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A julid milliped in Chilean Patagonia, and a compilation of ordinal representatives in South America and associated islands (Diplopoda: Julida)

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Abstract. An adventive female Julidae (Julida), discovered in a moist, grassy depression in the Peninsula de Brunswick south of Punta Arenas, Chile, and assigned to *Cylindroiulus* Verhoeff, 1894, is the first vouchered milliped from southern Patagonia. The southernmost milliped ever collected in Chile, South America, and the Western Hemisphere, it may also constitute the southernmost in the world as the site is only ~1,176 km (735 mi) northwest of the Antarctic Peninsula. Records are consolidated of the two families, three genera, and five species of this Holarctic order that are known from South America. They are documented from Argentina, Chile, and southern Peru and Brazil; three species are known from the Juan Fernandez Islands.

Key words: Blaniulidae, *Brachyiulus*, Chile, *Cylindroiulus*, Juan Fernandez Islands, Julidae, *Nopoiulus*.

Introduction

The world's southernmost indigenous diplopod is *Notonaia campbellensis* Johns, 1970 (Chilognatha: Polydesmida: Dalodesmidae) on Campbell Island, subAntarctic New Zealand (52°36'S) (Johns 1964, 1970; Shelley and Golovatch 2011). The southernmost record from South America is the type locality of the penicillate *Propolyxenus patagonicus* (Silvestri, 1903) (Polyxenida: Polyxenidae), Puerto San Julián (49°18'S) near the Bay of San Julián on the coast of Santa Cruz Province (Prov.), Argentina, around 3° (~333 km, 207 mi) to the north. Silvestri (1903) mistakenly placed the town on Rio Santa Cruz, ~80 km (50 mi) to the southwest, and the error could be with either the river or town. Condé and Massoud (1974) repeated Silvestri's locality; Mauriès (1998) cited Santa Cruz Prov.; and Shelley and Golovatch (2011) reported an unknown site along the river. While *P. patagonicus* surely inhabits both areas, we believe the town is probably correct, but the matter is moot because the type and only voucher specimen is lost and a neotype is needed. Whichever is correct, both are in "Patagonia," the southernmost region of South America that is shared by Argentina and Chile. Although Patagonia extends southward to include Cape Horn (55°58'S), the southernmost headland of Isla Hornos, Chile, and Islote Águila (56°33'S) of the Diego Ramírez islands, Chile, the southernmost land associated with the continent, no millipeds, indigenous or introduced, have been taken in South America south of the Santa Cruz River (Shelley and Golovatch 2011). The southernmost vouchered records are of native chilognaths, *Anaulacodesmus lacustris* and *Monenchodesmus inermis nahuelhuapiensis*, both by Schubart,

1954 (Polydesmida: Dalodesmidae), and *Argentocricus subtriangularis* Hoffman and Golovatch, 2012 (Spirobolida: Rhinocricidae), all from Parque Nacional Alerces (42°48'S), in the Andes Mountains of Chubut Prov., Argentina (Shelley and Golovatch 2011, Hoffman and Golovatch 2012). *Tsagonus muermo* Chamberlin, 1957 (Polydesmida: Dalodesmidae), occurs in X Región de Los Lagos, Chile, a little to the north (Chamberlin 1957, Shelley and Golovatch 2011). Parque Nacional Alerces is around 7° (741 km, 463 mi) northwest of Puerto San Julián and 10° (1,110 km, 690 mi) north of the latitude of Campbell Island. Discounting the unvouchered type of *P. patagonicus*, the southernmost 1,590 km (994 mi) of South America and associated southern islands lack records of both native and introduced millipeds.

We now alleviate this deficiency as EDM and DAF discovered a juliformian in January 2013 in mixed woodland/shrubland habitat south of Punta Arenas, Chile, on the Peninsula de Brunswick, the southernmost part of continental South America that is separated from Isla Grande de Tierra del Fuego to the east by the Strait of Magellan. The individual is an adult female measuring around 14.2 mm long and 1.1 mm wide (Fig. 1); with distinct metazonal striae, it is a representative of the Eurasian family Julidae (order Julida) (Enghoff 1993, Shelley and Golovatch 2011). We assign it to *Cylindroiulus* Verhoeff, 1894 (tribe Cylindroiulini), the only cylindroiulinine genus introduced into the New World. The locality, Puerto de Hambre, at the abandoned settlement “Ciudad del Rey Don Felipe,” is approximately 1,136 and 566 km (710 and 354 mi) south of Parque Nacional Alerces and south-southeast of Puerto San Julián, respectively. The millipede was found in a wet, grassy depression under an object – a rock, brick, or piece of cardboard – in a spot with trails that may have been formed by grazing cattle. The area sees substantial human traffic, as evidenced by considerable trash and beer bottles; there were also many cow pies, particularly in drier patches, and flooded channels that may have been eroded by cows. Lacking a photo of the actual spot, we present (Fig. 2–3) comparative pictures of wet and dry grassy habitats in the Puerto de Hambre region. Though adventive, this female is the southernmost diplopod recorded from Chile, South America, and the Western Hemisphere, and perhaps also the world. Blower (1985) reported *Cylindroiulus latestriatus* (Curtis, 1845) (Julida: Julidae) from “St. Paul Island (Antarctica),” which is the basis for Lee’s citation (2006) of Antarctica in general. However, St. Paul Island is in the “French Southern and Antarctic Lands” in the Southern Indian Ocean and substantially north of this glaciated continent; coordinates are 38°43'S and 77°13'E. Thus, St. Paul actually lies ~3,443 km (2,152 mi) north of Antarctica and around 15° (1,665 km, 1,041 mi) north of the latitude of the Chilean site; the latter, by contrast, is only ~1,176 km (735 mi) northwest of the Antarctic Peninsula. The millipede is deposited in the California Academy of Sciences, San Francisco (CAS); sample data are as follows:

Chile: *XII Región Magallanes, Provincia de Magallanes*, Puerto de Hambre (53°37'N, 70°56'S), 51.2 km (31.9 mi) S Punta Arenas, F, 10 January 2013, E.D. Morrill, D.A. Faber, C.E. Griswold.

Julida of South America and associated islands

Julida is exclusively Holarctic and hence not native to South America (Brölemann 1909, Hoffman 1980, Enghoff 1993, Shelley and Golovatch 2011). The closest indigenous julidan is “*Parajulus schmidti australis*” Shelley, 2008 (Parajulidae: Parajulinae: Parajulini), in El Salvador, around 1,464 km (915 mi) northwest of the Panama/Colombia border (Shelley 2008), so all South American julidans have been introduced by man. Ostensibly native South American species described in, or assigned to, *Julus* L., 1758, by early authors (Brandt 1833, 1840, 1841; Lucas 1840; Gervais 1847; Saussure 1860; Karsch 1881; Tömösváry 1885; etc.) belong to the other juliformian orders, Spirobolida and Spirostreptida. Brölemann (1909) summarized South American julidans, and species addressed/described by Brandt and Gervais were further treated and/or modernly reassigned by Golovatch and Hoffman (2000) and Mauriès et al. (2001). The only name that Brölemann (1909) could not then place was that of the Brazilian species, *Julus crassicornis* Mikan, 1834, subsequently cited by Brandt (1840, 1841) and Gervais (1847), which he considered a *nomen nudum*.

To the best of our knowledge, the first South American record of an authentic julidan is of the blaniulid, *Nopoiulus kochii* (Gervais, 1847) (= *Blaniulus pulchellus* Leach, 1814), from a garden in old Cavanha, Iquique, Chile (Attems 1903:81), which Brölemann (1909) overlooked. To facilitate studies on continental Diplopoda, RMS scoured potential references and found records for two julidan families, three genera, and five species that we cite taxonomically below under modern names with localities



Figure 1. Lateral view of left side of the Patagonian cylindroiuline julid; damaged section caused by handling with forceps. Photo courtesy of A. E. Bogan.

and citations. All are from southern South America, particularly Chile, and occurrences are depicted in Fig. 4. More surely exist, but some better known and important works, like that of Carl (1914) on Colombia, lack them. Most records appear under old or archaic names that we also cite. Sources for modern names are Blower (1985) and the Fauna Europaea website (<http://www.faunaeur.org/>); taxonomy is per Hoffman (1980), Enghoff (1990), Shelley (2003), Enghoff et al. (2011), and Shear (2011).

Order Julida Brandt 1833.

Argentina in general (Mauriès 1998).

Superfamily Blaniuloidea C. L. Koch, 1847.

Family Blaniulidae C. L. Koch, 1847.

South America in general (Attems 1926).

Subfamily Nopoiulinae Verhoeff, 1911.

Genus *Nopoiulus* Menge, 1851.

Chile in general (Attems 1926).

***Nopoiulus kochii* (Gervais, 1847)** (= *N. venustus* Meinert, 1868; *Blaniulus pulchellus* Leach, 1814; *N. pulchellus*).

Neotropical Region in general (Fauna Europaea).

South America in general (Pedroli-Christen 1993, Lee 2006).

Chile in general (Schubart 1963). *I Tarapacá Region, Iquique Prov.*, Iquique, garden in old Cavanha (Attems 1903). *Santiago Metropolitan Area, Santiago Prov.*, Santiago, botanical gardens of Quinta Normal (Chamberlin 1957). *Valparaíso Reg. Valparaíso Prov.*, Valparaíso (Schubart 1942a); *Juan Fernandez Islands* in general (Chamberlin 1957, Kraus 1959, Schubart 1963), *Robinson Crusoe I.* (Ilha Más a Tierra) (Verhoeff 1924; Schubart 1934, 1946). *Unknown Reg. and Prov.*, Lastate (Schubart 1934).

Peru, Puno Reg., Lake Titicaca area (Schubart 1963); Puno City (Kraus 1959).

Superfamily Juloidea Leach, 1814.

Juloidea in general (unidentified “iuloides”). **Argentina, Tucuman Prov.**, Las Azucenas (Demange 1963); west of Tucuman City (Demange 1963).

Family Julidae Leach, 1814.

Subfamily Julinae Leach, 1814.

Tribe Cylindroiulini Verhoeff, 1930.

Genus *Cylindroiulus* Verhoeff, 1894.

Chile, Valparaíso Reg., Juan Fernandez Islands in general (Attems 1926).

***Cylindroiulus britannicus* (Verhoeff, 1891)** (= *C. (Aneuloboiulus) britannicus*).

Neotropical Region in general (Fauna Europaea).

Brazil in general (Schubart 1946). *São Paulo State* in general (Schubart 1942b); São Paulo (Schubart 1947, 1963); Pirassununga (Schubart 1942b, 1944, 1946, 1947); Tremembé (Schubart 1947). *Rio de Janeiro State*, Itatiaia (Schubart 1963).

Chile in general (Schubart 1963). *Valparaíso Reg. Valparaíso Prov.*, Viña del Mar (Schubart 1942a).

***Cylindroiulus truncorum* (Silvestri, 1896)** (= *C. (Aneuloboiulus) truncorum*).

South America in general (Lee 2006).

Brazil in general (Schubart 1946, Blower 1985, Korsós and Enghoff 1990). *São Paulo State* in general (Schubart 1963); São Paulo, Departamento de Botânica da Universidade de São Paulo (Schubart 1946, 1947).



Figures 2-3. Habitat at Puerto de Hambre. **2)** Wet wooded grassland similar to where the milliped was discovered; the trees are *Nothofagus ?betuloides*. **3)** Dry shrubby grassland on slope leading to the Strait of Magellan, adjacent to the wetter site where the milliped was collected.

Cylindroiulus latestriatus (Curtis, 1845) (= *C. (Aneuloboiulus) latestriatus*, *C. (Aneuloboiulus) frisius* (Verhoeff, 1891), *C. frisius oceanicus* Verhoeff, 1924; *C. latestriatus hesperus* Chamberlin, 1914).
Coastal areas from Chile north to California (Chamberlin 1957).

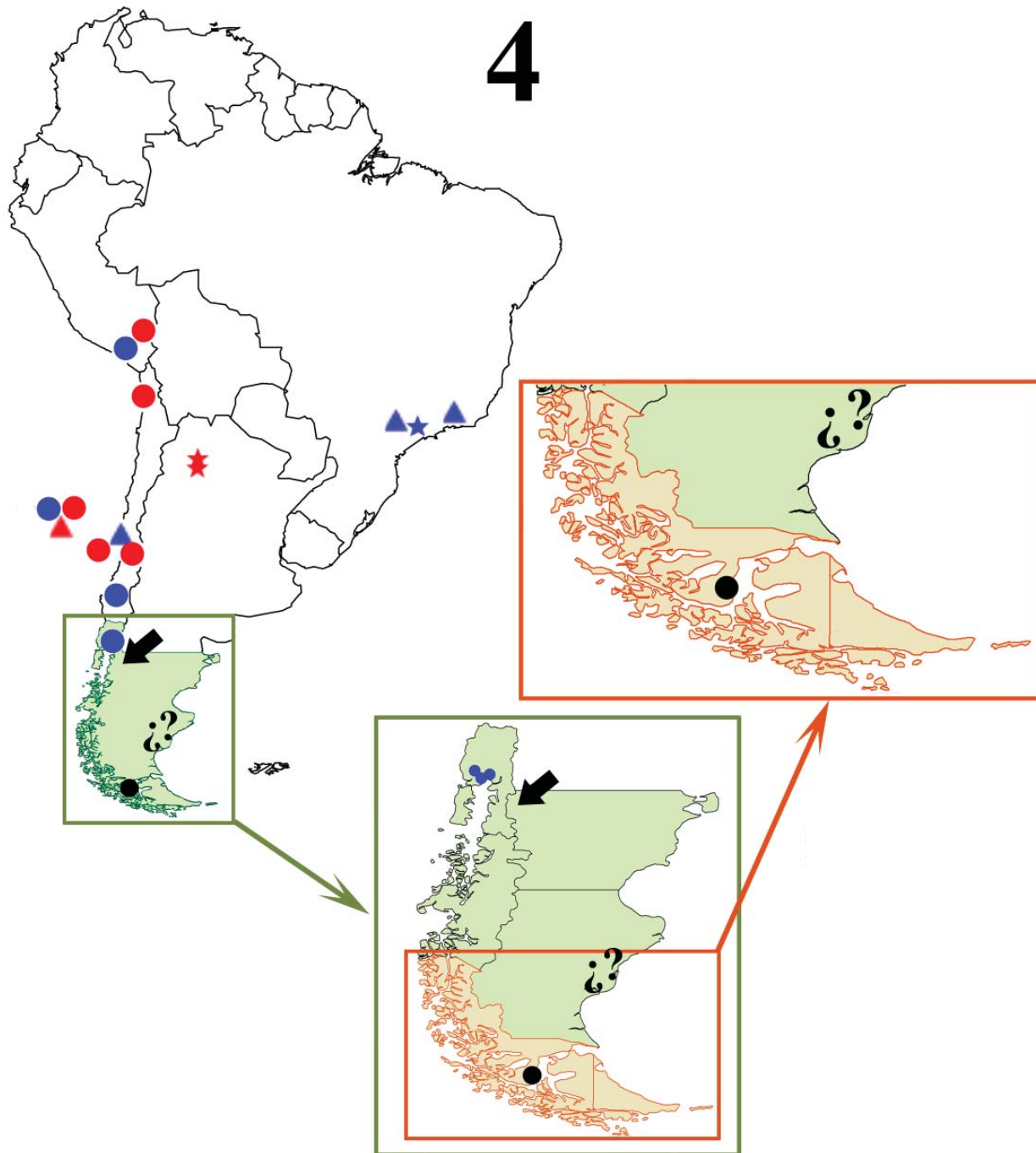


Figure 4. Julida occurrences in South America and localities relevant to southern Patagonian diplopods. **BLACK:** Dots, *Cylindroiulus* sp. ?, Puerto San Julian, possible type locality for *Propolyxenus patagonicus* (Polyxenida/ae). ¿, lower Santa Cruz River, possible type locality for *P. patagonicus*. **BLUE:** Triangle, *C. britannicus*; Star, *C. truncorum*; Dots, *C. latestriatus*. **RED:** Triangle, *Brachyiulus pusillus*; Dots, *Nopoiulus kochii*; Stars, unidentified Julioidea. Some markings denote two or more closely proximate sites; those in the Pacific Ocean west of Chile represent occurrences in the Juan Fernandez Islands. The bold arrows point to the location of Parque Nacional Alerces, Chubut Prov., Argentina.

Chile, *Valparaíso Reg.*, *Juan Fernandez Islands*, Robinson Crusoe I. (Ilha Más a Tierra) (Verhoeff 1924, Schubart 1934, Blower 1985). *Los Lagos Reg.*, Chamiza Valley; western side of Rio Coihuin near estuary; Estero Pichi Pilluco; harbor area of Puerto Montt; northeastern Isla Tenglo (all Chamberlin 1957). *Araucanía Reg.*, *Cautín Prov.*, 25 km (15.6 mi) E Temuco (Chamberlin 1957). **Peru in general** (Blower 1985). *Arequipa Reg.*, near Arequipa (Kraus 1960).

Cylindroiulus sp.

Chile: *XII Región Magallanes*, *Provincia de Magallanes*, Puerto de Hambre (herein).

Tribe Brachyiulini Verhoeff, 1909.

***Brachyiulus pusillus* (Leach, 1814)** (= *B. (Microbrachyiulus) pusillus*, *Microbrachyiulus litoralis* Verhoeff, 1897).

South America in general (Lee 2006).

Argentina in general (Blower 1985).

Chile, *Valparaíso Reg.*, *Juan Fernandez Islands*, Robinson Crusoe I. (Ilha Más a Tierra) (Verhoeff 1924).

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