

# Emerging elements in the alien flora of Tenerife (Canary Islands, Spain): new records and invasion risks

Filip Verloove<sup>1</sup>, Jorge Alfredo Reyes-Betancort<sup>2</sup>

<sup>1</sup> Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium

<sup>2</sup> Jardín de Aclimatación de La Oratava (ICIA), Puerto de la Cruz 38300, Tenerife, Spain

Corresponding author: Filip Verloove ([filip.verloove@botanicgardenmeise.be](mailto:filip.verloove@botanicgardenmeise.be))

**Abstract.** During recent fieldwork on Tenerife, several non-native plant species were recorded, some newly documented for the island and others as first records for the Canary Islands. These include fully established species like *Brassica fruticulosa* Cirillo, *Crassula alata* (Viv.) A.Berger, and *Hydrocotyle sibthorpioides* Lam., as well as casual species such as *Bacopa monnieri* (L.) Wettst. and *Nephrolepis biserrata* (Sw.) Schott. Many of these species have potential to naturalize or become invasive. Additional notes are provided on *Biancaea decapetala* (Roth) O.Deg. and *Digitaria radicata* (J.Presl) Miq.

**Key words.** Alien species, biodiversity, flora, invasive species, records, surveys, weeds

Verloove F, Reyes-Betancort JA (2026) Emerging elements in the alien flora of Tenerife (Canary Islands, Spain): new records and invasion risks. *Check List* 22 (1): 75–90. <https://doi.org/10.15560/22.1.75>

## Introduction

Although the vascular flora of the Canary Islands is among the best studied in the Macaronesian region (e.g. Beierkuhnlein et al. 2021), fieldwork continues to yield noteworthy discoveries. In particular, knowledge of the archipelago's non-native flora remains incomplete, especially concerning recently escaped ornamental species. Each confirmed case of reproduction from seed is of interest: while not all escaped ornamentals will ultimately naturalize—let alone become invasive—the establishment of reproductive individuals represents a critical early stage in the potential trajectory toward local or widespread naturalization (Richardson and Pyšek 2012).

An important subset of these species consists of so-called cryptic exotics—non-native taxa that, due to initial misidentification or confusion with morphologically similar, non-invasive species, have managed to become established or even fully naturalized prior to being correctly identified (Verloove 2010). The detection of such taxa remains a priority, as their ecological impact may go unnoticed until they are well integrated into native or semi-natural vegetation (Pyšek et al. 2013).

Continued field surveys are therefore warranted, particularly in highly anthropogenic habitats such as urban environments, roadsides, agricultural areas, and riparian zones. These habitats often act as initial points of entry for alien species and are especially prone to hosting incipient invasions (numerous references, e.g. Skultety and Matthews 2017). Recent field campaigns have once again yielded a number of significant plant records in Tenerife, including both locally established species—some of which may have been previously overlooked—and ephemeral taxa whose future persistence remains uncertain. Notably, several of these ephemeral species are known to be naturalized or invasive in other parts of the world with comparable climates, suggesting that they may also pose an ecological risk in the Canary Islands.

In this paper, we document eight such taxa. Three of these (*Brassica fruticulosa* Cirillo, *Crassula alata* (Viv.) A.Berger, and *Hydrocotyle sibthorpioides* Lam.) are at least locally naturalized, while five others (*Bacopa monnieri* (L.) Wettst., *Hyparrhenia anthistirioides* (Hochst. ex A.Rich.) Andersson ex Stapf, *Momordica charantia* L., *Nephrolepis biserrata* (Sw.) Schott and *Rothea myricoides* (Hochst.) Steane et Mabb. are currently considered casuals. In addition, we provide updated records for two further species of particular interest: the recently naturalized but poorly documented grass *Digitaria radicata* (J.Presl) Miq. and a confirmed occurrence of *Biancaea decapetala* (Roth) O.Deg. on Tenerife.



Academic editor: Anatoliy Khapugin  
Received: 26 June 2025  
Accepted: 26 January 2026  
Published: 10 February 2026

Copyright © The authors. This is an open-access article distributed under terms of the [Creative Commons Attribution License \(Attribution 4.0 International – CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/)

## Methods

We have conducted floristic fieldwork in Tenerife over several decades. The data presented in this paper were primarily collected during two recent field campaigns, conducted between 13–26 March and 25 September–8 October 2022. During these periods, multiple localities across the island were surveyed, with a particular focus on coastal and lowland zones. Priority was given to habitats characterized by high levels of human disturbance, including urban areas, roadsides, agricultural fields, and riparian corridors.

For all taxa documented, herbarium vouchers were collected and deposited in the herbaria of the Meise Botanic Garden (BR), Belgium, and the Jardín de Aclimatación de La Orotava, ICIA (ORT), Tenerife. After mounting and digitization, the BR specimens will be accessible through the online portal of the Virtual Herbarium of the Meise Botanic Garden (2025). All records of the first author were also entered into the citizen-science platform Observation.org (2025), from where the data were subsequently integrated into the Global Biodiversity Information Facility (GBIF 2025).

The distribution maps were generated using the Cartographic Base provided by GRAFCAN, based on the WGS84 ellipsoid and projected in UTM Zone 28.

## Results

### Newly recorded alien species

*Bacopa monnieri* (L.) Wettst. in H.G.A.Engler & K.A.E.Prantl, Nat. Pflanzenfam. 4(3b): 77 (1891) (Plantaginaceae)

Figures 1, 11

**New records.** SPAIN — TENERIFE • Santa Cruz de Tenerife, Parque García Sanabria; 28.4722, –16.2541; 51 m a.s.l.; 24 Sep. 2022; Filip Verloove leg.; lawn weed; F. Verloove 14551 (BR) • San Cristóbal de la

**Figure 1.** *Bacopa monnieri* on the bank of an artificial lake in La Laguna, Tenerife, 28 September 2022. Photo by Filip Verloove.



Laguna, Parque La Vega; 28.4961, –16.3129; 550 m a.s.l.; 28 Sep. 2022; Filip Verloove obs.; along the margins of an artificial pond. See also Appendix for corresponding Observation.org (2025) records.

*Bacopa monnieri* is a pantropical species widely naturalized across various regions of the world. Its spread is often linked to its frequent cultivation as an ornamental in water gardens, particularly for ponds and swamps. The species reproduces prolifically and readily escapes from cultivation, with waterfowl likely playing a role in its unintentional dispersal.

Within the Euro+Med Plantbase area, the species remains rare, though it is known to be naturalized in parts of the northwestern Iberian Peninsula (Spain and Portugal) and the Middle East (Raus 2003). A first record for the Balearic Islands was recently published by Fraga-Arguimbau et al. (2024). In several regions worldwide, *B. monnieri* is considered invasive (numerous references).

In September 2022, two patches of *Bacopa monnieri* were found growing as a lawn weed in Parque García Sanabria, Santa Cruz de Tenerife. Additional populations were observed in abundance along the margins of an artificial pond in Parque de La Vega (La Laguna), although it remains unclear whether these plants were deliberately introduced or represent escapes. These records constitute the first from the Canary Islands.

**Identification.** *Bacopa monnieri* is a perennial herb, typically found in moist environments. The plant is characterized by its small, opposite, and succulent leaves, which are ovate to elliptical in shape, and its striking blue to white funnel-shaped flowers. The stems are prostrate or trailing, often rooting at the nodes, and the plant has a characteristic aromatic smell when crushed. None of the indigenous nor of the established non-native species in Tenerife, exhibit the same morphological features.

***Brassica fruticulosa* Cirillo, Pl. Rar. 2: 7 (1792) (Brassicaceae)**

Figures 2, 11

**New records.** SPAIN — TENERIFE • Igueste de San Andrés, roadside, March 2014; Filip Verloove leg.; F. Verloove 13434 (BR) • Igueste de San Andrés, Carretera de Igueste de San Andrés; 28.5287, –16.1568; 65 m a.s.l.; 26 March 2022; Filip Verloove leg.; roadside, below basaltic rocks; F. Verloove 14233 (BR). See also Appendix for corresponding Observation.org (2025) records.

*Brassica fruticulosa* is a species native to the western Mediterranean region. It exhibits a weedy growth habit and is naturalized in several regions outside its native range, including Australia, New Zealand, and California (POWO 2026).

This taxon had not previously been recorded from the Canary Islands, although its presence may have gone unnoticed due to its morphological similarity to other yellow-flowered crucifers. The species was first observed by the first author in 2014 along the TF-121 road in Igueste de San Andrés. Its persistence and spread were confirmed in March 2022, indicating that it is now abundantly naturalized at this locality.

**Identification.** *Brassica fruticulosa* shares some morphological similarities with other species in the *Brassica* L. and *Diplotaxis* DC. genera, particularly in terms of its leaf shape and flower structure. However, it can be differentiated from *Diplotaxis* by the arrangement of seeds in the fruit, which is a key characteristic—*Diplotaxis* species have seeds in two rows, while in *B. fruticulosa*, the seeds are aligned in a single row. Additionally, the leaves of *B. fruticulosa* are typically more glaucous and fleshy compared to the more commonly found, often finer-textured leaves of *Diplotaxis*.

***Crassula alata* (Viv.) A.Berger in H.G.A.Engler, Nat. Pflanzenfam., ed. 2. 18a: 389 (1930)**

(Crassulaceae)

Figures 3, 11

**New records.** SPAIN — TENERIFE • Tierra del Trigo (Los Silos); 28.37, –16.83; 425 m a.s.l.; 12 March 1988; Arnoldo Santos, Ana Calero & Rolf Lidberg leg.; common in trampled, sunny places; ORT 30672 • La Matanza de Acentejo, track towards El Sauzal; 28.4558, –16.4562; 355 m a.s.l.; 13 March 2022; Filip Verloove leg.; cracks in paved path, common; F. Verloove 14237 (BR). See also Appendix for corresponding Observation.org (2025) records.

*Crassula alata* is a relatively poorly known species, probably native to the Mediterranean region (especially North Africa and nearby islands), parts of sub-Saharan Africa, the Middle East, and parts of Asia (see Greuter et al. 1984; Boulos and Al-Hasan 1986; Lambinon 2000; Bartolo et al. 2004; Martínez Fort and Donat Torres 2006; Gallo 2008; Fraga-Arguimbau et al. 2018; De Beer and Verloove 2020). It is widely naturalized in Australia (including Tasmania) and New Zealand, where it is considered an aggressive invader and environmental weed (Toelken 1981; Sykes 2005; Ogle et al. 2020; Wapstra and Baker 2022).



**Figure 2.** Herbarium specimen of *Brassica fruticulosa* collected in 2022 in Iguete de San Andrés, Tenerife. The identity of these plants remained unclear for many years and was only recently correctly determined.



**Figure 3.** Herbarium specimen of *Crassula alata* from Tierra del Trigo, Tenerife (March 1988), originally preserved under *C. tillaea*. The close-up shows the diagnostic trimerous flowers (vs. pentamerous in *C. campestris*) and the presence of pedicellate flowers (vs. sessile in *C. tillaea*).

This species represents a new addition to the Canary Islands flora. The earliest material, collected in March 1988 at Tierra del Trigo (Los Silos) and originally determined as *Crassula tillaea* Lest.-Garl., has been re-identified by us as *C. alata* following our recent discoveries in northern Tenerife. This reinterpretation shows that the species has in fact been present on the island for several decades. More recently, a second population has been found in La Matanza de Acentejo, where the species is frequent and clearly naturalized. Its apparent absence from floristic literature likely reflects misidentification, as it is easily confused with *C. tillaea* and *C. campestris* (Eckl. & Zeyh.) Endl., with which it co-occurs at this site. These three annual species, part of section *Glomeratae* Haw. (sometimes treated as the genus *Tillaea* L.), share similar general morphology. It is therefore plausible that *C. alata* also occurs elsewhere in the northern part of Tenerife but has gone unnoticed due both to its similarity with *C. campestris* and *C. tillaea* and to its very short life cycle, being detectable only for a few weeks in late winter to early spring.

**Identification.** *Crassula alata* can easily be confused with other small, annual species from the genus, particularly *C. campestris* and *C. tillaea*. Both *C. alata* (at least the subspecies *alata*) and *C. tillaea* have 3-merous flowers, although it is worth noting that *C. alata* subsp. *pharnaceoides* (Fisch. & C.A.Mey.) Wickens & M.Bywater, from Africa and the Arabian Peninsula, has 5-merous flowers. A key distinguishing feature between *C. alata* and *C. tillaea* is that, while some flowers of *C. alata* are distinctly pedicellate, all flowers in *C. tillaea* are sessile.

The epithet “*alata*” may be somewhat misleading, as the characteristic winged stem ridges are typically only visible on dried specimens. Additionally, *C. alata* has sepals approximately twice as long as the petals, whereas in *C. tillaea*, the sepals are only slightly longer than the petals. *Crassula alata* also tends to be slightly more robust in growth, resembling *C. campestris* in general habit, a species which has 5-merous flowers.

Both *C. alata* and *C. tillaea* share similar seed ornamentation (Wickens and Bywater 1980), suggesting a close phylogenetic relationship. Photographs from the “Floradecanarias” website ([http://www.floradecanarias.com/crassula\\_tillaea.html](http://www.floradecanarias.com/crassula_tillaea.html)) indicate that *C. alata* may also occur on Lanzarote, where it has previously been confused with *C. tillaea*.

A simplified key to the three annual *Crassula* species currently known from the Canary Islands:

1. Flowers 5-merous; sepals usually not spine-tipped ..... *Crassula campestris*

- 1'. Flowers 3(–4)-merous; sepals usually spine-tipped ..... 2
2. Some flowers pedicellate; sepals twice as long as petals; stem with prominent marginal ridges when dried ..... *C. alata* subsp. *alata*
- 2'. All flowers sessile; sepals barely longer than petals; stem winged or not when dried ... *C. tillaea*

***Hydrocotyle sibthorpioides* Lam., Encycl. 3: 153 (1789) (Araliaceae)**

Figures 4, 11

**New records.** SPAIN — TENERIFE • La Orotava, Jardines del Marquesado de la Quinta Roja; 28.3897, -16.5225; 374 m a.s.l.; 1 Oct. 2022; Filip Verloove leg.; damp lawn, abundant but only locally; F. Verloove 14460 (BR). See also Appendix for corresponding Observation.org (2025) records.

*Hydrocotyle sibthorpioides* is native to the Old World tropics and subtropics and has become naturalized in several regions of Europe and North America, typically in irrigated lawns and other moist, disturbed habitats (Lipscomb and Diggs Jr. 2005; Verloove and Heyneman 2021). Despite its delicate, inconspicuous appearance, it can form persistent populations and is easily overlooked.

In the gardens of La Orotava, where it was discovered, this species is abundant but confined to a single, less-maintained corner of the park. Interestingly, although *H. sibthorpioides* is not included in contemporary floras or checklists for the Canary Islands, Fægri (1970) reported "*Hydrocotyle* aff. *sibthorpioides*" from Puerto de la Cruz, specifically in the lawns of Hotel San Borondon. Unfortunately, no herbarium material was preserved, making definitive identification impossible.

**Identification.** Another exotic *Hydrocotyle* Tourn. ex L.—*H. bowlesii* Mathias & Constance, native to Central and South America—is currently well established in Puerto de la Cruz (Siverio Núñez et al. 2013). Although first documented only in 2010, its distribution suggests an earlier, undetected

**Figure 4.** Dominant stand of *Hydrocotyle sibthorpioides* in a lawn in La Orotava, Tenerife, 1 October 2022. Photo by Filip Verloove.



presence. Compared to *H. bowlesioides*, *H. sibthorpioides* is glabrous (vs. densely hirsute), with smaller (3–12 mm vs. up to 35 mm wide), more rounded leaves. Given that Fægri described his specimen as hairy, it likely referred to *H. bowlesioides*, not *H. sibthorpioides*.

A third related species, the New Zealand endemic *H. microphylla* A.Cunn., has also been reported from Tenerife, based on Hansen and Sunding (1993), but apparently without supporting herbarium material, rendering the record unverifiable. The report has nevertheless been perpetuated through online databases (e.g. Banco de Datos de Biodiversidad de Canarias 2025; Euro+Med Plantbase 2025). It may reflect a misapplied name, possibly referring instead to either *H. bowlesioides* or *H. sibthorpioides* (cf. Stace 2019 for similar confusion in the British Isles).

***Hyparrhenia anthistirioides* (Hochst. ex A.Rich.) Andersson ex Stapf, Fl. Trop. Afr. 9: 331 (1919)**  
(Poaceae)

Figures 5, 12

**New records.** SPAIN — TENERIFE • Santa Cruz de Tenerife, Barranco de Cueva Bermeja; 28.5017, –16.2234; 203 m a.s.l.; 26 Feb. 2023; J.A. Reyes-Betancort & N. Tabares-Concepción leg.; in herb communities in a succulent scrub dominated by *Euphorbia lamarckii* Sweet; J.A. Reyes-Betancort & N. Tabares-Concepción s.n., ORT 48643.

*Hyparrhenia anthistirioides* is an annual grass native to tropical East Africa. It is occasionally introduced outside its native range as a contaminant in commercial birdseed mixtures, particularly Niger

**Figure 5.** Detail of spikelets of *Hyparrhenia anthistirioides* in Santa Cruz de Tenerife in February 2023. Photo by Alfredo Reyes-Betancort.



seed (*Guizotia abyssinica* (L.f.) Cass.) (Hanson 2019). Despite its sporadic inclusion in such products, the species does not appear to have been previously documented in the wild beyond its native distribution area.

The means of introduction to Tenerife remains speculative. However, its presence may be linked to the importation of fodder for small livestock such as goats and sheep. The population observed in Barranco de Cueva Bermeja consisted of only a few individuals (approximately four or five), suggesting a recent and possibly accidental introduction.

**Identification.** *Hyparrhenia anthistirioides* is easily distinguished by its annual growth habit, long spatheoles, awns, and homogamous spikelets. Additional distinguishing features include its small stature, brightly striped spatheoles, and dark-colored awns (Clayton 1969). In contrast, all other species from this genus found in the Canary Islands are coarse, perennial grasses that grow in dense clumps from underground rhizomes.

***Momordica charantia* L., Sp. Pl.: 1009 (1753) (Cucurbitaceae)**

Figures 6, 12

**New records.** SPAIN — TENERIFE • Puerto de la Cruz, San Nicolás, Calle Goya; 28.3999, -16.5393; 182 m a.s.l.; 26 Sep. 2022; Filip Verloove leg.; rough ground, roadside, looks quite established; F. Verloove 14465 (BR) • Puerto de la Cruz, San Nicolás, Calle Velázquez; 28.3998, -16.5386; 187 m a.s.l.; 26

**Figure 6.** Invasive population of *Momordica charantia* in Puerto de la Cruz, Tenerife, 26 September 2022, Photo by Filip Verloove.



Sep. 2022; Filip Verloove obs.; tree basin. See also Appendix for corresponding Observation.org (2025) records.

*Momordica charantia*, a fast-growing tropical liana, is cultivated worldwide for its edible, bitter fruits and is commonly grown throughout the Old World tropics and subtropics. It readily escapes cultivation and has become naturalized in parts of the Neotropics (POWO 2026). Due to its aggressive growth and capacity to form dense, smothering colonies, it is considered invasive in various regions, including parts of Australia, South America, and the United States (Rizzo et al. 2023).

In the Canary Islands, *M. charantia* was previously only recorded from La Palma (Santos Guerra et al. 2013; Otto and Verloove 2016). This new record from Tenerife represents its first confirmed occurrence on the island. The species was found growing vigorously on disturbed land adjacent to a banana plantation at the edge of a residential area, from which it likely escaped. Curiously, the name of the street—Calle Goya—coincides with one of the vernacular names for this species.

**Identification.** This species is easily recognized by its distinctive, warty, bright orange to red fruit, which splits open to reveal a cluster of seeds embedded in a spongy, bright red pulp. The fruit's appearance, with its elongated, oval shape and characteristic wart-like texture, is unique and unlikely to be confused with other species.

While *Momordica charantia* is distinctive due to its fruit, it does share its family, Cucurbitaceae, with other species found on the Canaries, such as *Cucumis sativus* L. (Cucumber) and *Cucurbita pepo* L. (Zucchini), both of which are cultivated on the islands. However, neither of these species produces the highly distinctive, wart-covered fruit of *M. charantia*. Additionally, the bitter taste and the unique morphological structure of the fruit make it easy to distinguish from other cucurbits, both native and introduced.

***Nephrolepis biserrata* (Sw.) Schott, Gen. Fil. (Vindob.): t. 3 (1834) (Polypodiaceae)**

Figures 7, 12

**New records.** SPAIN — TENERIFE • Santa Úrsula, El Calvario I, Calle Caracas; 28.4280, −16.4977; 234 m a.s.l.; 7 Oct. 2022; Filip Verloove leg.; foot of wall, cracks, and crevices, abundantly planted and escaping; F. Verloove 14568 (BR). See also Appendix for corresponding Observation.org (2025) records.

*Nephrolepis biserrata* is a pantropical fern and one of the most widespread species of the genus in Southeast Asia (Hovenkamp and Miyamoto 2005). It is commonly cultivated as an ornamental and is known to readily escape from cultivation. In several regions—particularly on Indian Ocean and Pacific islands—it has become naturalized to the point of being considered an invasive or environmental weed (Whistler 1983; Stone et al. 1992; Swarbrick and Hart 2000).

This represents the first record of the species in the wild in the Canary Islands. In Santa Úrsula, scattered individuals were found growing from wall crevices and at the base of concrete structures, often alongside *Cyrtomium falcatum* (L.f.) C.Presl. The species is widely planted in the area, and it remains uncertain whether the wild plants originated from spore germination or are vegetative offshoots (runners) from cultivated individuals.

**Figure 7.** *Nephrolepis biserrata* escaped in Santa Úrsula, Tenerife, 7 October 2022. Photo by Filip Verloove.



**Identification.** *Nephrolepis biserrata* is a robust species, typically producing fronds up to 150 cm in length. It is distinguishable by its sparse, spreading (not appressed) scales on stolons and by its sub-marginal to medial sori (as opposed to marginal), which help to differentiate it from similar cultivated taxa such as *N. brownii* (Desv.) Hovenkamp & Miyam., *N. hirsutula* (G.Forst.) C.Presl, and *N. oblitterata* (R.Br.) J.Sm. (Hovenkamp and Miyamoto 2005).

***Rotheca myricoides* (Hochst.) Steane et Mabb., Novon 8: 205 (1998)** (Lamiaceae)

Figures 8, 12

**New records.** SPAIN — TENERIFE • La Orotava, Calle Noruega; 28.4019, -16.5099, 285 m a.s.l.; 7 Oct. 2022; Filip Verloove leg.; foot of tree and walls, self-sown (planted in private garden nearby), F. Verloove 14474 (BR). See also Appendix for corresponding Observation.org (2025) records.

*Rotheca myricoides* [Syn.: *Clerodendrum myricoides* (Hochst.) R.Br. ex Vatke] is native to eastern and southern Africa, from Eritrea to South Africa. It is widely cultivated as an ornamental in subtropical regions, valued for its striking flowers. The species is known to escape from cultivation and has been recorded as naturalized or invasive in various regions, including Australia, Brazil, and Hawaii (POWO 2026).

In October 2022, a self-sown individual bearing flower buds was discovered growing at the foot of a tree in La Orotava. Additional seedlings were later noted in the vicinity. The proximity of cultivated specimens in a nearby private garden strongly suggests that these escapes originated from intentional plantings. Although only a small number of individuals have been observed so far, these findings indicate the species' capacity to reproduce and potentially establish itself outside cultivation.

**Identification.** *Rotheca myricoides* is a shrub or small tree with a loosely branched, open growth habit and can reach heights of 2–3 m. The leaves are ovate to lance-shaped and emit a distinctive, somewhat unpleasant smell when crushed. Its striking blue flowers resemble the delicate wings of butterflies. It bears no resemblance to any endemic flora in terms of flower structure or scent.

**Figure 8.** *Rotheca myricoides* as an escape in La Orotava, Tenerife, 7 October 2022. Photo by Filip Verloove.



### Miscellaneous records

#### *Digitaria radicata* (J.Presl) Miq. in Fl. Ned. Ind. 3: 437 (1857) (Poaceae)

Figures 9, 13

**New records.** SPAIN — TENERIFE • Santa Cruz de Tenerife, Plaza del Príncipe de Asturias; 28.4685, −16.2503; 31 m a.s.l.; 24 Sep. 2022; Filip Verloove leg.; plantation weed; F. Verloove 14516 (BR) • Santa Cruz de Tenerife, Parque García Sanabria; 28.4722, −16.2541; 51 m a.s.l.; 24 Sep. 2022; Filip Verloove leg.; plantation and lawn weed; F. Verloove 14518 (BR) • La Orotava, Av. Comunidad Iberoamericana; 28.3932, −16.5247; 319 m a.s.l.; 1 Oct. 2022; Filip Verloove leg.; sidewalk, cracks in concrete, ca. 6 individuals; F. Verloove 14544 (BR) • Puerto de la Cruz, Plaza Francisco Afonso Carrillo; 28.4137, −16.5533; 34 m a.s.l.; 8 Oct. 2022; Filip Verloove leg.; plantation weed; F. Verloove 14476 (BR). See also Appendix for corresponding Observation.org (2025) records.

This Asian weed was only recently reported for the first time from the Canary Islands (Otto and Scholz 2009; Otto and Verloove 2016; Verloove 2017). Although a recent introduction—the first finds of which date back to 2014 in Tenerife—the further spread of *Digitaria radicata* in Tenerife was recently observed. It was regularly seen in parks and other urban habitats, where it occurs in irrigated lawns and as a plantation weed.

**Identification.** *Digitaria radicata* bears some resemblance to the widespread subtropical weed *D. ciliaris* (Retz.) Koeler. However, it is readily distinguished by its smooth, never scabrous rachis margins, its more delicate overall habit, and its fewer, more slender racemes.

#### *Biancaea decapetala* (Roth) O.Deg. in Fl. Hawaiiensis: K7 (1936) (Fabaceae)

Figures 10, 14

**New records.** SPAIN — TENERIFE • La Orotava, barranco del Lomo de los Pastores at Jardines Victoria; 28.3898, −16.5224; 381 m a.s.l.; 1 Oct. 2022; Filip Verloove leg.; shady ravine, two self-sown shrubs; F. Verloove 14462 (BR) • La Orotava, Avenida La Torrita; 28.3878, −16.5216; 411 m a.s.l.; 25 Feb. 2024; Jorge Alfredo Reyes-Betancort leg.; abandoned crop terraces; J.A. Reyes-Betancort s.n., ORT 48659. See also Appendix for corresponding Observation.org (2025) records.

This ornamental shrub is native to Asia but has become widely naturalized in regions of Africa, South America, New Zealand, and Australia (POWO 2026). It reproduces prolifically by self-seeding and readily becomes established in suitable habitats wherever introduced, often to the extent of being considered invasive (e.g. Coetzer and Neser 1999).

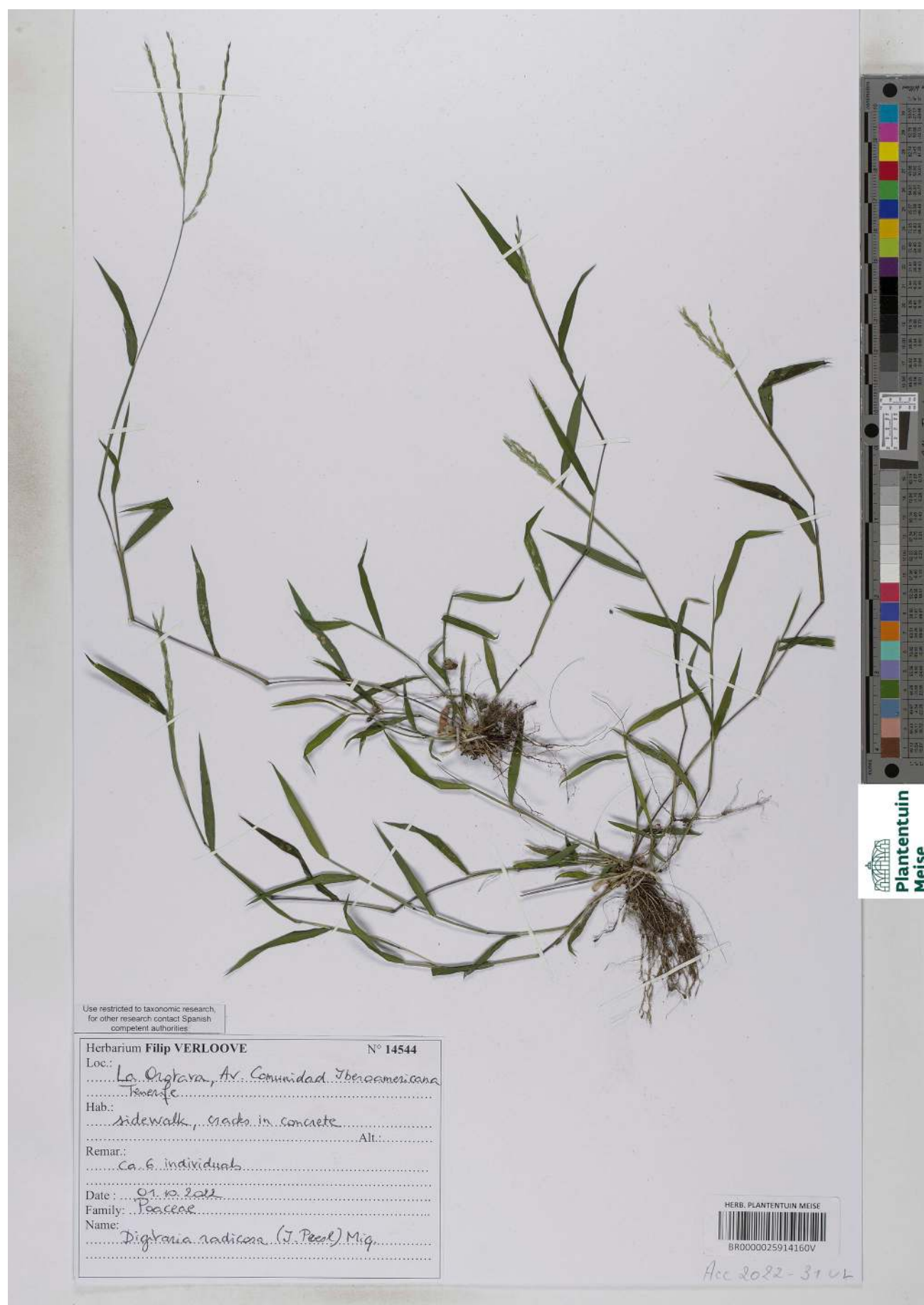
Within the Canary Islands, *Biancaea decapetala* (Roth) O. Deg. [Syn.: *Caesalpinia decapetala* (Roth) Alston; *C. sepiaria* Roxb.] was previously recorded from Tafira on Gran Canaria (Lindinger 1926, based on Bornmüller's collection), although its current wild status there is uncertain and it is possibly extinct. In Tenerife, it was documented in Santa Cruz and La Orotava (Knapp 1976), but was omitted from later floristic catalogues (e.g. Hansen and Sunding 1993; Banco de Datos de Biodiversidad de Canarias 2025). In October 2022, two young self-sown shrubs were recorded in a ravine in La Orotava. These likely originated from a long-established population along Avenida La Torrita, where over 20 mature individuals grow amidst a dense, thorny scrub dominated by *Arundo donax* L. and *Lantana camara* L., forming a stand that is difficult to manage. This population likely corresponds to Knapp's (1976) record and indicates a presence of approximately 50 years.

**Identification.** *Biancaea decapetala* is a vigorous, thorny woody climber or scrambling shrub. It is readily recognized by its bipinnate leaves with numerous small, ovate leaflets, and by its abundant, sharp recurved thorns found on stems, petioles, and rachises, and its large, yellow-flowered racemes.

## Discussion

The newly recorded alien plant species reported here for Tenerife underscore a continuing and significant increase in both casual and naturalized non-native flora within the Canary Islands. These records not only expand the known alien flora of the archipelago but also provide insight into current introduction pathways and the ecological dynamics facilitating plant establishment.

Several of the newly documented species, such as *Crassula alata*, have established persistent populations, indicating successful naturalization. Although already collected in 1988 in the north of Tenerife, the species has remained overlooked in the regional literature. Its morphological similarity to *C. campestris* and *C. tillaea*, together with its very short life cycle, likely contributed to this oversight. The existence of two confirmed populations and the presence of suitable microhabitats suggest that *C.*



**Figure 9.** Herbarium specimen of *Digitaria radicata* from La Orotava, Tenerife (October 2022). The slender, trailing habit and inflorescences with few branches are characteristic.

**Figure 10.** *Biancaea decapetala* in a ravine in La Orotava, Tenerife, where the species has been known for half a century, 1 October 2022. Photo by Filip Verloove.



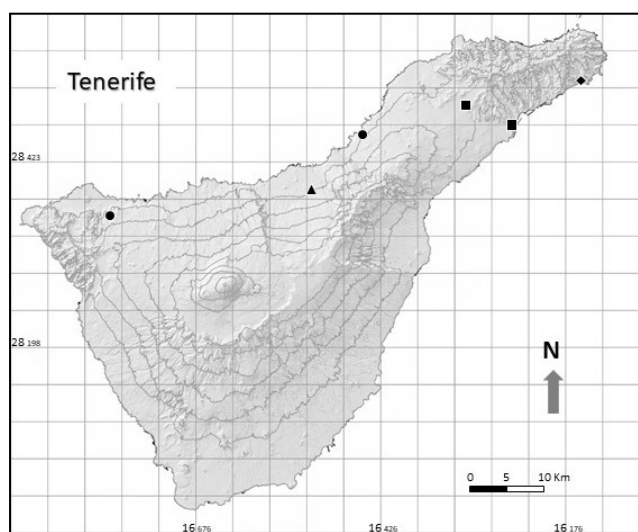
*alata* may be more widespread in northern Tenerife than currently recorded. This highlights both the importance of careful taxonomic scrutiny when surveying introduced taxa and the potential for further spread of this inconspicuous annual.

Species such as *Bacopa monnieri*, which is frequently associated with artificial water bodies, illustrate the combined influence of horticultural usage and natural vectors—e.g. waterfowl-mediated dispersal—in facilitating escape from cultivation. Its new record in Tenerife is particularly notable given its pantropical distribution and known invasiveness in wetland habitats elsewhere.

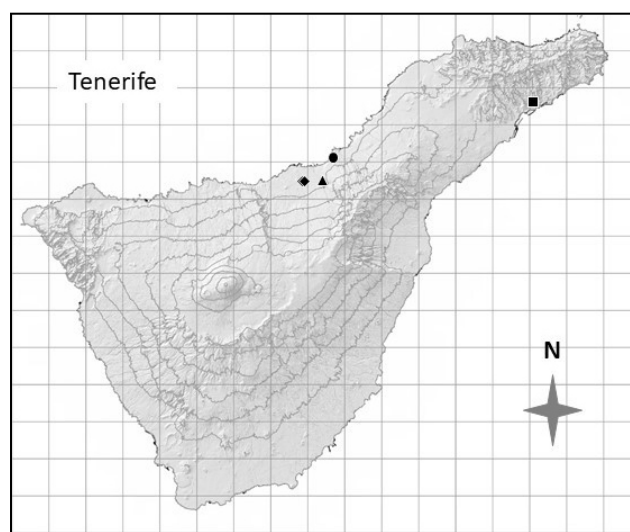
*Hyparrhenia anthistirioides* appears to represent a more recent, likely accidental introduction, with animal-feed contamination as a plausible introduction vector. This record marks the first for the Canary Islands and significantly extends the known range of the species outside its native African range.

Similarly, *Momordica charantia* and *Rotheca myricoides* are currently observed as casual escapes but show signs of potential naturalization. Both are widely cultivated ornamental or medicinal plants, and their repeated presence in disturbed sites near urban areas suggests a capacity for establishment. Continued monitoring is needed to determine whether these taxa follow the trajectory of other formerly casual species that have become invasive.

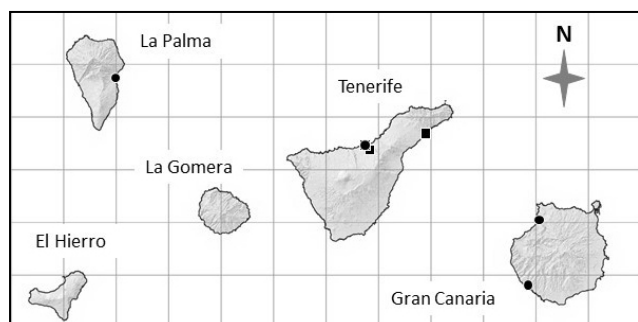
The detection of naturalized populations of *Digitaria radicata* and *Biancaea decapetala* confirms that several alien species introduced in previous decades are now well established. These cases illustrate the phenomenon of “lag phases”—a delay between introduction and noticeable spread—common



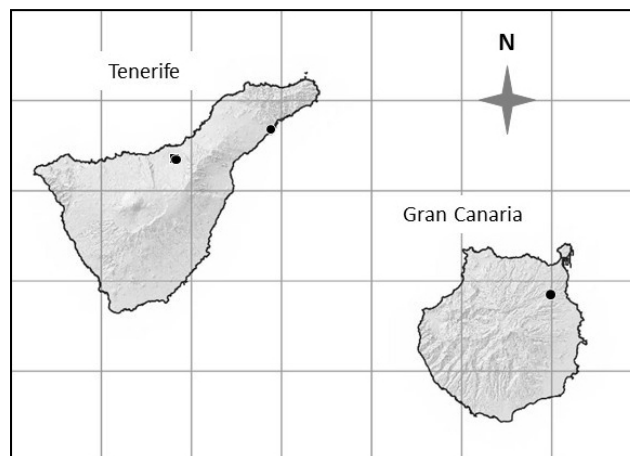
**Figure 11.** Distribution of *Bacopa monnieri* (■), *Brassica fruticulosa* (◆), *Crassula alata* (●) and *Hydrocotyle sibthorpioides* (▲) in Tenerife. Grid cells are 5 × 5 km.



**Figure 12.** Distribution of *Hyparrhenia anthistirioides* (■), *Momordica charantia* (◆), *Nephrolepis biserrata* (●) and *Rotheca myricoides* (▲) in Tenerife. Grid cells are 5 × 5 km.



**Figure 13.** Distribution of *Digitaria radicata* in the Canary Islands: new (■) and previous (●) records. Grid cells are 25 × 25 km.



**Figure 14.** Distribution of *Biancaea decapetala* in the Canary Islands: new (■) and previous (●) records. Grid cells are 25 × 25 km.

in biological invasions. Notably, the confirmed presence of *Biancaea decapetala* in Tenerife raises concerns given its aggressive growth habit and reported invasiveness in other tropical regions.

Overall, these new records highlight Tenerife's ongoing role as a hotspot for alien plant introductions, shaped by a confluence of factors: a subtropical climate, high habitat diversity, and intense anthropogenic activity including tourism, horticulture, and global trade. The findings emphasize the importance of early detection and continuous floristic surveillance in island ecosystems, where invasive species can rapidly alter native biodiversity.

Future research should prioritize assessing the invasiveness potential of these newly recorded taxa and clarifying their pathways of introduction. In addition, a more systematic evaluation of urban, peri-urban, and horticultural zones could yield further undocumented records and help refine prevention and management strategies.

## Acknowledgements

We thank the reviewers for their valuable comments and suggestions, which helped improve an earlier version of this manuscript.

## Additional information

### Conflict of interest

The authors declare that no competing interests exist.

### Ethical statement

No ethical statement is reported.

### Funding

This study was not financially supported.

### Author contributions

Conceptualization: FV. Data curation: FV, JARB. Investigation: FV, JARB. Writing – original draft: FV. Visualization: FV, JARB. Writing – review and editing: FV, JARB.

### Author ORCID iDs

Filip Verloove  <https://orcid.org/0000-0003-4144-2422>

Jorge Alfredo Reyes-Betancort  <https://orcid.org/0000-0003-0732-3219>

### Data availability

All data that support the findings of this study are available in the main text.

## References

Banco de Datos de Biodiversidad de Canarias (2025) <https://www.biodiversidadcanarias.es/biota/>. Accessed on: 2025-06-11.

- Bartolo G, Brullo S, Gianguzzi L (2004) Note tassonomiche su *Tillaea alata* Viv. (Crassulaceae), nuova per la flora italiana. *Informatore Botanico Italiano* 36: 524–528.
- Beierkuhnlein C, Walentowitz A, Welss W (2021) FloCan—a revised checklist for the flora of the Canary Islands. *Diversity* 13 (10): 480. <https://doi.org/10.3390/d13100480>
- Boulos L, Al-Hasan R (1986) Ten species new to the flora of Kuwait and Bahrain. *The Arab Gulf Journal of Scientific Research* 4 (2): 437–447.
- Clayton WD (1969) A revision of the genus *Hyparrhenia*. *Kew Bulletin Additional Series* II: 1–196.
- Coetzer W, Naser S (1999) Biological control initiatives against the invasive Oriental legume, *Caesalpinia decapetala* (Roth) Alston (Mauritius Thorn), in South Africa. *African Entomology Memoir* 1: 145–152.
- De Beer D, Verloove F (2020) *Crassula alata*. In: Raab-Straube E von, Raus T (Eds.) *Euro+Med-Checklist Notulae*, 12 [Notulae ad floram euro-mediterraneam pertinentes No. 41]. *Willdenowia* 50: 313–314. <https://doi.org/10.3372/wi.50.50214>
- Euro+Med Plantbase (2025) <https://europusmed.org/>. Accessed on: 2025-06-11.
- Fægri K (1970) Appendix: *Hydrocotyle* aff. *sibthorpioides* Lam. In: Lid J (Ed.) *Notes on plants from the Canary Islands*. *Nytt Magasin for Botanikk* 17: 1–6.
- Fraga-Arguimbau P, Mascaró-Sintes C, Pallicer-Allès X, Carreras-Martí D (2018) Notes i contribucions al coneixement de la flora de Menorca (XIII). *Notes florístiques. Bolletí de la Societat d'Història Natural de les Balears* 61: 183–198.
- Fraga-Arguimbau P, Mascaró-Sintes C, Pallicer-Allès X, Seoane-Barber M, Truyol-Olives M (2024) Notes i contribucions al coneixement de la flora de Menorca (XX). *Contribució a la flora al·lòctona. Bolletí de la Societat d'Història Natural de les Balears* 67: 17–32.
- Gallo L (2008) *Tillaea alata* Viv. In: Jeanmonod D, Schlüssel A (Eds.) *Notes et contributions à la flore de Corse*, XXII. *Candollea* 63: 145.
- GBIF (2025) Global Biodiversity Information Facility. <https://www.gbif.org>. Accessed on: 2025-08-21.
- Greuter W, Matthäs U, Risse H (1984) Additions to the flora of Crete, 1973–1983 (1984) – II. *Willdenowia* 14 (2): 269–297.
- Hansen A, Sunding P (1993) Flora of Macaronesia. Checklist of vascular plants (4. revised edition). *Sommerfeltia* 17: 1–295. <https://doi.org/10.2478/som-1993-0003>
- Hanson CG (2019) Birdseed aliens originating from Niger (*Guizotia abyssinica*) wild bird food. *British & Irish Botany* 1 (4): 292–308.
- Hovenkamp PH, Miyamoto F (2005) A conspectus of the native and naturalized species of *Nephrolepis* (Nephrolepidaceae) in the world. *Blumea* 50: 279–322. <https://doi.org/10.3767/000651905X623003>
- Knapp R (1976) Endemische Pflanzen und anthropogene Ausbreitung am Beispiel der Vegetation und der Flora von Tenerife, Canarische Inseln, und von Hessen. *Oberhessische Naturwissenschaftliche Zeitschrift* 42: 77–95.
- Lambinon J (2000) Additions et corrections à la liste des plantes vasculaires de l'île de Djerba (Tunisie méridionale). *Bulletin, Société pour l'Échange des Plantes Vasculaires de l'Europe Occidentale et du Bassin Méditerranéen* 28: 127–143.
- Lindinger KHL (1926) Beiträge zur Kenntnis von Vegetation und Flora der kanarischen Inseln, Zweiter Teil: Flora der kanarischen Inseln, Berichtigungen und Nachträge zu J. Pitard et L. Proust, *Les Îles Canaries. Flore de l'Archipel*. Paris 1909. *Abhandlungen aus dem Gebiet der Auslandskunde* 21: 142–350.
- Lipscomb BL, Diggs Jr. GM (2005) *Hydrocotyle sibthorpioides* (Apiaceae) new for Texas and notes on introduced species. *Sida* 21: 2449–2456.
- Martínez Fort J, Donat Torres P (2006) *Crassula alata* (Viv.) Berger subsp. *alata*: primera cita para la Península Ibérica. *Flora Montiberica* 33: 41–44.
- Observation.org (2025) <https://observation.org>. Accessed on: 2025-08-21.
- Ogle CC, de Lange PJ, Cameron EK, Parris BS, Champion PD (2020) Checklist of dicotyledons, gymnosperms and pteridophytes naturalised or casual in New Zealand: additional records 2007–2019. *Perspectives in Biosecurity* 5: 45–116.
- Otto R, Scholz H (2009) *Digitaria radicata*. In: Greuter W, Raab-Straube E von (Eds.) *Euro Med Notulae*, 4. *Willdenowia* 39: 332. <https://doi.org/10.3372/wi.39.39210>
- Otto R, Verloove F (2016) New xenophytes from La Palma (Canary Islands, Spain), with emphasis on naturalized and (potentially) invasive species. *Collectanea Botanica* 35: e001. <https://doi.org/10.3989/collectbot.2016.v35.001>
- POWO (2026) Plants of the world online. <https://powo.science.kew.org/>. Accessed on: 2026-01-02.
- Pyšek P, Hulme PE, Meyerson LA, Smith GF, Boatwright JS, Crouch NR, Figueiredo E, Foxcroft LC, Jarošík V, Richardson DM, Suda J, Wilson JR (2013) Hitting the right target: taxonomic challenges for, and of, plant invasions. *AoB Plants* 5: plt042. <https://doi.org/10.1093/aobpla/plt042>
- Raus T (2003) *Bacopa* (Scrophulariaceae) in Greece and adjacent countries. *Bocconeia* 16 (2): 745–749.
- Richardson DM, Pyšek P (2012) Naturalization of introduced plants: ecological drivers of biogeographical patterns. *New Phytologist* 196: 383–396. <https://doi.org/10.1111/j.1469-8137.2012.04292.x>
- Rizzo K, Herrera I, Vargas A, Cornejo X, López-Guillén E (2023) *Momordica charantia* (Cucurbitaceae) as an alien weed in Ecuador: Spatio-temporal distribution and invasion risk. *Collectanea Botanica* 42: e010. <https://doi.org/10.3989/collectbot.2023.v42.010>

- Santos Guerra A, Reyes Betancort JA, Padrón Mederos MA, Mesa Coello R (2013) Plantas poco o nada conocidas de la flora vascular silvestre de las Islas Canarias. *Botanica Complutensis* 37: 99–108. [https://doi.org/10.5209/rev\\_BOCM.2013.v37.42274](https://doi.org/10.5209/rev_BOCM.2013.v37.42274)
- Siverio Núñez AM, Sobrino Vesperinas E, Rodríguez de la Torre HA, Reyes Betancort JA, Santos Guerra A (2013) Nuevos xenófitos de elevada capacidad invasora para la flora canaria. *Botánica Macaronésica* 28: 165–173.
- Skultety D, Matthews JW (2017) Urbanization and roads drive non-native plant invasion in the Chicago metropolitan region. *Biological Invasions* 19: 2553–2566. <https://doi.org/10.1007/s10530-017-1464-7>
- Stace C (2019) New flora of the British Isles, 4th edition. C & M Floristics, Middlewood Green, Suffolk, United Kingdom, 1266 pp.
- Stone CP, Smith CW, Tunison JT (1992) Alien plant invasions in native ecosystems of Hawaii: management and research. University of Hawaii Cooperative National Park Resources Studies Unit, Honolulu, Hawaii, USA, 903 pp.
- Swarbrick JT, Hart R (2000) Environmental weeds of Christmas Island (Indian Ocean) and their management. *Plant Protection Quarterly* 16 (2): 54–57.
- Sykes WR (2005) Notes on *Euphorbia* and *Crassula* with a revised key to the latter wild in New Zealand. *New Zealand Botanical Society, Newsletter* 79: 8–16.
- Toelken HR (1981) The species of *Crassula* L. in Australia. *Journal of the Adelaide Botanic Gardens* 3: 57–90.
- Verloove F (2010) Invaders in disguise. Conservation risks derived from misidentifications of invasive plants. *Management of Biological Invasions* 1: 1–5. <https://doi.org/10.3391/mbi.2010.1.1.02>
- Verloove F (2017) New xenophytes from the Canary Islands (Gran Canaria and Tenerife; Spain). *Acta Botanica Croatica* 76: 120–131. <https://doi.org/10.1515/botcro-2017-0013>
- Verloove F, Heyneman G (2021) A note on some alien species of *Hydrocotyle* (Araliaceae) in Belgium. *Dumortiera* 117: 26–29. <https://doi.org/10.5281/zenodo.4541037>
- Virtual Herbarium of the Meise Botanic Garden (2025) <https://www.botanicalcollections.be>. Accessed on: 2025-08-21.
- Wapstra M, Baker ML (2022) The apparent sudden arrival of *Crassula alata* in Tasmania. *The Tasmanian Naturalist* 143: 1–12.
- Whistler WA (1983) Weed handbook of western Polynesia. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany, 151 pp.
- Wickens GE, Bywater M (1980) Seed studies in *Crassula* Subgen. *Disporocarpa*: studies in the Crassulaceae for the 'Flora of Tropical East Africa': I. *Kew Bulletin* 34 (4): 629–637. <https://doi.org/10.2307/4119060>

## Appendix

- Bacopa monnieri* (L.) Wettst. in H.G.A.Engler & K.A.E.Prantl, Nat. Pflanzenfam. 4(3b): 77 (1891)** (Plantaginaceae)  
Additional data: <https://observation.org/observation/255519240/>  
Additional data: <https://observation.org/observation/255671124/>
- Brassica fruticulosa* Cirillo, Pl. Rar. 2: 7 (1792)** (Brassicaceae)  
Additional data: <https://observation.org/observation/236255346/>
- Crassula alata* (Viv.) A.Berger in H.G.A.Engler, Nat. Pflanzenfam., ed. 2. 18a: 389 (1930)** (Crassulaceae)  
Additional data: <https://observation.org/observation/235382242/>
- Hydrocotyle sibthorpioides* Lam., Encycl. 3: 153 (1789)** (Araliaceae)  
Additional data: <https://observation.org/observation/255901552/>
- Momordica charantia* L., Sp. Pl.: 1009 (1753)** (Cucurbitaceae)  
Additional data: <https://observation.org/observation/255572127/>  
Additional data: <https://observation.org/observation/255572080/>
- Nephrolepis biserrata* (Sw.) Schott, Gen. Fil. (Vindob.): t. 3 (1834)** (Polypodiaceae)  
Additional data: <https://observation.org/observation/256398445/>
- Rothea myricoides* (Hochst.) Steane et Mabb., Novon 8: 205 (1998)** (Lamiaceae)  
Additional data: <https://observation.org/observation/256396248/>
- Biancaea decapetala* (Roth) O.Deg. in Fl. Hawaiiensis: K7 (1936)** (Fabaceae)  
Additional data: <https://observation.org/observation/255901581/>