

FIRST RECORD OF *ARAUJIA SERICIFERA* (APOCYNACEAE: ASCLEPIADOIDEAE) FOR CHILE, A NEW ALIEN CLIMBING SPECIES FROM SOUTH AMERICA

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Summary: The presence of *Araujia sericifera* Brot. (Apocynaceae) in the vascular flora of central Chile is reported for the first time. A morphological description and an illustration is provided, as well as a background about its habitat, ecology and phenology.

Key words: Alien species, naturalization, Valparaíso vascular flora, weeds.

Resumen: Primer registro de *Araujia sericifera* (Apocynaceae: Asclepiadoideae) para Chile, una nueva especie exótica trepadora de América del Sur. La presencia de *Araujia sericifera* Brot. (Apocynaceae) en la flora vascular de Chile central es reportada por primera vez. Se entrega una descripción morfológica y una ilustración, así como también antecedentes acerca de su hábitat, ecología y fenología.

Palabras clave: Especies exóticas, flora vascular de Valparaíso, malezas, naturalización.

INTRODUCTION

Anthropogenic activities at the global scale have strongly altered the biotic and abiotic environments with increasing speed (Van Kleunen *et al.*, 2015), causing a weakening of the biogeographical barriers that have facilitated the dispersion of species in new regions where they can become naturalized (McNeely, 2005; Lambdon *et al.*, 2008). Sometimes, the introduction of plant species in new ranges derives in biological invasions, causing negative impacts on native biodiversity and ecosystems processes (Manchester & Bullock, 2000; Brooks *et al.*, 2004). In this sense, the documentation and characterization of alien species is critical to the management of plant invasions and

for the preservation of natural ecosystems (Fuentes *et al.*, 2013). For this reason, in this study we describe for the first time the presence of *Araujia sericifera* Brot. in the alien flora of Chile.

Araujia sericifera is an invasive vine belonging to the Apocynaceae family, native from northeastern Argentina, southern and southeastern Brazil, Paraguay, and Uruguay (Zuloaga *et al.*, 2008; BFG, 2015). Because of their multiple uses as a medicinal, edible, ornamental and textile plant, *A. sericifera* is usually cultivated worldwide (Kunkel, 1984; Gaig *et al.*, 2005; D'Errico *et al.*, 2014). Nevertheless, due to its ability to quickly spread, has become naturalized in Asia, Europe, North America, Oceania and South Africa (Kleinschmidt & Johnson, 1979; Joel & Liston, 1986; Hickman, 1993; Altinozlu & Donmez, 2003; Sanz *et al.*, 2004; Henderson, 2007; Champion *et al.*, 2010).

Araujia sericifera tends to grow in natural and disturbed habitats, where it is associated with forest and riparian vegetation (Csurhes & Edwards, 1998), as well as with species of economic interest, such as lemon and oranges trees (Sanz *et al.*, 2004; Vladimirov *et al.*, 2010). Its dense foliage smothers native shrubs and trees, and stranglers

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and causes breaks tree branches, interfering with its development and preventing their natural regeneration (Weber, 2003; Sanz *et al.*, 2004). For these reasons, it is considered as an invasive species in Australia, Israel, Italy, New Zealand, Spain, South Africa, and United States (Sanz *et al.*, 2004; D'Errico *et al.*, 2014). Also, it has been included in the risk list by European and Mediterranean Plant Protection Organization (D'Errico *et al.*, 2014).

Until now, no species of the genus *Araujia* has been described for Chile (Marticorena & Quezada, 1985; Zuloaga *et al.*, 2008), nevertheless, during 2016 and 2017, three populations of *A. sericifera* were first detected in central Chile. These populations inhabit urban settlements and crop fields, where they grow associated with other alien species. In order to increase the knowledge about alien plant species in Chile, the presence of *A. sericifera* in the country is reported for the first time, and a brief morphological description and an illustration of the species are also provided.

MATERIALS AND METHODS

During the Austral spring and summer of the years 2016 and 2017, several floristic surveys were conducted in agricultural crops from Valparaíso region of central Chile, in which were detected populations of an unknown species in three localities: Olmué, Petorca and Quillota. Then, specimens were collected, and identification keys were used.

In order to confirm that *A. sericifera* is reported for the first time for Chile, we look for other specimens of the species deposited in the SGO herbarium, as well as in checklists of the native and alien vascular Chilean flora (e.g. Marticorena & Quezada, 1985; Zuloaga *et al.*, 2008; Fuentes *et al.*, 2013).

RESULTS

Araujia sericifera Brot. *Trans. Linn. Soc. London* 12: 62, t. 4-5. 1818. Type: t. 4 in Brotero, *Trans. Linn. Soc. London* 12: 69, 1818 (Lectotype designated by Forster & Bruyns, *Taxon* 41: 746. 1992). Fig. 1.

= *Physianthus albens* Mart. *Nov. Gen. Sp. Pl.* 1: 54, t. 32. 1824.

= *Araujia albens* G. Don. *Gen. Hist.* 4: 149. 1837.

= *Araujia hortorum* E. Fourn. *Fl. Bras.* 6(4): 293, t. 84. 1885. ≡ *Araujia sericifera* Brot. var. *hortorum* (E. Fourn.) Malme. *Kongl. Vetensk. Acad. Handl. Ny Följd* 34: 74, t. 3, f. 7. 1900.

Sub-shrub climbing or vine, up to 5 m long, evergreen, lactiferous. Stem voluble, unbranched or branched, circular in cross section and densely pubescent at the apical region. Taproot, with a main axis and smaller secondary branches. Leaves simple, opposite, petiolate with petiole of 10-20 mm long, leaf blade ovate-oblong, ovate-lanceolate or subtriangular, 40-95 x 15-60 mm, apex acuminate, base truncate or lobate, margin entire, upper surface green and glabrous, and under surface canescent and densely pubescent. Inflorescences axillary of 2-5 flowers, sometimes solitary; bracts 4-10.1 x 0.9-1.9 mm; pedicels 10-16 mm long, pubescent. Calyx with 5 sepals, ovate or lanceolate, 8.5-13.3 x 5.7-8.1 mm. Corolla with tube of 11-16 x 21-28 mm, lobes 5 patent, oblong or ovate-acuminate, 7-9 x ca. 4 mm, apex obtuse, white or greenish dorsally and purple ventrally. Androecium with 5 stamens, pollinia gradually widening to the apex, forming a gynostegium inside the tube of the corolla. Follicle 85-125 x 35-55 mm, pruinous, pendulous greenish or brown. Seeds ca. 400 per fruit, 6.3-7.8 x 2.8-3.5 mm, compressed, oval-lanceolate, rough, with pappus sericeous, 25-40 mm long, white, deciduous.

Common names: "Cruel plant", "doca", "planta cruel", "tasi", "white bladderflower".

Habitat, ecology and phenology

The presence of *A. sericifera* was recorded in three localities from Valparaíso region: Olmué, Petorca, and Quillota (Fig. 2). The populations from Olmué and Petorca grow in high density patches under the arboreal canopy of an avocado crop (*Persea americana* Mill.), and also climbing on lemon trees (*Citrus limon* (L.) Osbeck), orange trees (*Citrus sinensis* (L.) Osbeck), olive trees (*Olea europaea* L.), and grape vines (*Vitis vinifera* L.) in agricultural crops, in association with other alien herbaceous species, such as *Convolvulus arvensis* L., *Hirschfeldia incana* (L.) Lagr.-Foss., *Portulaca oleracea* L., and *Raphanus raphanistrum* L. On the other hand, the third population from Quillota grows into a peri-urban area, in association with other alien



Fig. 1. *Araujia sericifera*. **A:** Floriferous branch. **B:** Inflorescence. **C:** Flower. **D:** Fruit. **E:** Seed. Santa Cruz s.n. (SGO 167373). Drawing by H. Tapia Berardi.

species, such as *C. arvensis*, *H. incana* and *Lactuca serriola* L., and climbing on *Acacia caven* (Molina) Molina and on fences of the nearby houses. In all the studied locations, *A. sericifera* exhibits vegetative growth throughout the year, occurring its flowering between the months of December and March.

Material examined. CHILE. *Reemplazar por Region of Valparaíso: Prov. Marga-Marga*, Olmué, 33°00'45" S 71°12'10" W, 134 m, X-2016, Santa Cruz s.n. (SGO 167373); *Prov. Petorca*, Petorca, 32°16'45" S 71°00'37" W, 400 m, III-2017, Cordero s.n. (SGO 167343); *Prov. Quillota*, Quillota, 32°51'45" S 71°14'09" W, 144 m, XII-2016, Santa Cruz s.n. (SGO 167374).

DISCUSSION

Araujia sericifera is capable of sustain self-replacing populations without direct human intervention by recruitment from seeds and with independent growth, for this reason, the species is suitable to be categorized as a naturalized species, according to the classifications for alien species proposed by Pyšek *et al.* (2004). Other concepts for alien species, such as casual alien plants and transformers, are not applicable in this study for *A. sericifera* because its persistence is not due to repeated introductions and no changes in the character, condition, form or nature of ecosystems over a substantial area have been observed (Pyšek *et al.*,

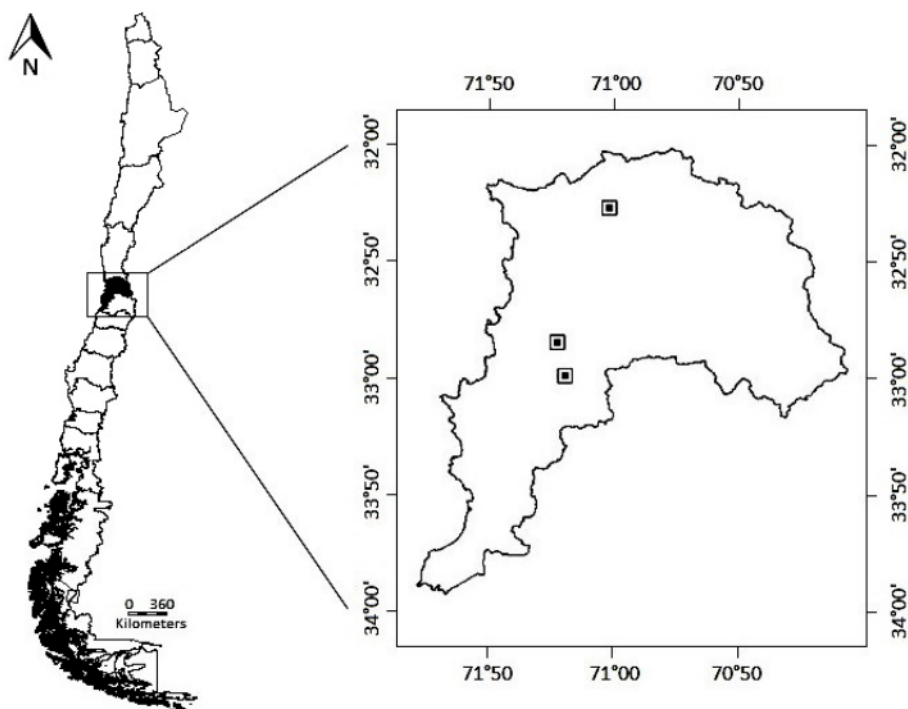


Fig. 2. Study area in Valparaíso region (central Chile), including new populations of *Araujia sericifera* (squares).

2004; Pyšek & Richardson, 2006). On the other hand, the lack of antecedents about the distance and time of spreading of the species since its arrival in central Chile and the fact that the studied populations do not expand in large geographical areas, make it impossible to categorize it as an invasive plant (Pyšek *et al.*, 2004).

Since *A. sericifera* is widely cultivated as an ornamental species in Valparaíso region, it is possible that the species has escaped from cultivation and naturalized in surrounding areas, and eventually establishing in agricultural crops. On the other hand, an alternative explanation based on the introduction of the species mediated by agricultural activities results less plausible because the presence of *A. sericifera* has been registered only in two fields of cultivation. Further, according to conversations with farmers and local people of Petorca, the presence of the species has been observed in the locality for at least 20 years, but only in recent years has it become more important as an agricultural weed.

In the agricultural plantations studied, the plants are controlled with herbicides and removed manually,

as they tend to suffocate and strangle tree branches, interfering with their development and consequently reducing their production. This behavior has also been observed in other parts of the world, not only in agricultural contexts, but also in natural environments (Weber, 2003; Sanz *et al.*, 2004). For these reasons, some preventive actions, such as avoiding the cultivation of the species for ornamental purposes in areas close to natural environments, and exhaustive inspections of agricultural fields to find new populations, could be key to control the range of expansion of the species in Chile.

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