

Two new species of *Centruroides* Marx 1890 (Scorpiones: Buthidae) from Oaxaca, Mexico

CARLOS E. SANTIBÁÑEZ-LÓPEZ^{1,2*} & GERARDO A. CONTRERAS-FÉLIX^{1,2}

¹Posgrado en Ciencias Biológicas, Universidad Nacional Autónoma de México; Av. Universidad 3000, C.P. 04510, Coyoacán, Distrito Federal, México

²Colección Nacional de Arácnidos, Instituto de Biología, Circuito exterior s/n, Ciudad Universitaria, Copilco, Coyoacán A.P. 70-233, Distrito Federal, C.P. 04510, México

*Corresponding author: ironc81@hotmail.com

Abstract

Centruroides franckei, n. sp. and *Centruroides rodolfoi*, n. sp. are described from Oaxaca, Mexico. These species belong to the “striped” group within the genus. Thirteen species of the genus are reported for the state, six of them belonging to the “striped” group (*infamatus-nigrovariatus* subgroup). Both new species are compared to their most morphologically similar species. A map with the six “striped” (*infamatus-nigrovariatus* subgroup) species in the state is also provided.

Key words: Scorpions, diversity, Buthidae, *Centruroides*, “striped” group

Resumen

Centruroides franckei, n. sp. and *Centruroides rodolfoi*, n. sp. son descritas del estado de Oaxaca, México. Estas especies pertenecen al grupo de los “rayados” dentro del género. Trece especies del género son reportadas para este estado, seis de ellas pertenecientes al grupo de los “rayados” (subgrupo *infamatus-nigrovariatus*). Ambas especies nuevas son comparadas con las morfológicamente más similares. Se incluye también un mapa con la distribución de las seis especies “rayadas” (subgrupo *infamatus-nigrovariatus*) en el estado.

Introduction

The genus *Centruroides* Marx, 1890 contains nearly 80 species (Rein, 2012; Ponce-Saavedra & Francke, 2011a, b), and for Mexico 36 species are reported (Armas *et al.*, 2003; Francke, 2010; Ponce-Saavedra & Francke, 2011a, b). Traditionally, since Hoffmann (1932), the genus has been divided into several groups (recently summarized in Ponce-Saavedra & Francke, 2011a, b): a) *gracilis* group, which includes species with a uniform mesosomal coloration (no striped longitudinal bands present), and with the pedipalp chela fingers with nine rows of denticles; b) *bertholdii* group, which differs from the *gracilis* group only in the possession of eight rows instead of nine; c) *thorelli* group, which includes small species, with a spotted body coloration, and arboreal ecomorphotype (*sensu* Prendini, 2001); and d) the “striped” group, which includes species with two dark longitudinal bands along the mesosoma, and one yellow band between them. This last group was also subdivided into two, characterized by the presence of four dark longitudinal bands on the carapace, or with a diffuse pattern. The monophyly of these groups has not been tested by molecular or morphological analysis. However, the recognition of three groups based on coloration is still practical but the characterization of the *bertholdii* group needs to be revised.

Eleven species of the genus *Centruroides* were reported by Santibáñez-López & Ponce-Saavedra (2009) for Oaxaca, Mexico. Five belong to the *gracilis* group and six to the “striped” group (see their table 1). In the present contribution, two new species belonging to the “striped” group (*infamatus-nigrovariatus* subgroup *sensu* Santibáñez-López & Ponce-Saavedra, 2009) are described. *Centruroides franckei*, n. sp., from the southern mountain range of Oaxaca, and *Centruroides rodolfoi*, n. sp., from the Mixteca region.

Acknowledgements

We would like to thank to Dr. Oscar Francke for all his support through these years. To Gabriel Villegas, Hector Montaño, Jesus Cruz, Diego Barrales, and Alejandro Valdez for their help during collecting trips. We would like to thank also to the Posgrado en Ciencias Biológicas of Universidad Nacional Autónoma de México (UNAM), to Consejo Nacional de Ciencia y Tecnología (CONACYT) for financial supporting our graduate studies. Fieldwork in Mexico was conducted under scientific permit FAUT-0175 from Semarnat to O.F. Francke, and partially supported by U.S. National Science Foundation grant DEB 0413453 to L. Prendini and a grant from the Instituto Bioclon to O.F. Francke.

References

- Armas, L., Martín-Frías, E. & Estévez-Ramírez, J. (2003) Lista anotada de las especies mexicanas del género *Centruroides* Marx 1890 (Scorpiones: Buthidae). *Revista Ibérica de Aracnología*, 8, 93–98.
- Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) (2011) Geoinformación, metadatos y mapoteca digital. Available from: <http://www.conabio.gob.mx/informacion/gis/> (Accessed March 2012)
- Francke, O.F. (1977) Scorpions of the genus *Diplocentrus* from Oaxaca, Mexico (Scorpionida, Diplocentridae). *Journal of Arachnology*, 4, 145–200.
- Francke, O.F. (2010) Escorpiones y Escorpionismo en México. Universidad Nacional Autónoma de México. Available from: <http://www.ibiologia.unam.mx/html/main.html> (Accessed February 2013)
- Hadley, A. (2008) CombineZM. Available at: <http://hadleyweb.pwp.blueyonder.co.uk/> (Accessed September 2011)
- Hoffmann, C.C. (1932) Monografías para la entomología médica de México número 2. Los escorpiones de México. Segunda parte: Buthidae. *Anales del Instituto de Biología Universidad Nacional Autónoma de México*, 3, 243–361.
- Jarvis A., Reuter, H.I., Nelson, A. & Guevara, E. (2008) Hole-filled seamless SRTM data Ver. 4, International Centre for Tropical Agriculture. Available at: <http://srtm.csi.cgiar.org> (Accessed 30 September 2012)
- Martín-Frías, E., L. Armas & J. Paniagua-Solís. (2007) Complementos a la taxonomía e historia natural de *Centruroides orizaba* Armas & Martín-Frías, 2003 (Scorpiones: Buthidae). *Boletín Sociedad Entomológica Aragonesa*, 41, 313–319.
- Ponce-Saavedra, J. & Francke, O.F. (2011a) Nueva especie de alacrán del género *Centruroides* (Scorpiones, Buthidae) del estado de Jalisco, México. *Revista Mexicana de Biodiversidad*, 82, 465–474.
- Ponce-Saavedra, J. & Francke, O.F. (2011b) Especie nueva de alacrán del género *Centruroides* (Scorpiones: Buthidae) de la costa del estado de Jalisco, México. *Revista Mexicana de Biodiversidad*, 82, 1163–1175.
- Prendini, L. (2000) Phylogeny and classification of the superfamily Scorpinoidea Latreille 1802 (Chelicerata, Scorpiones): an exemplar approach. *Cladistics*, 16, 1–78.
<http://dx.doi.org/10.1006/clad.1999.0127>
- Prendini, L. (2001) Substratum specialization and speciation in southern African scorpions: the Effect Hypothesis revised. In: Fet, V. & Selden, P.A. (Eds.), *Scorpions 2001. In Memoriam Gary A. Polis*. British Arachnological Society, Burnham Beeches, UK, pp. 113–118.
- Prendini, L. & Wheeler, W.C. (2005) Scorpion higher phylogeny and classification, taxonomic anarchy, and standards for peer review in online publishing. *Cladistics*, 21, 446–494.
<http://dx.doi.org/10.1111/j.1096-0031.2005.00073.x>
- Prendini, L., Crowe, T.M. & Wheeler, W.C. (2003) Systematics and biogeography of the family Scorpionidae (Chelicerata: Scorpiones), with a discussion on phylogenetic methods. *Invertebrate Systematics*, 17, 185–259.
<http://dx.doi.org/10.1071/is02016>
- Rein, J.O. (2012) The Scorpion files. Norwegian University of Science and Technology. Available from: <http://www.ntnu.no/ub/scorpion-files/> (Accessed February 2013)
- Santibáñez-López, C.E. & Ponce-Saavedra, J. (2009) A new species of *Centruroides* (Scorpiones: Buthidae) from the northern mountain range of Oaxaca, Mexico. *Revista Mexicana de Biodiversidad*, 80, 321–331.
- Stahnke, H.L. (1970) Scorpion nomenclature and mensuration. *Entomological News*, 81, 297–316.
- Vachon, M. (1974) Étude des caractères utilisés pour classer les familles et les genres de scorpions (Arachnides). 1. La trichobothriotaxie en arachnologie, sigles trichobothriaux et types de trichobothriotaxie chez les scorpions. *Bulletin du Muséum National d'Histoire Naturelle*, 3, 857–958.
- Vachon, M. (1975) Sur l' utilisation de la trichobothritaxie du bras des pédipalpes des scorpions (Arachnides) dans le classement des genres de la famille des Buthidae Simon. *Comptes rendus Hebdomadiers des Séances de l'Académie des Sciences (Paris)*, série D, 281, 1597–1599.