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GYMNODORVILLEA FLORIDANA, A NEW GENUS AND SPECIES OF DORVILLEIDAE (POLYCHAETA) FROM SOUTHEASTERN FLORIDA

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Abstract.—*Gymnodorvillea floridana*, n. gen., n. sp. (Polychaeta: Dorvilleidae), is proposed for specimens collected off southeastern Florida. *Gymnodorvillea* appears to be a continuation of the *Schistomeringos-Pettiboneia* line of dorvilleid evolution. The principal diagnostic characters are the complete lack of prostomial appendages and dorsal cirri, and a unique jaw apparatus.

During an investigation of polychaete-sediment relationships in shallow waters off Highland Beach, Palm Beach County, Florida (Wainright, in prep.), it was found that the most common species of Dorvilleidae is undescribed and possesses characters not assignable to any currently accepted genus.

Benthic core samples were collected in summer and winter during 1978 at 5 stations along a transect in depths of 3.7–19.8 m. Stations 4 and 5 yielded specimens of the new species.

Station 4 (26°24.6′N, 80°03.1′W) was located near a 3–5 m diameter patch reef approximately 20–30 m shoreward of the major reef tract parallelling the shoreline of Dade, Broward, and Palm Beach Counties, Florida. Mean depth was 19.8 m; sediments were soft, white to grey, moderately-sorted, fine-grained, calcareous-siliceous sand. Collections were made on 28 February and 27 August 1978. Station 5 was located at the same coordinates and depth as Station 4, but adjacent to the major reef tract noted above. Sediments were moderately- to poorly-sorted, medium- to fine-grained. Collections were made on 23 February and 20 August 1978.

Samples were fixed immediately after collection in 15% seawater formalin with Rose Bengal dye added, and sieved about 24 hrs later using a 1 mm screen. The remaining material was transferred to 70% ethanol.

Six specimens were serially transferred to 100% ethanol, critical-point dried in CO_2, coated with 3 × 125 Å gold-palladium and photographed with an ISI Super III A scanning electron microscope. Four specimens were mounted on slides using CMC-10 clearing-mounting medium for examination of mouthparts. External body parts were drawn with aid of a camera lucida attachment on a Wild M20 microscope or from SEM photomicrographs; mouthparts were drawn using a camera lucida and Zeiss Nomarski interference-contrast optics.

Types and additional specimens are deposited in the National Museum of Natural History, Smithsonian Institution (USNM), the Florida Department of Natural Resources, Marine Research Laboratory (FSBC I), and the Department of Biological Sciences, Florida Atlantic University (FAU).

Anatomical nomenclature follows that of Perkins (1979). Nomenclature of mouthparts follows Jumars (1974). Free denticles are numbered sequentially from the posterior end as in Perkins (1979).

Gymnodorvillea, new genus

Type-species.—*Gymnodorvillea floridana,* new species.

Diagnosis.—Body minute, slender, cylindrical, with about 20–30 setigers; prostomium slightly flattened, pear-shaped, lacking antennae and palps, having 2 encircling bands of cilia; parapodia uniramous, without notoacicula and dorsal cirri, with ventral cirri beginning on setiger 2; setae including serrate capillary, furcate, geniculate, and cultriform simple setae and heterogomph falcigers; jaws consisting of mandibles and 2 rows of maxillary denticles, with reduced basal plates; carriers reduced if present; denticle rows fused posteriorly; denticles of 3 types: rounded serrate, serrate with principal tooth, and spinous; mandibles without free lateral teeth.

Etymology.—The generic name is derived from Greek, *gymno* meaning naked plus *Dorvillea* and refers to the lack of prostomial appendages. Gender: feminine.

Gymnodorvillea floridana, new species
Figs. 1–4

Material examined.—Highland Beach, Wainright *et al.,* collectors; Sta. 4, winter, holotype (USNM 71445), 9 paratypes (USNM 71446; FSBC I 28986); Sta. 4, summer, 3 paratypes (USNM 71447; FSBC I 28987; FAU); Sta. 5, winter, 9 paratypes (USNM 71448; FSBC I 28988; FAU); Sta. 5, summer, 5 paratypes (USNM 71449; FAU).

Description.—Body (Fig. 1A) without color pattern in alcohol; largest specimen 2.9 mm long, 0.24 mm wide. Prostomium without eyes, without appendages. Two apodous peristomial rings, each with transverse ciliated band at least dorsally and laterally; length of anterior ring about ½–⅔ that of posterior ring. Dorsal, transverse ciliary bands from first peristomial ring to about setiger 14 (Fig. 2).

Parapodia supported by 1 or 2 neuroacicula (Fig. 1B); upper one resembling single aciculum of other parapodia, stout, thicker than setal shafts, tapering, sometimes protruding through parapodial lobe; lower aciculum apparently absent from some parapodia, more slender, not protruding, located below cluster of setal shafts surrounding upper aciculum. Presetal and postsetal lobes similar, indistinct (Fig. 1B–E). Acicular lobes often protruding; lower acicular lobe protruding especially in parapodia with cultriform setae (Fig. 1B, E). Ventral cirri bluntly conical, arising about midway along parapodium (Fig. 1D), extending ventrolaterally about ¼–⅓ parapodial length (Fig. 1C–E).

Setae of 5 types: (1) furcate setae with about 3 rows of serrations on short prongs (Figs. 1I, 2); (2) geniculate setae (Fig. 1H); (3) serrated capillaries (Figs. 1F, G); (4) heterogomph falcigers with blades having serrate cutting edges and entire tips, with blade lengths decreasing dorsally to ventrally, with blades joined with shafts by thin membranes, with shafts having 2–3 rows of serrations below joints (Figs. 1J–L); (5) simple serrate cultriform setae (Fig. 1M).

Furcate setae supra-acicular, beginning on setiger 1 (28 specimens) or setiger 2 (4 specimens), rarely 2 per parapodium. Geniculate setae replacing furcate setae in middle or posterior segments (range for setiger of replacement: 2–29, $\bar{Y} = 12.8$, $SD = 8.0$, $n = 19$), occasional furcate seta occurring posterior to first appearance of geniculate setae, geniculate and furcate setae rarely occurring on same para-

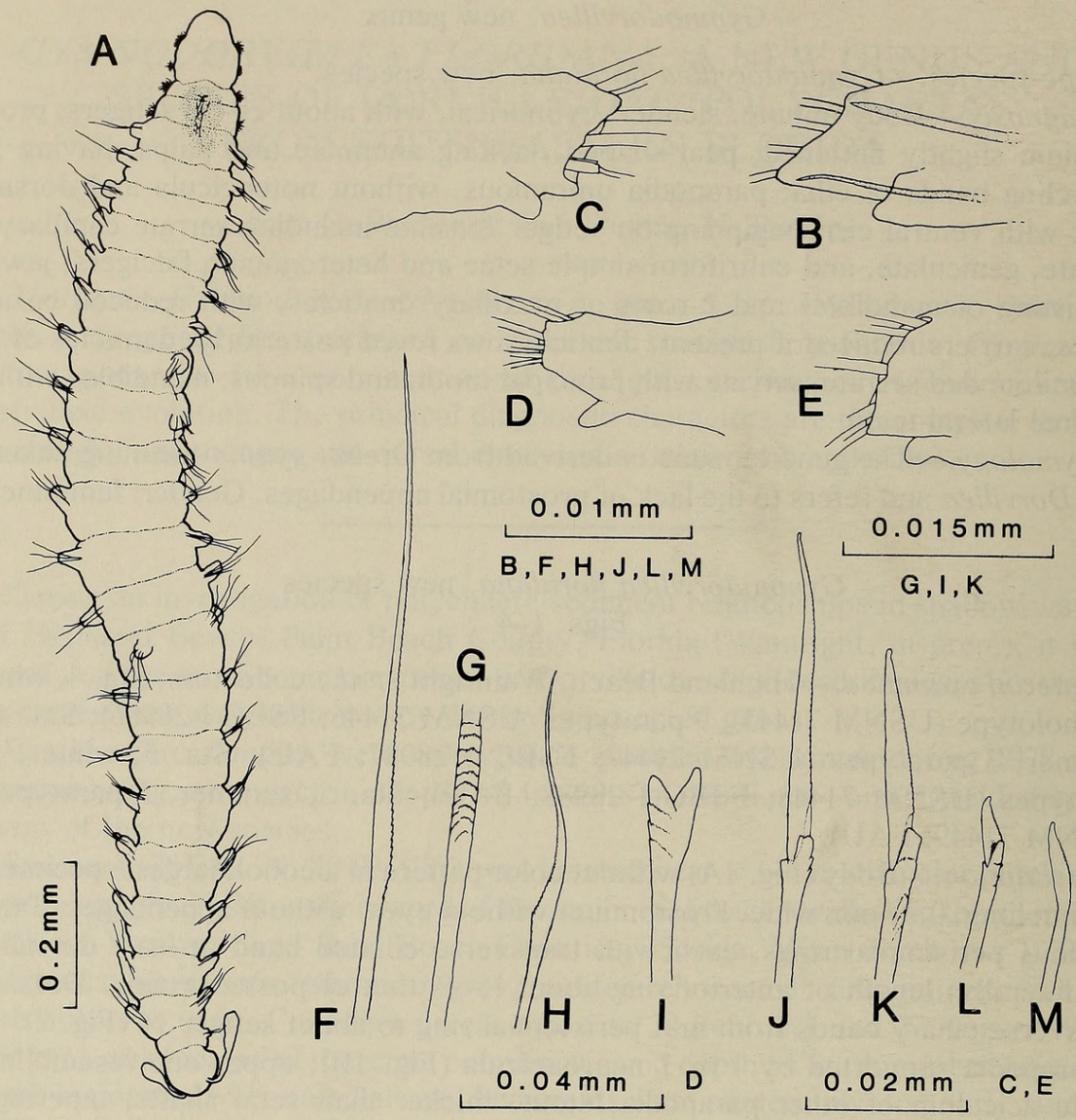

Fig. 1. *Gymnodorvillea floridana,* paratypes: A, Dorsal view, outer margins of ciliary bands on prostomium and apodous rings shown, bands on subsequent segments omitted; B, 11th parapodium, ventroposterior view, showing acicula; C, 14th parapodium, posteroventral view; D, 11th parapodium, posterior view; E, 20th parapodium, anterior view; F, Capillary seta; G, Portion of same, edge-on view; H, Geniculate seta; I, Furcate seta; J, Upper falciger; K, Middle falciger; L, Lowest falciger; M, Cultriform seta. (C–E, G, I, J drawn from SEM photomicrographs.)

podium. Serrate capillaries appearing supra-acicular on parapodia with furcate setae, subacicular on parapodia with geniculate setae, 1, occasionally 2, per parapodium. Subacicular falcigers occurring in fascicles of 3 on anterior parapodia, 2 on middle or posterior parapodia, but often 4 or 3, respectively. Cultriform setae beginning on setiger 1–11 ($\bar{Y}$ = 6.3, SD = 3.6, n = 19) similar to and replacing lower falcigers.

Mandibles (Fig. 3A) fused, flared, and thinly chitinized anteriorly, each with small medial tooth just anterior to point of fusion, posteriorly curved, forming characteristic horseshoe shape and more thickly chitinized. Maxillae (Figs. 3B, 4A, B) forming single pair of denticle rows. Carriers, if present, greatly reduced, formed of thin, dorsolateral, winglike structures fused to basal parts of maxillary

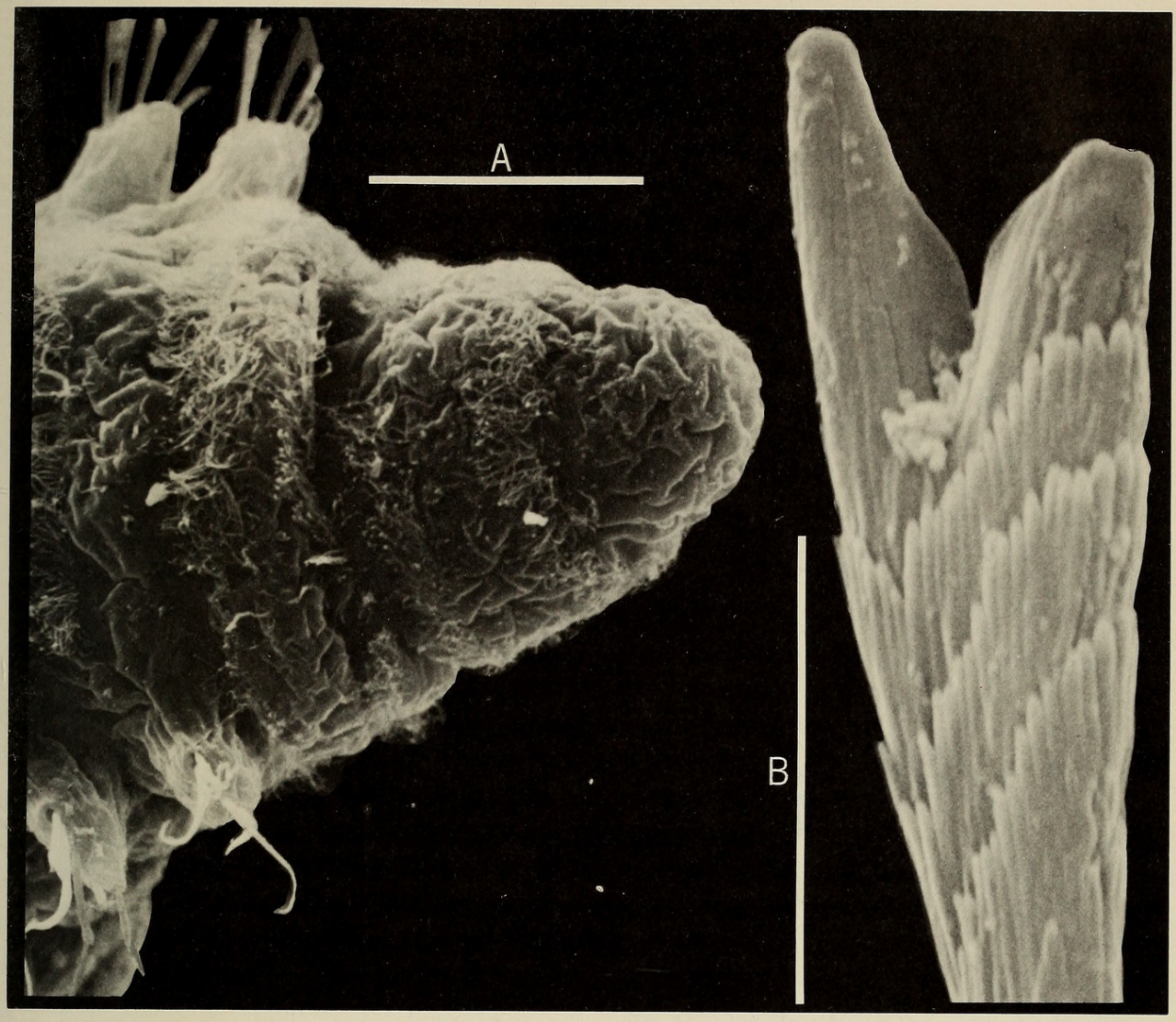

Fig. 2. *Gymnodorvillea floridana,* paratypes: A, Anterior region, dorsal view, showing ciliary bands, shrinkage due to fixation and/or critical-point drying; B, Furcate seta (SEM photomicrographs. Scales: A = 50 μm, B = 5 μm).

rows (Figs. 3Bb, 4A, B), with points of fusion indistinct; parts of ligaments of D 1–5 attached to winglike structures on basal pieces; posterior pieces of denticle rows fused, continuous with posterior tonguelike projection of ligament (Fig. 3Ba); anterior central part of ligament darkened. Remnants of basal plates probably consisting of posterior maxillary piece and D 1–5 (Fig. 4B). Denticles of 3 distinct types: (1) D 1 (Fig. 3Bc) ventrally hollow, with row of about 9–15 irregular serrations; (2) D 2–5 ventrally hollow, with single, falcate major tooth directed dorsoposteriorly with row of fine serrations on border, with serrations on medial sides beginning with D 3 and increasing anteriorly; D 5 with anterior margin elongate dorsoanteriorly (Fig. 4A); (3) D 6–8, spinous, padlike, with rounded surface covered with numerous fine spines (spines much more numerous than indicated on figures); D 6 approximately same size as D 5, with reniform spinous surface directed medially when pharynx withdrawn (Fig. 4); D 7 oval, with spinous pad, extending anteriorly as indistinct chitinous plate; D 8 overlapping D 7 laterally and dorsally, with hemispherical spinous surface, beaklike posterior projection, and indistinct anterior plate (Fig. 3B).

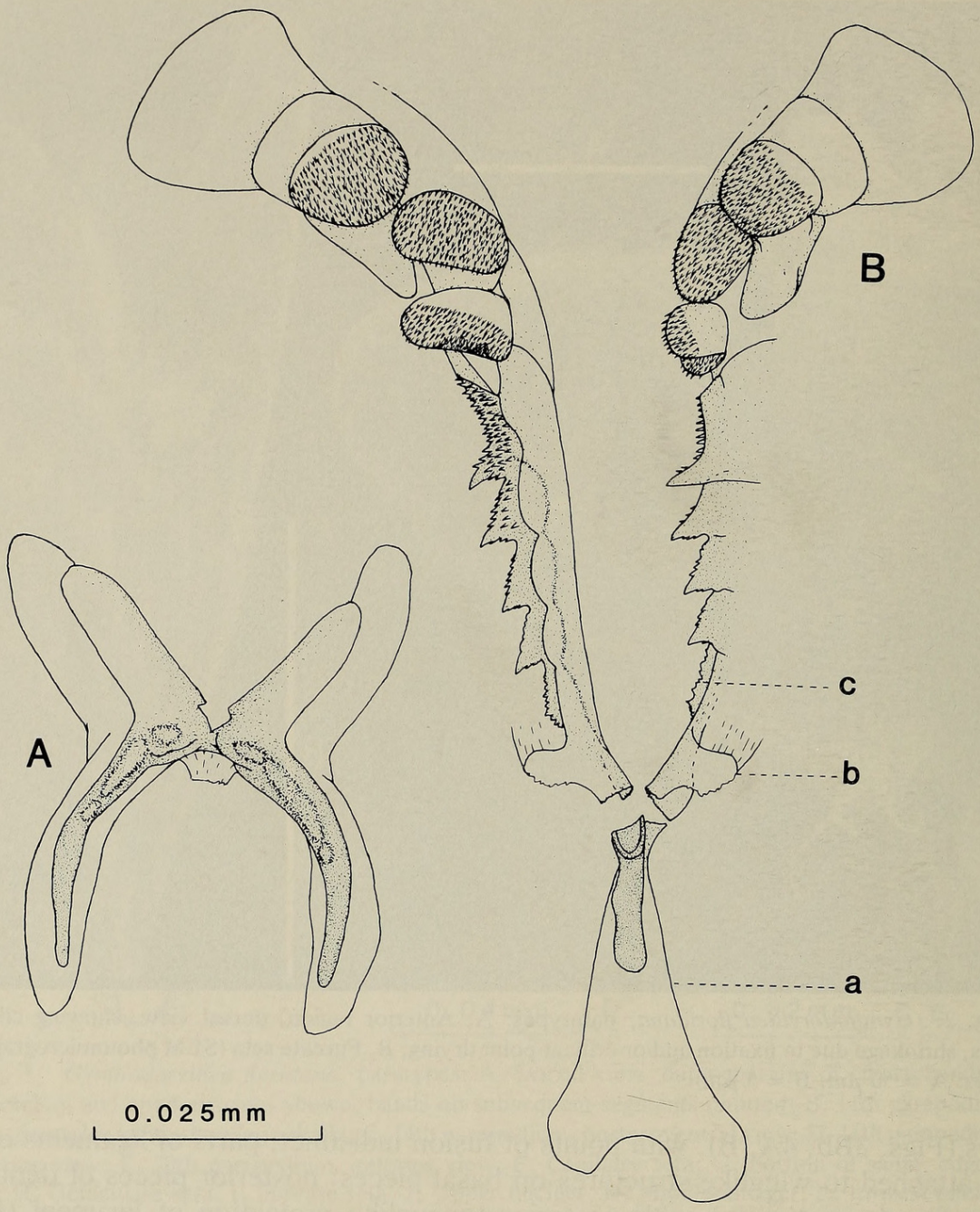

Fig. 3. *Gymnodorvillea floridana,* paratypes: A, Mandibles, dorsal view; B, Maxillae, denticles 1–6 turned, posterior maxillary piece broken, a, posterior tonguelike extension of maxillary ligament, b, winglike projection on basal piece, c, posterior denticle.

Pygidium truncate, with 2 clubshaped anal cirri.

Sexually mature specimens with gametes in about medial 10 setigers. Eggs of one specimen measuring 3–5 μm in diameter.

Etymology.—The specific name refers to the type locality.

Biology.—Specimens were collected only at the 19.8 m stations, although three shallower-water stations (3.7, 7.6, and 12.2 m) were sampled, suggesting a restriction to deeper water or to areas near coral reefs. The gut of one specimen, viewed through the body wall, contained what appeared to be diatom chains, agreeing with the feeding mode described by Fauchald and Jumars (1979) for the

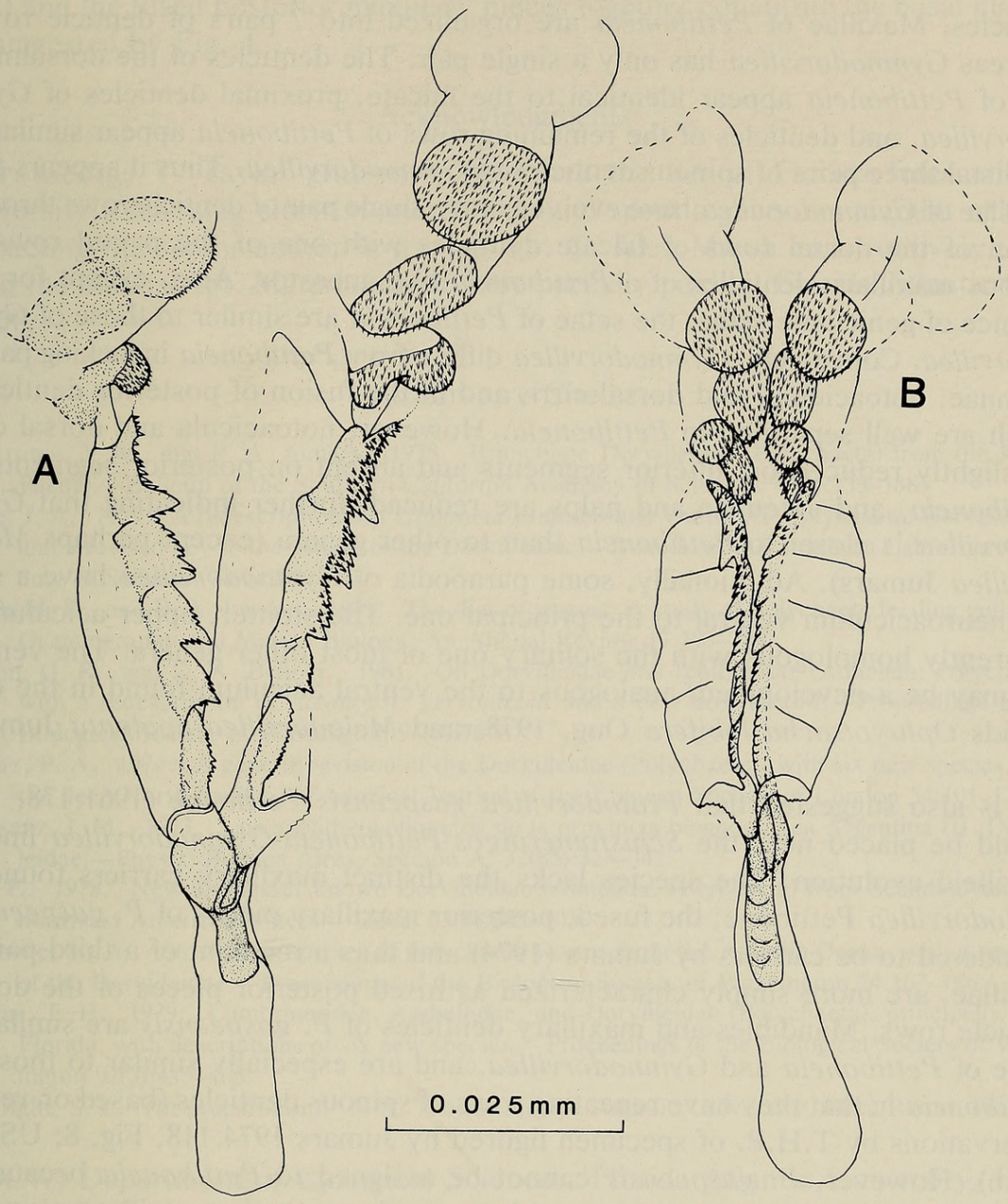

Fig. 4. *Gymnodorvillea floridana,* paratypes: A, Maxillae, dorsal view, turned; B, Same, of smaller paratype, only very slightly turned.

family. The greater number of specimens collected in winter samples at both stations suggests a fall or winter reproductive periodicity. Depth of occurrence within the sediment could not be determined, although lack of head appendages and eyes and minute body size imply an infaunal existence.

Remarks.—Currently accepted dorvilleid genera were defined by Jumars (1974), Blake (1979), and Gaston and Benner (1981); however, characters of species described in recent papers by Oug (1978) and Armstrong and Jumars (1978) indicate that a generic revision of the family is needed.

Gymnodorvillea appears most closely related to *Pettiboneia* Orensanz (1973), both genera being allied with Jumars' (1974) *Schistomeringos-Protodorvillea-Meiodorvillea* line of dorvilleid evolution. Both genera have similar maxillary

denticles. Maxillae of *Pettiboneia* are organized into 7 pairs of denticle rows, whereas *Gymnodorvillea* has only a single pair. The denticles of the dorsalmost row of *Pettiboneia* appear identical to the falcate, proximal denticles of *Gymnodorvillea,* and denticles of the remaining rows of *Pettiboneia* appear similar to the distal three pairs of spinous denticles of *Gymnodorvillea*. Thus it appears that maxillae of *Gymnodorvillea* have evolved into a single pair of denticle rows through fusion of the dorsal rows of falcate denticles with one of the paired rows of spinous maxillary denticles of a *Pettiboneia*-like ancestor. Also, except for the absence of geniculate setae, the setae of *Pettiboneia* are similar to those of *Gymnodorvillea*. Conversely, *Gymnodorvillea* differs from *Pettiboneia* in lacking palps, antennae, notoacicula, and dorsal cirri, and in the fusion of posterior denticles, which are well separated in *Pettiboneia*. However, notoacicula and dorsal cirri are slightly reduced on anterior segments and absent on posterior segments of *Pettiboneia,* and antennae and palps are reduced, further indicating that *Gymnodorvillea* is closer to *Pettiboneia* than to other genera (except perhaps *Meiodorvillea* Jumars). Additionally, some parapodia of *Gymnodorvillea* have a second neuroaciculum ventral to the principal one. The stouter, upper aciculum is apparently homologous with the solitary one of most other genera. The ventral one may be a development analogous to the ventral aciculum found in the dorvilleids *Ophryotrocha lobifera* Oug, 1978, and *Meiodorvillea apalpata* Jumars, 1974.

It is also suggested that *Protodorvillea gaspeensis* Pettibone (1961:178, 179) should be placed near the *Schistomeringos-Pettiboneia-Gymnodorvillea* line of dorvilleid evolution. The species lacks the distinct maxillary carriers found in *Protodorvillea* Pettibone; the fused, posterior maxillary pieces of *P. gaspeensis,* considered to be carriers by Jumars (1974) and thus a remnant of a third pair of maxillae, are more simply characterized as fused posterior pieces of the dorsal denticle rows. Mandibles and maxillary denticles of *P. gaspeensis* are similar to those of *Pettiboneia* and *Gymnodorvillea,* and are especially similar to those of *Pettiboneia* in that they have repeating rows of spinous denticles (based on recent observations by T.H.P. of specimen figured by Jumars 1974:118, Fig. 8; USNM 43516). However, *P. gaspeensis* cannot be assigned to *Pettiboneia* because it lacks notopodial cirri and acicula, and because the posterior maxillary pieces of the upper denticle rows are joined rather than well separated. Further, since both prostomial appendages and repeating rows of denticles are present, *P. gaspeensis* should probably not be assigned to *Gymnodorvillea,* but instead to a new genus.

Gymnodorvillea is similar to *Meiodorvillea* Jumars, 1974, in having maxillae with only 2 rows of denticles, uniramous parapodia, and furcate or geniculate setae, but the latter differs in having distinct maxillary carriers, antennae, and usually palps. *Meiodorvillea apalpata* Jumars, which lacks palps, also has parapodia with a second neuroaciculum and may prove to belong to another genus.

The position and distribution of furcate and geniculate setae on the parapodia of *Gymnodorvillea floridana* suggests that they are homologous. Also, in our opinion, the posterior denticles (D 1) which do not have a large principal tooth are homologous with those denticles which have such a tooth (D 2–5). These are not considered to be important generic characters.

An alternative interpretation to that presented in the description for the maxillary organization of *Gymnodorvillea floridana* may be that the proximal denticles

(D 1) and the fused posterior maxillary pieces together constitute the basal plates, as suggested by Fig. 4.

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