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***Antonbruunia sociabilis* sp. nov. (Annelida: Antonbruunidae) associated with the chemosynthetic deep-sea bivalve *Thyasira scotiae* Oliver & Drewery, 2014, and a re-examination of the systematic affinities of Antonbruunidae**

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Abstract

Antonbruunia sociabilis sp. nov., an abundant endosymbiont of *Thyasira scotiae* from a putative sulphidic ‘seep’ in the Hatton-Rockall Basin (1187–1200 m), North-East Atlantic Ocean, is described. The new species is compared with *A. viridis* and *A. gerdesi* from the West Indian Ocean and South-East Pacific Ocean respectively. The three species can be distinguished using a suite of morphological characters, and are associated with geographically separated chemosynthetic bivalve molluscs from different families (Thyasiridae, Lucinidae, Vesicomidae) living in sediments at different depths. New morphological features are recognized for *Antonbruunia* and a re-assessment of its systematic affinities indicates a close relationship with the Pilargidae. Previous suggestions of an affiliation with the Nautiliniellidae, recently incorporated into the Calamyzinae (Chrysopetalidae), were not supported. The apparent morphological similarities between the two groups are indicative of convergence related to their shared relationships with chemosynthetic bivalves. The first molecular analyses of *Antonbruunia* (16S and 18S rDNA) clearly indicate that a close relationship to Pilargidae (represented by *Ancistrosyllis* sp. and *Sigambra* sp.) is more likely than an affinity to Calamyzinae (represented by *Calamyzas amphitencicola*, *Natushima* sp., and *Vigtorniella* sp.).

Key words: Polychaete, mollusc, symbiosis, NE Atlantic, morphology, molecular analyses, relationships

Introduction

Antonbruunidae Fauchald, 1977, comprises a single genus *Antonbruunia* Hartman & Boss, 1965 and two species: *A. viridis* Hartman & Boss, 1965 and *A. gerdesi* Quiroga & Sellanes, 2009. Both species are associated with chemosynthetic bivalve molluscs, living freely within the mantle cavities of *Lucina fosteri* Hartman & Boss, 1965 (Lucinidae J. Fleming) and *Calyptogena gallardoi* Sellanes & Krylova, 2005 (Vesicomidae Dall & Simpson), respectively. *Antonbruunia viridis* and its host bivalve are only known from shallow water (68–82 m) sediments “of black-brown oozy mud and detritus” off southwest Madagascar, Western Indian Ocean, while *A. gerdesi* and its host occur in the “sticky dark grey sediments smelling of sulphide at a deeper water (795–846 m) cold seep location off central Chile, South-East Pacific Ocean.

In June 2012, two unusual bivalves were collected from 1187–1200 m in the Hatton-Rockall Basin (North-East Atlantic Ocean), 500 km west of the Isle of Harris, Outer Hebrides, Scotland. These new species were described as *Isorropodon mackayi* Oliver & Drewery, 2014 and *Thyasira scotiae* Oliver & Drewery, 2014 and, from their chemosymbiotic nature, it was deduced that they inhabited sulphidic sediments associated with an active cold seep. The latter species, on dissection, frequently had numerous individuals of a new species of *Antonbruunia* within. The species is described herein and its morphology compared with *A. viridis* and *A. gerdesi*.

The systematic affinities of *Antonbruunia* have always been unclear. Hartman & Boss (1965) considered it to have some similarities with the Pilargidae de Saint-Joseph, but possessing modifications for a commensal existence. Salazar-Vallejo (1986) re-assessed the characteristics of the genus and regarded the establishment of