

**Systematics of the endemic south-west African dung beetle genus
Pachysoma MacLeay (Scarabaeidae: Scarabaeinae)**

by

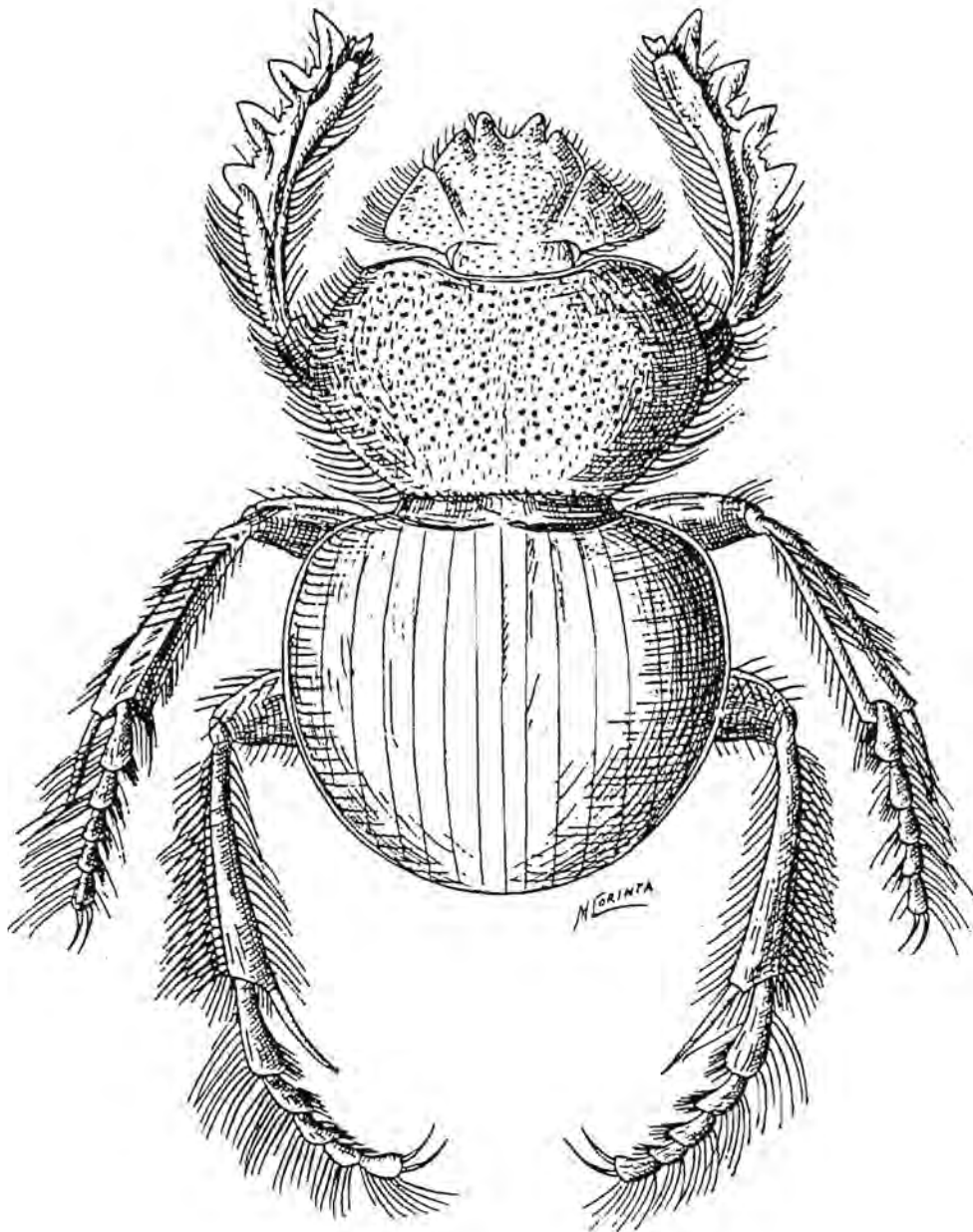
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Scarabaeus (Pachysoma) hippocrates (MacLeay, 1821)

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I humbly dedicate this thesis to:

FATHER,
SON AND HOLY SPIRIT

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Who all wittingly or unwittingly made a contribution,

'From James, a servant of God and of the Lord Jesus Christ, To the twelve tribes scattered
among the nations: Greetings' James 1:1.

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Systematics of the endemic beetle genus *Pachysoma*
MacLeay (Scarabaeidae: Scarabaeinae)

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ABSTRACT

The phylogenetic validity of *Pachysoma* MacLeay, 1821, is assessed. Cladistic analysis of 64 adult characters from 37 taxa comprising all Scarabaeini genera (except the monotypic *Madateuchus* Paulian, 1953) and two outgroup Canthonini genera, resulted in some currently recognised genera (i.e. *Sceliages* Westwood, 1837; *Kheper* Janssens, 1940; and *Drepanopodus* Janssens, 1940) being recognised as paraphyletic. *Pachysoma* comprises a monophyletic clade of highly derived *Scarabaeus* Linnaeus, 1758. To further nomenclatural stability within the Scarabaeini, *Pachysoma* should best be considered a subgenus of an expanded genus *Scarabaeus*. *Neopachysoma* Ferreira, 1953; *Mnematum* MacLeay, 1821 and *Neomnematum* Janssens, 1938 are maintained as synonyms of *Scarabaeus* s.l. The unique biology of *Pachysoma* is interpreted as an adaptation to arid conditions, and is presumably derived from ball rolling and wet dung feeding. Aridification of the Namib Desert is postulated to have initiated the evolution of *Pachysoma* from a *Scarabaeus*-like ancestor, while dune movement accounts for their current distribution. The evolutionary history of *Pachysoma* is discussed based on the phylogenetic analysis, and distributional and biological information.

The subgenus *Scarabaeus* (*Pachysoma*) MacLeay, 1821 is revised. All thirteen species of the subgenus are endemic to the west coast of southern Africa. A key to all *S.* (*Pachysoma*) species is provided, and their distributions are mapped. Two new species *Scarabaeus* (*Pachysoma*) *endroedyi* and *Scarabaeus* (*Pachysoma*) *glentoni* from the southwestern Cape are described. The subspecies *S.* (*P.*) *denticollis penrithae* (Zunino) is synonymised with *S.* (*P.*) *denticollis denticollis* (Péringuey). The synonymy of *S.* (*P.*) *hessei* (Ferreira) with *S.* (*P.*) *hippocrates* (MacLeay) is confirmed. *S.* (*P.*) *valeflorae* (Ferreira) previously considered a synonym of *S.* (*P.*) *schinzi* (Fairmaire) is reinstated as a valid species. The missing type series of *Pachysoma hessei* Ferreira is traced. A lectotype is designated for *Scarabaeus aesculapius*



Olivier, three paralectotypes are *Pachysoma marginatus* Péringuey and one paralectotype for *Pachysoma denticolle* Péringuey. Notes on the type series, distribution records, morphological variation and known biology, are provided for all flightless Scarabaeini. A checklist of all valid species and their synonyms of *Pachysoma*, *Neopachysoma*, *Mnematium* and *Neomnematium* is included.

KEYWORDS FOR THESIS RETRIEVAL: Insects, Coleoptera, Scarabaeidae, Scarabaeinae, Scarabaeini, Afrotropical, *Pachysoma*, *Neopachysoma*, *Mnematium*, *Neomenmatium*, *Scarabaeus*, *Kheper*, *Sceliages*, *Drepanopodus*, *Pachylomerus*, cladistic, phylogeny, endemic, dung beetles, flightless, food preference, dry dung, detritus, psammophily, relocation strategy, systematic revision, biology, distribution.