



A new species of *Polyzoa* (Ascidiacea: Styelidae) from the Atlantic coast of N America, U.S.A.

KAREN SANAMYAN¹, DANIEL F. GLEASON² & NADEZHDA SANAMYAN¹

¹Kamchatka Branch of the Pacific Institute of Geography, Partizanskaya 6, Petropavlovsk-Kamchatsky, 683000, Russia.
E-mail: ascidiacea@sanamyan.com

²Georgia Southern University, Department of Biology, P.O. Box 8042, Statesboro, GA 30460-8042, U.S.A.
E-mail: dgleason@georgiasouthern.edu

A new species of colonial Styelid ascidian of the genus *Polyzoa* was found attached to the test of solitary ascidians collected by divers off the coast of Georgia, U.S.A. The colony of this new species, consisting of small sandy zooids, is cryptic and difficult to detect. The species is characterized by three longitudinal branchial vessels on each side of the body and is the second species of the genus reported for the Atlantic.

Polyzoa atlantica n.sp.

(Figures 1–3)

Material examined: Holotype: collected in 2004, at 31°36.056' N, 80°47.431' W, specimen #190, deposited in Kamchatka Branch of the Pacific Institute of Geography (KBPIG 1/1384).

The colony consists of several ovoid or globular zooids 3–4 mm in diameter that are attached to the test of the solitary ascidians *Molgula occidentalis* Traustedt, 1882 and *Styela canopus* Savigny, 1816. The spacing between zooids is variable, zooids are never coalescent, and are attached by a small narrow surface on their posterior side (Figure 1 A, B). Zooids are connected only by inconspicuous thin sheet or stolons that are spread over the substrate. Each zooid has its own test covered completely with firmly attached sand grains (Figure 1 C). The zooids do not possess hair-like outgrowths. The siphons are not discernible on the preserved material and, as a whole, this sandy colony is very inconspicuous and difficult to detect.

The body wall is thin, firm, and translucent. Body musculature consists of a rather irregular mesh of spaced longitudinal and circular fibers that are long and fine, but rather resistant. The branchial siphon opens approximately on the top of the zooid and the atrial siphon is displaced slightly downward along the dorsal side. Simple oral tentacles are rather long and robust; in two zooids about 10 larger tentacles were observed alternating with an equal number of smaller ones. The prepharyngeal band runs as a circular line without dorsal indentation around minute dorsal tubercle. The dorsal lamina is high and has a smooth margin. A flat branchial sac has only three internal longitudinal vessels on each side. Stigmata are in 12 transverse rows with 30–35 stigmata per row. Most stigmata are crossed by a rather thick parastigmatic vessel. As is common in many species of ascidians, the space between the endostyle and the most ventral longitudinal vessel is about two times wider than the space between adjacent longitudinal vessels. All stigmata are longitudinal (transverse protostigmata are not present).

The gonads are firmly attached to the body wall but not embedded into it. They are arranged in a single series along each side of the ventral mid-line. Gonads on the right side are more numerous, up to eight, and are more or less equally spaced along the whole length of the endostyle. Those on the left side are not as numerous, four to six, and are positioned along the endostyle above the pole of the gut loop. Most gonads on each side of the body are hermaphrodite, consisting of a single large non-lobed testis and one or two ova of different sizes on its mesial surface. Sometimes the ovary is not developed and the gonad consists of only one male follicle. Sperm ducts are short, not attached to the body wall, and directed dorsally. The short oviducts are not always visible, but when observed have large openings and are directed dorsally.

In less contracted zooids the gut forms a slightly curved loop across the posterior end of the body and the rectum extends forward to the atrial aperture (Figure 3B). The stomach is rather short and expanded distally. It has 10 wide,

straight, well defined folds. Except for the shorter folds occurring on each side of the typhlosolis, most of these folds extend the full length of the stomach. The stomach folds have no swellings at their cardiac end. A strong gastro-intestinal connective extends from the stomach wall at the posterior end of the typhlosolis. Straight gastric caecum is embedded into the gastro-intestinal connective.

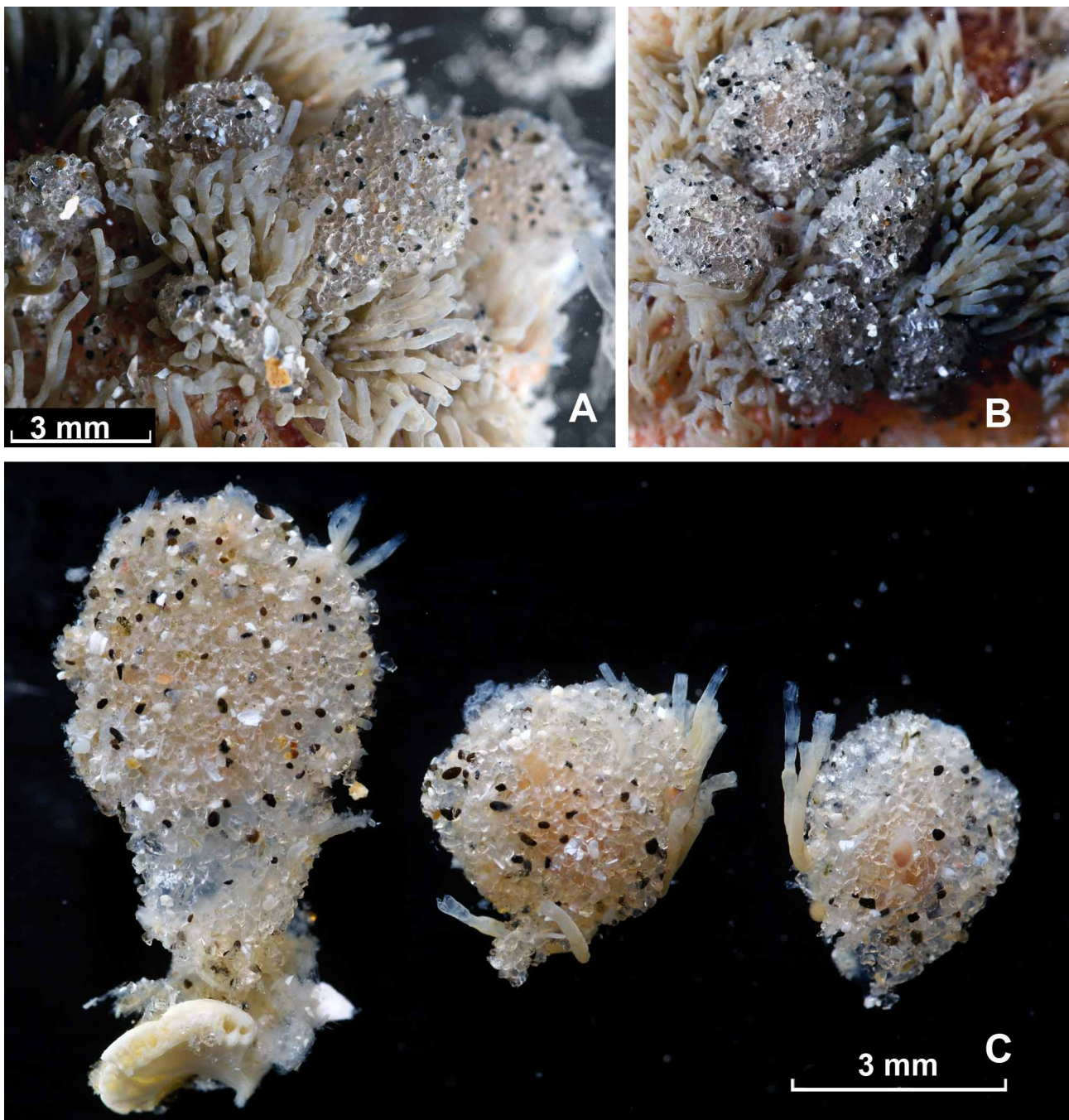


FIGURE 1. *Polyzoa atlantica* n.sp. A and B—a colony consisting of several zoids attached to the test of the solitary ascidian *Molgula occidentalis*. C— zoids separated from the substrate.

An elongated or oval, often rather large endocarp is present in the middle of each side of the body. On the left side this endocarp is above the gut loop.

Five tailed larvae were found on the right side in the atrial cavity of one zoid. The trunk is 0.6mm long and the whole larva, including the fin, is 1.5mm long. As is typical for this family the larva has unstalked triradially arranged adhesive organs and a single sense organ. Eight ectodermal finger shaped ampullae are positioned around the anterior end of the trunk.

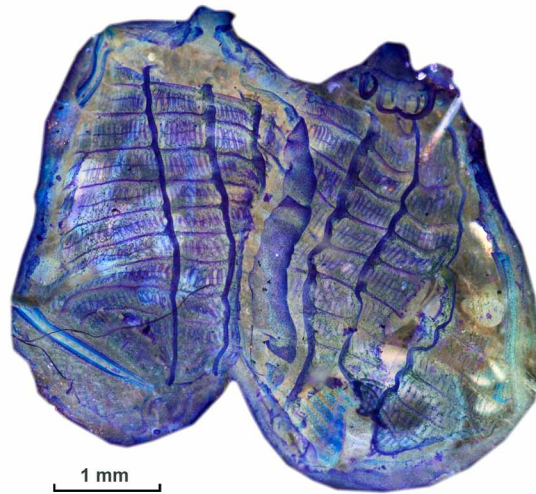


FIGURE 2. *Polyzoa atlantica* n.sp. Zooid opened ventrally and stained with methylene blue to show the structure of the branchial sac. Note the presence of only three internal longitudinal vessels on each side of the branchial sac.

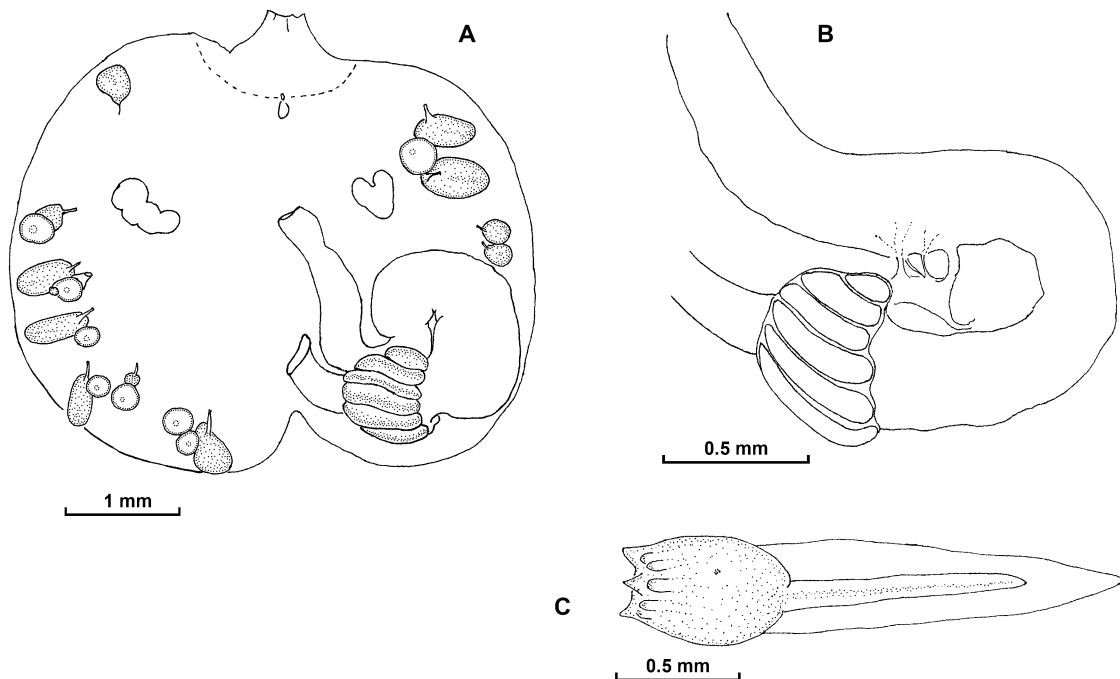


FIGURE 3. *Polyzoa atlantica* n.sp. A—zooid opened ventrally; branchial sac removed to show gonads, endocarps, and gut loop. B— Gut loop of another zooid. C —Tailed larva.

Remarks. The genus *Polyzoa* is characterized by small, usually separate, but sometimes coalescent zooids with a flat branchial sac and hermaphrodite gonads on each side of the body. Typically each gonad has one, and occasionally two, undivided male follicles.

The main distinguishing characters of the present species are upright or globular sand encrusted zooids and only three internal longitudinal vessels on each side of the branchial sac. Among nine or ten species currently assigned to this genus, the following have three branchial vessels: *P. translucida* Ritter, Forsyth, 1917 described from southern California, *P. pacifica* Tokioka, 1951 and *P. vesiculiphora* Tokioka, 1951 from Japan, and *P. exigua* Kott, 1990 from Australia. Colonies of both Japanese species differ from the present species externally, their zooids have stomach with conspicuous caecum and it is hard to believe that the Japanese species are conspecific to the present material. The present

species more closely resembles *P. translucida* from California, known so far only from the original description. According to Ritter and Forsyth (1917), this species has semitransparent, colourless zooids that are not covered by sand. Although the presence of embedded or attached sand can be a character with high variability, the nature of the sand coating in the present species suggests it is a reliable species specific feature that distinguishes it from the geographically distant *P. translucida*. The Australian *P. exigua* has low, dome shaped zooids (no more than 2 mm high) that are covered by sand and, according to the original description (Kott, 1900), are attached by the entire ventral side. It has eight rows of stigmata and a straight gastric caecum. We agree with Kott (1990) who suggested that the close resemblance between *P. exigua* and *P. translucida* is due to convergence rather than a direct phylogenetic relationship. The same is apparently true for other *Polyzoa* species having three longitudinal branchial vessels.

The only other species of *Polyzoa* recorded from the central or northern Atlantic is *P. insularis* Millar, 1967. This species is known only from the original description based on several colonies from Tristan da Cunha and differs markedly from *P. atlantica* n.sp. in a number of features, including having significantly greater numbers of internal longitudinal vessels in the branchial sac (seven or eight on each side).

References

- Ritter, W.E. & Forsyth, R.A. (1917) Ascidians of the littoral zone of southern California. *University of California Publications in Zoology*, 16, 439–512.
- Kott, P. (1990) The Australian Ascidiacea, Phlebobranchia and Stolidobranchia, Supplement. *Memoirs of the Queensland Museum*, 29(1), 267–298.