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A New Species of *Prosorhynchoides* (Trematoda: Bucephalidae) from White Bass, *Morone chrysops* (Moronidae), in the Big Thicket National Preserve, Texas, U.S.A.

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ABSTRACT: *Prosorhynchoides fabulus* n. sp. (Trematoda: Bucephalidae) is described from the intestine of white bass *Morone chrysops* (Moronidae) collected from the Neches River in the Big Thicket National Preserve in Texas, U.S.A. The new species is characterized by a relatively large cirrus sac extending anteriorly to the level of the ovary and cecum, a mouth nearly exactly midbody, obliquely arranged testes, a serpentine excretory bladder limited to the hindbody, and small size (<500 µm). The extent of the cirrus sac distinguishes *P. fabulus* n. sp. from most other species in the genus in North America. The new species displays similarities to *Prosorhynchoides carvajali*, *Prosorhynchoides labiatus*, and *Prosorhynchoides megacirrus* in the extent of the cirrus sac but differs from these species in combinations of the location of the vitellaria, position of the pharynx and mouth, extent of the excretory bladder, arrangement and position of the gonads, and body size.

KEY WORDS: *Prosorhynchoides fabulus*, Trematoda, *Morone chrysops*, white bass, Big Thicket National Preserve, Texas.

During a biodiversity inventory of the parasites of fishes from waters of the Big Thicket National Preserve, Texas, U.S.A., specimens of *Prosorhynchoides* spp. (Bucephalidae) were recovered from white bass (*Morone chrysops*). The only records of bucephalids from white bass are those of Van Cleave and Mueller (1934) from Oneida Lake, wherein “*Bucephalus (elegans) type*” is listed as an occasional parasite that does not mature in *M. chrysops*, and that of Curran and Overstreet (2009), who described *Rhipidocotyle tridecapapillata* from white bass from the Luxapalila River in Mississippi, U.S.A. In Texas, Meade and Bedinger (1972) found the bucephalid *Rhipidocotyle septapapillata* parasitizing dollar sunfish, *Lepomis marginatus*; warmouth, *Lepomis gulosus*; and banded pygmy sunfish, *Elassoma zonatum* in eastern Texas, and Underwood and Dronen (1984) reported *R. septapapillata* from rock bass, *Ambloplites rupestris* and *L. gulosus* in the San Marcos River, south of Austin. The specimens of *Prosorhynchoides* in the present investigation do not correspond to any described species in North America, and thus, a new species is described herein.

MATERIALS AND METHODS

Eight white bass were collected by gill net and seine from the Neches River several kilometers upstream of the Lower Neches Valley Authority Salt Water Barrier, in the Beaumont Unit of the Big Thicket National Preserve, Polk County, Texas, U.S.A. on 9 July 2014. Worms were killed in hot water, fixed and stored in 70% ethanol, stained in carmalum, dehydrated in an ethanol series, cleared in xylene, and mounted on glass slides in damar balsam. Mounted worms were examined with brightfield and differential interference contrast microscopy, and photographs were taken with an Olympus DP-73 camera mounted on an Olympus BX53

compound microscope. Line drawings of individual structures were made from high-resolution photographs taken in a series of adjacent focal planes, and drawings were then assembled in Adobe PhotoShop CS software to produce composite line drawings.

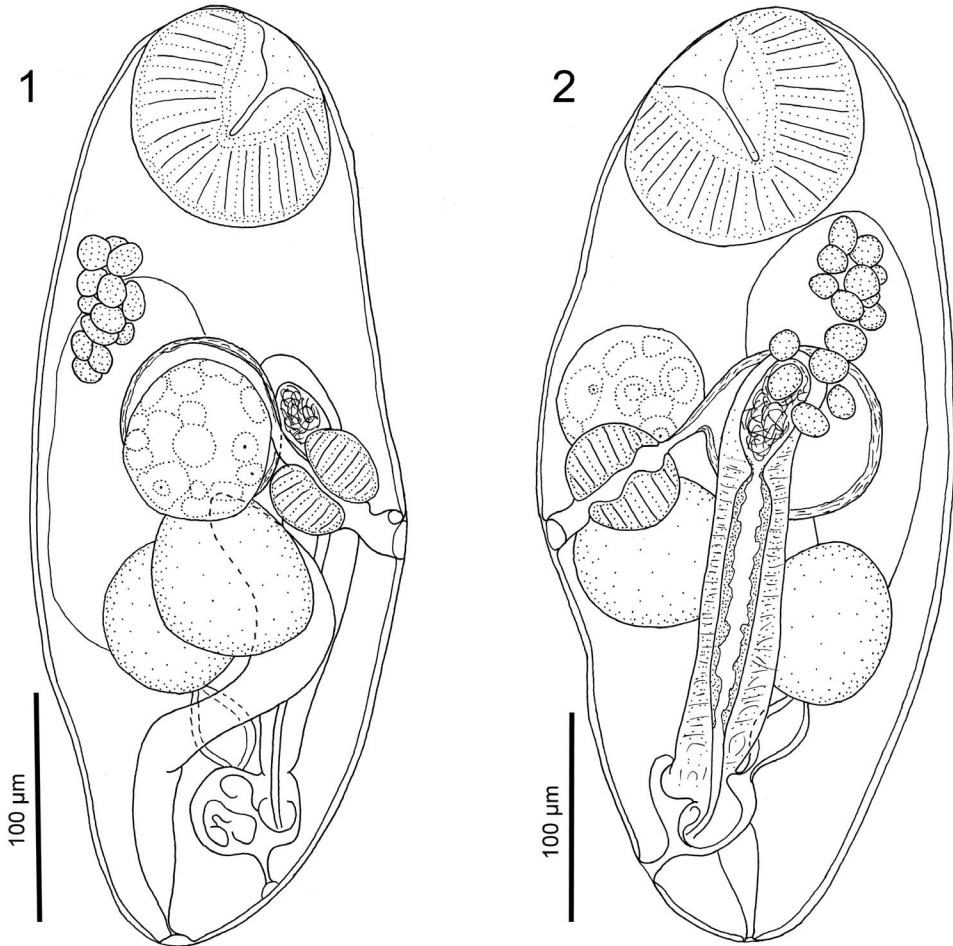
Comparisons were made to species listed by Curran and Overstreet (2009) as belonging to *Prosorhynchoides* from North America and its boundary waters. Shape terms follow the recommendations of Clopton (2004) where possible. Measurements are presented in micrometers as the range, followed by the mean parenthetically.

RESULTS

Prosorhynchoides fabulus n. sp. (Figs. 1, 2)

Description

Based on observation and measurements of 20 specimens, with characters of the genus. Body roughly bean-shaped, widest point 190–243 (219) from anterior end (42–53% of body length) at or just posterior to anterior of pharynx, tapering gradually to the posterior end, 401–489 (449) long, 159–240 (202) wide at widest point. Tegument spinous. Forebody 156–215 (191) long; hindbody 177–209 (193) long; forebody:hindbody ratio 0.85–1.20 (0.99). Rhynchus subterminal, angled ventrally, 88–112 (103) long, 89–112 (103) wide. Mouth opening midventrally, directed posteriorly, barely postequatorial. Pharynx muscular, 41–58 (49) long, 50–63 (55) wide. Cecum a spherical sac extending anterodorsally from pharynx, 66–94 (80) long, 67–88 (77) wide. Excretory vesicle serpentine, bending ventrally around posterior testis, terminating at level of anterior end of anterior testis; excretory pore terminal.



Figures 1, 2. Specimens of *Prosorhynchoides fabulus* n. sp. **1.** Holotype, dextral view. **2.** Paratype, nearly sinistral view, showing details of cirrus sac.

Testes overlapping, oblique, spherical to sub-spherical. Anterior testis at level of pharynx, ventral and dextral to posterior testis, 67–86 (75) long, 67–81 (75) wide. Posterior testis sinistral to, and overlapping anterior testis by about one half, 69–88 (78) long, 60–79 (70) wide. Posttesticular space, 97–112 (106) long. Cirrus sac sinistral, extending anteriorly to level of anterior edge of cecum or ovary, 200–259 (238) long, 35–48 (43) wide. Seminal vesicle elliptical, 34–43 (39) long, 19–23 (20) wide. Pars prostatica straight, elongate, 107–155 (128) long. Ejaculatory duct 26–50 (38) long. Genital atrium subquadrate, 37–52 (44) long, 43–65 (52) wide.

Ovary pretesticular, dextral to testes, pharynx, and cecum, at level of cecum, spherical to subspherical, 65–83 (71) long, 62–84 (70) wide. Mehlis' gland at

level of anterior of posterior testis. Vitelline fields anterior, beginning 93–115 (106) from anterior end, in elongate bundles of separate follicles, overlapping ovary, cecum, cirrus sac and sometimes pharynx posteriorly; total number of follicles 23–26 (24). Vitelline reservoir formed by uniting vitelline ducts at level of anterior testis. Uterus terminating at anterodorsal edge of genital atrium in bulb, extending and expanding anteriorly to level of anterior of vitelline fields, nearly to rhynchus. Common genital pore subterminal, 30–45 (37) from posterior end. Eggs 33–36 (35) long, 17–19 (18) wide.

Taxonomic summary

Type Host: *Morone chrysops* (Rafinesque, 1820), white bass.

Type Locality: Neches River upstream of Lower Neches River Authority Salt Water Barrier, Beaumont Unit, Big Thicket National Preserve, Beaumont, Orange County, Texas, 30°10'16.32"N; 94°6'44.99"W.

Date of Collection: 9 July 2014.

Site of infection: Intestine, 20 worms in 1 of 8 fish.

Specimens deposited: Holotype and paratypes deposited in the Harold W. Manter Laboratory of Parasitology, University of Nebraska State Museum, Lincoln, Nebraska (HWML 75379; 75380).

Etymology: The specific epithet *fabulus* means 'small bean' and refers to the bean-shaped body.

Remarks: *Prosorhynchoides fabulus* n. sp. resembles *Prosorhynchoides megacirrus* (Riggins and Sparks, 1962) from red drum in the Gulf of Mexico in that specimens of both species possess a cirrus sac occupying at least half of the body length. However, the cirrus sac of *P. megacirrus* is longer than any of the worms of the new species, the cecum is elongate, the testes are tandem, and the worms themselves are more than twice the size of the new species (940–1,230). *Prosorhynchoides carvajali* Munoz and Bott, 2011, was described from marine fish off Chile and is superficially similar to the new species, especially regarding its shape and extent of the cirrus sac. However, in *P. carvajali*, the vitelline fields are displaced posteriorly, the pharynx and mouth are far into the hindbody, the anterior testis is anterior to the pharynx, the gonopore is terminal, and the body is usually much larger (453–1,100). The new species is similar to *Prosorhynchoides labiatus* (Manter and Van Cleave, 1951) from halibut in that the cirrus sac extends beyond the level of the mouth (Manter and Van Cleave, 1951). However, in *P. labiatus*, the mouth and pharynx are further posterior, the anterior testis is anterior of the pharynx, and the body is widest near the rhynchus; specimens of *P. labiatus* are also substantially larger (635–745).

The very large cirrus sac, extending past midbody, the pharynx, and all but the anterior edges of the ovary and cecum, distinguishes *P. fabulus* from other North American species, including those parasitizing marine fishes: *Prosorhynchoides arcuatus* (Linton, 1900), *Prosorhynchoides bennetti* (Hopkins and Sparks, 1958), *Prosorhynchoides caecorum* (Hopkins, 1956), *Prosorhynchoides longicirrus* (Nagaty, 1937), *Prosorhynchoides longoviferus* (Manter, 1940), *Prosorhynchoides ovatus* (Linton, 1900), *Prosorhynchoides paralichthydis* (Corkum, 1961), *Prosorhynchoides potamoensis* Curran and Overstreet, 2009, *Prosorhynchoides*

pusilla (Stafford, 1904), *Prosorhynchoides scomberomorus* (Corkum, 1968), *Prosorhynchoides strongyluræ* (Hopkins, 1954), and *Prosorhynchoides trichiuri* (Soganderes-Bernal, 1955). The only other 2 freshwater species in North America are *P. potamoensis* Curran and Overstreet, 2009 and *P. pusilla* (Stafford, 1904). In addition to the above differences: (1) in *P. potamoensis*, the widest part of the body is in the forebody, the testes are nearly tandem, the pharynx and mouth are pre-equatorial, and the excretory bladder extends anterior to the pharynx (Curran and Overstreet, 2009); (2) in *P. pusilla*, the body is cylindrical, the vitellaria are displaced posteriorly, and the excretory bladder extends anterior to the pharynx (Woodhead, 1930); and, (3) the new species is smaller than both *P. potamoensis* (618–888) and *P. pusilla* (549–770) (Stafford, 1904; Woodhead, 1930; Curran and Overstreet, 2009).

The genus *Prosorhynchoides* has been reevaluated recently by Overstreet and Curran (2002) and Curran and Overstreet (2009), the latter of which formally completed the transfer of species of *Bucephaloides* and *Bucephalopsis* to *Prosorhynchoides*. Manter and Van Cleave (1951) stated that specimens of *P. labiata* possessed a "pre-oral lip"; however, Munoz and Bott (2011) suggested that it is not a consistent character that could be used to distinguish among species in the genus. Observations of the new species agree with Munoz and Bott (2011): an apparent lip is present at the anterior edge of the oral opening, but it is not evident in all specimens and is apparently a product of different degrees of contraction of the muscles in that area during processing.

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