

## Scientific Note

**First record of the genus *Polyxenus* Latreille (Diplopoda: Penicillata: Polyxenida) in the supralittoral zone of Cocholgüe, Biobío Region, Chile**

Primer registro del género *Polyxenus* Latreille (Diplopoda: Penicillata: Polyxenida) en la zona supralitoral de Cocholgüe, Región del Biobío, Chile

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ZooBank: urn:lsid:zoobank.org:pub: BBA44C9A-8C3F-4806-8D4B-C347D1A638CD  
<https://doi.org/10.35249/rche.45.3.19.11>

**Abstract.** Diplopods are commonly found in edaphic habitats, but can also be present in other types of environments including supralittoral zones. In Chile, there are few records of halophilic diplopods, but none of them are from supralittoral environments. Therefore, this study reports the first record of a halophilic diplopod belonging to the genus *Polyxenus* Latreille in Chile, which was collected from the rocky supralittoral of Cocholgüe, Biobío Region. The presence of these specimens in the supralittoral zone is discussed together with the possible peculiarities that this type of myriapods presents in this unusual ecosystem.

**Key words:** Myriapods, halophile, rocky supralittoral zone, intertidal zone, edaphic habitat.

**Resumen.** Los diplópodos se encuentran comúnmente en los hábitats edáficos. Sin embargo, también están presentes en otros tipos de ambientes incluyendo zonas supralitorales. En Chile, existen escasos registros de diplópodos halófilos, pero ninguno de estos registros son de ambientes supralitorales. Por lo tanto, en este trabajo se entrega el primer registro de un diplópodo halófilo perteneciente al género *Polyxenus* Latreille en un hábitat supralitoral de Chile. Los registros se obtuvieron en el supralitoral rocoso de la localidad de Cocholgüe, Región del Biobío. Se discute respecto de la presencia de estos especímenes en la zona supralitoral junto con las posibles peculiaridades que este tipo de miriápodo presenta en este inusual ecosistema.

**Palabras clave:** Miriápodos, halófilo, supralitoral rocoso, zona intermareal, hábitat edáfico.

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Intertidal and supralittoral zones are highly productive due to the proliferation of algae and plant matter carried by the tides (Barber 2009). In several stages of decomposition, this matter generates energy for a wide variety of organisms, including arthropods, occasionally myriapods (Barber 2009).

Halophilic species are those associated with supralittoral and intertidal zones (Short and Huynh 2011). Except for some species from the Australian and European coasts, halophilic

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Received 30 May 2019 / Accepted 22 July 2019 / Published online 9 August 2019

Responsible Editor: José Mondaca E.

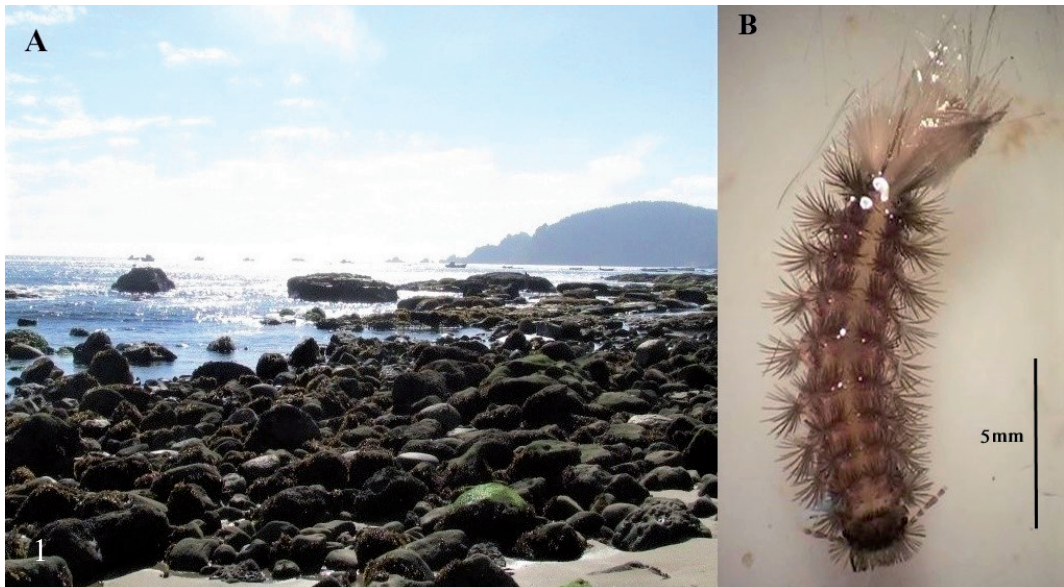
myriapods are scarce. The first record of a halophilic myriapod was a description of the chilopod *Strigamia maritima* Leach, 1817 from the shores of Great Britain and Ireland in Europe. Several subsequent studies were carried out including myriapods (Plateau 1890; Hennings 1903; Crabill 1960; Lewis 1960, 1981; Pereira and Minelli 1993; Pereira 1999; Barber 2009, 2011).

The first description of the halophilic myriapods in Chile was made by Verhoeff (1924) who describes three species of chilopods present in the supralittoral coasts of the Archipelago Juan Fernández. Later, Vega-Román *et al.* (2011) searched the supralittoral zone of Cocholgüe (Biobío Region) and registered the presence of *Cryptops patagonicus* Meinert, 1886 but did not find diplopods.

The order Polyxenida is a taxon that contains small-sized species (2-5 mm) with a soft body without calcareous incrustations and with silk-coated diplo-segments arranged in tufts or series (Melic 2011). The specimens are commonly found in leaf litter, actively participating in its degradation and the formation of humus. Three species have been identified in Chile: *Polyxenus chilensis* Silvestri, 1903, *Polyxenus rosendinus* Silvestri, 1903 and *Polyxenus rossi* Chamberlin, 1957, registered in Temuco, San Rosendo, and Zapallar, respectively (Chamberlin 1957). These three species have been found in association with wooded areas and also decaying wood. Thus, the present study delivers the first record of an indeterminate species of the genus *Polyxenus* (Diplopoda: Penicillata: Polyxenida), at the supralittoral level in Chile.

The sampling area corresponds to the rocky supralittoral zone of Cocholgüe, Biobío Region (Fig. 1a). This area is characterized by a wide intertidal platform of almost 100 meters in length and a supralittoral band of almost 30 meters in width. The samples were collected directly from the substrate, using an alcohol spray and a wet brush. The specimens were stored in jars and immersed in 70% alcohol and were then observed with a stereoscopic microscope and photographed with a Nikon D-3000 camera.

**Sample studied.** One specimen (Fig. 1b) of indeterminate sex. Collection location: Caleta Grande, Cocholgüe (36°35'12"S, 72°58'35"W), Biobío Region, March 23, 2015, collectors: E. Vega-Román & V.H. Ruiz. The specimen was deposited at the Museum of Zoology of the University of Concepción, Chile (MZUC-UCCC).



**Figure 1.** A. Rocky supralittoral zone of Cocholgüe, Biobío Region, Chile. B. Dorsal view of the specimen collected.

One *Polyxenus* specimen of indeterminate sex was found on the rocky supralittoral zone of Cocholgue, Biobío Region. Therefore, we establish here the first record of this type of myriapods in coastal environments in our country.

The coastal strip of Cocholgue is generally very productive given the large amounts of algae brought in by the tides; which would provide nutrition for detritivore organisms such as diplopods (Barber 2009; Bueno-Villegas 2012). Additionally, the rocky shores have fissures used as shelter against predators and weather protection providing stable microenvironments. Furthermore, the salinity of the sea generates a negative effect on parasites due to unfavorable conditions for their development, favoring the settlement of diverse species (Lewis 1981).

Another aspect to consider is the possibility flow of matter and energy from the littoral zones to terrestrial environments, profoundly influencing ecosystem structure and dynamics (Polis and Hurd 1995; Nakano and Murakami 2001; Polis *et al.* 2004). This flow favors the inclusion of diverse taxa, especially insects, chelicerates (Polis and Hurd 1995), and myriapods (Barber 2009, 2011).

The evolutionary pattern of arthropods is also worth of consideration. Myriapods are closely related to crustaceans (Budd and Telford 2009; Regier *et al.* 2010) and, therefore, their evolutionary origin is most likely aquatic. This type of records of diplopods in coastal areas could be considered a relic of the evolution of the group in its transition from marine to terrestrial environments (Golovatch and Kime 2009).

The specimen collected lost some physical characteristics after storage; therefore identification at species level could not be done. Given the small size of these millipedes, the absence of identification keys at a specific level, Huynh and Veenstra (2018) suggest that identification should be done using genetic tools or observation through a scanning electron microscope.

On the other hand, we know that three species of polyxenids have been registered in Chile, and that, to date, none of them had been observed in coastal areas, which makes specimen approximation at a specific level difficult. Additionally, the species registered in Chile have not been documented in the Biobío Region (only known in Temuco, San Rosendo, and Zapallar); therefore, venturing to classify taxonomically at the species level would be hasty and untidy.

The presence of the family Polyxenidae in the Cocholgue supralittoral zone is unusual, despite being common on Australian coasts (Short and Huynh 2011). In Chile, the three species registered to the moment have been documented under the bark of trees and associated with leaf-litter life. Considering the size, the disposition, and the number of bristles as well as the habitat of the registered specimen, we suggest a thorough examination of the morphological characteristics that may reveal the presence of a new species.

## Acknowledgments

We thank CONYCIT-PCHA/National Ph.D. /2017-21171666 grant, and Dra. Margarita Marchant San Martín for her comments and suggestions.

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