



Are *Bryodrilus parvus* Nurminen, 1970 and *Bryodrilus librus* (Nielsen and Christensen, 1959) (Annelida: Enchytraeidae) really different species? A revision based on DNA barcodes and morphological data

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Abstract

The taxonomic status of the enchytraeid species *Bryodrilus parvus* Nurminen, 1970 and *Bryodrilus librus* (Nielsen and Christensen, 1959) was tested with respect to their possible conspecificity. *B. parvus*, considered as a typical northern Holarctic species, was also found in Hungarian lowlands. The species *B. librus* (Nielsen and Christensen, 1959), distributed in Northern and Central Europe, is very close morphologically to *B. parvus*. In this paper we demonstrate that *B. parvus* and *B. librus* are not different species based on both morphological and molecular analyses of specimens from different regions in Europe. The valid name of the species is *Bryodrilus librus* (Nielsen & Christensen, 1959) following the principle of priority (ICZN 1999, Art. 23.1). The species *B. librus* was revised and a new description is given here.

Key words: DNA barcodes, CO1, species revision, taxonomy, *Bryodrilus*, Enchytraeidae

Introduction

Bryodrilus librus (Nielsen and Christensen, 1959) was described from Denmark in grassy bank of sewage drain as *Marionina libra* (Nielsen and Christensen 1959), then transferred to the genus *Bryodrilus* by Schmelz and Collado (2010). As specimens were also found in Svalbard (Nurminen 1965, 1966), Ireland (Healy 1979), Sweden (Chalupský 1992) and Poland (Kasprzak 1986), the distribution of this species was extended to Northern and Central Europe.

A sibling species *Bryodrilus parvus* Nurminen, 1970 was described from the West coast of Greenland (see Nurminen 1970). This species is considered a typical of the Northern Holarctic, on the bases of its distributional data: widespread in Greenland (Christensen and Dózsa-Farkas 2006), Svalbard (Birkemoe and Dózsa-Farkas 1994, Dózsa-Farkas 1999), Siberia (Christensen & Dózsa-Farkas 1999), Northern Fennoscandia (Rota *et al.* 1998), Iceland (Nurminen 1973a), Canadian Rocky Mountains, Alberta (Dash 1970), the Canadian Archipelago (Nurminen 1973b, Christensen and Dózsa-Farkas 2006), Alaska (Dózsa-Farkas & Christensen 2000 and not published data) Ireland (Healy 1977, 1979) and Poland (Kasprzak 1986).

Within the scope of the exploration of Hungarian enchytraeids we started to investigate the Hungarian lowlands. *B. librus* was found in 2009 in the Kiskunság area. In 2010 this species was found sympatric with *B. parvus* in the Mezőföld (Fejér and Tolna Counties). The similarity of the two species was conspicuous. The main diagnostic character between the two species is the spermatheca: in *B. parvus* this organ is attached to the oesophagus, but in *B. librus* there is no connection, the spermatheca is free (= liber, Lat., species name *librus* refers to this feature). In order to explore further the morphological differences between the two species, fixed and living specimens available from different localities (Svalbard, Canadian Archipelago, Greenland, Siberia and Alaska) were examined.

Four syntypes of *B. parvus* were loaned for investigation from the Zoological Museum of Helsinki.