



A new and endangered species of the pseudoscorpion genus *Lagynochthonius* from a cave in Vietnam, with notes on chelal morphology and the composition of the Tyrannochthoniini (Arachnida, Chelonethi, Chthoniidae)

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Abstract

Lagynochthonius fragilis n. sp. is described from a limestone cave in the Hong Chong karst of Kien Giang Province, southern Vietnam, which is currently threatened by quarrying activities. This is the first record of a troglomorphic species of *Lagynochthonius* Beier, 1951 from continental Asia. The presence of chemosensory setae on the dorsum of the chelal palm is interpreted as a synapomorphy of the tribe Tyrannochthoniini Chamberlin, 1962. The New Zealand genus *Maorichthonius* Chamberlin, 1925 is transferred from the Chthoniini Daday, 1888 to the Tyrannochthoniini. The genus *Tyrannochthoniella* Beier, 1966, also endemic to New Zealand, is assigned to the tribe Chthoniini Daday, 1888. The genus *Stygiochthonius* Carabajal Márquez, García Carrillo & Rodríguez Fernández, 2001, from southern Spain, is synonymized with *Paraliochthonius* Beier, 1956 (n. subj. syn.). Five new combinations are proposed: *Lagynochthonius ovatus* Vitali-di Castri, 1984 (ex *Tyrannochthonius*); *Paraliochthonius barrancoi* (Carabajal Márquez, García Carrillo & Rodríguez Fernández, 2001) (ex *Stygiochthonius*); *P. curvidigitatus* (Mahnert, 1997) (ex *Lagynochthonius*); *P. setiger* (Mahnert, 1997) (ex *Tyrannochthonius*); and *P. superstes* (Mahnert, 1986) (ex *Tyrannochthonius*). A key is given to the genera of the Tyrannochthoniini. The parallel evolution in several groups of pseudoscorpions of a characteristic chelal morphology, here termed *lagyniform*, is discussed. New designations are proposed for the spot-sensilla of the chelal fingers. The so-called 'sensorium' near the tip of the fixed chelal finger of *Lagynochthonius* species is shown to be a modified tooth that has migrated dorsally from the dental margin. The new term *rallum* is introduced as a replacement for the inappropriate term 'flagellum', as applied to the cheliceral blades of pseudoscorpions. The term *bothridial vestibulum* is introduced for the internal cuticular sheath at the base of the bothridia of the trichobothria.

Résumé

Lagynochthonius fragilis n. sp. est décrit d'une grotte calcaire de la province de Kien Giang, au sud du Vietnam, actuellement menacée par une exploitation de carrière. Elle est la première espèce troglomorphe du genre *Lagynochthonius* Beier, 1951 connue de l'Asie continentale. La présence des soies chemosensorielles sur la main de la pince est interprétée comme une synapomorphie de la tribu des Tyrannochthoniini Chamberlin, 1962. Le genre néo-zélandais *Maorichthonius* Chamberlin, 1925 est transféré des Chthoniini Daday à la tribu des Tyrannochthoniini. Le genre *Tyrannochthoniella* Beier, 1966, également endémique de la Nouvelle Zélande, est attribué à la tribu des Chthoniini Daday, 1888. Le genre *Stygiochthonius* Carabajal Márquez, García Carrillo & Rodríguez Fernández, 2001, du sud de l'Espagne, est mis en synonymie avec *Paraliochthonius* Beier, 1956 (n. syn. subj.). Cinq combinaisons nouvelles sont proposées : *Lagynochthonius ovatus* Vitali-di Castri, 1984 (ex *Tyrannochthonius*) ; *Paraliochthonius barrancoi* (Carabajal Márquez, García Carrillo & Rodríguez Fernández, 2001) (ex *Stygiochthonius*) ; *P. curvidigitatus* (Mahnert, 1997) (ex *Lagynochthonius*) ; *P. setiger* (Mahnert, 1997) (ex *Tyrannochthonius*) ; et *P. superstes* (Mahnert, 1986) (ex *Tyrannochthonius*). Une clé de détermination des genres de Tyrannochthoniini est fournie. L'évolution parallèle des facies caractéristiques de la pince, ici qualifié de "lagyniforme", est évoquée chez plusieurs groupes de pseudoscorpions. Des

nouveaux sigles sont proposés pour les sensilles punctiformes des doigts de la pince. Il est démontré que le “ sensorium ” à l’extrémité du doigt fixe de la pince des espèces de *Lagynochthonius* est une dent modifiée qui a migré dorsalement dès la marge dentale. Le terme inapproprié de “ flagelle ”, dans le sens de son application aux lames chélicériennes des pseudoscorpions, est remplacé par *rallum*. Le terme nouveau *vestibule trichobothriale* est introduit pour la gaine cuticulaire à la base des bothridies des trichobothries.

Key words: Pseudoscorpion, Tyrannochthoniini, taxonomy, morphology, endangered species, cave, Vietnam, New Zealand, Spain, sensilla

Introduction

According to Deharveng *et al.* (2005), the Hon Chong-Kien Luong Hills contain the most threatened karst system in the world. These hills, with their unique cave and deep-soil fauna are currently menaced by quarrying activities (Deharveng *et al.* 1995, 2005; Anonymous 2005). They are situated in the Ha Tien Plain of Kien Giang Province, Vietnam, which also contains important wetlands, and efforts are being made to establish a nature reserve to preserve this region (Anonymous 2005). Because these isolated karsts are under imminent threat, there is an urgent need to evaluate their fauna in order to make informed conservation proposals. Extensive sampling of the arthropod fauna of the karsts has therefore been carried out in recent years by a Franco-Vietnamese team. Amongst the pseudoscorpions collected was one species with typically troglomorphic facies, which can therefore be assumed to be endemic to the area. This species, which is first cave-adapted member of the genus *Lagynochthonius* Beier to be recorded from continental Asia, is described here as *Lagynochthonius fragilis* n. sp.

The description of the new species provides an opportunity to discuss certain aspects of the chelal morphology, which allow a better understanding of the limits of both the genus *Lagynochthonius* and the tribe to which it belongs, the Tyrannochthoniini Chamberlin. The occasion is also taken to reconsider the generic position of some troglobitic species described in recent years from Tenerife and southern Spain that have proved difficult to classify.

Terminology

The terminology used generally follows Chamberlin (1931), except that the segments of the palps and legs are named according to Harvey (1992) and the term *rallum* is proposed here as a replacement for the inappropriate ‘flagellum’. The setal formula of the palp femur follows Vachon (1941) (rows in sequence anterior–anterodorsal–dorsal–posterodorsal–posterior–ventral) and that of the carapace follows Gabbutt & Vachon (1963). New designations are proposed here for the sensilla of the chela and the term *trichobothrial vestibulum* is introduced for the internal cuticular sheath at the base of the trichobothria. The new term *lagyniform chela* is defined in the discussion at the end of this paper. The terms *antiaxial* and *paraxial*, which are more commonly used in acarology, refer to the faces of appendages turned away (*antiaxial*) or towards (*paraxial*) the body, assuming that the chelicerae, palps and legs I–II are directed anteriorly, whereas legs III–IV are directed posteriorly. *Antiaxial* therefore has the same meaning as *abaxial* or *ectal*, whereas *paraxial* corresponds to *adaxial* or *mesal*. The choice of terms is of little importance, but the anatomically incorrect use of ‘external’ and ‘internal’ as their equivalents should be avoided. The measurements are taken using Chamberlin’s (1931) reference points; the lengths of the chela and its palm include the pedicel.

Designations for the chelal spot-sensilla

Pseudoscorpions have a maximum of six spot-sensilla on the *antiaxial* face of the chelal fingers: two apical sensilla near the tips of each finger and two sensilla in a more proximal position on the movable finger.