

## MARINE FISH TREMATODES OF WEST PAKISTAN

## Part IV.—Description of Three New Genera and Species

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Three new genera and species *Bicaudum otolithi*, *Qadriana fusiformis* and *Tritesticulum biovarium* are described from the fishes *Otolithus argenteus*, *Sciaenia glauca* and *Stromateus* sp. of the Karachi coast. The genus *Bicaudum* (Allocreadiidae, Diploproctodaeinae) is characterized in having bifurcated posterior extremity, delicate

body divided into two regions, with the lateral edges of the forebody slightly turned over ventrally but not fused posteriorly to form a scoop as in *Bianium*<sup>5</sup> Stunkard, 1930, pharynx and esophagus prominent, ceca terminate blindly near the posterior extremity, large vitelline follicles arranged in rows in posterior half of the body, immediately preacetabular median genital pore. The genus *Qadriana* (Hemiuridae, Lecithasterinae) is characterised in having well-marked preoral lobe, tubular postovarian vitellaria, post-testicular ovary, peculiar arrangement of uterine coils which are entirely extra-caecal in postacetabular region, and intra-caecal in the acetabular and preacetabular region, pyriform seminal vesicle and convoluted hermaphroditic pouch and genital pore ventral to oral sucker. The third genus *Tritesticulum* (Allocreadiidae, Allocreadiinae) can be differentiated from other genera of the subfamily in having three posteriorly situated testes, prominent elongated seminal vesicle, ventrally placed marginal vitelline follicles, tubular oral sucker longer than acetabulum, and immediate preacetabular, median genital opening.

Little is known about parasites from Pakistani fishes. Recently attention has been paid to the fish trematode fauna of the Karachi coast<sup>1,2</sup> and some peculiar trematodes are recorded. At present trematodes from three fish species are described. These are different from the known genera of fish trematodes and are regarded as new. Three genera *Bicaudum*, *Qadriana* and *Tritesticulum* are proposed for the trematodes from the fishes *Otolithus argentea*, *Sciaenia glauca* and *Stromateus* sp. respectively. The genus *Qadriana* is proposed in the honour of Professor M.A.H. Qadri of this Department. The species are named *Bicaudum otolithi*, *Qadriana fusiformis* and *Tritesticulum biovarium*.

## Materials and Methods

Fishes were collected either from the Karachi coast or purchased from the fish market. The trematodes were fixed in 70% alcohol with few drops of acetic acid under slight cover glass pressure, stained either with borax carmine or acetocarmine and mounted permanently by usual method. Before fixing they were also studied alive. Diagrams were made by a camera Lucida. All the measurements in the text and diagrams are in millimeters. Holotypes are in the Department of Zoology, University of Karachi, Karachi.

*Bicaudum* n. gen.

**Generic Diagnosis.**—Allocreadiidae, Diploproctodaeinae. Small, delicate almost transparent trematodes. Body smooth, divided into two regions, with the lateral edges of the forebody slightly turned over ventrally but not fused posteriorly to form a scoop as in *Bianium* Stunkard.<sup>5</sup>

Terminal oral sucker and pharynx well differentiated. Acetabulum in anterior half of body, much larger than oral sucker. Esophagus prominent. Ceca long terminating blindly near the posterior extremity. Testes tandem, in posterior half of body. Seminal vesicle dorsal to acetabulum. Other terminal genital organs poorly differentiated. Genital pore almost median, immediately preacetabular. Ovary smooth, submedian, a little to the right, pretesticular and postacetabular. Receptaculum seminis present. Uterus coiled in the preovarian region. Vitelline follicles in lateral fields, commencing at posterior level of acetabulum, confluent behind testes encircling the posterior ends of ceca. Eggs large, elongated and thin-shelled. Excretory vesiclet subular, terminating below the acetabulum.

**Remarks.**—The new genus *Bicaudum* appears to be closely related to *Bianium* Stunkard,<sup>5</sup> because of the lateral edges of the forebody which do not fuse posteriorly to form a scoop similar to the latter and in contrast with those of *Diploproctodaenum* La Rue. The new genus can be differentiated from *Bianium* Stunkard, 1930, in having ceca which terminate blindly near the posterior extremity, large vitelline follicles arranged regularly in the posterior half of the body and different position of the genital opening which is above the acetabulum, while it is anterolateral or posterolateral to the acetabulum in *Bianium*. The name *Bicaudum* refers to the bifurcated posterior extremity.

The genus *Bianium* Stunkard, 1930, is a synonym of *Diploproctodaenum*<sup>4</sup> La Rue, 1926. Genus *Diplocreadium* Park, 1939, has been considered a synonym of *Bianium* Stunkard, 1930, by Yamaguti<sup>6</sup> who believes that the anus of *Diplocreadium* were

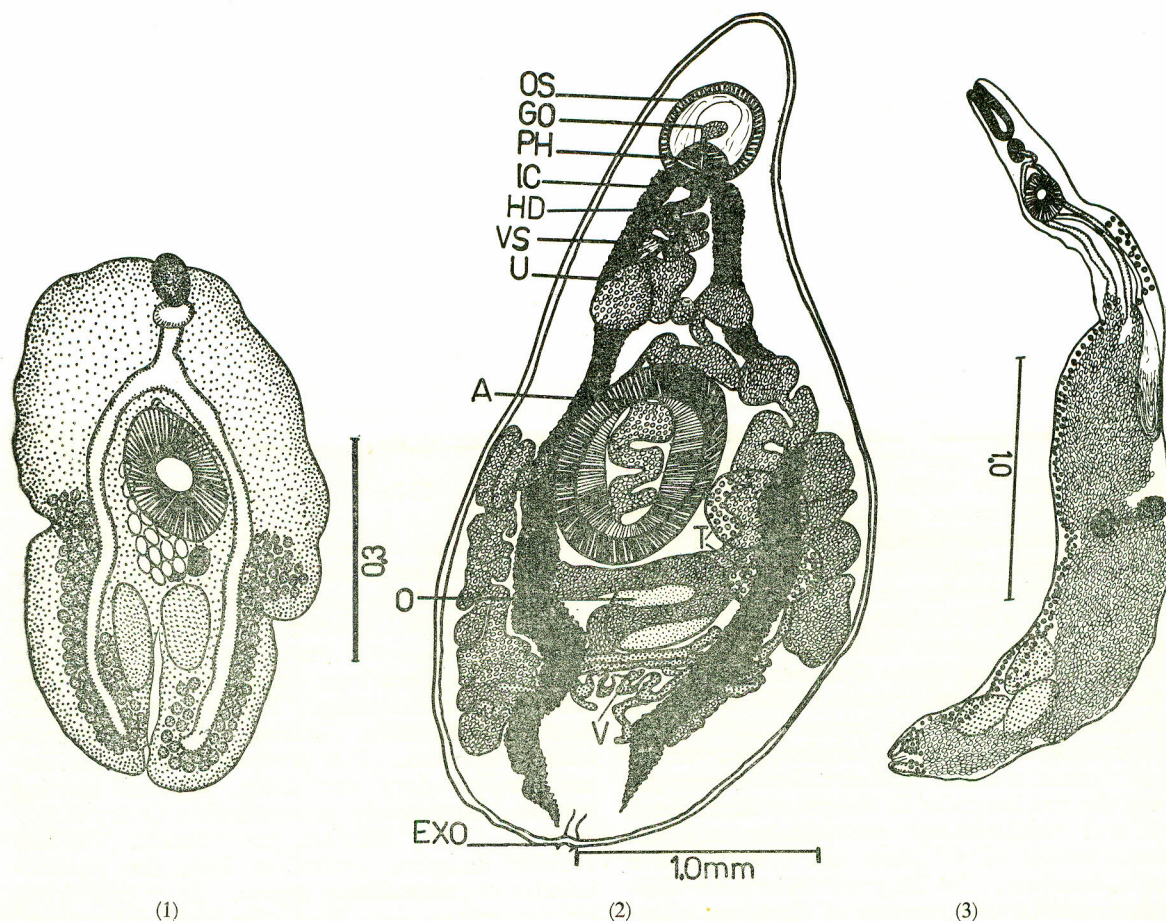


Fig. 1.—*Bicaudum otolithi*, n. gen., n. sp. Fig. 2.—*Qadriana fusiformis*, n. gen., n. sp. Fig. 3.—*Tritesticulum biovarium*, n. gen., n. sp. A, acetabulum; EXO, excretory opening; GO, genital opening; HD, hermaphroditic pouch; IC, intestinal caeca, O, ovary; OS, oral sucker; PH, pharynx; T, testes; U, uterus; V, vitellaria; VS, seminal vesicle.

probably overlooked. But Sogandares-Bernal and Hutton prefer to retain *Diplocreadium* Park, 1939, as a separate genus until anus are demonstrated. Even if *Diploproctodaenum* is taken as a synonym of *Bianium* Stunkard, the new genus can still be differentiated on the basis of the morphological characters mentioned above.

*Bicaudum otolithi*, n. sp. (Fig. 1)

Host.—*Otolithus argenteus* (c.v.), Habitat—intestine, Number—a single specimen; 20 hostsexamined.

Description.—Body small, delicate and transparent, divided into anterior larger and posterior smaller region with generic characteristics. Length 0.66, maximum width 0.44 anteriorly and 0.36 posteriorly. Terminal rounded oral sucker  $0.044 \times 0.044$  in size followed by prominent pharynx 0.022 long, 0.027 wide. Esophagus moderately long 0.033 in length, bifurcating a little anterior to acetabulum. Ceca long, reaching to posterior extremity and terminating blindly. Acetabulum in anterior half of the body, many times larger than oral sucker measuring  $0.15 \times 0.14$ .

Testes situated in the posterior  $1/3$  of body, elongated in shape, unequal measuring  $0.17 \times 0.09$  and  $0.19 \times 0.06$ . Seminal vesicle and other terminal genitalia indistinct. Genital opening almost median and immediately preacetabular in position.

Ovary smooth, slightly submedian, pretesticular and postacetabular, much smaller than testes measuring  $0.05 \times 0.04$ . Receptaculum seminis probably as large as the ovary. Its exact size could not be determined because of the uterus which hides most of it. In the unfixed specimen the vitelline follicles were obvious even by the naked eye through the transparent body. These extend from the posterior level of acetabulum to the posterior extremity of body, encircling ceca posteriorly. So that the vitelline follicles are both extracaecal and intercaecal near the posterior end of the body but are strictly extracaecal anteriorly. The vitelline follicles are also peculiar in forming regular rows in posterior region. Uterus a small thin-walled tube, intercaecal, lying in the pretesticular region. Eggs few, relatively large, elongated and thin-shelled measuring  $0.033 \times 0.022$  to  $0.023$ . Excretory vesicle tubular, median,

terminating almost at anterior margin of testes.

*Qadriana* n. gen.

*Generic Diagnosis.*—Hemiuridae, Lecithasterinae. Medium sized trematode, body fusiform, without tail. No cuticular denticulations. Oral sucker surmounted by preoral lobe, followed by ovoid pharynx. Esophagus indistinct, ceca reaching to posterior extremity. Acetabulum larger than oral sucker, slightly subequatorial. Testes immediately posterolateral to acetabulum, one behind the other. Pars prostatica well differentiated. Seminal vesicle pyriform, posterolateral to hermaphroditic pouch. Hermaphroditic pouch convoluted. Genital opening ventral to oral sucker. Ovary in posterior third of the body, slightly submedian. Vitellaria of several tubes, posterior to ovary. Uterine coils mostly extracaecal in post-acetabular region reaching near to posterior extremity and intercaecal in preacetabular zone. Eggs elongated without polar filaments. Parasitic in the stomach of marine fish.

*Remarks.*—The new genus *Qadriana* differs from the previously described genera of the subfamily Lecithasterinae in having asymmetrical testes, ovary posttesticular, vitellaria tubular; postovarian, seminal vesicle saccular and a different arrangement of the uterine coils. In the genus *Macradenina* ovary and vitellaria are pretesticular and the vitellaria consist of claviform lobes; in *Aphanurus* is single, compact. In the genus *Macradena* vitellaria is divided into a number of claviform lobes; while in *Mitrostoma* vitellaria consists of two compact lobes and the seminal vesicle is tubular. In *Opisthadina* the seminal vesicle is saccular but the vitellaria consist of two compact masses. In the genera *Mardvilkovia* and *Lecithaster* the vitellaria is divided into several rounded lobes.<sup>6</sup> The new genus is also different from the three recently erected genera of the subfamily<sup>3</sup> in the shape and relative size of the body, seminal vesicle and the structure of vitellaria.

*Qadriana fusiformis*, n. s. p. (Fig. 2)

*Host.*—*Sciaena glauca* (Day), Habitat stomach, Number a single specimen; 23 host examined.

*Description.*—Body length 3.53, width 2.14. Preoral lobe well-marked, oral sucker large measuring 0.39 × 0.37. Pharynx rounded 0.15 × 0.17. Esophagus absent. Ceca long, narrow posteriorly, terminating blindly near the posterior extremity, thin-walled with irregular outline, and filled with a brownish black material. Acetabulum almost equatorial, larger than oral sucker, rounded measuring 0.9 × 0.85 in size. Testes posterolateral to acetabulum, asymmetrical, one behind the other measuring 0.28 × 0.31 and 0.3 × 0.34. Seminal vesicle pyriform, situated in anterior

one quarter of body, at considerable distance from acetabulum, posterolateral to hermaphroditic pouch, 0.32 long; 0.19 wide. Pars prostatica long. Hermaphroditic pouch convoluted opening ventral to oral sucker.

Ovary submedian, slightly towards left, larger than testes measuring 0.4 × 0.37 in size. Seminal receptacle and Laurer's canal not obvious. Vitellaria composed of several tubes, postovarian in position. Uterus coiled occupying extracaecal field behind acetabulum but intercaecal in the preacetabular region. Eggs elongated, without polar filaments measuring 0.017 to 0.018 × 0.010 to 0.011. Excretory arms not clearly visible in the anterior region.

*Tritesticulum* n. gen.

*Generic Diagnosis.*—Allocreadiidae, Allocreadiinae. Small, lanceolate, aspinulate trematodes. Anterior region of the body considerably narrow, containing the terminal tubular oral sucker, spherical pharynx, prominent esophagus and rounded acetabulum. Ceca long, terminating blindly near the posterior extremity. Testes three, near the posterior extremity. Seminal vesicle postacetabular, elongated. Pars prostatica indistinct. Hermaphroditic duct very long. Genital opening median, immediately preacetabular. Ovary slightly or distinctly bilobed, pretesticular. Vitelline follicles marginal extending from the postacetabular to posttesticular region. More prominent on the ventral margins of the body, but extend dorsally for some distance at the immediate postacetabular region. Uterus joins the hermaphroditic duct anterior to the seminal vesicle and runs backwards reaching to near the posterior extremity. Eggs elongated, thin-shelled. Excretory vesicle tubular.

*Remarks.*—The new genus *Tritesticulum* appears to be a close relative of *Procaudotesis*<sup>6</sup> Szidat, 1954 in having testes near the posterior extremity but differ from it in having a tubular oral sucker, long esophagus, vitelline follicles prominent on the ventral margins of the body, uterus extending to near posterior extremity behind testes, and testes three in number.

*Tritesticulum biovarium*, n. sp. (Fig. 3)

*Host.* *Stromateus* sp., Habitat. stomach and intestine, number. 3 from a single host; 19 host examined.

*Description.*—(Holotype). Body length 3.72, width 0.6. The terminal tube-shaped oral sucker longer than acetabulum measuring 0.75 × 0.25. Rounded pharynx 0.11 × 0.10, acetabulum also rounded, near anterior extremity, 0.2 × 0.19. Esophagus prominent, bent dorsally, bifurcating a little above the acetabulum. Ceca

long simple, terminating near the posterior end of the body. Testes three, unequal, near the posterior end, two dorsal and one ventral in position measuring  $0.34 \times 0.22$ ,  $0.36 \times 0.24$ , and  $0.30 \times 0.17$ . Prominent elongated seminal vesicle,  $0.6 \times 0.14$  in size, situated in anterior half of body at considerable distance behind acetabulum. Hermaphroditic duct very long opening immediately anterior to acetabulum.

Ovary distinctly bilobed, each lobe measuring  $0.11 \times 0.08$  and  $0.22 \times 0.20$  and connected together by central tubular duct. Vitelline follicles extend from behind acetabulum to posterior extremity, more prominent at the ventral margins and dorsally, and are obvious near the hermaphroditic duct. Receptaculum seminis indistinct. Uterus extends behind testes reaching to posterior extremity. Eggs numerous, elongated, thin-shelled and  $0.18$  to  $0.19 \times 0.01$  to  $0.012$  in size. Excretory vesicle tubular.

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