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Geophilus arenarius, a long-misunderstood species in the still unresolved *carpophagus* species-complex (Chilopoda: Geophilidae)

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Abstract

Geophilus arenarius Meinert (Chilopoda: Geophilidae), a neglected nominal species from north-western Africa of uncertain identity, is here described in detail and its taxonomic position assessed. *G. arenarius* is actually a morphologically distinct species belonging to a widespread Western Palaearctic species-complex whose internal taxonomy is still largely unresolved, to the exclusion of the two British species *G. carpophagus* and *G. easoni*. *G. arenarius* differs from both other species mainly by lacking a transverse suture on the head, lacking peculiar integumental features (carpophagus-structures) along the trunk, and having relatively stouter antennae and forcipular coxosternite.

Key words: Geophilomorpha, *Geophilus carpophagus*, *Geophilus easoni*, morphology, taxonomy, Western Palaearctics

Introduction

For almost two centuries since the original description, *Geophilus carpophagus* Leach, 1815 has been known as one of the most widely distributed and most frequently encountered geophilid centipedes in the Western Palaearctic. Populations have been recorded from the Macaronesian islands, throughout north-western Africa and most of Europe, eastward to Ukraine at least. As a consequence, it turned out to be one of the best known geophilids in the world, especially with respect to anatomy, development and ecology, as summarised in major monographs (e.g.: Brolemann 1930; Eason 1964; Lewis 1981; Rosenberg 2009; Minelli 2011).

G. carpophagus has long been universally acknowledged as a monotypic species, inclusive of other nominal species, described by different authors mainly in the second half of the nineteenth century, but rejected as synonyms (Minelli 2006) despite the broad variation in the number of trunk segments documented between populations.

In the last decades, however, morphological as well as biochemical evidence has been accumulating which suggests that what has long been regarded as a single species is actually a species-complex (Eason 1979; Lewis 1985, 1989; Arthur *et al.* 2001, 2002; Haswell *et al.* 2006). The genetic and anatomical differentiation within this complex (hereafter the *carpophagus* species-complex) has been elucidated only for the populations inhabiting Great Britain, where two species are now confidently distinguished (Arthur *et al.* 2001; Barber 2009), namely *G. carpophagus s.s.* and *G. easoni* Arthur, Foddai, Kettle, Lewis, Luczynski & Minelli, 2001. Conversely, only preliminary investigations have addressed the actual pattern of differentiation in the remaining range of this species-complex (Haswell *et al.* 2006). This work was inconclusive in evaluating how many species are present and their taxonomic status with respect to the two British species.

As a contribution to clarifying the phylogenetic and taxonomic structure of the *carpophagus* species-complex, in this paper we provide evidence for the presence of another morphologically distinct species within the complex. It had been already described as *Geophilus arenarius* Meinert, 1870, but has always been treated as a nominal species of uncertain position, and therefore mostly ignored. After direct examination of the type material of *G. arenarius*, and of representative specimens of the other species in the complex, we provide a full redescription of *G.*

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