DIEFFLUVIUM UNIPAPILLATUM N. G., N. SP. (CESTODA: CARYOPHYLLAEIDAE) FROM THE RIVER REDHORSE MOXOSTOMA CARINATUM (COPE) FROM THE SOUTHEASTERN UNITED STATES

ERNEST H. WILLIAMS, JR.
Department of Marine Sciences, University of Puerto Rico, Mayaguez, Puerto Rico 00708

WILLIAMS, E. H., Jr. 1978. Dieffluvium unipapillatum n. g., n. sp. (Cestoda: Caryophyllaeidae) from the river redhorse Moxostoma carinatum (COPE) from the southeastern United States. Trans. Amer. Micros. Soc., 97: 601–605. The new cestode Dieffluvium unipapillatum n. g., n. sp. is characterized by having a scolex with two loculi, no postovarian vitellaria, a single gonopore, a uterus extending anterior of the cirrus, and a distinct seminal receptacle. The generic significance of the shape of the scolex, number of uterine loops, absence of postovarian vitellaria, and the postovarian loop of this cestode is discussed.

One genus, Calentinella Mackiewicz, 1974, and numerous species of caryophyllaeid cestodes have been described from the southeastern United States (Mackiewicz, 1968, 1972, 1974; Williams, 1974, 1975; Williams & Rogers, 1972). The following is a description of a second genus from this region.

MATERIALS AND METHODS

Fishes were collected with seines, backpack shocker, and monofilament gill and trammel nets. Specimens were held alive until examined, which was within one day of capture. Cestodes were fixed in hot 5% formalin. Paraffin sections of 10 μm thickness were prepared and stained with hematoxylin and eosin; whole mounts were stained with Semichon's carmine, some with a fast green counterstain. Sections and whole worms were mounted in Permount. Testes and vitellaria measurements on a single worm were obtained by taking the mean of 30 follicles consisting of a nonrandom sample of 10 anterior, middle, and posterior follicles (Mackiewicz, 1963). Ten eggs were measured from the uterus of each specimen. Average measurements are given in micrometers with range in parentheses unless otherwise stated. Drawings were made with the aid of Bausch and Lomb Trisymplex microprojector and a camera lucida.

Comparative material (all USNM Helm. Coll.) consisted of paratypes of Biacetalbula banghami (70933), B. biloculoides (39441), B. carpioidei (71263), B. macrocephalum (39440), and B. hoffmanii (72314).

SYSTEMATIC DESCRIPTION

Order Caryophyllidae Van Beneden in Carus, 1863
Family Caryophyllaeidae Leuckart in Luhe, 1910
Dieffluvium n. g.
(Figs. 1–5)

Generic diagnosis: Caryophyllaeidae. Scolex with two loculi. Cirrus joining uterovaginal canal. Ovary H-shaped. Uterus extending anterior of cirrus. Pre-

1 Thanks are extended to Drs. Ronald P. Phelps, Joseph R. Sullivan, John L. Gaines, and Wilmer A. Rogers of the Southeastern Cooperative Fish Disease Project of Auburn University for help in collecting hosts. Gratitude is also expressed to Dr. John S. Ramsey and the Alabama Cooperative Fishery Unit of Auburn University for use of collecting equipment. Special thanks to Dr. Joseph R. Sullivan for construction of Latin names. Supported by the Southeastern Cooperative Fish Disease Project, Department of Fisheries and Allied Aquacultures, Auburn University, Auburn, Alabama 36830 and, in part, by Sport Fish Restoration funds.

ovarian vitellaria lateral and median. Postovarian vitellaria absent. External seminal vesicle and distinct seminal receptacle present.

*Type-species:* Diefflувium unipapillatum n. sp.

*Remarks:* The genus *Diefflувium* most closely resembles *Biacetabulum* Hunter, 1927 in having a single gonopore, an H-shaped ovary, a uterus extending anterior of the cirrus, and an external seminal vesicle. The type-species, *B. infrequens* Hunter, 1927, and the other seven species described in the genus *Biacetabulum* possess median preovarian vitellaria, or some variation of the median condition (*B. banghami* Mackiewicz, 1969), although this character was not considered in the diagnosis (Hunter, 1927). *Diefflувium* also possesses median preovarian vitellaria.

*Diefflувium* differs from the original diagnosis of *Biacetabulum* by having a pair of median loculi on the scolex instead of a pair of acetabular suckers; however, three species have been described in this genus which possess a pair of median bothria on the scolex instead of acetabular suckers—*B. biloculoides* Mackiewicz & McCrae, 1965; *B. banghami* Mackiewicz, 1968, and *B. hoffmani* Mackiewicz, 1972 (Mackiewicz & McCrae, 1965; Mackiewicz, 1968, 1972).

The genus *Diefflувium* differs from *Biacetabulum* and from all the species now included in that genus by possession of a pair of median loculi on the scolex instead of a pair of median acetabular suckers or bothria, by not possessing post-ovarian vitellaria, and by having a distinct seminal receptacle, as occurs in genus Caryophyllaeus Gmelin, 1790 or *Khucia* Hsiu, 1935.

The name is Greek (Di-two, twice) and Latin (effluo-flowing out) and refers to the two loops of the uterus passing anterior of the cirrus pouch. The gender is neuter.

*Diefflувium unipapillatum* n. sp.

(Figs. 1–5)

*Type-host and locality:* River redhorse *Moxostoma carinatum* (Cope), Cahaba River, north of Highway 85, 5 miles SW of Selma, Dallas County, Alabama (13 April 1972).

*Habitat:* Intestine, loosely attached.

*Specimens studied:* Seven (five measured). One cross-sectioned, two sagittally sectioned.

*Type-specimens:* Holotype and one paratype, USNM Helm. Coll. No. 73489; 5 paratypes in author’s collection.

*Description:* Gravid adults 37.0 mm (34.4–39.7 mm) in length by 1.6 mm (1.6–1.8 mm) in greatest width. Scolex 1.2 mm (1.1–1.3 mm) in width expanded posteriorly with a pair of loculi in expanded portion, tapering to a terminal papilla anteriorly. Body length 4.8–5.5 times combined length of neck and scolex. Inner longitudinal musculature well developed, outer poorly developed. Neck long, constricted posterior to the scolex and with groove just posterior to scolex. Testes numbering 972–1443, randomly arranged. Testes measure 210 (160–280) by 178 (130–270), beginning 10.3 mm (9.6–11.2 mm) from tip of scolex and

Abbreviations: C, cirrus pouch; E, external seminal vesicle; EB, excretory bladder; EC, excretory canal; G, groove; Gp, gonopore; IL, inner longitudinal muscle; P, papilla; S, seminal receptacle; T, testis; U, uterus; V, vitellaria; VD, vas deferens.

Figs. 1–5. *Diefflувium unipapillatum* n. g., n. sp. Fig. 1. Scolex. Fig. 2. Cross-section through testicular region. Fig. 3. Reproductive organs. Fig. 4. Sagittal section through gonopore, cirrus everted. Fig. 5. Whole specimen.
extending to external seminal vesicle; not extending to anterior level of vitellaria. Genital aperture opens 2.5 mm (2.4–2.6 mm) from posterior end. Cirrus sac large, spherical 475 (430–510) with thick walls. External seminal vesicle, large 647 (620–690) in length by 323 (260–400) in maximum width, wall thick. Two coils of uterus extend well anterior of cirrus pouch and external seminal vesicle; passing along either side of vas deferens into testicular field. Vas deferens conspicuous, long, large mass from external seminal vesicle forward of uterus into testicular field. Ovary H-shaped, arms 1.2 mm (1.1–1.3 mm) in length. Vagina with large seminal receptacle. Preovarian vitellaria 141 (60–240) by 102 (60–160), beginning 7.0 mm (6.3–7.7 mm) from tip of scolex and extending almost to external seminal receptacle; postovarian vitellaria absent. Ten pairs of osmoregulatory canals in the testicular portion of the body. Eggs operculate, shell smooth, 51 (48–54) by 32 (29–34) (measured in utero).

Remarks: The vas deferens of Dieffluvium unipapillatum is very large and conspicuous. The external seminal vesicle is very large and muscular, almost as wide and longer than the cirrus pouch. This development of the external seminal vesicle is very unlike that found in species of the genus Biacetabulum but is very similar to that of species of Archigetes Leuckart, 1878. A very distinct, large elongate seminal receptacle is present. The long neck possesses an unusual deep groove just posterior to the scolex. The loculi are large and well developed. The single terminal papilla superficially resembles a terminal introvert as found in Monobothrium Diesing, 1863; however, the musculature, form of the scolex, and size and depth of the loculi would not indicate such a function. Unfortunately, living specimens of D. unipapillatum were not observed microscopically before being relaxed and preserved, and no observations were made on the changes of shape of the scolex.

The name is Latin: uni (single) and papilla (small nipple-like projection).

Discussion: This species possesses a number of characters which differ from those found in species of the genus Biacetabulum and one difference from all known species in family Caryophyllaeidae. Some of these differences may prove, with additional study, to be of generic significance; at the present time it is more prudent to utilize the standardly accepted generic characteristics and only consider these differences at the specific level. Dieffluvium unipapillatum differs from all the known species of the family Caryophyllaeidae by having a scolex which possesses a single, large, prominent, terminal papilla. D. unipapillatum is similar to Rowardleus pennensis Mackiewicz & Deutsch, 1976 in having a uterus which extends anterior of the cirrus pouch in two distinct loops, while the known species of the genus Biacetabulum possess a uterus which extends anterior of the cirrus pouch in single loop.

A well-formed postovarian vitelline loop occurs in D. unipapillatum similar to the postovarian loop occurring in the nearctic species of the genus Monobothrium. These species of Monobothrium normally lack postovarian vitellaria, but at least one species (M. hunteri Mackiewicz, 1963) occasionally has some follicles associated with the postovarian vitelline loop (Mackiewicz, 1963). Mackiewicz (1968) suggested that the absence of this loop in Promonobothrium minytrema Mackiewicz, 1968 might preclude the occurrence of postovarian vitellaria as a normal variation in the genus. Conversely, the presence of this loop in D. unipapillatum indicates postovarian vitellaria might be expected to occur if not as a variation in this species, perhaps as a variation in the genus Dieffluvium. The presence or absence of postovarian vitellaria as a generic character has been questioned by Mackiewicz (1972); however, no distinction was made between the absence of postovarian vitellaria with the presence of a postovarian
vitelline loop and the absence of both postovarian vitellaria and loop. Perhaps only the latter condition should be considered of generic significance.

**Literature Cited**


