

5

Entoprocta

Alan L. Shanks

The entoprocts are a small phylum with only around 120 species worldwide. They are tiny animals, most only a few millimeters in length. Adults form colonies of polyps or zooids, each composed of a bowl-shaped calyx mounted on a stalk. The rim of the bowl has ciliated tentacles that produce a feeding current. The mouth and anus are connected by a U-shaped gut and both open within the calyx. The largest grouping in the phylum is the family Loxosomatidae. Most of the species in this family are symbionts on other invertebrates; nearly half of them reside on polychaete worm tubes (Mariscal, 1975; Brusca and Brusca, 1990). Eleven species are found locally (Table 1).

Asexual reproduction is common and in some species may be the most important means of reproduction. In addition, a curious form of precocious asexual budding has been described in the larvae (sexually produced) of several loxosomatids. In these species, free-swimming larvae are produced. These larvae, while pelagic, asexually produce adult buds. The miniature adults are held within pockets in the larvae. Prior to settlement of the larvae, the miniature adults are released through a rupture of the larval body wall. After release, the pelagic larvae die. In one species from Florida, half of the miniature adults produced by the larvae were reproductively mature males. In another species (*Loxosomella vivipara*), the adult buds were forming in the larvae while the larvae were still developing in the ovary of the parent. The larvae are released and swim for one to three days before the buds are released through the ruptured larval body wall (Mariscal, 1975).

Fertilization is internal and the zygotes are brooded within the atrium of the parent. Brooding continues until a relatively large free-swimming larva is released. Nutrition is provided by yolky eggs or direct nutrient transfer from the parent. In the later case, small eggs (10 μm diam.) grow into relatively large larvae (200 μm diam.) during development in the atrium. Fully developed larvae have been observed "stealing" food from the parental food groove prior to their release into the plankton. In some species, large nutrient-rich cells are released into the atrium by the parent and fed upon by the brooded larvae (Mariscal, 1975; Nielsen, 1990).

Table 1. Species in the phylum Entoprocta from the Pacific Northwest (from Kozloff, 1996)

Order Solitaria
Family
Loxosomatidae
<i>Loxosoma davenporti</i>
<i>Loxosomella nordgaardi</i>
<i>Loxosomella</i> spp.
Order Coloniales
Family
Loxokalypodidae
<i>Loxokalypus socialis</i>
Family Pedicellinidae
<i>Myosoma spinosa</i>
<i>Pedicellina cernua</i>
Family Barentsiidae
<i>Barentsia benedeni</i>
<i>Barentsia gracilis</i>
<i>Barentsia misakiensis</i>
<i>Barentsia ramosa</i>
<i>Barentsia robust</i>

Fig. 1. Entoproct larvae.

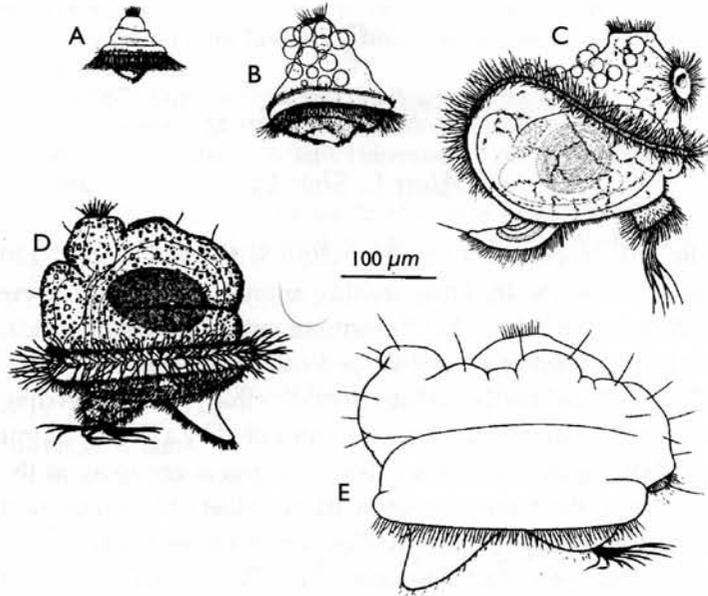
(A) *Loxosomella elegans*. (B) *Loxosoma pectinaricola*.

(C) *Loxosoma jaegersteni*. (D)

Barentsia gracilis. (E)

Pedicellina nutans.

Highlighted species and genera are represented locally. In B and C, the numerous circles on the larvae are stalked vesicles. (From Nielsen 1990, Figs. 3 and 5)



Some loxosomatid species produce feeding larvae that can have long residence times in the plankton (up to 7 months, Nielsen, 1990). Early stages in these feeding forms appear to be typical trochophores (Fig. 1A); they would be difficult to distinguish from the trochophores of polychaetes. Most species produce non-feeding larvae. Many of the loxosomatid larvae have numerous, conspicuous stalked vesicles (Fig. 1B, C). Larva in the families Pedicellinidae and Barentsiidae are much like miniature swimming adult calyxes (Fig. 1D, E). All that is needed to turn these larvae into adults is an outgrowth of a stalk and tentacles. The pelagic phase in the non-feeding larvae is short (a few days). Some larval types (e.g., *Pedicellina nutans*, Fig. 1E) are such poor swimmers that there is no pelagic phase; they settle immediately and begin exploring the bottom.

References

- Brusca, R. C. and G. J. Brusca (1990). Invertebrates. Sinauer Associates, Inc., Sunderland.
- Kozloff, E. N. (1996). Marine Invertebrates of the Pacific Northwest. University of Washington Press, Seattle.
- Mariscal, R. H. (1975). Entoprocta. In: Reproduction of Marine Invertebrates Vol. II, A. C. Giese and J. S. Pearse (eds.), pp. 1-42. Academic Press, New York.
- Nielsen, C. (1990). Bryozoa Entoprocta. In: Reproductive Biology of Invertebrates. Vol. IV, Part B. Fertilization, Development, and Parental Care, K. G. Adiyodi and R. G. Adiyodi (eds.), pp. 201-10. John Wiley & Sons, New York.