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The phylogeny of mole crickets (Orthoptera: Gryllotalpoidea: Gryllotalpidae)

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Abstract

The monophyly and phylogenetic relationships of the family Gryllotalpidae were researched. Twenty-six in-group taxa, representing all known genera of Gryllotalpidae were included in a cladistic analysis, based on 89, morphological charac-

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ters (including genital characters of the males). The different analyses of the resulting data matrix supported the monophyly of Scapteriscinae and Gryllotalpinae and its internal group. Subfamilies, tribes and genera of Gryllotalpidae are fully diagnosed, illustrated and keys to their identification are provided. Four tribes are established (Indioscaptorini **n. trib.** (Scapteriscinae), Triamescaptorini **n. trib.**, Gryllotalpellini **n. trib.** and Neocurtillini **n. trib.** (Gryllotalpinae)) and two other are fully delimited (Scapteriscini **stat. rev.** and Gryllotalpini **stat. rev.**). Two new genera are described (*Neoscapteriscus* **n. gen.** and *Leptocurtilla* **n. gen.**) and as well as seven new species: *Gryllotalpella rehni* **n. sp.**, *G. tindalei* **n. sp.**, *G. lawrencei* **n. sp.**, *Neocurtilla ingrischi* **n. sp.**, *N. townsendi* **n. sp.**, *Leptocurtilla juanmanueli* **n. sp.** and *L. chopardi* **n. sp.** The following nomenclatural changes were made: All species previously placed in *Scapteriscus s.l.* are transferred to the new genus *Neoscapteriscus*, except *Scapteriscus oxydactilus* and *S. headsi* that are still placed in *Scapteriscus*, *Gryllotalpa chilensis* **reinst. stat.** and *Leptocurtilla maranona*, **n. comb**. Finally, previous contributions about the phylogenetic relationships of molecrickets are contrasted with the results of this research.

Key words: Scapteriscinae, Gryllotalpinae, *Neoscapteriscus, Leptocurtilla*, new classification

Resumen

La monofilia y las relaciones filogenéticas de la familia Gryllotalpidae, han sido investigadas. Veinte seis taxones son incluidos en el grupo interno, con representantes de todos los géneros de Gryllotalpidae, el análisis se basó en 89 caracteres morfológicos (incluyendo caracteres genitales de los machos). Los diferentes análisis soportan la monofilia de Scapteriscinae y Gryllotalpinae, incluyendo sus grupos internos. Se realizan y complementan diagnosis para subfamilias, tribus y géneros, ilustraciones de los taxones y claves para sus identificaciones son proporcionadas. Cuatro tribus han sido propuestas (Indioscaptorini **n. trib.**, Triamescaptorini **n. trib.**, Gryllotalpellini **n. trib.** y Neocurtillini **n. trib.**) y las otras tribus han sido delimitadas (Scapteriscini **stat. rev.** y Gryllotalpini **stat. rev.**). Se describen dos nuevos géneros (*Neoscapteriscus* **n. gen.** y *Leptocurtilla* **n. gen.**) y siete especies nuevas: *Gryllotalpella rehni* **n. sp.**, *G. tindalei* **n. sp.**, *G. lawrencei* **n. sp.**, *Neocurtilla ingrischi* **n. sp.**, *N. townsendi* **n. sp.**, *Leptocurtilla juanmanueli* **n. sp.** y *L. chopardi* **n. sp.** Los siguientes cambios nomenclaturales se realizaron: Todas las especies ubicadas previamente en *Scapteriscus s. l.* se transfieren al nuevo género *Neoscapteriscus* a excepción de *Scapteriscus oxydactylus* y *S. headsi* que aún se ubican en *Scapteriscus, Gryllotalpa chilensis* **reinst. stat.** y *Leptocurtilla maranona* **n. comb.** Finalmente se discute las contribuciones previas sobre las relaciones filogenéticas de los grillos topo y se contrastan con los resultados de esta investigación.

Palabras clave: Scapteriscinae, Gryllotalpinae, *Neoscapteriscus*, *Leptocurtilla*, nueva clasificación

Introduction

The mole cricket family Gryllotalpidae (Orthoptera: Ensifera: Gryllotalpoidea) is a monophyletic group (Zeuner, 1939; Sharov, 1968; Desutter-Grandcolas, 2003; Jost & Shaw, 2006) of the Gryllidea clade, (Desutter, 1990) which contains more than 100 species in three subfamilies (two recent and one fossil), 11 genera (six recent and five fossil) (Eades *et al.*, 2015). Mole crickets are distributed mostly over tropical and some temperate regions. The fossil genera recorded in the group are known from the Cretaceous (Martins-Neto, 1991; Perrichot *et. al.*, 2002).
Members of family Gryllotalpidae are one of the most distinctive groups in the order Orthoptera, characterized by having the first pair of legs quite clearly adapted to digging (Leach, 1815; Chopard, 1949), tumescent pronotum, antennae which are shorter than the head and pronotum together and hind legs only little specialized for jumping, features developed for fossorial life throughout their evolutionary history (Cadena-Castañeda, 2011).

Research in this group has been mostly taxonomical and based on external morphology; some of the characters tend to have phenotypical plasticity if they are not taken in a measurable way (Nickle, 2003; Cadena-Castañeda, 2015). Taxonomical history of the group begins with the description of *Gryllotalpa gryllotalpa* by Linnaeus (1758), although back then it was described as *Gryllus* (*Acheta*) *gryllotalpa*, indicating that it was related to common crickets. Later, Latreille (1802), described the genus *Gryllotalpa* and Leach (1815) officially created the family. Description of the remaining genera were made by the following authors: Scudder in 1868 described *Scapteriscus* (two-dactyls mole cricket), making a distinction of mole crickets with two or four dactyls. Kirby (1906), proposed *Neocurtilla* as a new name for *Curtilla*, with *N. hexadactyla* as type species. Likewise, he proposed *S. oxydactylus* for *Scapteriscus* as a type species, being it noteworthy to mention that Kirby did not acknowledge recognize the name *Gryllotalpa*, and kept most species within genus *Curtilla*. By 1917, Rehn