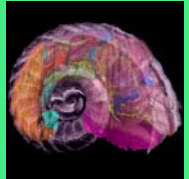


The Microanatomy of *Bathyxiphylophila excelsa* Marshall, 1988, and *Ventsia tricarinata* Warén & Bouchet, 1993, two Skeneimorph Vetigastropods from Pacific Deep Sea Habitats



Introduction

The family Skeneidae (Vetigastropoda, Trochoidea/Turboidea?) is currently regarded as a polyphyletic lumping pot for small (max. 3 mm), rhipidoglossate gastropods ("skeneimorphs") showing signs of internal fertilisation. Recent methodological progress including serial semithin sectioning combined with computer-aided 3D-reconstruction enables the detailed anatomical investigation of such small, helicoid gastropods. Here we describe the microanatomy of *Bathyxiphylophila excelsa* Marshall, 1988, and *Ventsia tricarinata* Warén & Bouchet, 1993.

Materials & Methods

Serial semithin sections were made through the softpart of adult animals. Digital images of each mechanical slice were recorded on a light microscope and imported into the 3D-rendering software Amira™, where the reconstructions were made. *Bathyxiphylophila excelsa* is a small (max. 1.5 mm), inhabitant from sunken wood (800 m depth) near Chatham Rise, New Zealand, and *Ventsia tricarinata* Warén & Bouchet, 1993, a hot-vent inhabitant (max. 2.5 mm) from the Lau Basin, Fiji (1800 m depth). Both species lost the last curls of the soft part by embedding.

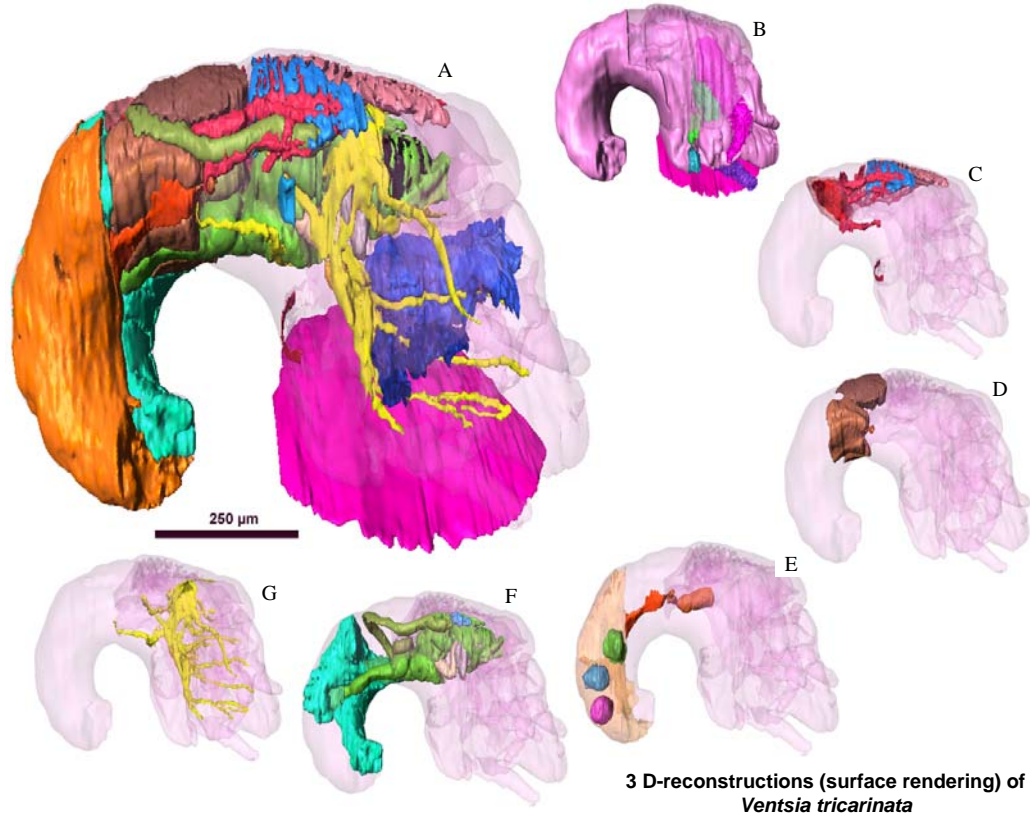
Results

Ventsia tricarinata has papillate cephalic and epipodial tentacles, a single left monopectinate tentidium with skeletal rods and bursicles, a monotocard heart penetrated by the rectum, a left papillate and a right excretory organ, a rhipidoglossate radula with one pair of radula cartilages, two intestinal loops, a papillate oesophagus, a hypoathroid nervous system, two statocysts with several statoconia, a single left osphradium, a subradular organ and one pair of ESO-tentacles. The sexes are separated, the female genital systems consists of an ovary with big yolky eggs covered by a vitellin layer, a simple urinogenital duct, and a separated receptaculum seminis.

Bathyxiphylophila excelsa differs as follows: The heart does not encircle the rectum, the oesophagus lacks papillae. Due to insufficient fixation, many histological details could not be cleared up.

Discussion

All anatomical data strongly suggest a position of both species within the Vetigastropoda. However, the combination of characters exclude both species from all currently defined subclades of the Vetigastropoda. Until more data on possibly related forms are collected they remain as "*incertae sedis*".



A: Soft body (transparent) with all organs and operculum (magenta) (lateral right view)

B: Surface of soft body with tentacles, mantle roof transparent, cephalic tentacles (light magenta), epipodial tentacles (lavender), ESO (turquoise), operculum (magenta) (*V. tricarinata*: right neck-lobes, green; *B. excelsa*: suboptic tentacles, dark red)

C: Vascular & respiratory system: auricle (dark red), pericard (transparent (light) red), ventricle & blood vessel (red), gill (pink), hypobranchial gland (blue)

D: Excretory system: left kidney (dark brown), right kidney (brown), urogenital duct: (light brown)

E: Genital system: ovary (light orange), oviduct (orange), urogenital duct (light brown) (*V. tricarinata*: ovary, transparent orange with three eggs, green, blue, purple)

F: Digestive system: oesophagus (green), stomach (olive), intestine (dark green) digestive gland (turquoise), salivary gland (blue), radula (pink), radula cartilage (silver)

G: Nervous system: nerves (yellow), statocysts (orange)

3 D-reconstructions (surface rendering) of *Bathyxiphylophila excelsa*

