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Research Note

Redescription of *Polylekithum catahoulensis* (Trematoda) and Anatomical Differentiation from *Polylekithum ictaluri*

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ABSTRACT: New collections of *Polylekithum* from catfishes in the Big Thicket National Preserve, Texas, U.S.A., provided material for a redescription of *Polylekithum catahoulensis* and an evaluation of the characters used to diagnose species in the genus. The new collections demonstrated that the relative size of the forebody is not a reliable diagnostic feature of *P. catahoulensis*, because the feature changes linearly as worms grow; similarly, the location of the maximum width of worms is not diagnostic because it depends on the number of eggs in the uterus. However, egg size reliably distinguishes between *P. catahoulensis* (small eggs) and *Polylekithum ictaluri* (large eggs). Other morphometric and relational characteristics did not distinguish between species.

KEY WORDS: *Polylekithum catahoulensis*, *Polylekithum ictaluri*, Trematoda.

Polylekithum catahoulensis was described previously (Curran et al., 2006) from catfishes (*Ictalurus furcatus* and *Ictalurus punctatus*) from Catahoula Lake in Louisiana, U.S.A. Curran et al. (2006) noted the overall similarity of *P. catahoulensis* to the type species in the genus, *Polylekithum ictaluri* (Pearse, 1924), but they distinguished the former from the latter species based on body shape characters and the size of eggs. The sample on which the description of *P. catahoulensis* was based was small, and Curran et al. (2006) indicated that subsequent collections might clarify some of the morphological and anatomical similarities and differences between the 2 species. A larger sample of *Polylekithum* was collected from catfishes in the Big Thicket National Preserve, Texas, U.S.A., and this material was the basis of a redescription and emended diagnosis of *P. catahoulensis*.

Twenty-seven specimens of *P. catahoulensis* were collected from 9 channel catfishes (*I. punctatus*) and 1 yellow bullhead (*Ameiurus natalis*) from 2 sites in Big Sandy Creek (Beaver Slide Trail, 30.57735°N; 94.64535°W; and at crossing of Sunflower Road, 30.62278°N; 94.69806°W) and 1 site in Turkey Creek (at FM 1943 crossing, 30.61981°N; 94.35658°W) in the Big Thicket National Preserve in southeastern Texas, U.S.A. Worms were killed in near-boiling water and preserved in 70% ethanol. The samples were stained in Mayer's carmalum, dehydrated, cleared in xylene, and mounted on glass slides in damar balsam. Fourteen specimens possessed eggs in the uterus, and another 13 specimens were juveniles. Averages and ranges refer to gravid worms, whereas all specimens were used in some statistical evaluations to determine the stability of morphometric characters across the adult ontogeny. Voucher specimens have been deposited in the Harold W. Manter Laboratory, Nebraska State Museum, Lincoln, Nebraska, U.S.A. (HWML 49521–49527). Specimens examined from the United States National Parasite Collection, Beltsville, Maryland, U.S.A., included *P. catahoulensis* (holotype, USNPC 99088 and paratype, NPC 99089) and *P. ictaluri* (holotype, USNPC 7621 and vouchers, USNPC 39586, 97067, 99087, 102154). Measurements were made on all examined museum material and are reported herein. For original measurements of this material, see Pearse (1924), Mueller and Van Cleave (1932), and Curran et al. (2006).

The prominence of the forebody was noted by Curran et al. (2006) as a way to differentiate *P. catahoulensis* from *P. ictaluri*. Forebody ratios were calculated for all specimens examined in the present investigation, and a correlation was performed between forebody ratio and total worm length to determine whether specimens of the 2 species grouped accordingly. Similar correlations were performed on forebody length, ventral sucker length, hindbody length, and the proportion of the ventral sucker length that is overlapped by the cirrus sac.

Overall, newly collected specimens conformed to the original description of *P. catahoulensis* and to measurements of specimens available in the USNPC (Table 1). The newly collected specimens represented a larger range of sizes and therefore expand the minimum and maximum values for most morphometric characteristics. Thus, the description of Curran et al. (2006) remains the same except for the following: 1) the forebody occupies between 29% and 44% of the total length and 2) the widest part of the body varies according to the number of eggs in the uterus.

Table 1. Morphometrics (in μm, range with mean in parentheses) of *Polylekithum catahoulensis* and *Polylekithum ictaluri* from new collections, type series, and vouchers.

Measurement*	New specimens†	*P. catahoulensis*‡	*P. ictaluri*§
Total L	1,830–4,600 (3,253)	2,090–3,250 (2,670)	1,955–4,290 (3,126)
Maximum W	410–960 (687)	500–800 (650)	485–1,340 (837)
Ant dist. to			
Cecal bifurcation	340–750 (557)	440–690 (565)	410–780 (577)
Ant VS	700–1,510 (1,079)	770–1,280 (1,025)	720–1,450 (1,037)
Post VS	950–2,000 (1,456)	1,780–2,070 (1,925)	1,000–2,020 (1,490)
Ant ovary	930–2,040 (1,443)	1,760–2,010 (1,885)	920–1,900 (1,428)
Post dist. to			
Post PT	190–1,100 (613)	340–430 (385)	320–910 (547)
Post VS	830–2,610 (1,796)	1,060–1,420 (1,240)	955–2,410 (1,629)
Forebody ratio‖	0.29–0.44 (0.40)	0.37–0.39 (0.38)	0.30–0.37
Oral sucker L	210–370 (296)	230–370 (300)	210–425 (330)
Oral sucker W	220–390 (297)	230–390 (310)	220–475 (352)
Pharynx L	130–285 (200)	170–280 (225)	150–260 (206)
Pharynx W	140–295 (205)	170–300 (235)	135–290 (211)
Ven. sucker L	250–535 (375)	295–510 (403)	280–640 (423)
Ven. sucker W	240–570 (412)	325–565 (445)	330–650 (483)
Cirrus sac L	230–555 (405)	235–330 (283)	195–405 (316)
CS into VS¶	0.28–0.73 (0.50)	0.16–0.42 (0.29)	0.01–0.23 (0.13)
Ovary L	110–250 (195)	113–120 (116)	133–290 (205)
Ovary W	110–290 (214)	123–210 (166)	150–330 (227)
Seminal receptacle L	148–373 (277)	200–210 (205)	Not visible
Ant testis L	230–430 (313)	215–325 (270)	165–285 (205)
Ant testis W	210–430 (306)	230–290 (260)	240–325 (273)
Post testis L	280–545 (405)	28–430 (355)	210–425 (279)
Post testis W	205–390 (285)	215–285 (250)	210–303 (257)
Egg L	73–93 (84)	78–90 (84)	90–108 (98)
Egg W	45–60 (53)	53–60 (56)	55–70 (63)

* L, length; W, width; Ant, anterior; dist., distance; Post, posterior; Ven., ventral; VS, ventral sucker; CS, cirrus sac.

† Specimens included in these measurements all contained eggs; juveniles were not included except for the forebody ratio.

‡ Measurements include the holotype and one paratype (see text for accession numbers).

§ Measurements include the holotype and vouchers (see text for accession numbers).

‖ Proportion of body occupied by forebody.

¶ Proportion of ventral sucker length overlapped by cirrus sac.

Curran et al. (2006) used the relative size of the forebody as a way to differentiate *P. catahoulensis* from *P. ictaluri*, with the former having a forebody occupying 35–41% of the total body length, and the latter only 29–34%. However, those specimens were largely toward the small range of overall worm size, as revealed by the new collections. The proportion of the body occupied by the forebody is largest in small worms and smallest in large adults, apparently decreasing gradually as worms age and grow (Fig. 1). This is consistent with correlations of forebody, ventral sucker, and hindbody lengths with overall worm size. Although all 3 body regions increase in size with increasing body length, the hindbody increases at more than twice the rate as the forebody (Fig. 1). If most of worm growth is confined to the hindbody, then the proportion of the body occupied by the forebody will decrease as worms grow. The correlations presented in Figure 1 were based only on the newly collected specimens. Plotting measurements of specimens of *P. ictaluri* and *P. catahoulensis* over these correlations reveals that the existing specimens on which these species are based cannot be differentiated from each other by using the relative size of the forebody or the absolute sizes of any of the body regions.

Curran et al. (2006) also noted that the widest part of the body in *P. catahoulensis* was at the anterior edge of the ventral sucker, whereas it is located at or posterior to the ovary in *P. ictaluri*. This was not designated a diagnostic characteristic because Curran et al. (2006) noted that all of the specimens of *P.*

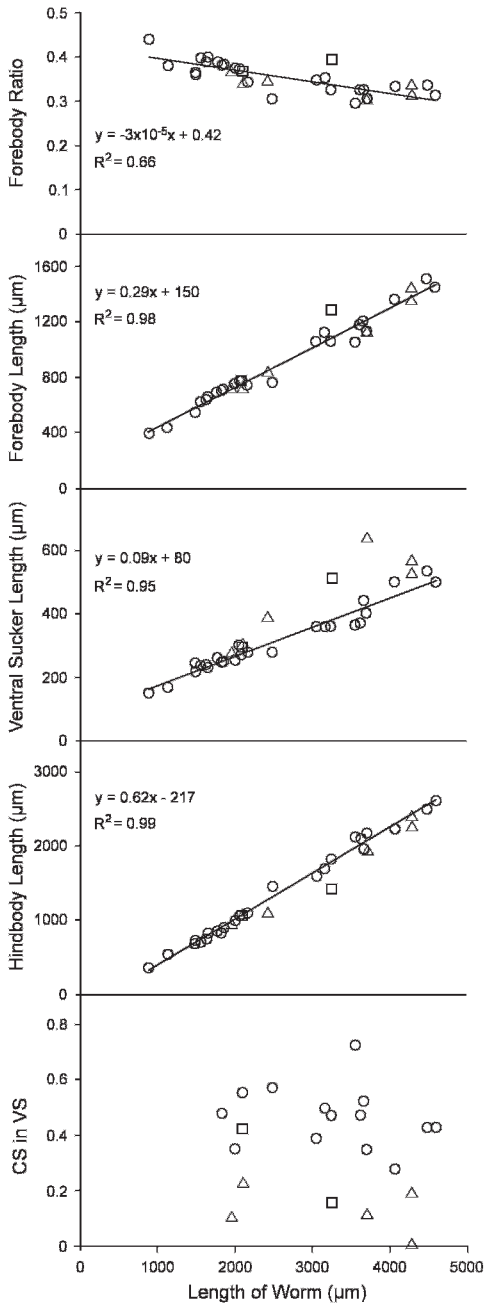

Figure 1. Relationship between each of 5 characteristics of *Polylekithum catahoulensis* and *Polylekithum ictaluri* and total worm length. Best-fit lines and correlations were computed based on specimens from the present investigation only (circles); measurements of *P. catahoulensis* (squares) and *P. ictaluri* (triangles) from museum specimens were plotted independently. Note the different scales on the abscissa and the different slopes for the three middle plots.

catahoulensis upon which the description was based contained very few eggs. Because the uterus is largely confined to the region between the ovary and the testes, a larger number of eggs could result in a broader body at that level. This seems to be the case, because all of the newly collected worms with many eggs (>50) had distended bodies posterior to the ventral sucker, whereas those with few eggs were characterized by a body widest anterior to the ventral sucker.

Egg dimensions constituted the other major diagnostic characteristic of *P. catahoulensis*. Measurements of eggs from the type series and the new specimens revealed that eggs of *P. catahoulensis* are typically smaller in both dimensions than eggs of *P. ictaluri*. There is a small amount of overlap, but this is probably due to some measured eggs not lying perfectly horizontal when measured. Although the differences in egg dimensions is not absolutely large, it is striking when examining specimens of both species microscopically, and it serves as the only remaining morphometric or anatomical characteristic that can be used to reliably differentiate *P. ictaluri* and *P. catahoulensis*.

Other characters were examined for their potential utility in this regard, but no character state was always associated with 1 species. For example, the cirrus sac of *P. catahoulensis* and the new specimens almost always overlaps the ventral sucker substantially (>25% of ventral sucker length), whereas the cirrus sac of *P. ictaluri* rarely overlaps the ventral sucker by >15% of the ventral sucker length. However, the holotype of *P. catahoulensis* is the one available exception to this pattern, possessed of a cirrus sac more characteristic of specimens of *P. ictaluri* (Fig. 1). Similarly, the shape and arrangement of the testes seem superficially to be different, with those of *P. catahoulensis* larger and more directly tandem (compare figs. 1 and 2 *in* Curran et al., 2006). However, specimens that otherwise conform to the description of *P. ictaluri* occasionally possess testes that would otherwise seem to conform to what is found in *P. catahoulensis*.

The taxonomy of *Polylekithum* species remains unresolved, although molecular data support the

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(Forebody Ratio is the proportion of the total body length occupied by the forebody; CS in VS is the proportion of the ventral sucker length overlapped by the cirrus sac.).

validity of *P. ictaluri* and *P. catahoulensis*. Curran et al. (2006) found 27 variable sites between these 2 taxa across the 18S-internal transcribed spacer (ITS)-28S region of ribosomal DNA, with most concentrated in the ITS2 region (2.6% of 378 sites variable). Additional samples of *Polylekithum* from a much broader geographical range are needed to resolve species diversity in the genus and to provide the necessary material to identify morphological characteristics that are diagnostic at the level of species.

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