

A NEW SPECIES OF *DIPLOCARDIA* FROM FLORIDA

(OLIGOCHAETA; MEGASCOLECIDAE)

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This description is based on 20 clitellate and 6 acitellate specimens which I collected in Columbia County, Florida, July 26, 1959. The specific location was 7 miles southeast of Lake City, along Route 245. All of this work has been accomplished during the tenure of research grant G-6378, awarded to me by the National Science Foundation.

Diplocardia bivesiculata n. sp.

Elongate, anterior and posterior ends somewhat swollen. Size, 165-215 by 2.5-3.0 mm. Somites, 190-241, average 212. Pigment lacking. Clitellum XIII-XVIII dorsally, XIII- $\frac{1}{2}$ XVII ventrally. Setal formula, $aa:ab:bc:cd:dd=20:7:20:10:80$. Protomium, epilobic, one half; margins converging. First dorsal pore in 10/11. Annulations, I-IV simple; V-XII, bi- or tri-annulate; post-clitellar annulations simple. Anus terminal. Tuberculae pubertates lacking. Nephropores are in setal line *d*, at anterior edge of each segment. Genital tumescences present as distinct papillae in setal line *ab* of VIII and IX; glandular area is present on ventral part of XXI or XXI-XXII. Genital setae; setae *ab* of XVIII and XX very small and confined to body wall. Spermathecal setae; setae *ab* of VIII and IX about twice the length of normal setae, distinctly curved, distal one-third strongly sculptured, tip hastate.

Spermathecal pores, two pair, in 7/8 and 8/9, on anterior edges of VIII and IX, in setal line *ab*. Spermiducal pores paired, between setal arc and anterior edge of segment in XIX, on outer edge of seminal gutter. Male field is flat, involves $\frac{1}{2}$ XVII-XX, between *a* setal lines. The seminal gutter is a nearly straight cleft with slightly raised edges, it involves $\frac{1}{2}$ XVIII- $\frac{1}{2}$ XX. Prostate pores are two pair, equatorial, at ends of seminal gutters. Oviducal pores paired on oval, flat field of mid-ventral XIV, located anterior to setal arc about one-half distance to anterior edge of segment.

Pharynx occupies II, III, IV. Pharyngeal glands compact, confined to II, III, IV. Gizzards two, in V and VI. Esophagus includes VII-XIV, ridged internally. Calciferous gland in XV and XVI; lamellae about 80 in number and free at inner margin. Intestine expands abruptly in XIX. Typhlosole weakly developed, begins anteriorly in XXIII; posterior ending variable between LIII-LXXIII. Septa 8/9 and 9/10 much thickened; 7/8, 10/11, and 11/12 thickened; 6/7 and 12/13 slightly thickened. Longitudinal musculature of pinnate type. Meganephridial; nephridia avesculate, appearing first in II. Dorsal vessel doubled from XVIII (XIX, XX?) forward into VII; doubling is intrasegmental only, vessel simplex at penetration of each septum. Ventral vessel present; subneural vessel absent. Last hearts in XIII.

Testes, two pair, free, branching, in X and XI. Sperm duct without post-septal epididymal looping; generally free of parietes, ducts of each side joining within the body wall in XIX. Prostate glands two pair, in XVIII and XX. One pair of lobulated seminal vesicles in XII, from 11/12. Single pair of rather flattish ovaries in XIII; ova in multiple string; ovarian funnel conelike; ovisac absent; oviduct short and direct to body wall of XIV. Seminal receptacles are two pair, in VIII and IX; ampulla and duct about equal in length; ampulla sub-spherical and compressed; diverticulum small, deeply incised, located on anterior surface of duct near the point where the latter enters the body wall. Setal follicles not developed internal to parietes. Syntypes have been placed in the United States National Museum (U.S.N.M. Cat. No. 30006).

DISCUSSION

No striking variations in the digestive tract were noted among the specimens examined. The esophageal walls are quite vascular. In segments XV and XVI,

the gut wall does show a characteristic calciferous gland development (fig. 1-F). Because the lumen is normally somewhat eccentric, it is not possible to give the exact proportion of the gland occupied by the lumen, but at the height of lamellar development the inside measurements would be 0.067 x 0.40 mm and the respective outside measurements 0.60 x 0.94 mm. Generally, the lamellae are free at their inner ends although in a few instances, coalescence does occur forming inter-lamellar tunnels.

The typhlosole begins quite abruptly in XXIII; the posterior end is indistinct and can be established anywhere from LIII to LXXIII. The entire typhlosolar structure does not exceed 0.20 mm in height (fig. 1-E). Its dorsal surface contains a deep groove filled with blood. This groove, or typhlosolar sinus, is con-

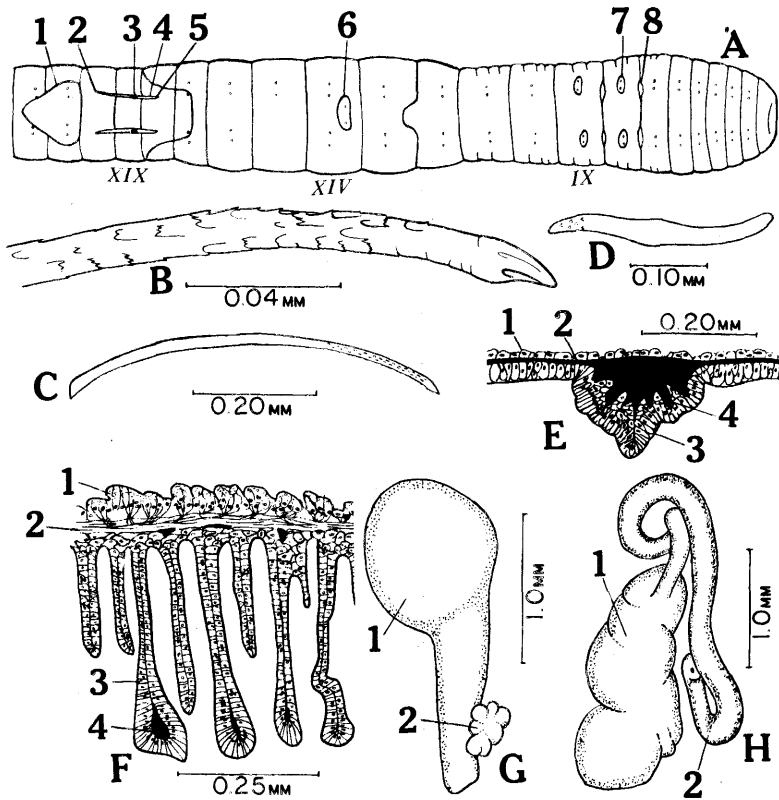


FIGURE 1

- A. Diagram of ventral aspect of *D. bivesiculata*.—1. Glandular field of XXI-XXII. 2. Position of prostatic pore of XX. 3. Spermiducal pore. 4. Seminal gutter. 5. Position of prostatic pore of XVIII. 6. Glandular field surrounding oviducal pores. 7. Glandular area surrounding setae *ab*. 8. Position of spermathecal pore in 7/8.
- B. Distal portion of spermathecal seta IX *b*.
- C. Spermathecal setae IX *b*.
- D. Normal seta X *a*.
- E. Typhlosole of XXX in cross section.—1. Chloragogen cells. 2. Intestinal blood sinus. 3. Typhlosolar epithelium. 4. Typhlosolar blood sinus.
- F. Dorsal portion of calciferous gland.—1. Chloragogen cells. 2. Muscle layer. 3. Lamella of gland. 4. Intra-lamellar sinus.
- G. Spermatheca of segment IX.—1. Ampulla. 2. Diverticulum.
- H. Prostate of segment XVIII.—1. Glandular portion. 2. Ectal portion of duct.

tinuous with the general blood sinus of the intestine, the Darmblutsinus of Hertling (1923).

Intra-segmental doubling of the dorsal vessel is easily determined from XVIII forward into VII. Behind XVIII, removal of the chloragogue layer reveals the vessel to be apparently doubled in XIX. In XX, the vessel is flattened and in this area it may be perforate medially. The simplex condition obtains at each point where the vessel penetrates a septum.

Sculpture of the spermathecal setae (setae *ab* of VIII and IX) is strong (fig. 1-B and C); the tip is hastate but subject to fracture so that this characteristic must be used diagnostically with some care. Setae *ab* of XVIII and XX are exceedingly small. Their dimensions, based upon saggital sections, are estimated to be: 0.005 x 0.034 mm in width and length respectively. These setae, in each segment bearing them, are nearly contiguous and close to the prostatic pore. I could not find them in gross dissection.

The two pairs of spermathecae, in VIII and IX, are equal in size. The ampulla is ovoid, compressed, and contains some sperm. Similarly, the deeply incised diverticulum contains sperm and is located on the anterior side of the duct near its penetration of the body wall (fig. 1-H). Externally the spermathecal pore is obscure but an elliptical glandular spot surrounds the opening in 7/8 and 8/9 (fig. 1-A). This glandular area is actually confined to the anterior edge of VIII and IX but presses into the intersegmental furrow.

The prostates are similar in size and general form. The duct of each is thickened, coiled, and about twice the length of the glandular portion (fig. 1-H). The anterior pair of prostates occupy segment XVIII with the glandular part normally confined to this segment and with its long axis extending in a transverse plane. Anteriorly, the duct may extend a loop into XVII, but in no example studied did the duct penetrate XIX. The posterior postates, of XX, lie with their long axes in the antero-posterior plane; the glandular portion penetrates XXI and the duct may extend into XIX and XXI.

Although *Diplocardia bivesiculata* has but a single pair of small seminal vesicles in XII, segments X and XI are filled with sperm and it is probable that the cavities of these segments function as seminal vesicles.

Inasmuch as we do not know how much significance to attach to the various features presently employed in the diagnosis of diplocardians, intrageneric affinities are quite uncertain. Of the described species, *bivesiculata* would appear to stand close to *Diplocardia eiseni* (Michaelsen, 1894) in possessing: (1) a doubled dorsal blood vessel anterior to XX; (2) reduction in the setae of prostatic segments; (3) quadrithecate condition; and (4) the presence of a pair of hearts in XIII. The major differences between *bivesiculata* and *eiseni* would be: (1) reduction in number of seminal vesicles in *bivesiculata*; (2) position of spermathecal pores; and (3) the position of the calciferous gland.

Diplocardia bivesiculata was collected from the compacted soil of a vehicular trail through a slash pine forest. Worms were common along the trail and at its edges, but I could not find them in the forest floor proper. The understory of the forest was palmetto, oak saplings, shrubs, and dense grass cover.

Many of the soil castings were fresh and certainly had been produced within a few hours at most from the time of collection (3:00 PM). The digestive tract of all specimens examined was filled with sand from the upper soil layers and contained little organic material. In terms of habitat occupancy, *bivesiculata* is to be considered an upland soil species, in contrast to species preferring leaf litter, logs, or emergent shore lines.

LITERATURE CITED

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