GAYANA BOTANICA Gayana Bot. (2024) vol. 81, No. 1, 77-81

SHORT COMMUNICATION

Chondrilla juncea L. (Asteraceae) a new plant for the alien flora of Chile

Chondrilla juncea, nuevo registro para la flora introducida de Chile

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ABSTRACT

Introduced species pose a potentially significant threat to local biodiversity. In this study, we report *Chondrilla juncea* L. (Asteraceae) as a new naturalized alien plant in Chile. We provide detailed description, photographs, coordinates sites and discussed potential impacts.

Keywords: biodiversity, biological invasions, conservation, flora of Chile, invasive species.

RESUMEN

Las especies introducidas representan una amenaza potencial para la biodiversidad local. En este estudio, reportamos a *Chondrilla juncea* (Asteraceae) como una nueva especie naturalizada en Chile. Presentamos su descripción, fotografías, sitios de hallazgo y sus impactos potenciales.

Palabras claves: biodiversidad, conservación, especies invasoras, flora de Chile, invasiones biológicas.

INTRODUCTION

The introduction and establishment of invasive species in new regions can lead to severe ecological and economic consequences, thereby posing a significant threat to global biodiversity (IPBES 2023, Pyšek *et al.* 2020). In Chile, the threat of plant invasions is of particular concern due to high levels of endemism and unique ecosystems (Ormazábal 1993, Myers *et al.* 2000, Mittermeier *et al.* 2005).

Asteraceae family includes 1030 taxa in Chile (Rodríguez *et al.* 2018). The number of introduced, naturalized and invasive species (*sensu* Richardson *et al.* 2000) are 110 (Fuentes *et al.* 2020), including this new record. *Chondrilla juncea* (Asteraceae) which originates from Canary Islands, Europe to Central Asia and Arabian Peninsula (POWO). *C. juncea* displays traits that make it highly invasive, such as prolific seed production, deep roots, and herbicide resistance (Panetta & Dodd 1987) ecological characters that could allow a plant invasion. It has been cited as invasive plant in several states of USA and Australia (Di Tomaso & Healy 2007).

TAXONOMY

Chondrilla juncea L., Sp. Pl. 2: 796. 1753.
"Habitat in Germannia, Helvetia, Gallia ad agrorum margines."
RCN: 5825.

Greyish-green biennial to perennial. Stems usually solitary, 50-100 cm, with numerous ascending branches, glabrous or with rigid hairs particularly below, sometimes with short

appressed hairs. Leaves glabrous or with a few rigid hairs; basal 40-120 x 15-45 mm, soon withering, oblanceolate, more or less acute, deeply and irregularly runcinate dentate, narrowed to a short, winged petiole; lower cauline usually like basal, the remainder usually long-linear, sometimes lanceolate, entire or denticulate. Capitula numerous, with 9-12 florets, terminal, lateral or axillary, solitary or in groups of 2-5, sessile or with rather short peduncles. Involucre 9-12 x 2.5-5 mm; bracts linear-lanceolate, obtuse to subacute, glabrous or sparsely tomentose, sometimes with a row of rigid hairs on the median line, the inner 7-9. Achenes 8-10 mm; beak slender, about half as long as to longer than the body (Tutin *et al.* 1976).

In some countries like Spain, it was used as food, making use of both the basal leaves and the tender flowering stems. However, the more typical traditional use was consuming the long white stems that grew from plant regrowth, probably becoming whitened as they were covered by agricultural work (https://conecte.es/index.php/es/plantas/523-chondrilla-juncea/usos-tradicionales).

Ecological characteristics

Chondrilla juncea, commonly known as rush skeletonweed, displays a set of ecological traits that significantly contribute to its high invasiveness. Displays a prolific seed production strategy, plants spread by seed, shoot buds on lateral roots, shoot buds on main root, and root fragments (Di Tomaso & Healy 2007). One plant can produce 15,000 to 20,000 seeds per season. Seeds have a plume-like pappus that aids in wind dispersal (Di Tomaso & Healy 2007). This reproductive advantage enables *C. juncea* to rapidly colonize and establish populations in diverse habitats (McVean 1966, Panetta & Dodd 1987). Furthermore, its deep and extensive root system confers a competitive advantage by allowing efficient resource acquisition, even under challenging conditions (Di Tomaso & Healy 2007). Deep taproots become woody and can penetrate soil to a depth of 2-3 m or more, roots are easily fragmented, and pieces as small as 1-2 cm can produce a new rosette from a depth to 1m. The plant's ability to tolerate a wide range of soil types and pH levels further enhances its invasiveness, as it can readily exploit various ecological niches (Cullen & Groves 1977). In addition, *C. juncea* has demonstrated remarkable resilience to herbicides, rendering traditional control methods less effective (McVean 1966, Heap 1993). *C. juncea* is able to thrive where soil disturbance occurs; removal of natural vegetation and/or cultivation may provide opportunities for *C. juncea* to establish; these disturbances create a favorable seedbed for seeds germination and seedling establishment and remove competition (Liao 1996).

These ecological attributes collectively contribute to the species' ability to outcompete native flora, alter ecosystem dynamics, and spread rapidly across landscapes, underscoring the significant threat it poses to native biodiversity and ecosystem stability (Di Tomaso & Healy 2007).

C. juncea has reported as alien in Australia in 1918, where the heaviest infestations were initially in the cereal growing area of New South Wales and Victoria, and later spread into western Australia (Panetta & Dodd 1987). According with USDA reports *C. juncea* had invaded also a variety of states and ecosystems in the United States and Canada. The list include North American ecosystems as forests and range cover types in which *C. juncea* is known or thought to be invasive, as well as some that may be invaded following disturbances in which vegetation is killed and/or removed and/or soil disturbed (e.g. cultivation, logging, fire, grazing, herbicide application, flooding). These lists are not necessarily exhaustive. More information is needed regarding incidents and examples of particular ecosystems and plant communities where *C. juncea* is invasive (https://www.fs.usda.gov/database/feis/plants/forb/chojun/all.html).

The specimens were collected in the city of Concepcion, Chile. It has been collected or observed repeatedly in vacant urban sites, from which, apparently, it has not yet dispersed outside the city.

Characters for the recognition of *Chondrilla juncea*

C. juncea belongs to the Asteraceae or Compositae family, within which it is placed in the subfamily Cichoroideae, tribe Cichorieae. This subfamily is characterized by inflorescences with homogamous capitula composed solely of ligulate flowers and by having white latex. In this context, *C. juncea* in our country is unmistakable due to being a plant reaching a height of 150 cm, its profusion of leafless stems, and its sessile capitula, each bearing 9-12 ligulate flowers.

Material studied

Región del Biobío. Provincia de Concepción, calle Fresia entre calle Freire y calle Los Carrera, 36°48'58,7'' S; 73°2'2,5'' O, 15 m, A. Marticorena 1243, 16-II-2022 (CONC 28821); calles San Martin con Rengo, 36°49'45,0'' S; 73°2'50,0'' O, 25 m, S. Teillier 8613 A, I-2023 (CONC 193561).

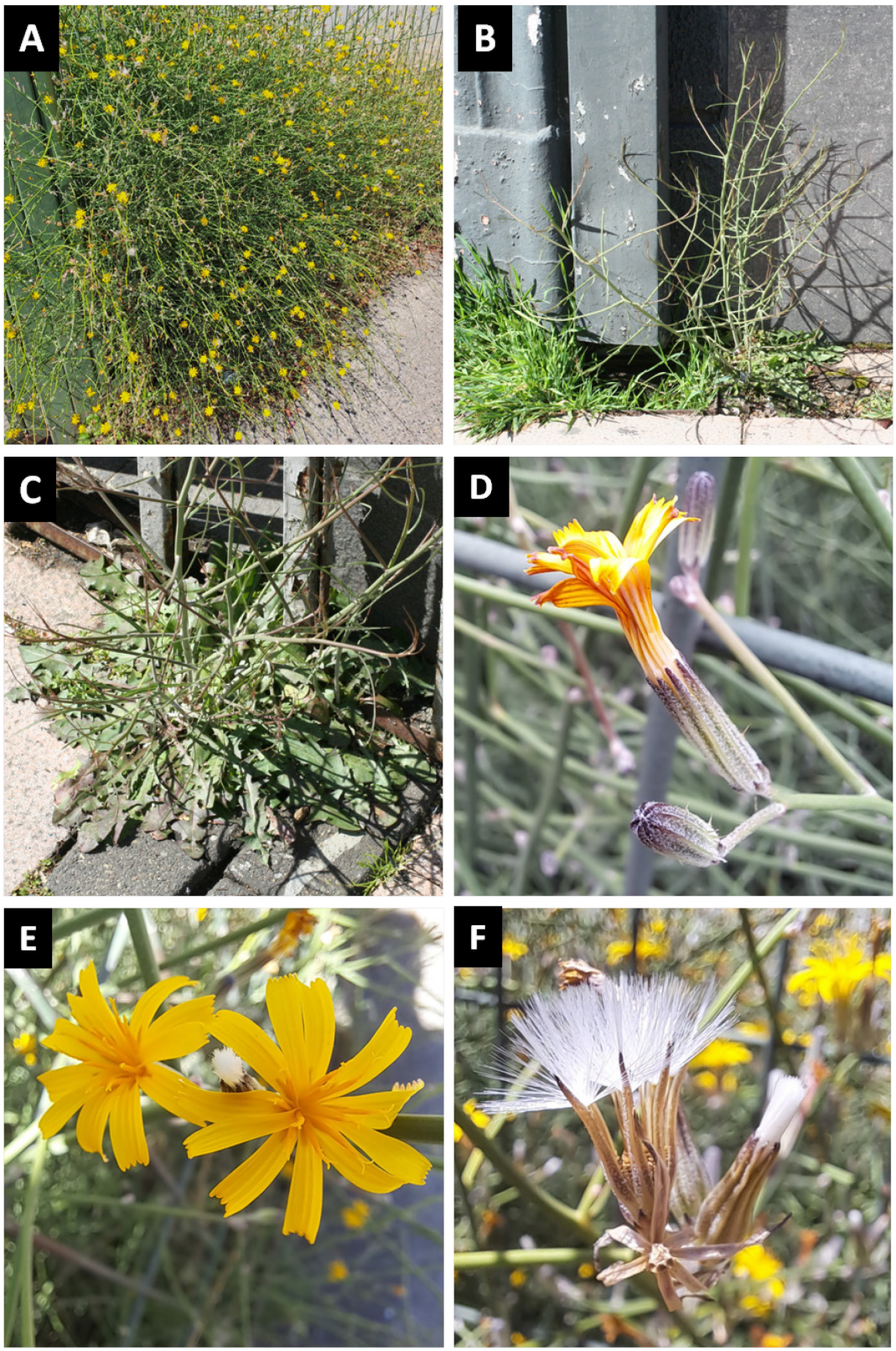

Figure 1. *Chondrilla juncea*. A-B. Individuals growing in two areas of the city. C. Appearance of the basal leaves. D-E. Capitules. F. Achenes. / *Chondrilla juncea*. A-B. Individuos creciendo en dos zonas de la ciudad. C. Aspecto de las hojas basales. D-E. Capítulo. F. Aquenios.

DISCUSSION

The introduction and establishment of alien species in new regions can have a severe implication for both, ecological systems and economies (IPBES 2023). In the case of Chile, a country known for its high levels of endemism and unique ecosystems, the threat of plant invasions is particularly alarming. *Chondrilla juncea*, a member of the Asteraceae family recently recorded in Chile, possesses traits that favor invasion, such as prolific seed production, deep roots, and resistance to herbicides. These ecological characteristics enable *C. juncea* to rapidly colonize diverse habitats, outcompete native flora, and resist traditional control methods, thereby posing a significant risk to native biodiversity and ecosystem stability (Parkes & Panetta 2009, Di Tomaso & Healy 2007).

The potential impacts of *C. juncea* extend beyond urban environments, as evidenced by its invasive behavior in various countries, including the United States and Australia (Di Tomaso & Healy 2007). Its ability to thrive in a wide range of ecosystems, coupled with its capacity to exploit soil disturbance, highlights the urgent need for effective management strategies. The species' recent detection in Concepcion, Chile, emphasizes the threat to native ecosystems, particularly considering its observed presence in urban areas. Without adequate intervention, there is a high risk of *C. juncea* escaping urban environments and spreading further, exacerbating its impact on native flora and ecosystems.

Addressing the challenge of invasive species like *C. juncea* requires a multi-faceted approach that integrates prevention, early detection, and rapid response measures. Enhancing monitoring efforts, implementing targeted control strategies, and promoting public awareness are essential steps in mitigating the spread of invasive species and safeguarding native biodiversity.

ACKNOWLEDGMENTS

The authors would like to thank the reviewers and the support of the Flora of Chile project (2023000111HER).

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Received: 11.03.2024
Accepted: 14.05.2024

Editor: Cristian Atala