



Three new species of *Ophryotrocha* (Annelida: Dorvilleidae) from a whale-fall in the North-East Atlantic

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Abstract

Three new *Ophryotrocha* species are described from sites with high levels of organic carbon flux including a whale-fall at 125 m depth off the Swedish coast and sediment sampled at 104 m depth beneath a fish farm in a Norwegian fjord. Phylogenetic analyses based on the nuclear gene H3 and the mitochondrial genes COI and 16S using MrBayes and Maximum Likelihood analyses show that *Ophryotrocha eutrophila* sp. nov. is a close relative to *Ophryotrocha puerilis*, while *Ophryotrocha craigsmithi* sp. nov. falls together with *Palpiphitime lobifera*, and *Ophryotrocha scutellus* sp. nov. occur within the 'hartmanni' clade. The genus *Ophryotrocha* is in our study monophyletic only if the genera *Iphitime* and *Palpiphitime* are included. Two representatives of *Ophryotrocha* previously described from anthropogenically-enriched sediments are here reported for the first time in very high abundance from a naturally occurring habitat. We suggest that whale falls are important habitats for the evolution of ecosystem services such as the degradation of complex organic compounds.

Key words: Polychaeta, organic enrichment, phylogeny, chemosynthetic ecosystem

Introduction

Whale carcasses that sink to the sea floor constitute a substantial addition of nutrients that can be utilised by benthic organisms as food (Smith & Baco, 2003). After the soft tissue is consumed by mobile scavengers, the bones can still sustain a diverse fauna for many years, where some species consume the complex organic carbons within the bones (e.g. *Osedax* Rouse et al., 2004) or use the diverse microbial communities that form bacterial mats at the surface of the bones. New species from several different annelid genera have been recently described from whale-fall habitats, e.g. five species of the siboglinid genus *Osedax* from the Pacific (Rouse et al., 2004; Fujikura et al., 2006; Rouse et al., 2008) and Atlantic Ocean (Glover et al., 2005), two species of the chrysopetalid genus *Vigtorniella* (Kiseleva, 1992) from the Pacific (Dahlgren et al., 2004) and Atlantic Ocean (Wiklund et al., 2009) and the new hesionid genus *Vrijenhoekia* Pleijel et al., 2008 described from a whale-fall off California. In this study we describe three new species of *Ophryotrocha* Claparède & Meczников, 1869 found on an experimentally implanted whale-fall at 125 m depth in the north east North Atlantic (Dahlgren et al., 2006), and report on dense populations of two additional *Ophryotrocha* species previously described from nutrient rich substrates of anthropogenic origin (e.g. cellulose fiber discards from a pulp mill; Åkesson, 1973).

Worms from the dorvilleid genus *Ophryotrocha* are often found in organically enriched or even heavily polluted areas, such as in harbours and beneath marine aquaculture plants. The genus has a complicated systematic history. It was erected with *Ophryotrocha puerilis* Claparède & Meczников, 1869 as type species although the authors described a mixture of characters from *O. puerilis* and the species that was later to be