttesticular space. Excretory pore subterminal.

Emended Diagnosis: The original description of the subfamily Pygidiopsinae by Yamaguti (1958) should be emended to include vitelline follicles invading posttesticular space posteriorly, not reaching acetabular level anteriorly; uterus confined to hindbody.

Discussion

The subfamily Caigniriinae, as originally described by Nasir and Díaz (1971), was distinguished from other subfamilies in Heterophyidae largely based on the presence of uterine coils in the preacetabular region. At the time that Caigniriinae was erected, a similar subfamily, Pygidiopsinae, was available that included *Pygidiopsis*, a genus that was similar to *Caiguiria* and where *C. anterouteria* could have been assigned. Although the diagnosis of Pygidiopsinae by Yamaguti (1958) did not specifically address the anterior extent of the uterus it housed *P. macrostomum*, a species similar to *C. anterouteria* and that also had uterine loops extending in to the preacetabular region. Rietschel and Werding (1978) noted these similarities and although they thought that *P. macrostomum* might be conspecific with *C. anterouteria*, they moved *P. macrostomum* into *Caiguiria* as a second species. The presence of uterine coils in the preacetabular region as the defining characteristic for members of Caigniriinae has not gained wide acceptance. Ostrowski de Núñez (1995) did not recognize Caigniriinae (*Caiguiria*) when she described *P. crassus* (Pygidiopsinae), a species that also has the uterus extending anteriorly in to the forebody. She also did not acknowledge the assignment of *P. macrostomum* to *Caiguiria* by Rietschel and Werding (1978) retaining it in *Pygidiopsis*. Our observations on specimens of species of *Pygidiopsis* (including *P. macrostomum*) and *C. anterouteria* support the observation of Rietschel and Werding (1978) that the anterior extent of the uterus in *P. macrostomum* is dependent on the state of development of the uterus, but we have found this characteristic to be reasonably consistent in fully-developed specimens. However, it is our opinion, that the anterior extent of the uterus should be used in concert with the distribution of the vitelline follicles in defining the subfamilies Caigniriinae and Pygidiopsinae and in the determination of their respective genera (*Caiguiria* and *Pygidiopsis*). Our observations also suggest that the shape of the body, the length of the ceca, the structure of the excretory vesicle, and the length of the prepharynx relative to the length of the esophagus are useful in the differentiation of species in these two genera. It is worth noting that although Odening (1969) reported the presence of an I-shaped excretory bladder (see also Ostrowski de Núñez, 1995, p. 18) in specimens that compared favorably with *P. macrostomum* and that were collected from the bat *Noctilio leporinus mastivus* from Cuba, we confirmed the presence of a Y-shaped excretory vesicle containing one pair of lateral branches running immediately posterior to the testes in specimens of *P. macrostomum* deposited by Zdzitowiecki and Rutkowska (1980) also from *N. leporinus mastivus* from Cuba.

The redescription of *C. anterouteria* herein is based on specimens, all of which clearly have body morphologies, measurements, and key characteristics consistent with those of *C. anterouteria*. The paratype specimen of Nasir and Díaz (1971) and the voucher specimens of Fischthal and Nasir (1974) represent *P. crassus*. Although the Figure 10A of Rietschel and Werding (1978) is undoubtedly *P. crassus*, voucher specimens they deposited represent only their figure 10B, which appears to be an undescribed species similar to *P. crassus*.

The 12 species traditionally assigned to *Pygidiopsis* can be divided into 4 basic morphological types: the *genata*-type where the oral sucker is armed with spines, the vitelline follicles fall well short of the level of the acetabulum anteriorly extending from the level of the ovary some distance into the posttesticular space, and the uterus does not exceed the acetabulum anteriorly including *P. ardea*, *P. australis*, *P. genata*, *P. marivillai*, and *P. pindoramensis*; the *summa*-type where the oral sucker is unarmed, the vitelline follicles fall well short of the level of the acetabulum anteriorly extending from the level of the ovary some distance into the posttesticular space, and the uterus does not exceed the acetabulum anteriorly including *P. pelecani*, *P. phalacrocoracis*, *P. plana*, and *P. summa*; the *macrostomum*-type where the oral sucker is unarmed, the vitelline follicles reach the level of the acetabulum anteriorly extending posteriorly to the level of the testes but not extensively invading the posttesticular space, and the uterus extends anteriorly into the preacetabular region including *P. crassus* and *P. macrostomum*; and the *piclaumoreli*-type where the oral sucker is unarmed, the vitelline follicles fall well short of the level of the acetabulum anteriorly extending posteriorly only to the level of the testes but not reaching the posttesticular space, and the uterus does not exceed the acetabulum anteriorly including only *P. piclaumoreli*.

Although spines may sometimes be lost when specimens are processed and are often difficult to see, we consider that the presence of spines on the oral sucker represents a consistent characteristic in the *genata*-type that with further study will likely warrant erection of a separate genus within Pygidiopsinae to accommodate those species with oral spination. The *summa*-type appears to be a uniform group with the exception of *P. pelecani*. We were not able to obtain specimens of *P. pelecani*; however, it should be noted that although this species was assigned to *Pygidiopsis* by Wang (1982), it differs from all species in the genus because it lacks a gonotyl, it has long ceca that form a cyclocoel and it has vitelline follicles that surround the cyclocoel posteriorly extensively invading the posttesticular space; characteristics that are more representative of species of Cyclocoelidae Stossich. However, the fact that *P. pelecani* is an intestinal parasite and has a well developed internal and external seminal vesicle suggests that this species may represent a new taxon. In any case, *P. pelecani* does not belong in *Pygidiopsis*.

Based on our examination of materials available from museums, we support the separation of Caiguirinae from Pygidiopsinae and the validity of the genus *Caiguiria*. Further, we conclude that members of *Pygidiopsis* of the *macrostomum*-type where the oral sucker

is unarmed, the vitelline follicles reach the level of the acetabulum anteriorly extending posteriorly to the level of the testes but not extensively invading the posttesticular space, and the uterus extends anteriorly into the preacetabular region form a natural group with *C. anterouteria*. Therefore we reassign *P. crassus* to *Caiguiria* (Caiguiriinae) as *Caiguiria crassa* n. comb. and support the assignment of *C. macrostomum*. *Pygidiopsis piclaumoreli* is unique from all other species in *Pygidiopsis* in having the vitelline follicles that fall well short of the level of the acetabulum anteriorly extending posteriorly only to the level of the testes. Although specimens and illustrations of *Taphrogonimus holostomoides* Cohn were not available, Yamaguti (1971) considered that this species was most similar to species of *Pygidiopsis* and assigned it to Pygidiopsinae. The testes of *T. holostomoides* are slightly diagonal rather than symmetrical, but its vitelline distribution, cecal length and distribution of its uterus are similar to that of *P. piclaumoreli* suggesting the latter species may belong in *Taphrogonimus* Cohn.

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