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A revision of the taxonomy and distribution of *Archispirostreptus* Silvestri 1895 (Diplopoda, Spirostreptida, Spirostreptidae), and description of a new spirostreptid genus with three new species

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Table of contents

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Abstract

As it is currently defined, *Archispirostreptus* includes two species groups (the southern African and the east African) with distinct kinds of gonopods. A new genus, *Cacuminostreptus* Mwabvu, is proposed to accommodate the southern African species which include *C. conatus* (Attems 1928) comb. n. and three new species, *C. vumbaensis* Mwabvu, *C. triangulatus* Mwabvu and *C. mazowensis* Mwabvu. Two new synonymies are established: *A. Cecchii* Silvestri 1897 = *A. phillipsii* Pocock 1896 and *A. transmarinus* Hoffman 1965 = *A. syriacus* (Saussure 1859). The species *A. arabs* Pocock 1895 is *incertae sedis*; and *A. sumptuosus* Silvestri 1896 is a *nomen dubium*. Identification keys to the genera and species based on gonopod morphology and distribution data are presented.

Key words: millipedes, distribution, gonopod, savanna, eastern highlands, East Africa, southern Africa, Horn of Africa

Introduction

In some terrestrial ecosystems millipedes are a major part of the soil macrofauna (Crawford 1992) in terms of numbers of species and biomass (Dangerfield 1990). Millipedes enhance organic matter breakdown (Bond & Sierwald 2002; Sierwald & Bond 2007) and mix organic matter with upper soil layers (Edwards *et al*. 1970). They are ranked behind earthworms and termites as one of the major groups involved in the breakdown of organic matter (Crawford 1992).

Despite being common, conspicuous (Hamer 1999; 2000) and ecologically important (New 1995), the diversity and distribution of spirostreptid millipedes are incompletely known. In addition, several African genera are of dubious taxonomic status. Although some genera have been revised (see Hamer 2000; Mwabvu *et al*. 2007; Mwabvu *et al*. 2009b), more African genera still need revision.

The tribe Spirostreptini, to which several large-sized African genera have been assigned based on the bifid or trifid prostatic groove (Hoffman 2008), is among the problematic taxa. According to Hoffman (2008), *Archispirostreptus* Silvestri 1895, *Choristostreptus* Hoffman 2008, *Limnostreptus* Hoffman 2008, *Plagiotaphrus* Attems 1914 and *Spirostreptus* Brandt 1833 can be grouped to form tribe Spirostreptini. Among these genera the definition and distribution of *Archispirostreptus* species are probably the most confusing (see Krabbe & Enghoff 1978). Hoffman (2008) suggested that *Archispirostreptus* may be heterogeneous, and Krabbe & Enghoff (1978) reported that the validity of some of the species of *Archispirostreptus* was doubtful. Although current data make *Archispirostreptus* the most widely distributed and speciose member of the tribe, these data are not beyond question.

A taxonomic revision of *Archispirostreptus* based on type material is necessary to define the taxa unequivocally (Hoffman 1965). However, this endeavour presents major challenges, including the unknown location or loss of type specimens of some of the species, including *Spirostreptus arabs* Pocock 1895, *A. Cecchii* Silvestri 1897 and *A. sumptuosus* Silvestri 1896. Additionally, some body segments and the male gonopods of some material are missing, thus making gonopod morphology (on which most millipede descriptions are based) unavailable to delineate taxa. Although this is not ideal, in the absence of holotypes or gonopods the revisions of some species will be based on published descriptions. These challenges are compounded by the limited material available, including the absence of new material, and the fact that many species are known from single localities and that most data labels only give the country of collection rather than the exact locality. In addition, some species descriptions lack detailed drawings of male gonopods or were based on female specimens (see Silvestri 1897). Having encountered similar problems, Krabbe (1982) listed as *nomina dubia* or *incertae sedis* several species that had been assigned to *Archispirostreptus*.

Although records are fragmentary, *Archispirostreptus* seems to be widely distributed. The genus has been recorded from southern Africa (South Africa, Mozambique, Zimbabwe and Malawi), East Africa (Uganda, Tanzania and Kenya), the Horn of Africa (Ethiopia, Eritrea and Somalia), Central Africa (Democratic Republic of Congo and Cameroon), West Africa (Senegal, Mali, Chad and Niger) and the Middle East (Israel, Yemen, Syria, Jordan, Saudi Arabia) (Hoffman 1965; Krabbe 1982; Shelley 2009).

Fifteen species and five subspecies have been described. *Archispirostreptus conatus* (Attems 1928) is found mainly in southern Africa. Although Krabbe (1982) reported that *A. gigas* (Peters 1855) has been