

The presence of *Diphaglossa gayi* Spinola in Argentina (Hymenoptera: Colletidae)

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Abstract. We report the presence of *Diphaglossa gayi* Spinola, a solitary bee species of the family Colletidae, in Argentina. Until now, this species was considered endemic to Chile, where it is a common element of the Valdivian temperate rainforest fauna. The new records are based on both historical museum specimens and validated photographic observations from the citizen science platform iNaturalist, expanding the known distribution of the species into the Andean forests of Neuquén, Río Negro, and Chubut provinces. Data on distribution and floral associations are presented and discussed.

Keywords. Abeja del notro; Valdivian temperate rainforests; Endemism; *Embothrium coccineum*.

INTRODUCTION

Diphaglossini (Colletidae) is a small South American bee tribe comprising only three extant genera: *Diphaglossa* Spinola, *Cadegualina* Michener, and *Cadeguala* Reed, which together account for five described species (Michener, 2007). The genus *Diphaglossa* is monotypic, characterized by an elongated lower portion of the face and strong notauli in anterior part of mesoscutum (Michener, 2007; Compagnucci, 2014). The species *Diphaglossa gayi* Spinola is considered endemic to Chile, occurring from Santiago to Valdivia and Chiloé Island (Montalva & Ruz, 2010; Compagnucci, 2014; Urban *et al.*, 2022; Ascher & Pickering, 2026). Spinola (1851) originally described both the genus and species based on material collected in two Chilean localities: Santa Rosa and Coquimbo. This solitary species is typically found within the latitudinal range of 30° to 50° as well as on Chiloé Island. Several studies on nesting biology have been conducted in Chile (Janvier, 1933; Ruiz, 1940; Sarzetti *et al.*, 2013). Recent citizen science observations on iNaturalist (2025), along with limited documentation in Argentina's scientific literature, have motivated this formal documentation of the species in Argentina. Based on specimens from museum collections and database records, we compiled distributional data, outlined diagnostic characteristics, and produced a map showing the species' current occurrence in Argentina and Chile.

MATERIAL AND METHODS

Specimens examined are from the following collections: División Entomología, Museo de La Plata (MLP); Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN); Facultad de Agronomía, Universidad de Buenos Aires (FAUBA), and Instituto Fundación Miguel Lillo (IFML). External morphological structures of bees were studied using a Nikon SMZ 745T stereomicroscope and photographic documentation was made using a Canon EOS Rebel T6 digital camera equipped with Oshiro macro 60 mm lens; focus stacking was achieved using Helicon Focus 6.7.1 (Helicon Soft Ltd.). Distribution maps were generated using SimpleMappr (Shorthouse, 2010) based on precise locality data from both historical specimens and citizen science observations. Terminology for morphological features follows Michener (2007) and biogeographical regionalization follows Olson *et al.* (2001).

RESULTS

Diphaglossa gayi Spinola, 1851 (Fig. 1A-D)

Diagnosis: The species *Diphaglossa gayi* is characterized by a long malar space, approximate-

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ly two-thirds the length of the eye in females and three-fourths in males. Body length ranges from 17 to 19 mm. Pubescence is predominantly orange. Integument dark brown to black on the head and mesosoma, dark orange on the metasoma, with two dark brown to black rounded spots on the lateral sides of tergum II. Males with sternum III exhibiting a broad, median, apical projection bearing stiff setae directed basally. This combination of the long malar space, integumental color pattern, and the male sternum III projection reliably separates *D. gayi* from *Cadeguala* and other similar genera (Michener, 1986).

Material examined: CHILE: 1♀, Chile, *Diphaglossa gayi* Spinola C. Schrottky det. 1910 (MLP). 2♀♀, Chile, Cautin,

12.7 km. N. Loncoche, 21-I-1967, Col. L. Stange (IFML). ARGENTINA: Neuquén. 11♂♂, Pucará, Parque Nac. Lanín, XI-1952, Col. J. Schajovskoi (MLP); 1♂, Pucará, Parque Nac. Lanín, XI-1954, Col. J. Schajovskoi (MLP); 2♂♂, Pucará, Lago Lacar, Col. J. Schajovskoi (MLP); 1♀, Lago Queñi, sobre *Embothrium coccineum*, 11-XII-1999, leg. N.H. Montaldo, M. Devoto & G. Gleiser (FAUBA); 2♂♂, Lacar, Territorio de Neuquén (MLP). **Chubut** 1♀, Lago Puelo, El Hoyo, 22-11-2013, Agustin Saez, Ex. *Rubus idaeus* (MACN).

Photographic records: ARGENTINA: Nine records from iNaturalist id #187557086; #188714484; #194712412; #201975723; #250486366; #253427027; #253677129; #254348047; #328998554.



Figure 1. *Diphaglossa gayi* Spinola. (A-B) Female, habitus, lateral view and head in frontal view; (C-D) Male, habitus, lateral view and head in frontal. Scale bar: 2 mm.

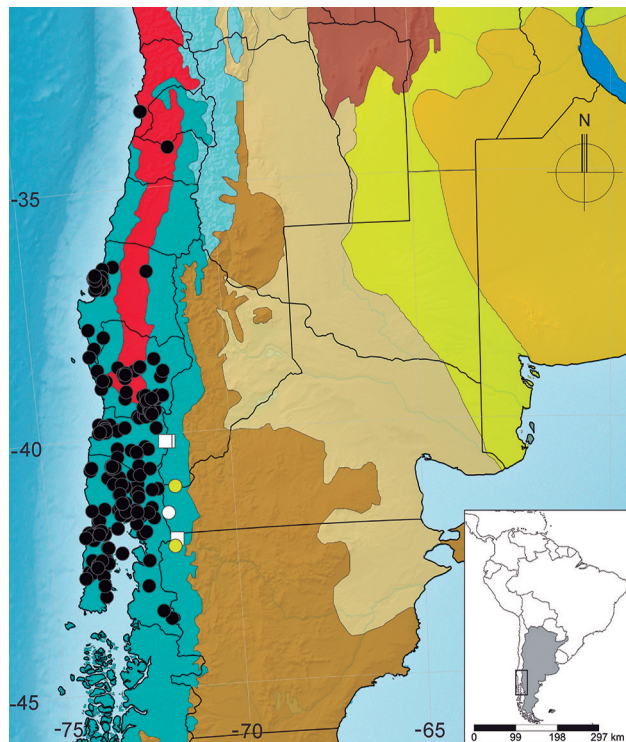


Figure 2. Collection localities for *Diphaglossa gayi* Spinola in Argentina and Chile. Black circles: iNaturalist in Chile; White circle: Locality from Chalcoff *et al.* (2012); Yellow circles: iNaturalist in Argentina and White squares: collections' specimens. Ecoregions: light blue: Valdivian temperate forest and red: Chilean matorral.

Distribution: Previously known only from Chile (Coquimbo, Valparaíso, Santiago, Concepción, Valdivia, Chiloé) (Michener, 2007; Montalva & Ruz, 2010). New records from Argentina confirm its presence in the province of Neuquén, Río Negro, and Chubut (Fig. 2).

Floral records: *Aristotelia chilensis* (Molina) Stuntz (Elaeocarpaceae), *Sophora macrocarpa* Sm. (Fabaceae), *Solanum* sp. (Solanaceae), *Amomyrtus meli* (Phil.) D. Legrand & Kausel and *Ugni molinae* Turez (Myrtaceae), *Embothrium coccineum* J.R. Forst. & G. Forst. (Proteaceae), *Luzuriaga radicans* Ruiz & Pav. and *Luzuriaga polyphylla* (Hook.) J.F. Macbr. (Alstroemeriaceae), *Alstroemeria aurea* Graham (Alstroemeriaceae), *Fuchsia magellanica* Lam (Onagraceae), *Vicia graminea* Sm. (Fabaceae), *Loasa tricolor* Ker Gawl. and *Loasa acanthifolia* Desr. (Loasaceae) (Smith-Ramírez *et al.*, 2005; Neira *et al.*, 2003; Montalva pers. obs.).

DISCUSSION

The presence of *D. gayi* in Argentina challenges its previous classification as a Chilean endemic species and underscores the ecological continuity of the Valdivian temperate forests across the Andes. These southern temperate forests are shared by Chile and Argentina, comprising two major ecoregions: the Valdivian Temperate Forests and the Magellanic Subpolar Forests (Dinerstein *et al.*, 2017). With respect to the bee fauna in the Western

Valdivian region, Marshall *et al.* (2023) recorded 110 species, 55 of which are endemic and 12 unique to the region, with *D. gayi* and *Corynura corinogaster* (Spinola) as characteristic species. The orange coloration of *D. gayi* may confer protection through Müllerian mimicry by closely resembling the native bumblebee *Bombus dahlbomii* Guérin, a declining species in Chile and Argentina characterized by similar coloration (Morales *et al.*, 2022). Comparable mimicry dynamics may also occur with bee species such as *Megachile semirufa* Sichel (Hymenoptera: Megachilidae) and newly emerged individuals of *Cadeguala occidentalis* (Haliday) (Hymenoptera: Colletidae). Despite pronounced morphological differences among these taxa, their shared floral preferences, particularly for *E. coccineum*, suggest ecological overlap and raise the possibility of Batesian mimicry in non-bee taxa, such as the syrphid fly *Aneriophora aureorufa* Philippi (Diptera: Syrphidae) (Polidori *et al.*, 2013), as well as in the horsefly *Oscra lata* Guérin-Ménéville (Diptera: Tabanidae). While initially thought to be specialized on Chilean Firebush (*Embothrium coccineum*), detailed observations reveal that *D. gayi* utilizes multiple plant species, demonstrating more floral flexibility than previously recognized (Smith-Ramírez *et al.*, 2005). This behavior may also be influenced by differences in resource collection strategies. Diphaglossinae exhibits a marked distinction between pollen and nectar provisioning in their nests, with cells predominantly filled with nectar and only small amounts of pollen (Sarzett *et al.*, 2013; Rozen, 1984). This pattern could be linked to their foraging behavior, suggesting a potential specialization or adaptation. However, further investigation is needed to fully understand the ecological and evolutionary implications of this resource allocation (Rozen, 1984). This discovery adds *D. gayi* to the short list of Diphaglossini in Argentina, alongside *Cadeguala albopilosa* (Spinola) and *C. occidentalis*, all of which are primarily Chilean elements with marginal distributions in Argentine Patagonia (Compagnucci, 2014). The only record we found in the scientific literature is reported by Chalcoff *et al.* (2012). In this article *D. gayi* is listed in the supplementary material for the Argentine locality of El Manso, Río Negro province (Fig. 2, white circle). One possible explanation for its absence on the Argentinian side is misidentification with the morphologically similar *C. occidentalis*, a well-known and commonly recorded species in the region that has long been recognized as part of Argentina's native fauna. The combination of collections' specimens (the earliest from 1952) and recent citizen science observations demonstrates the value of integrating traditional entomological approaches with modern biodiversity monitoring platforms like iNaturalist. Figure 2 illustrates the strong association between *D. gayi* and the Valdivian temperate forest. Even the records located within the Chilean Matorral (indicated in red) are linked to small, relictual patches of Valdivian temperate forest, highlighting the species' ecological dependence on this habitat. This study provides the first confirmed record of *Diphaglossa gayi* in Argentina, extending its known distribution across the Andes into the temperate forests of Patagonia.

These findings demonstrate the biogeographic continuity of Valdivian Forest fauna and reveal the importance of this habitat in supporting trans-Andean species distributions. Given the conservation concerns surrounding temperate forest ecosystems and their associated fauna, continued research on this species and its relatives is essential for effective conservation planning.

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