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***Archeterokrohnia docrickettsae* (Chaetognatha: Phragmophora: Heterokrohniidae), a new species of deep-sea arrow worm from the Gulf of California**

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Abstract

A new species of deep-sea chaetognath, *Archeterokrohnia docrickettsae* n. sp. is described from a single specimen captured by the ROV *Doc Ricketts* ~2 m above the sea floor at 3245 m depth in the Pescadero Basin of the Gulf of California, Mexico. This is the first record of a living specimen of *Archeterokrohnia* and the second known occurrence of *Archeterokrohnia* in the Pacific Ocean. In life, the head and trunk sections were orange, while the tail section was translucent, a unique colour pattern not before seen in chaetognaths. Observations of its swimming behaviour *in situ* are given. Comparisons are made with the three other species of *Archeterokrohnia*. At 28.5 mm in length, this is the largest known species of the genus. An artificial key to the four species of *Archeterokrohnia* is presented.

Key words: Gulf of California, chaetognath, deep sea, zooplankton

Introduction

Chaetognaths of the family Heterokrohniidae are known to inhabit deep-sea environments around the globe. Specimens of heterokrohniids are often in poor condition because they have been captured with nets fished to great depths and then preserved with other zooplankton for years before being passed on to a taxonomic expert. Many of these are thought to be benthopelagic (Casanova 1986a) or hyperbenthic (Bieri 1991). Over the last two decades, *in situ* observations of pelagic marine organisms have become more common (Haddock 2004), including *in situ* and behavioural observations of chaetognaths (Haddock & Case 1994; Thuesen *et al.* 2010). During the second leg of a Monterey Bay Aquarium Research Institute (MBARI) research expedition to the Gulf of California in 2012, one very large specimen of a heterokrohniid chaetognath new to science was observed near the sea floor and collected using the ROV *Doc Ricketts*.

Material and methods

Sample collection. Deep-sea organisms were collected on the second leg of MBARI's 2012 Research Expedition to the Gulf of California aboard RV *Western Flyer*, February 17–26, 2012. While searching for benthopelagic chaetognaths during dive #342 of ROV *Doc Ricketts*, a bright orange-coloured organism was observed swimming ~2 m above the sea floor at 3245 m depth. Although the specimen did not appear like other chaetognaths at first sight, the seminal vesicles were seen clearly, and the specimen was captured in a sealed container using the ROV's 'detritus sampling' system. The ROV returned to the surface ~9 hours following collection, and the specimen was recovered. At the sampling depth, the temperature, salinity and oxygen content were 1.9° C, 34.7 psu and 26.5% saturation, respectively.

Photography. *In situ* digital video was taken with an Insite Pacific Zeus Plus High Definition TV camera attached to ROV *Doc Ricketts*. Immediately upon recovery aboard ship, the specimen was transferred to a