Zoological Studies

Pumping Water or Producing Larvae? Oscula Occlusion during the Reproductive Period of the Sponge *Svenzea zeai*

Susanna López-Legentil[1,*] and Xavier Turon[2]

[1]*Department of Animal Biology (Invertebrates), Univ. of Barcelona, 645 Diagonal Ave., Barcelona 08028, Spain*
[2]*Centre d'Estudis Avançats de Blanes-CSIC, 14 Accés cala St Francesc, Blanes-Girona 17300, Spain*

(Accepted April 13, 2010)

The sponge *Svenzea zeai* (Demospongiae: Halichondrida), a common inhabitant of the Caribbean Sea, is known to brood the largest larvae recorded in sponges all year round (Rützler et al. 2003). In June 2008, we observed several specimens of *S. zeai* in the Bahamian islands of Little San Salvador (~10% of observed colonies) and Plana Cay (~80%) with some or all oscula partially or totally occluded by a thin veil (Fig. 1A). All sponges that exhibited closed oscula were brooding embryos (Fig. 1B), but not all brooding sponges had occluded oscula. The development of the veil appeared to interfere with water flow through the osculum, suggesting a reduction in water circulation throughout the sponge. We subsequently analyzed the oscular rims using transmission electron microscopy (TEM) and observed that the sponge mesohyl in the rim of the veil was occupied by a cell type (~30% of the section surface) filled with inclusions that had a granular content. Our observations suggest that the contents of these vesicles were continuously being released and were forming the mucus material of the veil (Fig. 1C).

Disruption of the aquiferous system in sponges is uncommon and is generally associated with pollution and disease (Olesen and Weeks 1994), or resting stages (Turon et al. 1999). The benthic communities present at Little San Salvador and Plana Cay appeared healthy, and no diseased sponges were observed. We postulated that the sponge aquiferous system may become partially disorganized during reproductive activities, temporarily decreasing the water flow through the sponge and allowing the accumulation of mucus in the oscula. A disorganization of the aquiferous system may also disrupt filter-feeding, respiration, and waste-removal activities. http://zoolstud.sinica.edu.tw/Journals/50.3/395.pdf

Acknowledgments: We thank J. Pawlik for inviting us aboard the *R/V Seward Johnson*, and P. Erwin for his comments on this note. Research was funded by the Spanish Government project CTM2010-17755.

REFERENCES

Olesen TME, JM Weeks. 1994. Accumulation of Cd by the marine sponge *Halichondria panicea* Pallas: effects upon filtration rate and its relevance for biomonitoring. Bull. Environ. Contam. Toxicol. **52:** 722-728.

Rützler K, RWM van Soest, B Alvarez. 2003. *Svenzea zeai*, a Caribbean reef sponge with a giant larva, and *Scopalina ruetzleri*: a comparative fine-structural approach to classification (Demospongiae, Halichondrida, Dictyonellidae). Invertebr. Biol. **122:** 203-222.

Turon X, MJ Uriz, P Willenz. 1999. Cuticular linings and remodelisation processes in *Crambe crambe* (Demospongiae, Poecilosclerida). Mem. Queensl. Mus. **44:** 617-625.

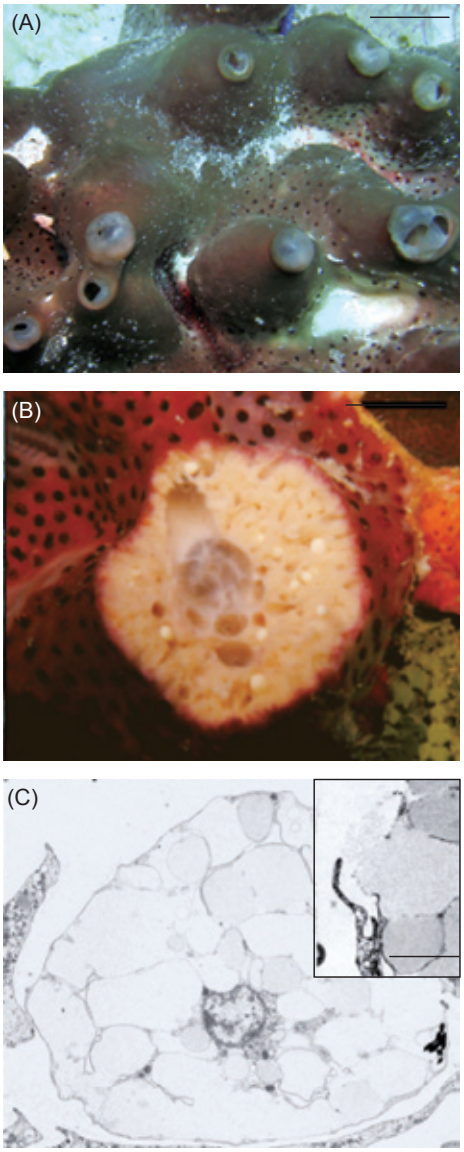

Fig. 1. (A) The sponge *Svenzea zeai* with closed and open oscula (scale bar = 6 cm); (B) brooding larvae in sponge tissue beneath a closed osculum (scale bar = 2 cm); (C) TEM image of spherulous cells in the rim of a closed osculum. Inset shows the release of granular material into the mesohyl (scale bars = 5 μm).

*To whom correspondence and reprint requests should be addressed. E-mail:slopez@ub.edu