



A revision of the Neotropical genus *Sacosternum* Hansen (Hydrophilidae: Sphaeridiinae: Megasternini)

MARTIN FIKÁČEK¹ & ANDREW E. Z. SHORT²

¹Department of Entomology, National Museum, Kunratic 1, CZ-148 00 Praha 4, Czech Republic, and Department of Zoology, Faculty of Science, Charles University in Prague, Viničná 7, CZ-128 44 Praha 2, Czech Republic. E-mail: mfikacek@gmail.com

²Division of Entomology, Biodiversity Institute, University of Kansas, Lawrence, KS, 66045 USA, and Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, KS 66045, USA. E-mail: aezshort@ku.edu

Table of contents

Abstract	2
Resumen	2
Introduction	2
Material and methods	3
List of species	3
Key to known species of <i>Sacosternum</i>	4
Taxonomy	5
Genus <i>Sacosternum</i> Hansen, 1989	5
Species descriptions	8
<i>Sacosternum auribleps</i> sp. n.	8
<i>Sacosternum cruciphallus</i> sp. n.	9
<i>Sacosternum delta</i> sp. n.	12
<i>Sacosternum emissarium</i> sp. n.	13
<i>Sacosternum epulum</i> sp. n.	15
<i>Sacosternum garciai</i> sp. n.	16
<i>Sacosternum inconnivum</i> sp. n.	19
<i>Sacosternum lebbinorum</i> sp. n.	24
<i>Sacosternum megalopus</i> Hansen, 1989	25
<i>Sacosternum</i> sp. A	28
<i>Sacosternum</i> sp. B	28
Unidentified material	29
<i>Sacosternum</i> sp.	29
Reconstruction of phylogenetic relationships	29
Results of the analysis	34
Discussion	35
Acknowledgements	37
References	37
Appendix	37

Abstract

The previously monotypic genus *Sacosternum* Hansen, 1989 is revised and redefined. Eleven species are recognized, of which eight are described as new: *Sacosternum auribleps* sp. n. (Brazil), *S. cruciphallus* sp. n. (Panama), *S. delta* sp. n. (Brazil, Paraguay); *S. emissarium* sp. n. (Costa Rica), *S. epulum* sp. n. (Brazil), *S. garciai* sp. n. (Costa Rica, Panama, Venezuela); *S. inconnivum* sp. n. (Costa Rica, Panama), and *S. lebbinorum* sp. n. (French Guiana, Peru, Brazil). *Sacosternum megalopus* Hansen, 1989 is newly recorded from Costa Rica. Two species, referred to as *Sacosternum* sp. A (Peru) and *S. sp. B* (Costa Rica) are left undescribed pending on the collecting of males. Additional unidentified specimens are recorded from Mexico (Veracruz State), Guatemala, Costa Rica, Panama, and Venezuela. A key to known species of the genus is provided, important characters are illustrated. A reconstruction of the phylogenetic relationships of *Sacosternum* species is performed, based on 51 adult morphological characters. The genus *Sacosternum* is decisively resolved as monophyletic based on six unique synapomorphies. Three species (*S. epulum* sp. n., *S. lebbinorum* sp. n. and an unidentified species of the “*S. cruciphallus* complex”) were collected in association with ecitonine army ants of the genera *Eciton* and *Labidius*. The possible preference of the *Sacosternum* species for the organic-rich leaf litter below the bivouacs of these ants is hypothesized from their label data and possible morphological adaptations are discussed.

Key words: Coleoptera, Hydrophilidae, *Sacosternum*, new species, morphology, phylogenetic analysis, association with ants, Neotropical Region

Resumen

El anterior género monotípico *Sacosternum* Hansen, 1989 fue revisado y redefinido. Once especies fueron reconocidas, de las cuales ocho son descritas como nuevas: *Sacosternum auribleps* sp. n. (Brasil), *S. cruciphallus*, sp. n. (Panamá), *S. delta* sp. n. (Brasil, Paraguay); *S. emissarium* sp. n. (Costa Rica), *S. epulum* sp. n. (Brasil), *S. garciai* sp. n. (Costa Rica, Panamá, Venezuela); *S. inconnivum* sp. n. (Costa Rica, Panamá) y *S. lebbinorum* sp. n. (Guayana Francesa, Perú, Brasil). *Sacosternum megalopus* Hansen, 1989 se registra nuevamente en Costa Rica. Dos especies, *Sacosternum* sp. A (Peru) y *S. sp. B* (Costa Rica) quedan sin describir y pendiente la colecta de machos. Otros especímenes sin identificar son registrados en México (Estado de Veracruz), Guatemala, Costa Rica, Panamá y Venezuela. Se da una clave para identificar especies de este género e importantes caracteres son ilustrados. Una reconstrucción de las relaciones filogenéticas de las especies de *Sacosternum* fue llevada a cabo basada en 51 caracteres morfológicos de adultos. El género *Sacosternum* se resuelve totalmente como monofilético basado en seis únicas sinapomorfias. Tres especies (*S. epulum* sp. n., *S. lebbinorum* sp. n. y una especie no identificada de el “complejo *S. cruciphallus*”) fueron colectadas junto con ecitoninos hormigas soldado del genero *Eciton* y *Labidius*. La posible preferencia de la especie *Sacosternum* por la hojarasca rica en compuestos orgánicos bajo los refugios de estas hormigas se da como hipótesis de los datos marcados y posibles adaptaciones morfológicas son discutidas.

Palabras clave. Coleopteros, Hydrophilidae, *Sacosternum*, especies nuevas, morfología, análisis filogenético, asociación con hormigas, región Neotropical

Introduction

The genus *Sacosternum* Hansen, 1989 was described to accommodate a single species, *S. megalopus* Hansen, known from three specimens collected in the Cordillera de Talamanca in Panama in 1979 (Hansen 1989). The separate generic status of these specimens was justified by a few characters unknown for any other representative of the tribe Megasternini, i.e. the extremely widened shield-like median portion of prosternum, extremely enlarged eyes and presence of fine longitudinal ridges on abdominal ventrites. Besides the morphological characteristics provided, no additional information was available about the habitat or collecting circumstances of the specimens.

During the last few years we have inspected many institutional collections, reviewing large amounts of terrestrial hydrophilid material from Central and South America. Even though *Sacosternum* proved to be very rare in the collections, we succeeded in accumulating 85 additional specimens from across the Neotropics, ranging from southern Mexico to southern Brazil and Paraguay. Ten new species have been recognized within this material and the first data on collecting circumstances and their biology were gained, suggesting a possible association of the *Sacosternum* species with the ecitonine army ants.