

***Cosmos sulphureus* Cav. (Asteraceae) in the Iberian Peninsula**

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Abstract

Cosmos sulphureus (Asteraceae) is an annual herb widely used as an ornamental, here reported as a new addition to non-native flora of the Iberian Peninsula. Individuals escaping from cultivation were recently detected in 2024 on the campus of the Autonomous University of Barcelona (Barcelona province, Spain). While citizen-science platforms suggest that the species might be spreading for some years, it was not cited in the Iberian Peninsula in bibliographic or electronic references. The finding of novel records of non-native plants in an extensively sampled area highlights the need for continuous vegetation sampling.

Keywords: alien species, exotic flora, new record, non-native species, ornamental plant.

Resumen

***Cosmos sulphureus* Cav. (Asteraceae) en la península ibérica**

Cosmos sulphureus (Asteraceae) es una hierba anual ampliamente usada como ornamental, que aquí se cita como novedad para la flora de la península ibérica. Algunos individuos escapados de cultivo fueron detectados recientemente en 2024 en el campus de la Universidad Autónoma de Barcelona (provincia de Barcelona, España). Aunque algunas plataformas de ciencia ciudadana sugieren que la especie lleva algunos años expandiéndose, no se encontraba citada en la península ibérica en obras de referencia bibliográficas o electrónicas. El hallazgo de nuevas especies no nativas en un territorio conocido pone de manifiesto la necesidad de muestreos de vegetación sostenidos a lo largo del tiempo.

Palabras clave: especie alóctona, especie no nativa, flora exótica, nueva cita, planta ornamental.

***Cosmos sulphureus* Cav.**

Spain. Barcelona province: Cerdanyola del Vallès, Torrent de Can Miró, 31TDF2594, 115-116 msnm, 6-10-2024, L. Sáez (BC 998435); bridge between train station and Plaça Cívica, 31TDF2594, 129 msnm, 31-10-2024, M. Riera. (Figures 1 and 2).

Cosmos sulphureus Cav. (Asteraceae) is an annual herb native to Mexico and Central America (POWO, 2024). This species has numerous popular cultivars, and has been introduced mainly intentionally (as an ornamental plant) in tropical and temperate regions around the world, often with invasive status: North and South America, Europe, Asia, and Australia, (Kirger, 2006; POWO, 2024; Puttock, 2017; Verloove & Lambinon, 2008). *C. sulphureus* grows rapidly probably due to its allelopathic activity, suppressing the

growth of other weeds (Silva, 2017). In the Mediterranean region, this species has been reported in France, Greece, Italy, Lebanon and Turkey (GBIF, 2025; POWO, 2024).



Figure 1. *Cosmos sulphureus*: Field photo of an escaped individual on the Autonomous University of Barcelona (UAB) campus.

Figura 1. *Cosmos sulphureus*: fotografía en el campo de un individuo escapado en el campus de la Universidad Autónoma de Barcelona (UAB).

C. sulphureus was discovered during field surveys carried out in October 2024. We found two localities of *C. sulphureus* distributed over a small area in the southern part of the campus of the Autonomous University of Barcelona (Cerdanyola del Vallès, Spain). The first locality accounted five flowering individuals, growing in ruderal herbaceous vegetation close to a riparian forest. *C. sulphureus* grows on alluvial soil among native species such as *Brachypodium phoenicoides* (L.) Roem. & Schult., *B. retusum* (Pers.) P. Beauv., *Centaurea aspera* L. subsp. *aspera*, *Dactylis glomerata* subsp. *hispanica* (Roth) Nyman and *Plantago lanceolata* L. Naturalized alien species were also recorded in this locality, including *Erigeron bonariensis* L., *Euphorbia chamaesyce* L. subsp. *chamaesyce*, *Medicago sativa* L. subsp. *sativa* and *Paspalum dilatatum* Poir. In a second locality, a flowering individual grew in a crack on the road surface, around 550 m from the first locality, and around 220 m away from other cultivated individuals. This suggests at least a moderate capacity for dispersal, probably on account of its beaked seeds that attach to animals and clothing.

In the university campus, *C. sulphureus* was grown (at least from 2023) in tree pits and pots as an ornamental plant, from where it probably escaped to the surrounding seminatural habitat. We observed that the flowering period of *C. sulphureus* is long, between the beginning of June until late October.



Figure 2. Herbarium specimen of *Cosmos sulphureus* (BC 998435).

Figura 2. Ejemplar de herbario de *Cosmos sulphureus* (BC 998435).

An extensive literature review revealed no previous reports for *C. sulphureus* in the Iberian Peninsula in relevant references at the sub-national (Campos & Herrera, 2009; Gómez-Bellver, 2023; Grupo de Flora del Madrid Urbano (2023); Romero, 2007; Rotchés-Ribalta *et al.*, 2021; Sáez & Aymerich, 2021; Sanz-Elorza *et al.*, 2008, 2011), national (Almeida, 2018; Almeida & Freitas, 2012; Anthos, 2024; Sanz-Elorza *et al.*, 2004; Sequeira *et al.*, 2011), and global scales (POWO, 2024; Puttock, 2017; van Kleunen *et al.*, 2019). The Global Biodiversity Information Facility (queried with the R package 'rgbif'; Chamberlain *et al.*, 2025) hosts 49 observations (47 of them in central and southern Portugal and two in southern Andalusia, Spain) in the Iberian Peninsula (GBIF, 2025). Nevertheless, 45 of the observations in Portugal corresponded to individuals from the Botanic Garden of the University of Coimbra, while the remaining observations come from the iNaturalist database, and it is unclear whether they refer to planted or escaped individuals. The iNaturalist platform hosts 15 observations of *C. sulphureus* in the Iberian Peninsula, of uncertain status, for the period 2018-2024 (iNaturalist, 2025). Overall, it seems that the species could be escaping in scattered locations across the Iberian Peninsula since some years, a process of spread that

this paper formally documents (Figure 3). The congeneric *Cosmos bipinnatus* Cav., which is pink-flowered, has been cited in Spain, Portugal, and elsewhere in Europe (Gómez-Bellver, 2023; Sanz-Elorza *et al.*, 2004; Sequeira *et al.*, 2011).

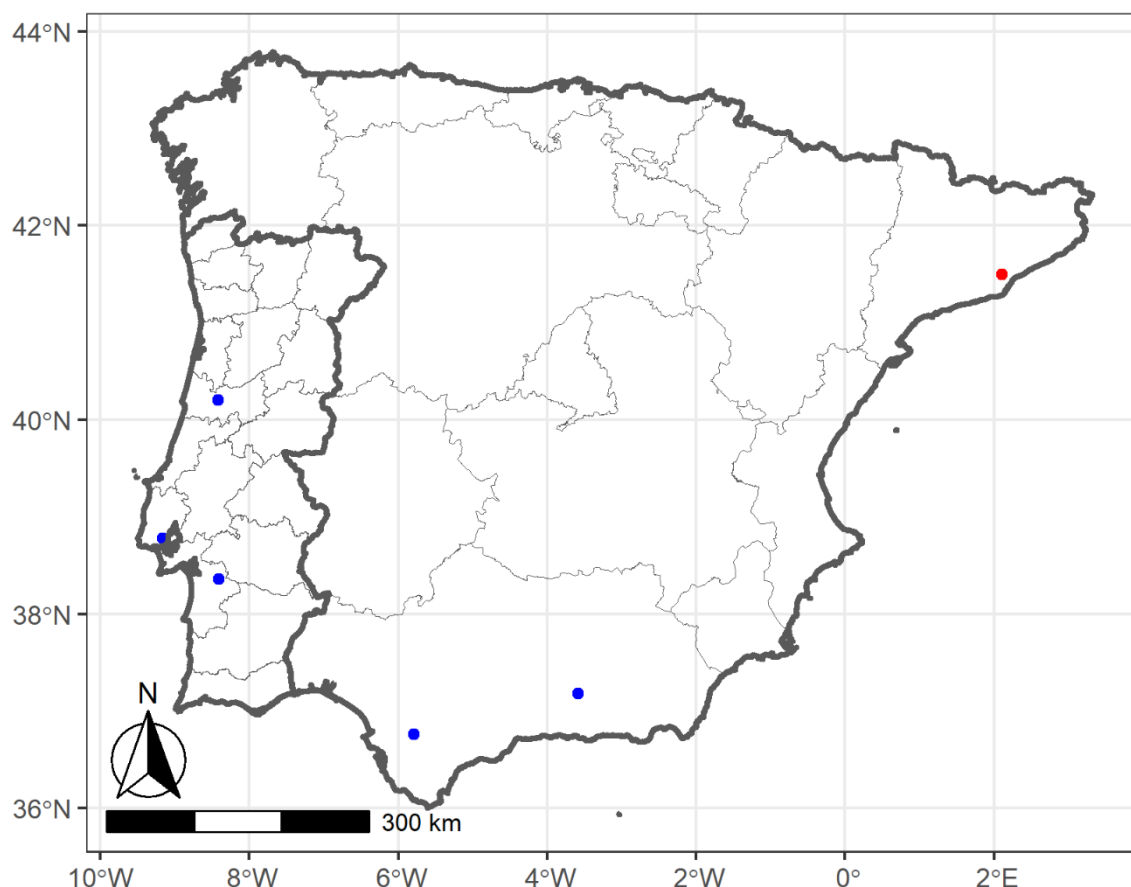


Figure 3. Known distribution of *Cosmos sulphureus* in the Iberian Peninsula. In blue, records from the GBIF portal (downloaded 9th January 2025); in red, the record of this work. We note that we do not plot records available in iNaturalist but absent from GBIF, due to the uncertain nature of such records.

Figura 3. Distribución conocida de *Cosmos sulphureus* en la península ibérica. En azul, citas procedentes del portal GBIF (descargado el 9 de enero de 2025); en rojo, la cita de este trabajo. No se muestran las citas presentes en iNaturalist pero ausentes de GBIF debido a la naturaleza incierta de dichos registros.

According to the criteria proposed by Pyšek *et al.* (2004), *C. sulphureus* should currently be treated as a casual alien species in the described localities; however, its naturalisation is likely due to suitable climatic conditions, the species' self-compatibility, its ability to thrive in a variety of soil types, and its potential allelopathic activity (Puttock, 2017; Silva, 2017). The finding of novel non-native plant species, shortly after the publication of floristic syntheses at the regional level (Gómez-Bellver, 2023; Rotchés-Ribalta *et al.*, 2021; Sáez & Aymerich, 2021), provide an example of the dynamic nature of biological invasions, and stress the need of continuous sampling to accurately monitor an ever-changing flora.

Conflict of interest

The authors declare that they have no conflicts of interest relevant to the content of this manuscript.

CRediT authorship contribution statement

Conceptualization: MR, LS. Investigation: MR, LS. Visualization: MR, LS. Writing-Original Draft Preparation: LS. Writing-Review & Editing: MR.

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