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Descriptions of two new and one newly recorded enchytraeid species (Clitellata, Enchytraeidae) from the Ozegahara Mire, a heavy snowfall highmoor in Central Japan

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Abstract

Three species of semi-aquatic freshwater Enchytraeidae of the genera *Mesenchytraeus* Eisen, 1878, *Chamaedrillus* Friend, 1913 and *Globulidrilus* Christensen & Dózsa-Farkas, 2012 are described from stream, wet soil or snow habitats in the Ozegahara Mire, an extensive high moor in heavy snowfall area in central Japan. Among *Mesenchytraeus* species, *Mesenchytraeus nivalis* sp. nov. is distinguished by not having enlarged chaetae and spermathecal diverticula, vas deferens with atrial glands 3 or 4 in number and club-shaped, spermathecal ental duct short, with sperm bundles in the sperm sack. *Chamaedrillus ozensis* sp. nov. closely resembles *C. floridae*, but the length of the sperm funnel and character of the coelomocytes are different. *Globulidrilus helgei* Christensen & Dózsa-Farkas, 2012 is recorded for the first time from Japan.

Key words: Oligochaeta, *Mesenchytraeus nivalis*, *Chamaedrillus ozensis*, *Globulidrilus helgei*, new species, taxonomy

Introduction

Enchytraeid Oligochaeta is the functionally most influential animal group in boreal upland and peatland forest soil (Laakso & Setälä 1999). Their important role in the functioning of these types of soil ecosystem includes reduction of plant biomass (Laakso & Setälä 1999), modification of soil structure, enhancement of the decomposition process, acceleration of soil carbon turnover (Waldrop *et al.* 2012), and nutrient mineralization (Lappalainen *et al.* 2013; Williams & Griffiths 1989). Therefore the elucidation of the enchytraeid community structure and their taxonomic composition is important to understand the food-web and organic matter decomposition in organic soils. In contrast to well-studied regions such as boreal forests in Europe, only 26 species from 14 genera have been previously recorded in Japan (Nakamura 1980, 1984, 1986, 1993, 2001; Schmelz *et al.*, 2000; Nakamura *et al.* 2006; Torii 2011, 2012, Torii *et al.* 2013). Records from aquatic or semiaquatic sites are sparse (Yamaguchi 1953; Coates & Ellis 1981; Torii & Ohtaka 2007), and only 10 species of enchytraeids have been identified: *Lumbricillus annulatus* Eisen, 1904, *Lumbricillus nipponicus* (Yamaguchi, 1937), *Lumbricillus lineatus* (Müller, 1774), *Fridericia perrieri* (Vejdovsky, 1878), *Globulidrilus riparius* (Bretscher, 1899), *Marionina nevisensis* Righi & Kanner, 1979, *Marionina coatesae* Erséus, 1990, *Marionina biwaensis* Torii, 2010, *Stephensoniella marina* (Moore, 1902), and *Stephensoniella sterreri* (Lasserre & Erséus, 1976). Unidentified *Marionina* species have also been recorded from riverbanks (Torii & Ohtaka 2007) and moist soils (Nakamura 1980, 1986; Fujita 1991). It is quite probable that many undescribed species are currently present in Japan (Torii 2012). The pivotal studies of enchytraeids in Japan by Nakamura (1980, 1984, 1986, 1993, 2001) focused mainly on agricultural soils.

The Ozegahara Mire is a highland moor in Central Japan, at 1400 m asl and with a surface area of 7.6 km², surrounded by *Abies mariesii*, a dominant subalpine conifer species, in a rare landscape in Japan. It is located in the heavy snowfall area of the Oze National Park in the boundary region of the Prefectures of Gunma, Fukushima, and Niigata. Some effort has recently been made to improve the knowledge of the oligochaete fauna of Ozegahara Mire; seventeen taxa of aquatic Clitellata, mainly Naididae, were recorded by Ohtaka (2000). Various invertebrates, nematodes, oligochaetes, harpacticoids, tardigrades, cladocerans, mites, larvae of dipteran insects (tipulids, ceratopogonids and chironomids) were recorded by Fukuhara *et al.* (2006), and eight taxa of