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A NEW SPECIES OF *DORIOPSILLA* (MOLLUSCA,
NUDIBRANCHIA, DENDRODORIDIDAE) FROM CUBA

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A new species of the genus *Doriopsilla*, *D. espinosai*, is described on the basis of four specimens collected from Cuba. This new species is characterized externally by having a combination of red spots and white patches. Internally, *D. espinosai* differs from other Atlantic species mainly in two characters: the bursa copulatrix has a single duct leading from it, and the penial hooks are small. Thus far, *D. espinosai* is only known from Cuba.

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Valdés and Ortea (1997) recently revised the species of the genus *Doriopsilla* in the Atlantic Ocean, regarding only three species as valid. *Doriopsilla areolata* Bergh, 1880, with three subspecies, is distributed through southern Europe (*D. areolata areolata* Bergh, 1880), West Africa (*D. areolata albolineata* Edmunds, 1968) and the Caribbean Sea (*D. areolata nigrolineata* Meyer, 1977). *Doriopsilla pelseneeri* d'Oliveira, 1895 is only present in the Iberian Peninsula, and *Doriopsilla pharpa* Marcus, 1961, is known from the Atlantic coast of North America and the Caribbean Sea.

This paper describes a third species of the genus *Doriopsilla* from the Caribbean Sea based on material collected from Cuba, and deposited in the Department of Invertebrate Zoology of the

California Academy of Sciences (CASIZ) and the Instituto de Oceanología de La Habana, Cuba (IDO).

SPECIES DESCRIPTION

***Doriopsilla espinosai* sp. nov.**
(Figs. 1–5)

TYPE MATERIAL. — HOLOTYPE (CASIZ 114836): Marina Hemingway, Havana, Cuba, at 1 m depth, 20 August 1997, one specimen 8 mm long, collected by José Espinosa. PARATYPES: Marina Hemingway, Havana, Cuba, at 1 m depth, 20 August 1997, one specimen 7 mm long, collected by José Espinosa (CASIZ 114837). Playa Los Maginos, Havana, Cuba, 3

September 1997, one specimen 5 mm preserved length, collected by José Espinosa (IDO). Playa Girón, Cuba, at 1 m depth, 12 October 1997, one specimen 15 mm long, collected by José Espinosa (CASIZ 114838).

EXTERNAL MORPHOLOGY. — Living animals are up to 15 mm in length. The general color of the living animals is translucent white in the smaller specimens (5–8 mm) and yellowish in the larger ones (15 mm) (Fig. 1). The dorsum has several large opaque white patches, proportionally larger in the bigger specimens. A number of conspicuous red spots are irregularly scattered all over the dorsum, more densely arranged near of the border of the notum. The viscera are visible through the skin as a pink area. The rhinophores are pale yellowish, with a white stalk. The gill is translucent white.

The body is oval (Figs. 1, 2A), high, stiffened by a subepidermal network of strong spicules all over the entire body surface. When the animal is moving the body becomes elongate, twice as long as wide. The dorsum is covered by a number of low, simple conical tubercles (Fig. 2B), stiffened with spicules. The medial tubercles on the dorsum are larger, decreasing in size toward the borders of the mantle. The mantle margin is wide and slightly undulate. The rhinophores are perforiate with 9 lamellae. When the animal is resting, the rhinophores are pointing backwards, but when moving they point forward. The gill is composed by 2–3 tripinnate branchial leaves. The anus is eccentric to the left.

Ventrally, the foot is shorter than the dorsum. The oral tentacles are small (Fig. 2C), fused together and grooved laterally. One short tip protrudes on each side of the oral tentacles. The anterior border of the foot is notched. The notch borders the mouth that is a rounded opening.

INTERNAL ANATOMY. — The buccal bulb is elongate (Figs. 3A, 4B), covered by minute, well-differentiated oral glands all over its surface (Fig. 3C). Two retractor muscles insert into the anterior region of the bulb and other two into the posterior region. The tubular esophagus leads from the buccal bulb. The esophagus is short and wide (Figs. 3B, 4B). Posteriorly, it broadens into a short, wide muscular portion, which has one retractor muscle attached. The intestine runs posteriorly in the usual position and has a prominent pyloric gland (Fig. 4A).

The ampulla is large and elongate (Fig. 4D). It divides into a short oviduct, which enters the female gland mass, and the prostate. The prostate is large, flattened (Fig. 4C). From its distal end, the prostate leads into an elongate and convoluted deferent duct. The penis, when everted, is very short and contains 7 rows of penial hooks. The penial hooks are approximately 10 μ m wide at the base and up to 25 μ m in length (Fig. 4E). The vaginal duct is short and convoluted. At its proximal end it connects with the small, thin-walled, spherical bursa copulatrix. The seminal receptacle is smaller than the bursa, having a long duct that joins the vagina at about the half of its length. From this point the uterine duct emerges.

The buccal ganglia are situated just behind the central nervous system.

The circulatory system consists of a small heart (Fig. 4A), joined by the aorta with a flattened blood gland, placed behind the central nervous system. The renal sac is very large and conspicuous in the posterior region of the viscera.

ETYMOLOGY. — The name *espinosai* was chosen to recognize Dr. José Espinosa of the Instituto de Oceanología de La Habana, Cuba. He originally discovered this species in Havana and Playa Girón.

DISTRIBUTION. — Thus far this species is known only from Cuba. It was collected from Havana on the north coast and Playa Girón, on the south coast (Fig. 5).

DISCUSSION

According to the recent diagnosis of the genus *Doriopsilla* published by Valdés and Ortea (1997), *Doriopsilla espinosai* clearly belongs to this genus. The main diagnostic features of this genus are mantle stiffened by spicules, dorsum covered by tubercles, anus eccentric to the left, oral tentacles reduced, digestive system lacking ptyaline glands and penis eversible with internal hooks. In addition this species has the buccal ganglia immediately behind the central nervous system, as indicated by Eliot (1906) for other species of *Doriopsilla*.

The two other species of *Doriopsilla* recognized by Valdés and Ortea (1997) from the Atlantic coast of North America and the Caribbean Sea, *Doriopsilla pharpa* Marcus, 1961 (= *Doriopsilla leia* Marcus, 1961) and *Doriopsilla areolata nigrolineata* are both clearly distin-



FIGURE 1. Living animal of *Doriopsilla espinosai* sp. nov. from Havana.

guished from *Doriopsilla espinosai* by their external morphology and anatomy. *Doriopsilla pharpa* is a yellow species with numerous dark brown spots (Valdés and Ortea 1997), which lacks the opaque white areas present in *D. espinosai*. Also, the tubercles of *D. pharpa* have spicules projecting that are absent in *D. espinosai*. The number of branchial leaves is also different in both species. In an 11 mm (preserved length) specimen of *D. pharpa* there are 5 branchial leaves, whereas in a 15 mm (preserved length) specimen of *D. espinosai* there are 3 branchial leaves. According to Marcus (1961) the reproductive system of *D. pharpa* consists of a bursa copulatrix with two ducts leading from it, instead of one as in *D. espinosai*. In addition, the bursa copulatrix of *D. pharpa* is very elongate and several times larger than the seminal receptacle, whereas in *D. espinosai* it is rounded and almost equal in size to the seminal receptacle. Another difference between both species is that the penial hooks of *D. pharpa* are very curved, instead of straight or slightly curved as in *D. espinosai*.

Doriopsilla areolata nigrolineata is an orange species that has the dorsum ornamented with a network of black lines and white rings around the tubercles (Meyer 1977), which are absent in *D. espinosai*. No anatomical data is available to compare.

The other two subspecies of *Doriopsilla areolata*, both inhabiting the eastern Atlantic, differ from *D. espinosai* in the morphology of the reproductive and digestive systems. From the bursa copulatrix of *D. areolata* three ducts lead, connecting with the seminal receptacle, the vaginal duct and the uterine duct (Valdés and Ortea 1997). However, in *D. espinosai* there is a single duct that branches into three. The penial hooks of *D. areolata* have a similar shape to those of *D. espinosai*, but they are much larger. In *D. areolata* they are about 400 μm in length, whereas in *D. espinosai* they are approximately 25 μm long. Another internal difference is the presence of a pyloric sac in *D. espinosai* that it is absent in *D. areolata*. Externally, the East Atlantic *D. areolata* have a dorsal network of white lines in the large specimens, or white rings around the tubercles in the smaller specimens. That differs from

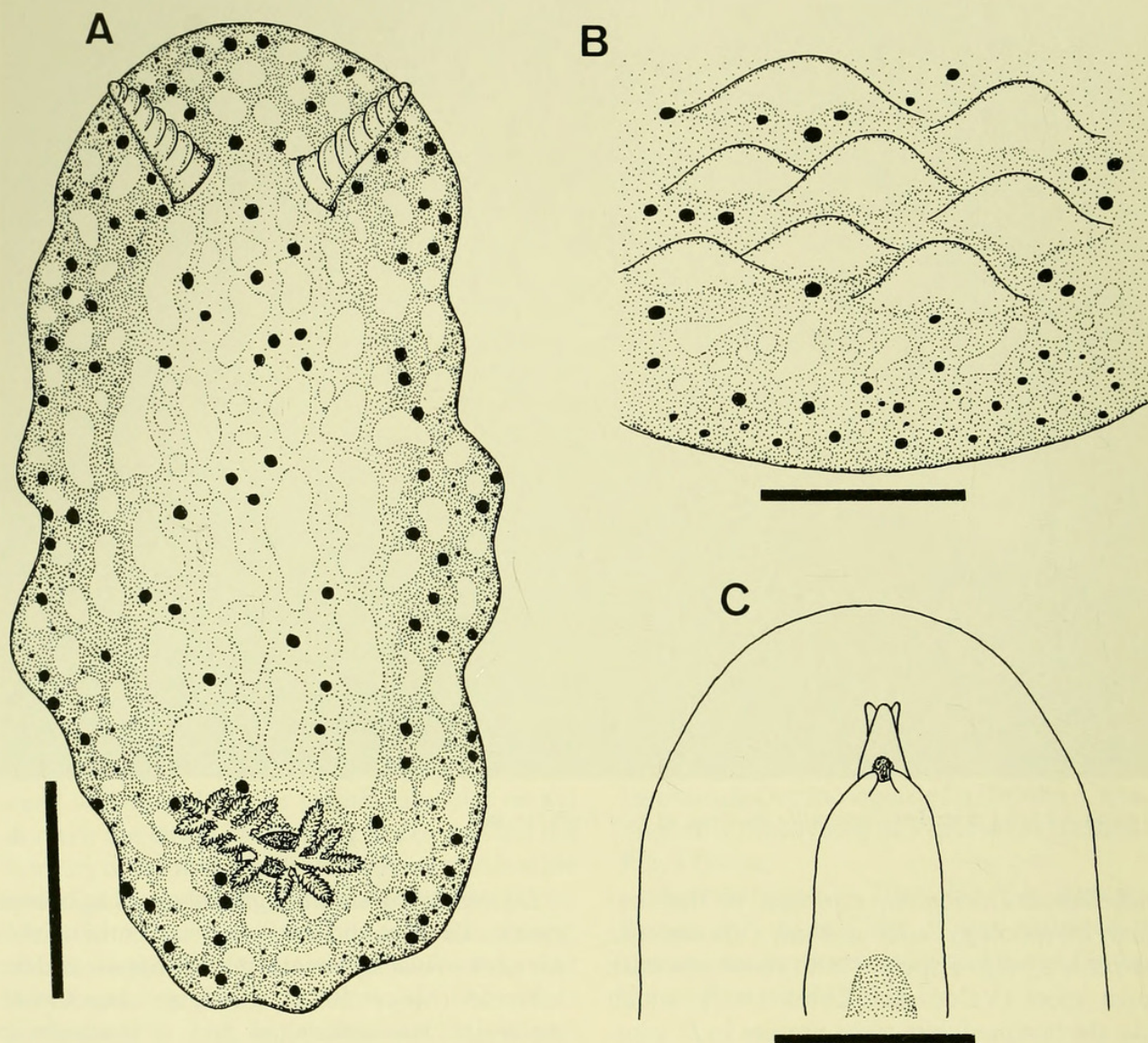


FIGURE 2. *Doriopsilla espinosai* sp. nov. (CASIZ 114838). A. Dorsal view of the living animal, scale bar = 2 mm. B. Detail of the dorsal tubercles, scale bar = 1 mm. C. Ventral view of the anterior border of the foot, scale bar = 2 mm.

D. espinosai in which the white patches never form rings around the tubercles or lines. Also this latter species has red dots, that are absent in *D. areolata*.

The remaining Atlantic species of *Doriopsilla*, *D. pelseneeri*, is very different from *D. espinosai*. According to Valdés and Ortea (1997) this species is uniform in color with the exception of a white ring around the branchial sheath, but it lacks the opaque white patches and red dots present in *D. espinosai*. In addition, the large irregular tubercles of *D. pelseneeri* are very different from the low, rounded and simple tubercles of *D. espinosai*. Internally, the bursa copulatrix of *D. pelseneeri* has three ducts leading from it, whereas *D. espinosai* has only one.

The penial hooks of *D. pelseneeri* are large (about 400 μ m long) and have an elongated base, whereas in *D. espinosai* they are short and have a short base.

Doriopsilla espinosai is also different from the Eastern Pacific species. According to Gosliner, Schaefer and Millen (in press), *Doriopsilla albopunctata* (Cooper, 1863) is a yellow species with a number of white spots. A similar pattern has been reported for a new, still undescribed species from this area (Gosliner et al. in press). Other nominal species of *Doriopsilla* described from the Pacific coast of North America are *Doriopsilla nigromaculata* (Cockerell in Cockerell and Eliot, 1905), *Doriopsilla rowena* Marcus and Marcus, 1967 and *Doriopsilla janaina*

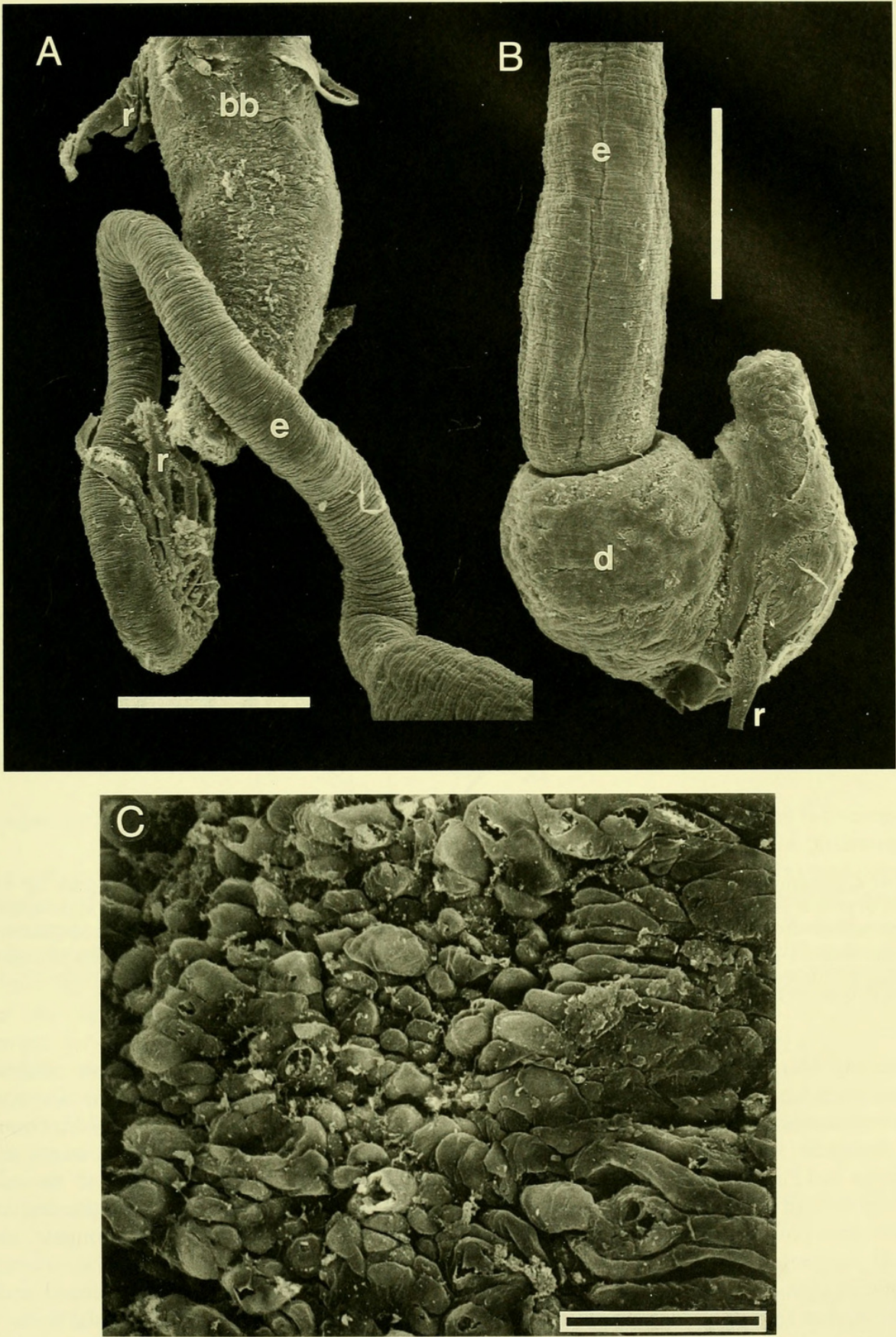


FIGURE 3. Scanning electron micrographs of *Doriopsilla espinosai* sp. nov. (CASIZ 114838). A. Anterior region of the digestive system, scale bar = 250 μ m. B. Posterior portion of the esophagus, scale bar = 300 μ m. C. Oral glands, scale bar = 25 μ m. Abbreviations: bb = buccal bulb, d = differentiated portion of the esophagus, e = esophagus, r = retractor muscle.

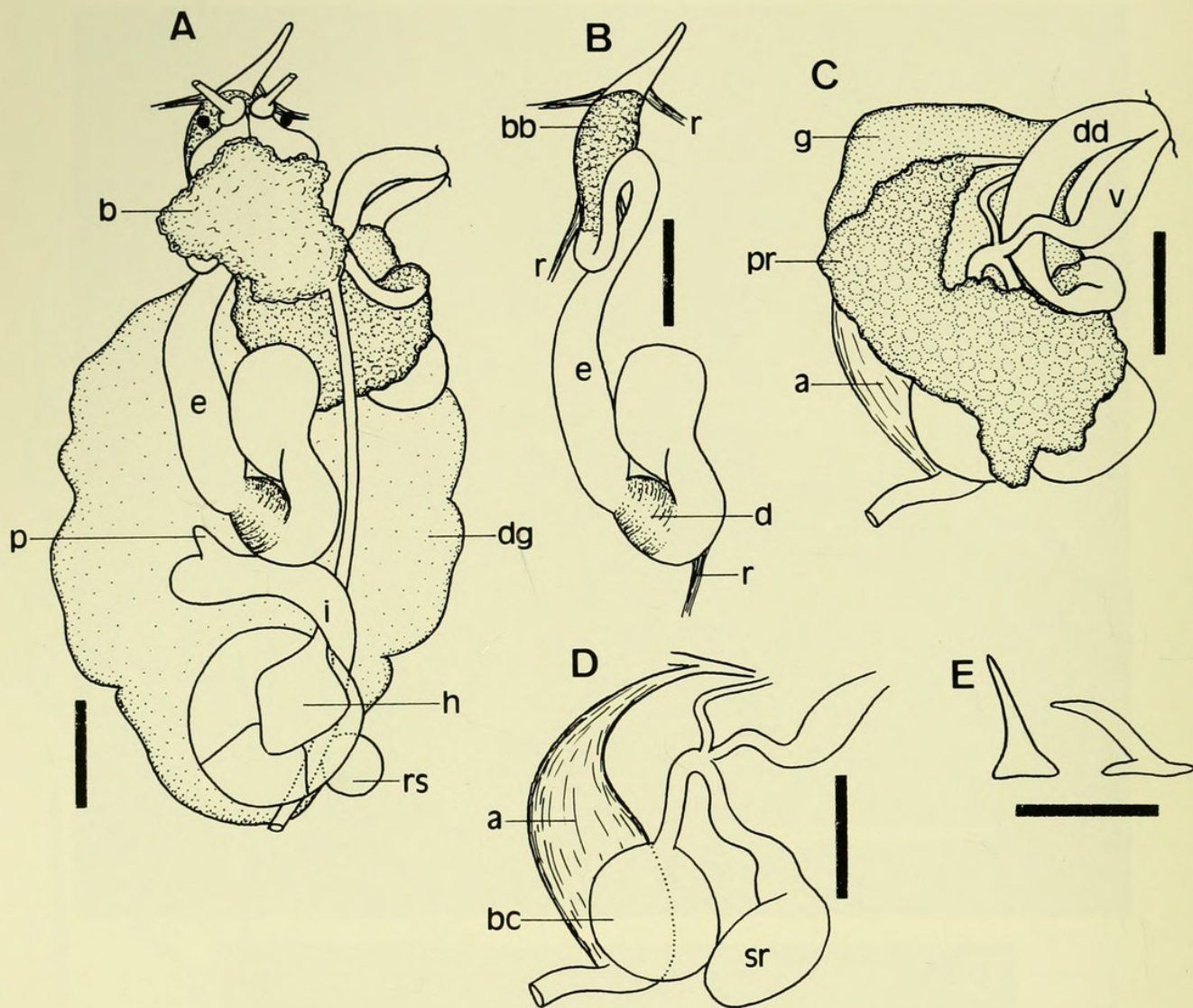


FIGURE 4. Anatomy of *Doriopsilla espinosai* sp. nov. (CASIZ 114838). A. Dorsal view of the anatomy, scale bar = 1 mm. B. Anterior portion of the digestive system, scale bar = 1 mm. C. General view of the reproductive system, scale bar = 1 mm. D. Dissected reproductive organs, scale bar = 1 mm. E. Penial hooks, scale bar = 25 μ m. Abbreviations: a = ampulla, b = blood gland, bb = buccal bulb, bc = bursa copulatrix, d = differentiated portion of the esophagus, dd = deferent duct, dg = digestive gland, e = esophagus, g = female gland, h = heart, i = intestine, p = pyloric gland, pr = prostate, r = retractor muscle, rs = renal sac, sr = seminal receptacle, v = vagina.

Marcus and Marcus, 1967. *Doriopsilla rowena* is probably a junior synonym of *D. nigromaculata* (see Behrens 1991), but anatomical comparisons between specimens from San Diego, California and Puerto Peñasco, Mexico (the type localities of both nominal species) are needed to confirm this point. These three species differ from *D. espinosai* in coloration and anatomy. *Doriopsilla janaina* is light red, orange or yellow with white dots (Marcus and Marcus 1967a), and *D. nigromaculata* and *D. rowena* are yellowish to orange with brown and white spots (Marcus and Marcus 1967b, Behrens 1991). Both species

lack a combination of red spots and white patches. The recently described *Doriopsilla spaldingi* Valdés and Behrens, 1998, from this area, differs externally from *D. espinosai* in having a blue iridescent band around the mantle margin (Valdés and Behrens 1998). Internally, the prostate of *D. spaldingi* is elongate, almost tubular, and the buccal bulb is oval, whereas in *D. espinosai* the prostate is flattened and the buccal bulb very elongate. The penial hooks have a similar shape in both species, but in *D. spaldingi* they are twice the length of those in *D. espinosai*.



FIGURE 5. Distribution of *Doriopsilla espinosai* sp. nov. in Cuba.

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RESUMEN

Se describe una nueva especie del género *Doriopsilla*, *D. espinosai*, en base a cuatro ejemplares recolectados en Cuba. Esta nueva especie

se caracteriza externamente por la presencia de puntos rojos y manchas blancas. Internamente, *D. espinosai* se diferencia de otras especies atlánticas en que posee un sólo conducto conectado con la bolsa copulatriz y en el pequeño tamaño de las espinas peneales. Hasta el momento, *D. espinosai* se conoce solamente de la isla de Cuba.

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