



<http://dx.doi.org/10.11646/zootaxa.3974.4.2>

<http://zoobank.org/urn:lsid:zoobank.org:pub:2CBE8AE3-EE5B-4EE3-AE98-94BC534B58CA>

## A new species of *Mesochaetopterus* (Annelida, Chaetopteridae) from Hong Kong, with comments on the phylogeny of the family

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### Abstract

We described a new species, *Mesochaetopterus tingkokensis*, based on 14 specimens collected from an intertidal area in Hong Kong. This species is large (body length of complete specimens 17.9–24.1 cm), with 9, 2 and 36–41 chaetigers in region A, B and C, respectively. It belongs to a small group of *Mesochaetopterus* species with an expanded wing-shaped notopodia in chaetiger B2. The new species can be distinguished from other *Mesochaetopterus* species in this group by having a pair of palps with two longitudinal stripes formed by suture-like discontinuous orange bands, more teeth in the uncini of region B and C neuropodia, and presence of a bundle of simple chaetae in region C notopodia. Comparison with other chaetopterids based on partial cytochrome oxidase I (COI), 18S and 28S rRNA gene sequences confirmed the placement of *M. tingkokensis* n. sp. within *Mesochaetopterus* and its distinction from other members of this genus with the available DNA sequences. The phylogenetic tree based on COI showed that *Mesochaetopterus* and *Chaetopterus* are paraphyletic, but that based on concatenated data, 18S and 28S showed they are monophyletic with low supporting values.

**Key words:** taxonomy, polychaete, *Mesochaetopterus*, new species, Hong Kong

### Introduction

Chaetopteridae is a small family of approximately 65 species of tube-building polychaete worms. Members of this family have been reported from the intertidal areas to the deep-sea hydrothermal vents, and from the tropics to the polar regions (Fauchald 1977; Rouse and Pleijel 2001; Morineaux *et al.* 2010). Chaetopteridae is divided into four genera based on whether their median notopodia are bilobed or fused, whether tentacular cirri are present, and whether palps are small. *Mesochaetopterus* can be distinguished from the other genera of chaetopterids by the presence of large palps and non-fused notopodia, and absence of tentacular cirri (Fauchald 1977), but this genus is considered paraphyletic based on analysis of a fragment of the cytochrome oxidase I (COI) gene (Martin *et al.* 2008; Morineaux *et al.* 2010). Previous analyses based on COI, 18S and 28S rRNA genes also showed that the other two genera *Phyllochaetopterus* and *Spiochaetopterus* are paraphyletic (Osborn *et al.* 2007; Martin *et al.* 2008; Morineaux *et al.* 2010).

Sixteen species of *Mesochaetopterus* are considered valid world-wide (Nishi 1999; Martin *et al.* 2008; Nishi *et al.* 2009; Nishi & Hsieh 2009). These species can be further divided into three groups based on the morphology of region B notopodia: 1, slightly modified and triangular; 2, conical; 3, extended and pointed (Nishi 1999), though the grouping scheme has not been subjected to a proper phylogenetic analysis. In the third group of *Mesochaetopterus* there are three large-sized species; two of them [*M. japonicus* Fujiwara, 1934, *M. selangolus* (Rullier, 1976)] are distributed in the western Pacific. *Mesochaetopterus selangolus* has been recorded from Malaysia only, whereas *M. japonicus* has been recorded widely from Japan (Nishi 1999), mainland China (Yang & Sun 1988) and Taiwan (Nishi & Hsieh 2004). Here we report *Mesochaetopterus tingkokensis* n. sp. from Hong Kong in southern China. It is the fourth species in the third group of *Mesochaetopterus*. We describe the morphology of this species, and present a phylogenetic analysis of chaetopterids based on partial sequences of the COI, 18S rRNA and 28S rRNA genes of *M. tingkokensis* and the corresponding sequences of these genes in other related species available in GenBank.