

A myzostomid endoparasitic in black corals

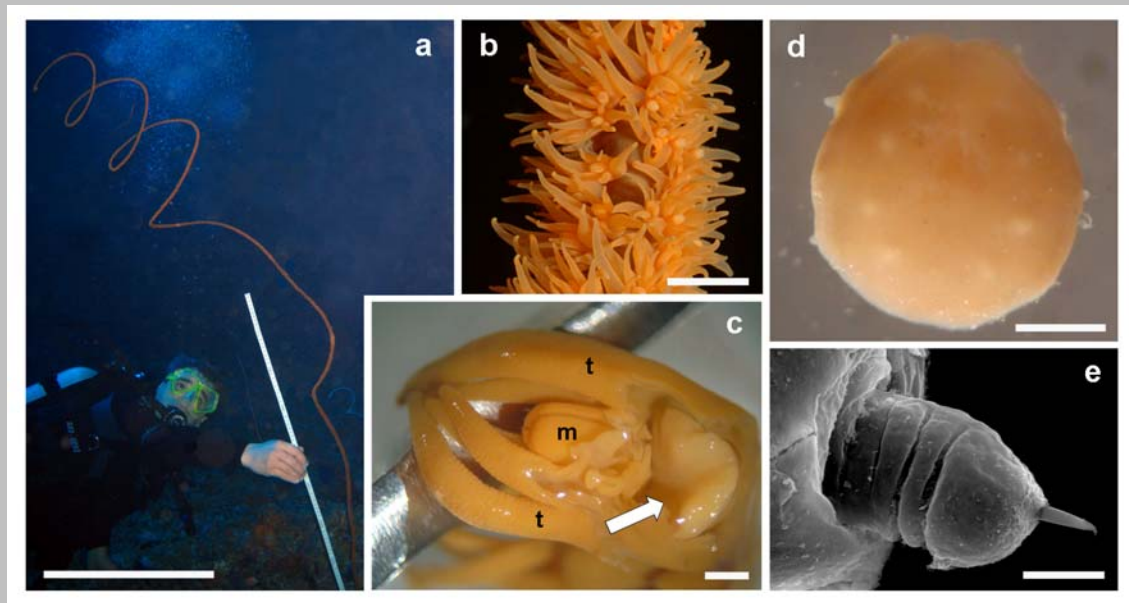


Fig. 1 **a** The whip black coral *Cirrhipathes* cf. *rumphii* from the Bunaken coral reef (Indonesia, Celebes Sea); **b** close-up of the large polyps arranged all around the stem; **c** longitudinal section of a polyp showing a myzostomid (white arrow) completely occupying the gastric cavity (m, polyp mouth; t, polyp tentacle); **d** an isolated specimen showing the small parapodia and the dorsal sense organs; **e** SEM image of a parapodium showing the acicular chaetae extruding from the distal extremity. Scale bars: a, 50 cm; b, 5 mm; c-d, 0.5 mm; e, 25 μ m.

Myzostomids are a group of animals whose phylogenetic relationships are still contentious, though an annelid affinity is increasingly favoured (Rouse and Pleijel 2007, Bleidorn et al. 2009). All are all ecto- or endosymbionts (either commensals or parasites) and the majority of the species lives in association with echinoderms, mainly crinoids (Lanterbecq et al. 2006). Although an endosymbiosis with a Caribbean black coral (Hexacorallia, Anthozoa, Antipatharia) was previously reported (Goenaga 1977), no direct evidence of such association was ever provided.

Morphological and histological analysis of the polyps of the Indonesian black coral *Cirrhipathes* cf. *rumphii* (Fig. 1a) revealed the occurrence of a myzostomid in about 30% of the coral colonies that were sampled. The specimens (usually one worm per polyp when present) were found only in the distal, large zooids (2-3 mm in diameter) of the colonies (Fig. 1b, c). The worms had rounded, flattened body (1.0-1.8 mm in diameter) (Fig. 1d) and a cylindrical extensible pharynx, similar to ectosymbiotic *Myzostoma* (Lanterbecq et al. 2006). Typical of myzostomids there were five pairs of parapodia with protruding chaetae (Fig. 1e) and a densely ciliated ventral surface. Histology showed the larger myzostomids were sexually mature females. The myzostomids occupied the entire basal portion of the gastric cavity (Fig. 1c), and no traces of digestion by the host were seen, indicating a true endobiotic lifestyle. The myzostomids were found all year round in female and male *Cirrhipathes* cf. *rumphii*, though the analyzed parasitized polyps were never fertile, even when the neighboring zooids contained mature gametes suggesting parasitic castration.

Histological observations on another 15 Indonesian black coral species suggest that this myzostomid lives exclusively in *Cirrhipathes* cf. *rumphii*. However, the occurrence of a myzostomid in the Caribbean *Stichopathes* sp. suggests that these endosymbioses may be more widespread, especially in species with large-sized polyps, like those of unbranched genera such as *Cirrhipathes*, *Stichopathes* and *Pseudocirrhipathes*.

References

- Bleidorn C, Podsiadlowski L, Zhong M, Eeckhaut I, Hartmann S, Halanych KM, Tiedemann R (2009) On the phylogenetic position of Myzostomida: Can 77 genes get it wrong? *BMC Evol Biol* 9: 150
- Goenaga C (1977) Two new species of *Stichopathes* (Zoantharia; Antipatharia) with observations on aspects of their biology. M.S. thesis. University of Puerto Rico, Mayaguez, Puerto Rico
- Lanterbecq D, Rouse GW, Milinkovitch MC, Eeckhaut I (2006) Molecular Phylogenetic Analyses Indicate Multiple Independent Emergences of Parasitism in Myzostomida (Protostomia). *Syst Biol* 55: 208-227
- Rouse GW, Pleijel F (2007) Annelida. In: Zhang ZQ, Shear WA (eds) *Linnaeus Tercentenary: Progress in Invertebrate Taxonomy*. Zootaxa, Magnolia Press, pp 245-264

M. Bo (✉) · G. Bavestrello

Dipartimento di Scienze della Terra, dell'Ambiente e della Vita, UNIGE, Corso Europa 26, 16132 Genova, Italy

e-mail: marzia.bo@unige.it

G.W. Rouse

Scipps Institution of Oceanography, UCSD, 9500 Gilman Drive, La Jolla CA, 92093-0202, USA

D. Martin

Centre d'Estudis Avançats de Blanes, CSIC, Carrer d'accés a la Cala Sant Francesc 14, 17300 Blanes (Girona), Catalunya (Spain)