

Eupolymnia nebulosa (Montagu, 1818) revisited: An homage to Michel Bhaud

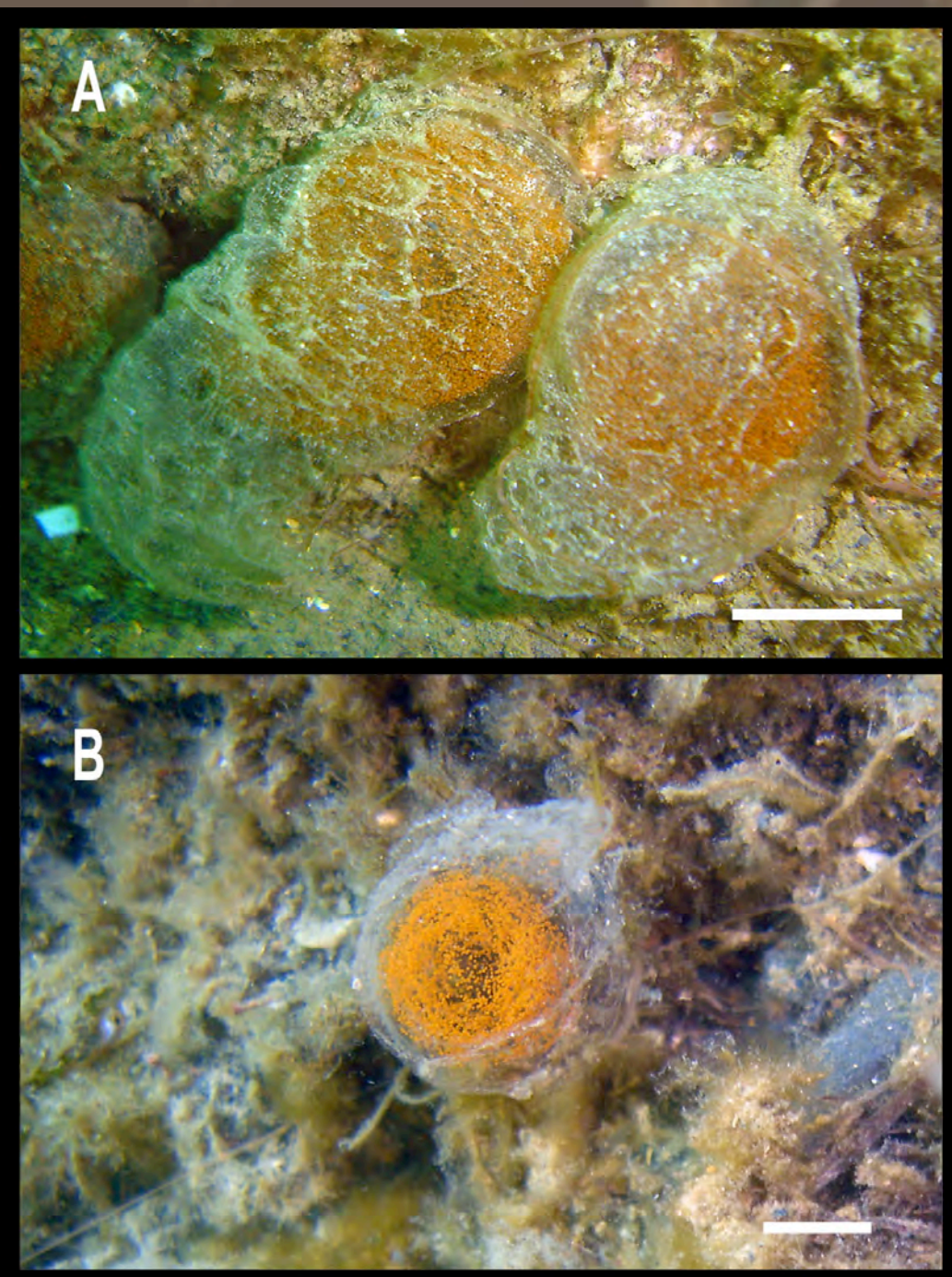
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Eupolymnia nebulosa (Montagu, 1818) is a sedentary, tubicolous polychaete, inhabiting shallow waters with mixed soft and hard bottoms. It has a wide geographical distribution, which includes the Atlanto-Mediterranean Europe coasts and has been reported as having different life cycles (i.e. free-spawning and egg-brooding) in different locations (Atlantic and Mediterranean, respectively). No morphological or genetic inter-specific differences have been demonstrated between them since the first attempt by Guy Lenaers and Michel Bhaud based on French English Channel and Gulf of Lions populations.

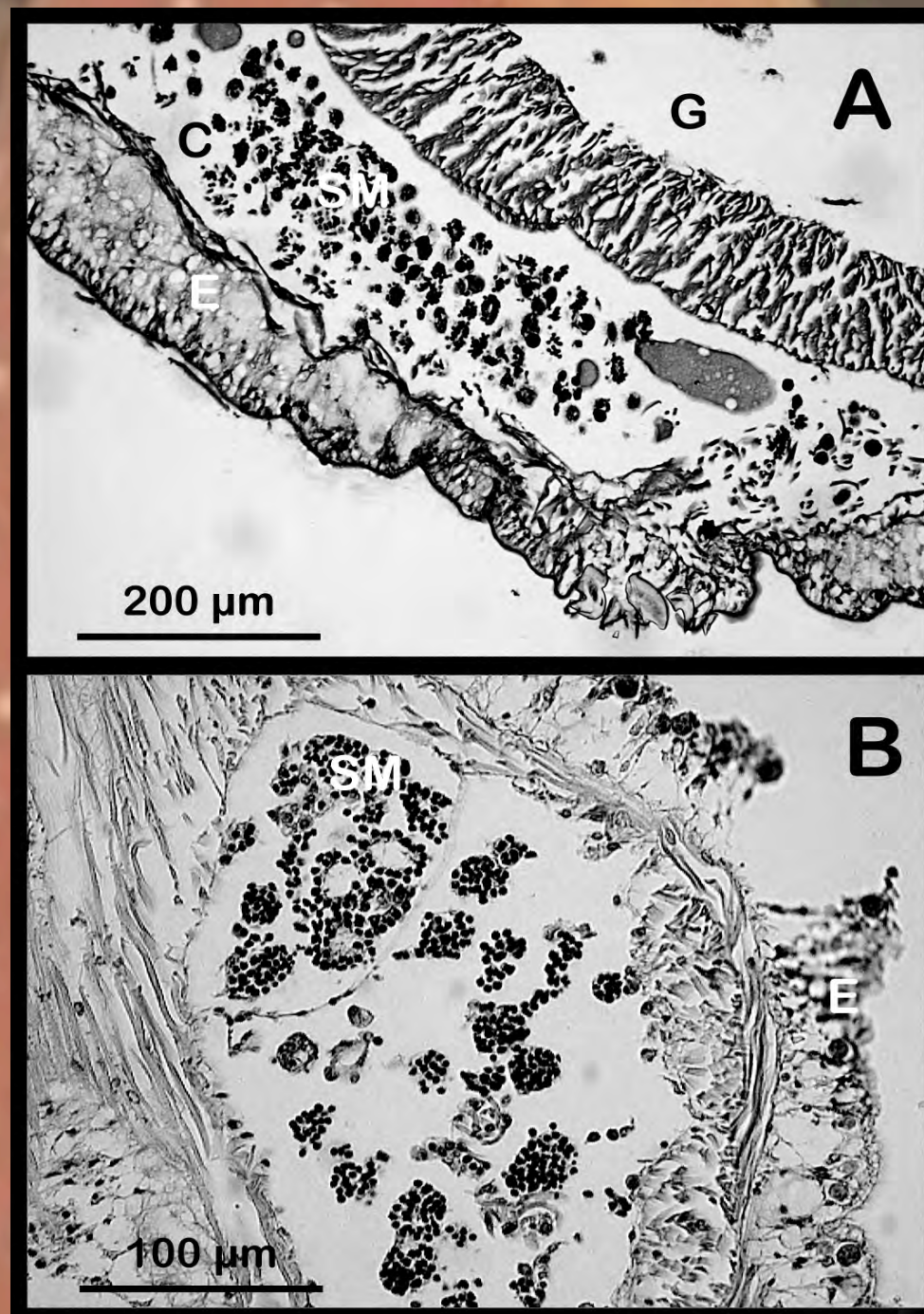
The objectives of this study are: (1) to check the postulated restriction of egg brooding in the Mediterranean and (2) to assess the possible existence of cryptic species using molecular markers, based on several Mediterranean and Atlantic populations from France, Spain, Portugal, Great Britain, and Norway.

Egg-masses



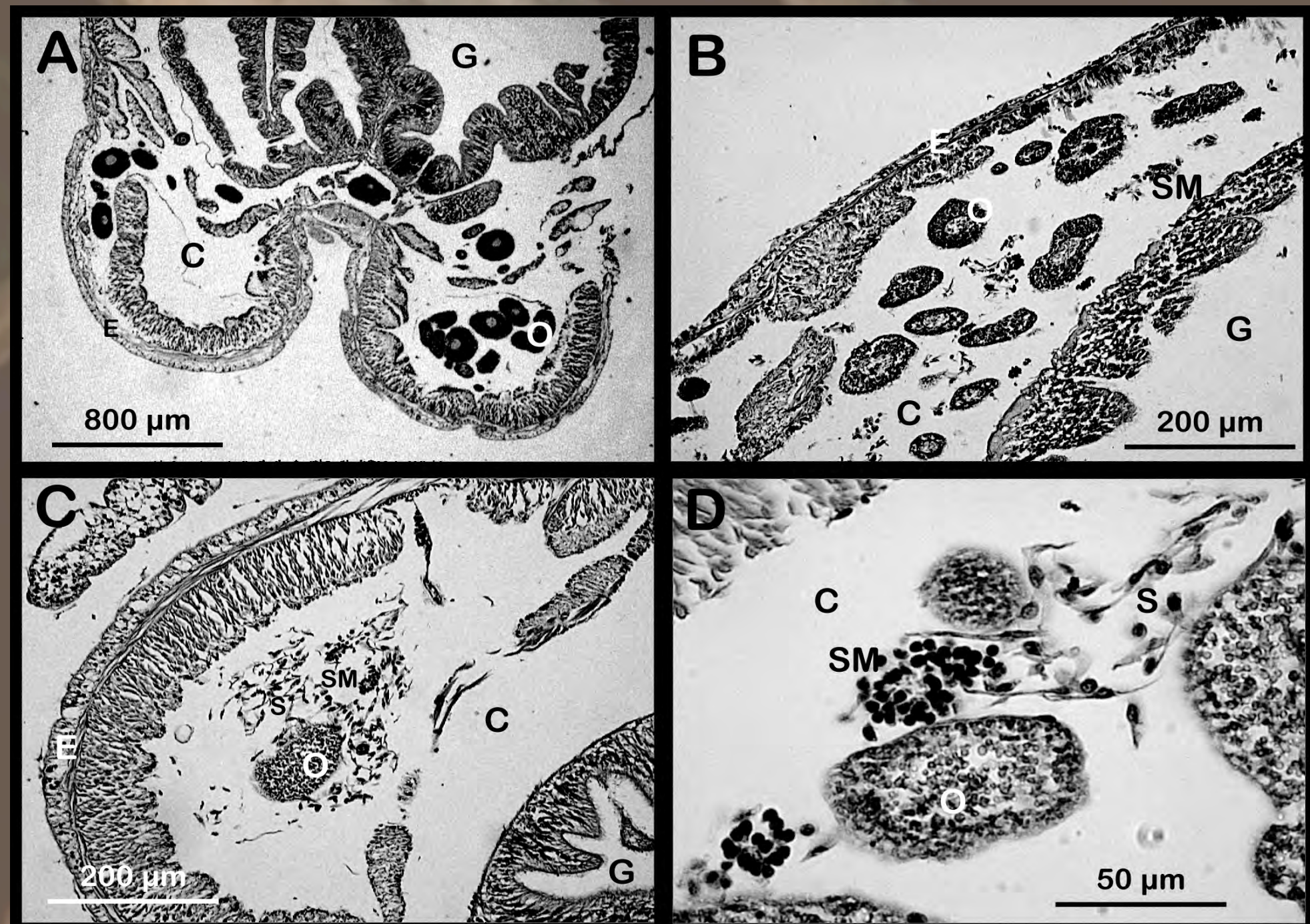
Egg-masses photographed “in situ” in Berlengas (Portugal). Scale bars are: 2 cm (A); 1.5 cm (B)

Male

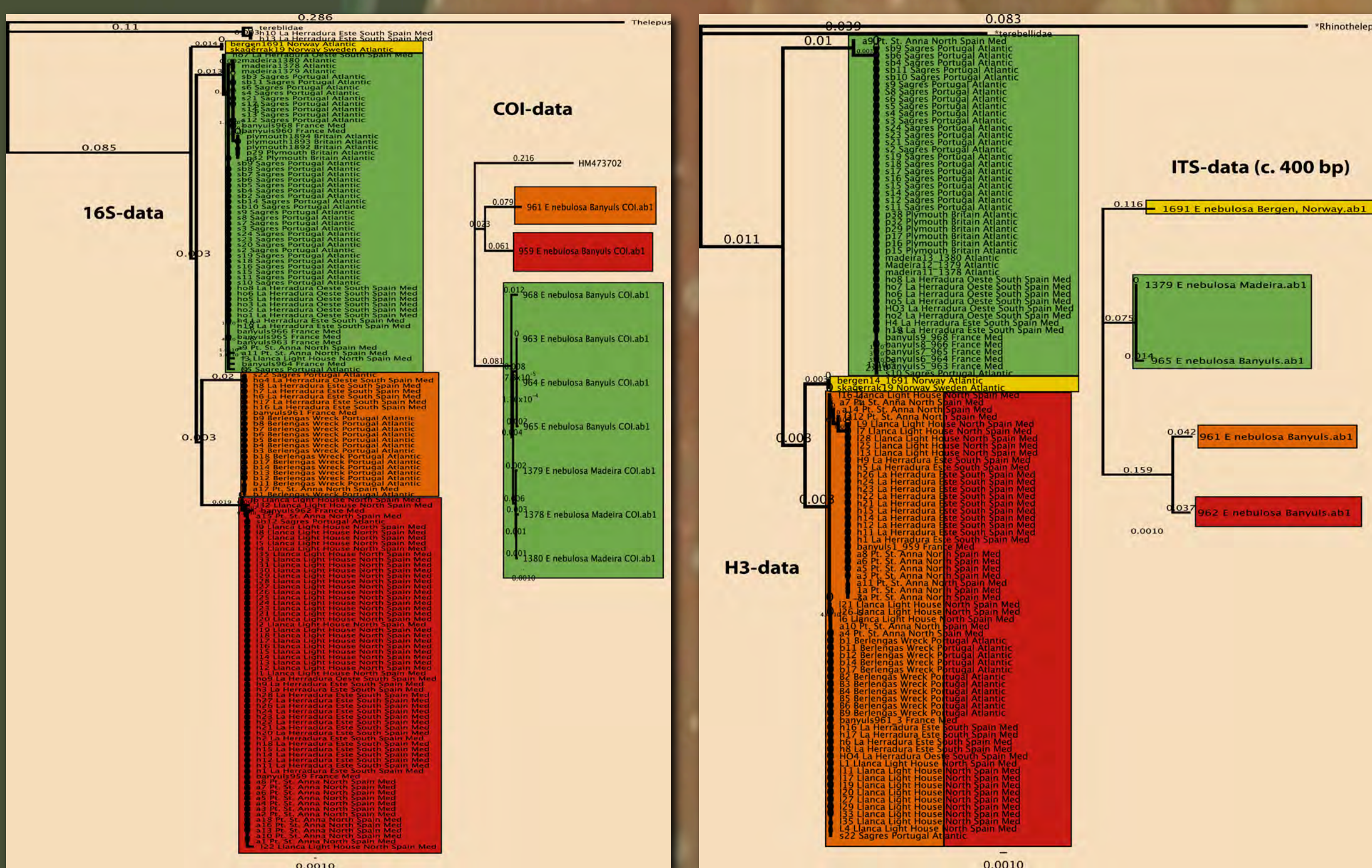


Histological sections of *Eupolymnia nebulosa* females under light microscopy. MALE. A. Pre-spawning. B. Post-spawning. FEMALE. A. Intra-coelomic oocytes of different sizes. B-D. Examples of intra-coelomic sperm morulae among oocytes. C: coelom; E: epithelium; G: gut; SM: sperm morulae.

Female

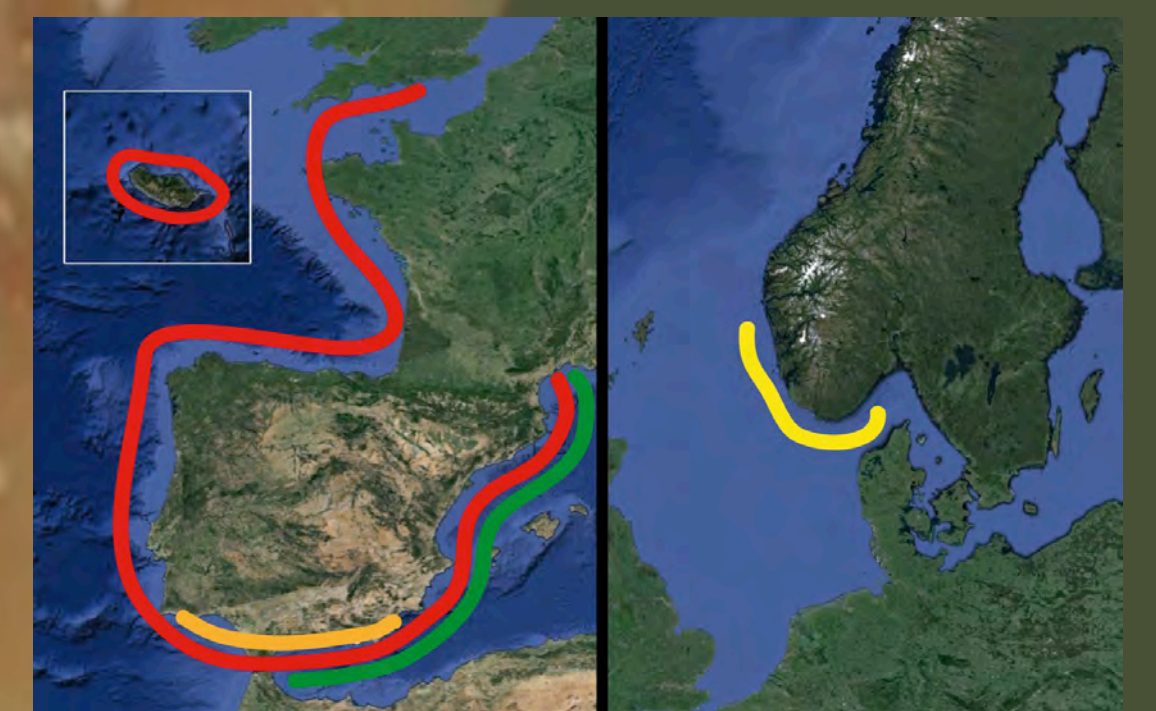


Molecular analyses



The analyses, based on sequence variations of mitochondrial (16S rDNA, COI) and nuclear (histone H3, ITS region) genes, were consistent in showing four lineages, which could be considered as cryptic species:

- Mediterranean exclusive
- SW Iberian Peninsula
- Atlanto-Mediterranean
- Scandinavian



Eupolymnia nebulosa appears to be a cryptic species-complex, with highest diversity in the Mediterranean (where three lineages exist sympatric): one restricted to the Mediterranean and two spread into the Atlantic (one in the SW Spanish and Portuguese coasts and another reaching the British Isles and Madeira). Then, there is a shift to another lineage in Scandinavian waters, clearly separated and allopatric to the other three.

The molecular results are consistent with the fact that egg-brooding is not restricted to the Mediterranean. Additionally, we provide the first first evidences supporting the possible existence of internal fertilisation among Terebellidae.