

Three new species of bacterivorous Chrysopetalidae and Microphthalmidae (Annelida) inhabiting a whale fall off eastern Australia

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ABSTRACT. A natural whale fall was opportunistically trawled at ~1000 m depth during the 2017 research vessel ‘Investigator’ voyage whilst sampling bathyal and abyssal communities along the eastern Australian margin. Colonising the whale bones were a diverse assemblage of annelids including three new species of free-living Phyllodocida (*Boudemos paulinae* sp. nov., *Pleijelius keni* sp. nov. and *Microphthalmus hvalr* sp. nov.). *Boudemos paulinae* sp. nov. (Chrysopetalidae, Calamyzinae) is a smaller sized species (< 2 mm) compared to its congeners (35–40 mm) and exhibits stylet jaw and notochaetal morphology observed in juveniles of the sister species *Boudemos flokati* (Dahlgren, Glover, Baco & Smith, 2004) from whale falls in the NE Pacific. Notochaetal serration patterns distinguish *Pleijelius keni* sp. nov. from its only congener *P. longae* Salazar-Vallejo & Orensanz, 2006 described in the family Hesionidae from wood falls in NW Atlantic. DNA sequence analysis using the COI, 16S and 18S gene fragments revealed that *Pleijelius keni* sp. nov. fell within the Microphthalmidae clade, this relationship was also supported by morphological observations. These results necessitated a formal transfer of the genus *Pleijelius* to the family Microphthalmidae. *Microphthalmus hvalr* sp. nov. is the first *Microphthalmus* species described from bathyal depths and is distinguished from its numerous congeners inhabiting shallow-water interstitial sediments by the absence of notochaetae.

Introduction

When whales die and sink, their carcasses (whale falls) provide a food source for a wide variety of organisms. Decomposition of a whale carcass passes through a series of successional stages of deep-sea communities. These stages are roughly subdivided into the mobile scavenger stage, comprised of mostly fish and crustaceans, the enrichment-

opportunistic stage, comprised of mostly polychaetes and crustaceans, and the sulfophilic stage, dominated by microbial mats (Smith & Baco, 2003).

Annelids frequently comprise the most abundant and diverse component of whale-fall communities (Dahlgren *et al.*, 2004; Fujiwara *et al.*, 2007; Smith *et al.*, 2015). Annelids commonly found include the notable ‘zombie worms’ *Osedax* (Siboglinidae) and those of the

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