Zootaxa 3964 (5): 501–525
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3964.5.1
http://zoobank.org/urn:lsid:zoobank.org:pub:398BC024-9546-409C-A18C-04948A9734E0

One new genus and five new nematode species (Monhysterida, Xyalidae) from Tonga and Kermadec Trenches, Southwest Pacific

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Abstract

Little is known about the diversity and systematics of nematodes in hadal trenches (>6000 m depth). The analysis of core samples recently obtained from Tonga (10810 m) and Kermadec Trenches (8081 m) reveals the presence of a diverse nematode community in these extreme environments, and provides the deepest record for the phylum. Here, one new genus and five new species of the family Xyalidae are described. *Lamyronema* n. gen. is characterised by a large, tripartite buccal cavity and can be distinguished from other genera with similar buccal cavities mainly by the pharyngeal tissue almost completely surrounding the buccal cavity and by the presence of sub-cephalic setae positioned anteriorly to the amphideal fovea. *Lamyronema horizonensis* **n. gen. n. sp.** is characterised by the presence of 16–22 sub-cephalic setae, pronounced sexual dimorphism in the size of the amphideal fovea, and short, straight spicules. *Daptonema amphorum* **n. sp.** is characterised by short somatic setae, narrow head region, amphideal fovea relatively far from anterior body extremity, thin gubernaculum without apophyses, and cuticularised prevulvar uterine sac with two conspicuous rims. *Manganonema kitasatoi* **n. sp.**, *M. rowdeni* **n. sp.**, and *M. majusculum* **n. sp.** share traits that set them apart from other species of the genus, *i.e*., large body size (1100–2080 µm), presence of one pair of short setae posterior to the amphideal fovea, and male reproductive system with two testes. The latter trait necessitates amendments to the genus diagnosis.

Key words: Horizon Deep, Sphaerolaimoidea, Facultative predator, *Daptonema*, *Manganonema*, *Lamyronema* **n. gen.**

Introduction

The hadal zone (6000–10900 m depth) accounts for almost half of the oceanic depth range, but little is known about the diversity of nematodes in this extreme environment. Prior to the present study, only ten nematode species belonging to four genera had been recorded/described from hadal environments (Miljutin *et al.* 2010), with the deepest species records from Puerto Rico Trench at 8380 m (Tietjen 1989). The deepest ever recorded nematode (a single, unidentified specimen) was recovered from a trawl sample at 10415–10687 m in Tonga Trench during one of the *Vityaz* expeditions in 1957 (Belyaev 1972). More recently, investigations conducted in the oceans' deepest point in Mariana Trench (Challenger Deep, ~10900 m depth) did not yield any nematodes (Glud *et al.* 2013; H. Kitasato pers. com.). The analysis of four sediment samples recently obtained from the oceans' second deepest point in Tonga Trench (Horizon Deep, ~10800 m), however, revealed a diverse nematode community consisting of over 30 morphospecies, with approximately one quarter of all individuals belonging to the family Xyalidae; in Kermadec Trench (~8000 m), a single core sample yielded over 50 morphospecies, about 15% of which belonged to the Xyalidae (D. Leduc unpublished data).

The family Xyalidae comprises 46 valid genera and is among the most common and widespread nematode families in marine environments, including hadal trenches (Tietjen 1989, Venekey *et al.* 2014). *Daptonema* Cobb, 1920 is the most diverse genus of the family with 116 species described to date (Venekey *et al.* 2014); it is widely distributed across the globe in coastal and deep-sea habitats and is also found in brackish and freshwater environments (Coomans & Eyualem-Abebe 2006). The deepest record for this genus was made in the Peru-Chile Trench at 7800 m (Gambi *et al.* 2003). The deep-sea nematode genus *Manganonema* Bussau, 1993 was described relatively recently based on specimens from manganese nodule deposits at 4000 m depth in the Southeast Pacific

Accepted by K. Davies: 11 May 2015; published: 5 Jun. 2015