

THE GENUS *AKYMNOPELLIS* SHELLEY, 2008 (CHILOPODA, SCOLOPENDROMORPHA, SCOLOPENDRIDAE) IN CHILE

Emmanuel Vega-Román^{1,2} Víctor Hugo Ruiz² & Patricia Arancibia-Ávila³

¹ Programa de Doctorado en Educación en Consorcio, Universidad del Bío Bío, Chillán, Chile. Email: emvega@udec.cl — ORCID iD: <http://orcid.org/0000-0002-5666-0433>

² Departamento de Zoología, Facultad de Ciencias Naturales y Oceanográficas, Universidad de Concepción, Concepción, Chile — ORCID iD: <http://orcid.org/0000-0001-7722-9784>

³ Magister Enseñanza de las Ciencias y Magister Ciencias Biológicas, Departamento de Ciencias Básicas, Facultad de Ciencias, Universidad del Bío Bío, Chillán, Chile. — ORCID iD: <http://orcid.org/0000-0002-5814-1725>

ABSTRACT

The Order Scolopendromorpha in Chile is represented by the families Cryptopidae and Scolopendridae, comprehending the genera *Cryptops* Leach, 1815 and *Akymnopellis* Shelley, 2008, respectively. Before the year 2008, the genus *Akymnopellis*, was known to have a geographic distribution area from Atacama through Valdivia. A broader distribution of the genus was reported later. This study reports, the first insular record, new continental records, and a broader geographic area of distribution for the genus in the country. An identification key is provided for species of the genus *Akymnopellis*.

Key words: *Akymnopellis*; new records; area of distribution; Chile.

RESUMEN

El género *Akymnopellis* Shelley, 2008 (Chilopoda, Scolopendromorpha, Scolopendridae) en Chile

El orden Scolopendromorpha en Chile está representado por las familias Cryptopidae y Scolopendridae, conteniendo a los géneros *Cryptops* Leach, 1815 y *Akymnopellis* Shelley, 2008, respectivamente. Hasta el 2008 la distribución conocida del género *Akymnopellis* se extendía desde Atacama a Valdivia. Sin embargo, estudios posteriores indican una distribución del género más amplia. Nuestros resultados muestran el primer registro insular, nuevos registros continentales y una ampliación del rango de distribución del género en el país. Se entrega una clave de identificación para las especies del Género *Akymnopellis*.

Palabras clave: *Akymnopellis*; registros; área de distribución; Chile.

Recibido/Received: 16/10/2017; **Aceptado/Accepted:** 16/01/2018; **Publicado en línea/Published online:** 09/04/2018

Cómo citar este artículo/Citation: Vega-Román, E., Ruiz, V. H. & Arancibia-Ávila, P. 2018. The genus *Akymnopellis* Shelley, 2008 (Chilopoda, Scolopendromorpha, Scolopendridae) in Chile. *Graellsia*, 74(1): e067. <https://doi.org/10.3989/graellsia.2018.v74.188>

Copyright: © 2018 SAM y CSIC. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International (CC BY 4.0) License.

Introduction

Chilopods within the Order Scolopendromorpha have a worldwide distribution and are active and agile predators (Edgecombe & Giribet, 2007;

Vega-Román *et al.*, 2014; Chiarello, 2015). Taxonomy of the Order Scolopendromorpha is based upon the number of locomotor appendages and the presence or absence of ocelli. According to that, chilopods of the Order Scolopendromorpha

can be classified into five families: Cryptopidae, Mimopidae, Plutoniumidae, Scolocryptopidae, and Scolopendridae (Giribet, 2015).

In Chile, the Order Scolopendromorpha is represented by the families Cryptopidae with the genera *Cryptops* Leach, 1815 and Scolopendridae, with the genera *Akymnopellis* Shelley, 2008. The latter, in turn, is represented by the species *Akymnopellis chilensis* (Gervais, 1847), *A. laevigata* (Porat, 1876), and *A. platei* (Attems, 1903). These species can be differentiated by the superposition of the cephalic plate to tergite 1, the spinal arrangement in the terminal appendages, and the presence of a transverse suture in tergite 20 (Shelley, 2008).

The latest revision of the genus (Shelley, 2008) reports that *Akymnopellis* is geographically distributed in Chile from Atacama through Valdivia. Posteriorly, Vega-Román *et al.* (2014) expanded the southern range to Torres del Paine, Provincia de Ultima Esperanza, Chile. Therefore, the objective of this study is to establish a new range of distribution of *Akymnopellis* in Chile, based on published information and upon a revision of the reported distribution of the specimens of the chilopod collection of the Museum of Zoology at the University of Concepción (MZUC-UCCC). Furthermore, this study adds new information recorded from specimens collected from different areas of the country by the first author of this paper.

Materials and methods

Information about *Akymnopellis* in Chile was done through a thorough literature search. Individual specimens deposited in the Museum of Zoology at the University of Concepción (MZUC-UCCC) and from the personal collection of the authors were also reviewed.

Taxonomical analyses were performed for each specimen; the diagnostic characteristics were taken from the works of Chamberlin (1955), Shelley (2008), and Vega-Román & Ruiz (2014). Every individual specimen was observed using stereoscopic microscopy and its taxonomical characteristics were analyzed using specific classification keys. Finally, new specimens collected by the authors were deposited in the Museum of Zoology at the University of Concepción (MZUC-UCCC).

The following codes were adopted: NR: New Record; ARD: Expanded Distribution Range; IND: Undetermined.

Results

The study by Shelley (2008) included the records of Gervais (1847), Silvestri (1899, 1905), Porter (1912), Chamberlin (1955) and Bucherl (1974). The



Fig. 1.— Locations where *Akymnopellis* species have been registered in South America: *A. platei* = ▲, *A. laevigata* = ●, *A. chilensis* = ★. Modified from Shelley (2008).

Fig. 1.— Localidades sudamericanas con citas de especies de *Akymnopellis*: *A. platei* = ▲, *A. laevigata* = ●, *A. chilensis* = ★. Modificado de Shelley (2008).

present study additionally includes the records of Vega-Román *et al.* (2014) (Fig. 1).

Based on the specimens review and the literature survey, the distribution range of the genus *Akymnopellis* can be established from the Niebla Oasis in La Chimba (Antofagasta Region) to the Torres del Paine National Park (Provincia de Ultima Esperanza) (Table 1).

Twelve new records were obtained for *A. chilensis* and four records for *A. platei*. Given that, the distribution of the latter is expanded to Cachimal de la Costa in the Antofagasta province (North of Chile) and to the town of Hualpén in the Biobío province (South of Chile). Specimens of *A. chilensis* kept their known distribution. Specimens of *A. laevigata* were not found. Seven specimens could not be identified at the species level, all of which were considered as indeterminate. The specimens collected at Quiriquina Island become the first insular record of the Order Scolopendromorpha in Chile (Table 1).

Table 1.— New records and expanded distribution range for the species *A. chilensis* and *A. platei* in Chile. Location and number of reviewed specimens are included. The total number of specimens recorded in the Table is 36. Codes: NR = New Record; ARD = Expanded Distribution Range; IND = Undetermined.

Tabla 1.— Nuevos registros e incremento del área de distribución de *Akymnopellis chilensis* and *A. platei* en Chile. Se incluyen la localidad y el número de ejemplares revisados (36). Abreviaturas: NR = Nuevo registro; ARD = ampliación del rango de distribución; IND = sin determinar.

Species	Location	Collection date	N° spec.	
<i>A. chilensis</i>	Bio-Bío Province. Villa Peluca (near Antuco).	03-07-2011	2	NR
<i>A. chilensis</i>	Santiago Province. Santiago, El Cepillo Gorge.	25-07-2000	1	NR
<i>A. chilensis</i>	Talca Province. Constitución.	12-06-2012	2	NR
<i>A. chilensis</i>	Bio-Bío Province. Polcura.	20-12-2012	1	NR
<i>A. chilensis</i>	Concepción Province. Lirquén, La Huasca Hill.	05-02-2011	1	NR
<i>A. chilensis</i>	Arauco Province. Raquí 063 1962/587 6531.	21-09-2011	1	NR
<i>A. chilensis</i>	Concepción Province. Lirquén, La Huasca Hill.	11-09-2010	3	NR
<i>A. chilensis</i>	Concepción Province. University district.	12-11-2010	1	NR
<i>A. chilensis</i>	Concepción Province. Lirquén, Rahue Hill.	26-06-2010	1	NR
<i>A. chilensis</i>	Malleco Province. Angol, Nahuelbuta Range.	17-06-1962	2	NR
<i>A. chilensis</i>	Malleco Province. Angol, Nahuelbuta Range.	18-08-1962	3	NR
<i>A. chilensis</i>	Malleco Province. Angol, Nahuelbuta Range.	15-07-1968	4	NR
<i>A. chilensis</i>	Torres del Paine National Park.	Vega-Román <i>et al.</i> (2014)	2	-
<i>A. platei</i>	Antofagasta Province, Cachimal de la Costa.	24-07-1964	2	ARD
<i>A. platei</i>	La Chimba National Reserve.	30-10-2009	1	ARD
<i>A. platei</i>	Concepción Province. Lirquén, Rahue Hill.	25-06-2010	1	ARD
<i>A. platei</i>	Concepción Province, Hualpén.	06-10-2004	1	ARD
IND.	Atacama Province, Lomas de Huasco.	24-07-1964	2	ARD
IND.	52 Km from Rancagua, near the hydroelectric dam.	25-08-2011	1	-
IND.	Atacama Province. Huasco Beach.	18-12-1963	1	-
IND.	Concepción Province, Quiriquina Island.	22-11-1969	2	-
IND.	Concepción Province. Escuadrón.	18-02-1973	1	-

Identification key for Scolopendromorpha families and species of the genus *Akymnopellis* in Chile

1. Adults with 19 to 21 pairs of legs (including terminal legs); with or without ocelli.....**2**
 - With 23 pairs of legs (including terminal legs); without ocelli **Family Scolopocryptopidae**
2. With ocelli on cephalic plate (Fig. 2A).....
 - **Family Scolopendridae. *Akymnopellis* spp. 3**
 - Without ocelli on cephalic plate (Fig. 2B) **Family Cryptopidae; *Cryptops* spp.**
3. Tergite 21 with mid-dorsal suture (Fig. 2C).....**4**
 - Tergite 21 without longitudinal mid-dorsal suture (Fig. 2D) ***A. chilensis* (Gervais, 1847)**
4. Prefemur of the last pair of legs is strongly sclerotized (Fig. 2E).....***A. platei* (Attems, 1903)**
 - Prefemur of the last pair of legs is slightly sclerotized (Fig. 2F) ***A. laevigata* (Porat, 1876)**

Discussion

The species *A. laevigata* is widely distributed throughout South America with records in Argentina, Peru, Brazil, Uruguay, French Guiana, Venezuela, Colombia, and Chile (Shelley, 2008), while *A. chilensis* and *A. platei* have only been registered in Argentina and Chile. Based on the literature search and collection specimens observations, the last two species are widely distributed in Chile, ranging from the Antofagasta Region to Torres del Paine National Park in the Provincia of Ultima Esperanza (Vega-Román *et al.*, 2014). Vega-Román *et al.* (2014) erroneously locates Torres del Paine in the Magallanes Region, whereas administratively and geographically belongs to the Provincia of Ultima Esperanza in Chile.

The absence of records in the north of Chile could be explained by the unfavorable conditions of the desert environment for chilopods. The desert could be a geographical barrier for species of the genus *Akymnopellis* and for other species of the Order Scolopendromorpha.

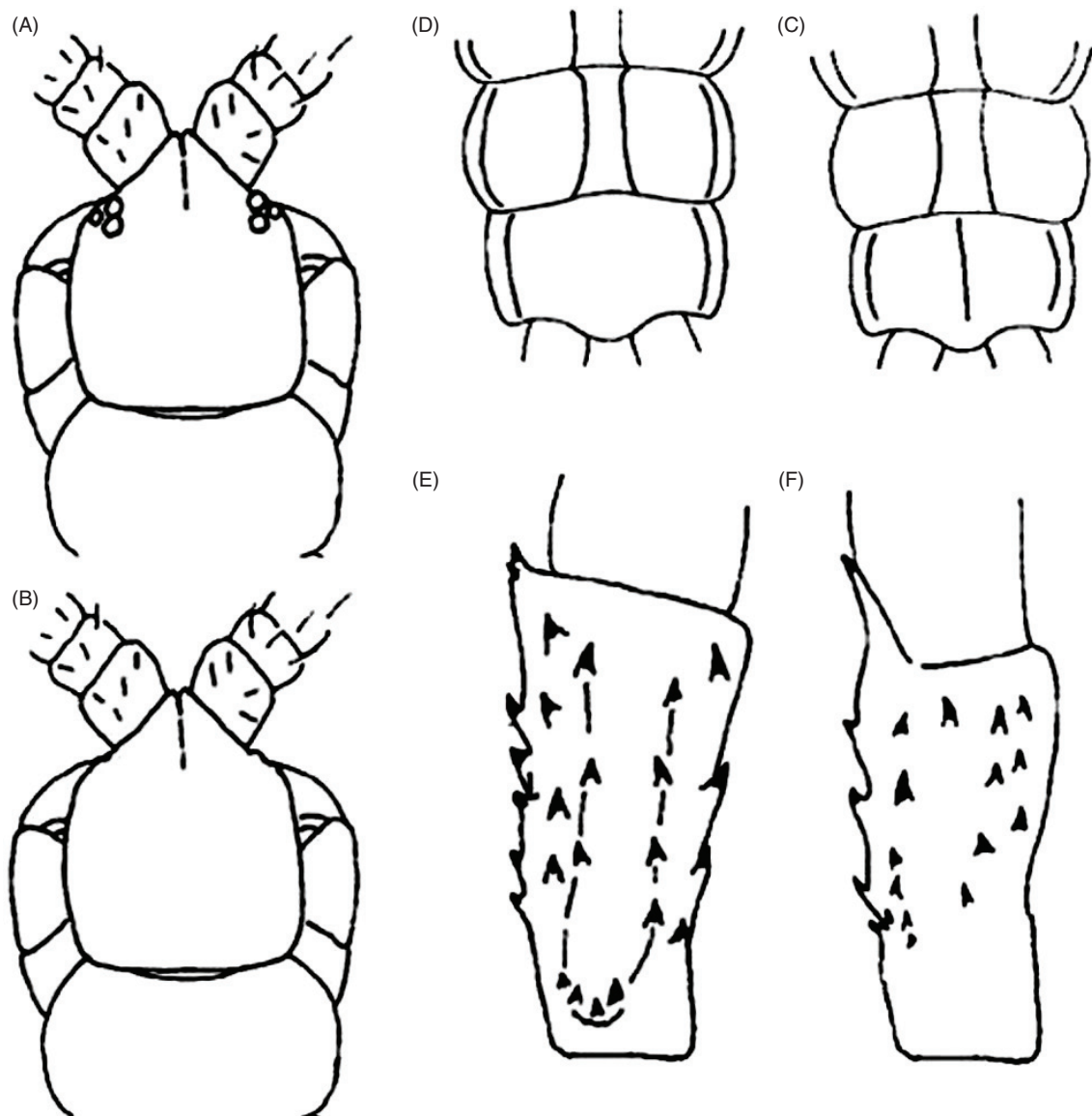


Fig. 2.— Morphological characteristics for species determination of the genus *Akymnopellis* in Chile. A) Lateral ocelli on the cephalic plate. B) Absence of ocelli on the cephalic plate. C) Dorsal view. Tergite 21 with longitudinal mid-dorsal suture. D) Dorsal view. Tergite 21 without longitudinal mid-dorsal suture. E) Ventral view. Last pair of legs is strongly sclerotized, with spines on the inner side. F) Ventral view. Last pair of legs is slightly sclerotized, with no spines on the inner side. Modified from Shelley (2008).

Fig. 2.— Características morfológicas para la determinación de las especies del género *Akymnopellis* en Chile. A) Ocelli laterales en la placa cefálica. B) Ausencia de ocelli en la placa cefálica. C) Terguito 21 con sutura medio-dorsal longitudinal. D) Terguito 21 sin sutura medio-dorsal longitudinal. E) Vista ventral. Último par de patas muy esclerotizadas, con espinas en la cara interna. F) Vista ventral. Último par de patas ligeramente esclerotizadas, sin espinas en la cara interna. Modificado de Shelley (2008).

On the other hand, several species of the order Scolopendromorpha present peculiarities which allow them to resist desiccation and high temperatures in the arid zones of the world (Khana, 2005; Webber & Graham, 2013). Therefore, some other factor or factors might explain why the species has not been found in the north of Chile.

Individuals of *A. laevigata* have records only in the North-Central Zone of Chile (Copiapó, Valparaíso, Viña del Mar, Quilpué, Coquimbo, Los Vilos, Zapallar, Aconcagua, and Santiago) (Shelley, 2008). This limited

distribution, as well as the low amount of records could be due to a scarce sampling effort and the incipient research about these kinds of arthropods in Chile. Vega-Román *et al.* (2011) indicate that the bibliographical list for our country considering these arthropods contains no more than 30 publications from 1847 to 2011; which averages only one publication every six years. The Museum of Zoology at the University of Concepción (MZUC-UCCC) currently holds a unique collection with copies of all Chilopoda orders registered in Chile until 2017 (Vega-Román *et al.*, 2017); once again

demonstrating the lack of knowledge of the group in the country. This situation leads to the underestimation of the actual distributions and records of the species.

These arthropods are generally found in the soil and humus (therefore considered edaphic and humic inhabitants) of areas with great vegetation coverage (Palacios & Vargas *et al.*, 2007). However, there are also records of myriapods in urban areas, and some species are considered synanthropic (Cupul-Magaña, 2016; Giurginca *et al.*, 2016); therefore, the distribution of these species might not necessarily be related to any specific vegetation structure.

This study contributes towards clarifying the distribution of the genus *Akymnopellis* in Chile. New localities are reported, the range of distribution is increased and an identification key for species of the genus *Akymnopellis* in Chile is provided.

Acknowledgements

The authors would like to thank to the staff of the Museum of Zoology of the University of Concepcion (MZUC-UCCC) and especially to Dr. Jorge Artigas for loan of the MZUC-UCCC material. Emmanuel Vega-Román was supported by a doctoral fellowship from the Chilean National Commission for Scientific and Technological Research (CONICYT) CONICYTPCHA/Doctorado Nacional/2017-2171666. Furthermore, the authors would like to thank Mr. Rodolfo Caro-Barbieri for assistance at various stages of the project financed by Dirección de Posgrado, Universidad del Bío-Bío, Chile.

References

- Bucherl, W., 1974. Die Scolopendromorpha der Neotropischen Region. *Symposia of the Zoological Society of London*, 32: 99–133.
- Chamberlin, R., 1955. Reports of the Lund University Chile Expedition 1948–1949. The Chilopoda of the Lund University and California Academy of Science Expeditions. *Acta Universitatis Lundensis N.S.*, 215(4): 1–44.
- Chiarello, T., 2015. Centipede care and husbandry. *Journal of Exotic Pet Medicine*, 24(3): 326–332. <https://doi.org/10.1053/j.jepm.2015.06.011>
- Cupul-Magaña, F., 2016. Primer registro del ciempiés *Rhysida longipes* (Newport, 1845) (Scolopendromorpha, Scolopendridae) en Cuba. *Revista Cubana de Ciencias Biológicas*, 4(3): 1–3.
- Edgecombe, G. & Giribet, G., 2007. Evolutionary Biology of Centipedes (Myriapoda: Chilopoda). *Annual Review Entomology*, 52(1): 151–170. <https://doi.org/10.1146/annurev.ento.52.110405.091326>
- Gervais, P., 1847. Myriapodes. In: C.A. Walckenaer & P. Gervais (eds.). *Histoire Naturelle des Insectes Aptères*, 4: 1–33, 577–595.
- Giribet, G., 2015. Orden Scolopendromorpha. *Ide@, Ibero Diversidad Entomológica @ccessible*, 30: 1–9. Accesible at <http://sea-entomologia.org/IDE@/>
- Giurginca, A., Baba, S. C. & Munteanu, C. M., 2016. New data on the Oniscidea, Diplopoda and Chilopoda from Urban parks Bucharest. *North-Western Journal of Zoology*, 13(2): e161306 [29 pp.]. Accesible at: <http://biozoojournals.ro/nwzj/content/v13n2.html>
- Khana, V., 2005. Scolopendrid centipedes of desert national park, Rajasthan (Chilopoda: Scolopendromorpha). *Zoological Survey of India*, 104: 121–127.
- Palacios-Vargas, J. G., Castaño-Meneses, G., Gómez-Anaya, J. A., Martínez-Yrizar, A., Mejía-Recamier, B. E. & Martínez-Sánchez, J., 2007. Litter and soil arthropods diversity and density in a tropical dry forest ecosystem in western México. *Biodiversity and Conservation*, 16(3): 3703–3717. <https://doi.org/10.1007/s10531-006-9109-7>
- Porter, C., 1912. Introducción al estudio de los miriápodos. Catálogo de las especies chilenas. *Boletín del Museo Nacional de Historia Natural*, 4:16–68. <http://publicaciones.mnhn.cl/668/w3-article-38739.html>
- Shelley, R., 2008. Revision of the centipede genus *Hemiscolopendra* Kraepelin, 1903: Description of *H. marginata* (Say, 1821) and possible misidentifications as *Scolopendra* spp.; proposal of *Akymnopellis*, n. gen., and redescriptions of its South American components (Scolopendromorpha: Scolopendridae: Scolopendrinae). *International Journal of Myriapodology*, 1(2): 171–204. <https://doi.org/10.1163/187525408X395931>
- Silvestri, F., 1899. Contribución al estudio de los quilópodos chilenos. *Revista Chilena de Historia Natural*, 3(10–11): 141–152. <http://rchn.biologiachile.cl/es/contents/1899v3n10-11.php>
- Silvestri, F., 1905. Fauna Chilensis. Myriapoda. *Zoologische Jahrbucher*, 6(3): 715–772.
- Vega-Román, E. & Ruiz, V. H., 2014. Clave de identificación para las familias de quilópodos (Myriapoda: Chilopoda) en Chile. *Boletín de la Sociedad Entomológica Aragonesa*, 54(2): 411–413.
- Vega-Román E., Ruiz, V. H., Arancibia-Ávila, P. & Mora-Pérez, A., 2017. La colección de quilópodos del Museo de Zoología: Una visión preliminar. *Archivos Entomológicos*, 17: 145–149. Accesible at: http://www.aegaweb.com/archivos_entomologicos/vol_17_2017.htm
- Vega-Román, E., Ruiz, V. H., Arancibia-Ávila, P. & Soto-Saravia, R., 2014. Primer registro de *Akymnopellis chilensis* (Gervais, 1847) (Scolopendridae, Scolopendromorpha, Chilopoda) en el extremo sur de Chile. *Anales del Instituto de la Patagonia*, 42(2): 85–88. <https://doi.org/10.4067/S0718-686X2014000200008>
- Vega-Román, E., Soto-Saravia, R. & Ruiz, V. H., 2011. Índice bibliográfico de los miriápodos de Chile desde 1847 al 2011. *Boletín de la Sociedad de Biología de Concepción*, [2010–2011], 80: 89–91.
- Webber, M. M., Graham, M.R. 2013. An Arizona bark Scorpion (*Centruroides sculpturatus*) found consuming a venomous prey item nearly twice its length. *Western North American Naturalist*, 73(4): 530–532. <https://doi.org/10.3398/064.073.0406>