

Dumortiera



n° 127

2026

Dumortiera is published in digital form only. Subscription is free. Use the form on the site of Meise Botanic Garden to subscribe.
Dumortiera verschijnt uitsluitend in digitale vorm. Het abonnement is gratis. Schrijf u in via de website van Plantentuin Meise.
Dumortiera est publié uniquement sous forme numérique. L'abonnement est gratuit. Inscrivez vous via le site du Jardin botanique de Meise.

Dumortiera publishes papers – in English, Dutch or French – on the flora and vegetation of Belgium and adjacent areas: vascular plants, bryophytes, lichens, algae and fungi. Themes that are discussed include changes in the indigenous and non-indigenous flora, revisions of 'difficult' or overlooked groups, identification keys, results of field surveys, short communications, etc. Each manuscript is refereed before publication.

Dumortiera is published in digital form only. Subscription is free. Use the form on the site of Meise Botanic Garden to subscribe (Dumortiera).

E-mail:
dumortiera@botanicgardenmeise.be

Dumortiera publiceert bijdragen – in het Nederlands, Frans of Engels – over de flora en vegetatie van België en de aangrenzende gebieden: vaatplanten, mossen, korstmossen, algen en paddenstoelen. De inhoud omvat de evolutie van de inheemse en niet-inheemse flora, revisies van moeilijke of miskende groepen, determinatiesleutels, resultaten van inventarisaties, korte mededelingen, enz. Elk aangeboden manuscript wordt door referenten beoordeeld.

Dumortiera verschijnt uitsluitend in digitale vorm. Het abonnement is gratis. Schrijf u in via de website van Plantentuin Meise (Dumortiera).

E-mail:
dumortiera@plantentuinmeise.be.

Dumortiera publie des contributions – en français, néerlandais ou en anglais – sur la flore et la végétation de la Belgique et des zones limitrophes: plantes vasculaires, mousses, lichens, algues, champignons. Les thèmes abordés incluent l'évolution de la flore indigène et non indigène, des révisions de groupes difficiles ou méconnus, des clés de détermination, des résultats d'inventaires de terrain, des communications brèves, etc. Chaque manuscrit est évalué par des reviewers.

Dumortiera est publié uniquement sous forme numérique. L'abonnement est gratuit. Inscrivez vous via le site du Jardin botanique de Meise (Dumortiera).

Courriel :
dumortiera@jardinbotaniquemeise.be.

Editorial board: Filip Verloove (editor), Quentin Groom, Philippe Martin, Geert Raeymaekers, Benoît Toussaint & Wouter Van Landuyt

Layout: Naomi Bousson and Sven Bellanger

Publication date fascicle 127:
February 2026

ISSN 2295-3728



Distributed under
Creative Commons CC-BY 4.0

Cover picture: *Oncosiphon pilulifer* in the Antwerp port area.

Dumortiera 127

› Contents | Inhoud | Sommaire

- 3-9** Globalization reflected in alien floras: uncovering the Australian origin of South African grain aliens in Belgium
— VERLOOVE F. & GONGGRIJP S.
- 10-28** New observations of garden escapes in Meise Botanic Garden (Belgium), part 2
— RONSE A. & VERLOOVE F.
- 29-35** *Panicum gilvum* in België: jarenlang miskend, maar wijd verspreid
— HOSTE I., VERLOOVE F., GONGGRIJP S. & BOMBLE F.W.
- 36-40** The *Portulaca oleracea* complex in Belgium: an update
— VERLOOVE F., HASSLER M. & VOGT D.
- 41-42** Boekbespreking: M. Warren John (2024) Frustrating flowers & puzzling plants
— HOSTE I.

Authors are asked to strictly follow the guidelines for authors [\[pdf\]](#)

De auteurs worden verzocht de auteursrichtlijnen strikt te volgen [\[pdf\]](#)

Les auteurs sont priés de se conformer aux instructions pour les auteurs [\[pdf\]](#)



**Meise
Botanic Garden**

Globalization reflected in alien floras: uncovering the Australian origin of South African grain aliens in Belgium

Filip VERLOOVE

Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium
filip.verloove@plantentuinmeise.be

Sipke GONGGRIJP

Pastoor van Kleefstraat 1, 1931 BL Egmond aan Zee, the Netherlands
sipkegonggrijp@live.nl

Samenvatting. – *Globalisering in de adventiefflora: het ontrafelen van de Australische herkomst van Zuid-Afrikaanse graanadventieven in België.* Meer dan drie decennia onderzoek in België naar adventieve planten geassocieerd met de import van graan en oliehoudende zaden — de zogenaamde graanadventieven — toont aan dat de soortensamenstelling in de loop der jaren duidelijke veranderingen heeft ondergaan. In de afgelopen jaren doken meerdere taxa op die geografisch niet in overeenstemming zijn met de vermoedelijke herkomst van het ingevoerde graan. Opvallend is de frequente aanwezigheid van akkeronkruiden uit zuidelijk Afrika zoals *Oncosiphon pilulifer* en *Arctotheca calendula*, ondanks het feit dat geen graan van daar wordt ingevoerd. Onderzoek wijst op een belangrijk aandeel van graanimport uit Australië, met Oekraïne als secundaire bron. Tot voor kort werden er echter geen Australische akkeronkruiden vastgesteld op overslagplaatsen. De vondst in 2024 van *Eragrostis parviflora* — een soort die endemisch is in Australië en nergens anders is ingeburgerd — vormt een directe aanwijzing voor introductie via Australisch graan. Een ander opvallend geval is *Panicum gilvum*, een soort uit zuidelijk Afrika die al geruime tijd voorkomt in Australische akkerbouwgebieden. De soort werd in 2024 voor het eerst herkend in België, op een graanloskade in Gent. Verder onderzoek toonde echter aan dat ze al minstens sinds twee decennia voorkomt in Belgische maïsakkers, maar over het hoofd werd gezien door verwarring met *P. dichotomiflorum*. Deze laattijdige herkenning, gecombineerd met haar status als Australisch akkeronkruid, wijst sterk op een introductie via Australische graanimport. Dit inzicht werpt bovendien mogelijk ook nieuw licht op de reële herkomst van een andere Zuid-Afrikaanse soort, *Panicum schinzii*, die al jarenlang in Belgische maïsakkers voorkomt en eveneens ingeburgerd is in Australië. In dit artikel bespreken we deze bevindingen, en onderstrepen we het belang van veranderingen in internationale handelsroutes bij het analyseren van de biogeografie van exoten.

Résumé. – *La mondialisation dans la flore adventice : la mise en évidence de l'origine australienne des adventices grainières sud-africaines en Belgique.* Plus de trois décennies de recherches sur les plantes adventices associées aux importations de céréales et de graines oléagineuses en Belgique — les dites “adventices grainières” — ont révélé des évolutions marquées dans la composition floristique. Ces dernières années, plusieurs taxons sont apparus dont l'origine géographique ne correspond pas à celle des produits importées. Des adventices sud-africaines telles que *Oncosiphon pilulifer* et *Arctotheca calendula* sont notamment observées de manière régulière, malgré l'absence apparente d'importations de grains en provenance d'Afrique du Sud. Des investigations ont mis en évidence une augmentation significative des importations de céréales depuis l'Australie, l'Ukraine représentant une source secondaire. Jusqu'à récemment, aucun taxon adventice typiquement australien n'avait toutefois été identifié sur les sites de transbordement. La découverte en 2024 de *Eragrostis parviflora* — une espèce endémique de l'Australie, non naturalisée ailleurs — constitue un indice direct d'introduction via les importations de céréales australiennes. Un autre cas remarquable est celui de *Panicum gilvum*, une espèce sud-africaine naturalisée de longue date dans les cultures australiennes, identifiée pour la première fois en Belgique en 2024 sur un quai de déchargement de céréales à Gand. Des recherches ultérieures ont révélé que l'espèce est en réalité présente dans les champs de maïs belges depuis au moins deux décennies, mais était confondue avec *P. dichotomiflorum*. Cette identification tardive, combinée à son statut d'adventice agricole en Australie, suggère fortement une introduction via les importations australiennes. Ces observations invitent également à reconsidérer l'origine de *Panicum schinzii*, une autre espèce sud-africaine naturalisée dans les champs de maïs en Belgique et également présente en Australie. Cet article analyse en détail ces découvertes et discute de leurs implications pour la compréhension des routes commerciales mondiales et de la biogéographie des plantes exotiques.

Abstract. – Over three decades of research on adventive plants associated with grain and oilseed imports in Belgium —so-called “grain aliens”— have revealed shifting patterns in species composition. In recent years, several taxa have emerged that are inconsistent with the presumed geographic origin of the imported grain. Notably, southern African weeds such as *Oncosiphon pilulifer* and *Arctotheca calendula* are now regularly encountered, despite the apparent absence of grain imports from southern Africa. Inquiries indicate that a substantial increase in grain shipments has occurred from Australia, with Ukraine being a secondary source. Until recently, however, no unequivocally Australian arable weeds had been identified at transshipment sites. The 2024 discovery of *Eragrostis parviflora* — a species endemic to Australia and not naturalized elsewhere — provides a direct indication of introduction via Australian grain imports. Another striking case is *Panicum gilvum*, a southern African species long naturalized in Australian croplands and first identified in Belgium in 2024 on a grain unloading quay. Subsequent investigations revealed that *P. gilvum* has in fact been established in Belgian maize fields since at least

two decades, but went unnoticed due to confusion with *P. dichotomiflorum*. The species' belated recognition in Belgium, together with its prominence as an arable weed in Australia, points to Australian grain as the likely vector of introduction. These observations may also shed new light on the true origin of another South African weed, *Panicum schinzii*, which has been established in Belgian maize fields for years and is likewise naturalized in Australia. This paper explores these findings in detail and discusses their implications for understanding global trade pathways and the biogeography of alien plant species.

Illustrations :

Rutger Barendse (Fig. 1), Filip Verloove (Fig. 2, 3, 4) and Sipke Gonggrijp (Fig. 5).

Citation :

Verloove F. & Gonggrijp S. (2026) – Globalization reflected in alien floras: uncovering the Australian origin of South African grain aliens in Belgium. *Dumortiera* **127**: 3-9.

Introduction

Before the Industrial Revolution, the introduction of adventive plants typically followed a predictable geographic pattern: Australian species arrived from Australia, South African ones from South Africa, and so on. However, starting in the 19th century, the Industrial Revolution began to alter these patterns, as increased shipping, railway expansion, and the mechanization of agriculture enabled faster and broader movement of goods — and, unintentionally, seeds of weed species (e.g., Chapman *et al.* 2017). These effects were further amplified in the 20th century by the globalization of trade (e.g., Hulme 2021). As agricultural goods were increasingly transported across continents, seeds often accompanied shipments as unintended contaminants. In the absence of effective measures to prevent the introduction and spread of weed seeds, many of these seeds readily established themselves in recipient regions — particularly when climatic conditions were similar to those of their native ranges. Initially colonizing port areas, some species subsequently spread via their own dispersal mechanisms or through human infrastructure such as roads and railways.

As a consequence, the global weed flora has become progressively homogenized, blurring the distinction between primary and secondary distribution ranges. Many grain and oilseed aliens now have extensive global distributions, making it difficult to ascertain their true geographic origin. In many cases, adventive species may be introduced from either their native range or a secondary area where they have previously become naturalized, depending on the source of imported grain. *Grindelia squarrosa* (Pursh) Dunal, for example, has occasionally been recorded near grain mills in Belgium. Although native to North America, it is also a noxious weed in Ukraine (Protopopova *et al.* 2021), and both countries are major exporters of grain and oilseeds to Belgium.

The situation becomes even more complex when alien species are found that are native to regions from which no grain is imported. In recent years, several conspicuous southern African weeds — such as *Oncosiphon pilulifer* and *Arctotheca calendula* — have repeatedly been observed as grain aliens in Belgian port areas. While grain imports from southern Africa are not documented, all of these species are known to be naturalized in Australia. Indeed, Australia has long grappled with invasive agricultural weeds, many of them South African in origin (Scott & Delfosse 1992), and the threat of additional problematic species originating in South Africa remains (Scott & Panetta 1993).

We recently became aware that Australia has become one of Bel-

gium's principal suppliers of grain and oilseeds in the past decades. Despite this, there was still a puzzling absence of native Australian weeds at Belgian grain handling sites — a stark contrast with the mid-20th century, when large imports of Australian wool brought with them a distinct alien flora composed largely of endemic Australian species (Verloove *et al.* 2026). A breakthrough came in 2024 with the discovery of *Eragrostis parviflora* (R.Br.) Trin. in the port area of Ghent. This species is native to Australia and has not been recorded as naturalized elsewhere. The occurrence of this species in Belgium provides a clear indication of direct introductions via Australian grain, which is also a vector for the introduction into our region of southern African weeds that have become naturalized in Australia.

In this paper, we discuss the repeated occurrence of some southern African weed species in Belgian grain-handling areas, which have most likely arrived via their secondary range in Australia. We also examine the recent discovery of the Australian endemic grass *Eragrostis parviflora* and its implications for our understanding of globalization-driven plant dispersal. Finally, we consider how this perspective may also shed new light on the long-established presence of *Panicum schinzii* in Belgian maize fields.

Results

Arctotheca calendula (L.) K.Lewin (Fig. 1)

Arctotheca calendula is native to South Africa, occurring naturally in the Cape Provinces, Free State, KwaZulu-Natal, and Lesotho. Over time, the species has been introduced and became naturalized in several regions — including the Mediterranean, Australia, and California (POWO 2024). In these non-native areas, its invasive potential has gained recognition, as documented by several studies (e.g., Wood 1994; Brundu *et al.* 2015; Sakhraoui *et al.* 2024).

In Belgium, historical records indicate that *A. calendula* was sporadically present as an ephemeral weed alien in the Vesdre River valley between 1902 and 1947 (Verloove 2006). Because wool was primarily imported from both Australia and South Africa, the plants could have originated from either the primary or a secondary distribution area.

Since 2012, however, *A. calendula* has been regularly observed yet again in Belgium. The species has been detected near grain storage facilities in the port areas of Ghent (Sifferdok and Rodenhuedok) and Antwerp (Kanaaldok). Given that Belgium does not import grain directly from South Africa, the source of these introductions was initially unclear. Subsequent inquiries revealed that a significant volume of grain — including oilseeds

such as canola or rapeseed — is imported from Australia. In Australia, *A. calendula* has established itself as an invasive, herbicide-resistant weed in agricultural fields (Khalil *et al.* 2021), particularly in canola-growing regions (Lemerle *et al.* 2001). Accordingly, it appears most likely that the populations recently recorded in Belgium have been introduced from this secondary range in Australia.

Herbarium:

Harbour of Ghent, Rodenhuedok (IFBL C3.43.42), unloading quay for cereals, few plants, all non-flowering, 09.09.2012, F. Verloove 9716 ([BR0000024510677](#));

Harbour of Ghent, Sifferdok near Bronsstraat (IFBL C3.53.33), unloading quay for cereals, scattered individuals, flowering and fruiting, 09.09.2012, F. Verloove 9734 ([BR0000024510660](#));

Harbour of Antwerp, E side of Kanaaldok (IFBL B4.55.41), rough ground near Cargill grain mill, two individuals, 25.05.2014, F. Verloove 10723 ([BR0000024510653](#));

Harbour of Ghent, Rodenhuedok (IFBL C3.44.31), unloading quay for cereals (GGT), 1x, 28.09.2014, F. Verloove 11115 ([BR0000024510646](#)).



Figure 1. *Arctotheca calendula* on the grain unloading quay at the Sifferdok in the Ghent port area in September 2012.

***Eragrostis parviflora* (R.Br.) Trin. (Fig. 2)**

Eragrostis parviflora is native to Australia and adjacent regions, including New Caledonia and New Guinea. Although it has occasionally been reported as an adventive species outside its native range — particularly in the past — it does not appear to be naturalized anywhere beyond Australasia. Alleged records of its naturalization in Hawaii are now considered incorrect and based on misidentifications, most probably due to confusion with *E. pectinacea* (Facenda 2022).

Historically, *E. parviflora* has been closely associated with the wool trade, and it appears to be a common weed in sheep-grazing areas of Australia. In Belgium, it was once one of the most characteristic ‘wool aliens’ with numerous collections documented between 1887 and 1969 (Verloove 2006). Within its native range, the species is still commonly encountered as a weed, particularly in irrigated agricultural systems (AusGrass2 2024) and along roadsides (Lazarides 1997).

In autumn 2024, several individuals of *E. parviflora* were discovered beneath and around grain conveyors at both the Sifferdok and Rodenhuedok in the Ghent port area. Although Australian grain imports into Belgium date back several decades, the discovery of *E. parviflora* constitutes one of the most unambiguous cases

of a weed species introduced directly from its primary range via this pathway. Given that *E. parviflora* has not naturalized outside its native region, its recent appearance in Belgium provides compelling evidence of direct introduction from Australia.

E. parviflora is a visually distinctive and graceful grass, characterized by its long, pendulous inflorescence, which can reach lengths of up to 60 cm — hence its common name, ‘Weeping Lovegrass’.

Herbarium:

Ghent, port area, Sifferdok at Bronsstraat (IFBL C3.53.33), roadside and unloading quay near grain storage, at least 6 individuals, 06.10.2024, F. Verloove 15171 ([BR0000027059548V](#)).



Figure 2. *Eragrostis parviflora* on the grain unloading quay at the Sifferdok in the Ghent port area in September 2024. The large, weeping inflorescences with verticillate lower branches are particularly distinctive.

***Oncosiphon pilulifer* (L.f.) Källersjö (Fig. 3)**

Oncosiphon pilulifer is native to South Africa, where it occurs in the Cape Provinces, Free State, KwaZulu-Natal, Lesotho, and the Northern Provinces (POWO 2024). It typically inhabits sandy soils along roadsides and other disturbed environments (Kolokoto & Magee 2018). Outside of its native range, the species has naturalized only locally. In the southwestern United States (particularly Arizona and California), it has been present since the 1980s and it is anticipated to become one of the region’s most troublesome invasive species, spreading from disturbed areas into adjacent natural habitats (Hedrick & McDonald 2020). It is also naturalized in Western Australia, where it has emerged as a significant weed in grain-producing regions (Thompson 2007; Michael *et al.* 2010). Under projected climate change scenarios, *O. pilulifer* is even predicted to become the fastest-increasing weed in Western Australia (Michael *et al.* 2011).

In Belgium, *O. pilulifer* was first recorded in 2017 on fallow ground at the Cargill grain transshipment site in the Kanaaldok area of the Port of Antwerp. Since then, it has been observed regularly at the site, often with dozens of individuals present. From 2019 onwards, the species was also recorded along the Sifferdok in the

Port of Ghent, consistently near grain storage facilities.

Morphologically, *O. pilulifer* closely resembles another recently detected grain alien, *Tripleurospermum decipiens* (Fisch. & C.A.Mey.) Bornm., a species native to Iran and Turkey. Both taxa are characterized by finely dissected foliage and typically discoid yellow flower heads. However, *O. pilulifer* can be readily distinguished by its cypselsae, which lack resin sacs, and by its disc florets, which are markedly wrinkled and possess only four lobes (as opposed to five in *T. decipiens*).

The origin of *O. pilulifer* in the Belgian ports was initially uncertain, as Belgium does not import grain from South Africa. However, employees at the Cargill mill in Antwerp indicated that, during the post-harvest season, most grain and oilseed imports originate from Australia and Ukraine. Given the species' naturalization and weed status in Australia, it is plausible that *O. pilulifer* reached Belgium as a contaminant of Australian grain shipments — having already traveled far beyond its native range before its arrival in Europe.

Herbarium:

Harbour of Antwerp, E side of Kanaaldok (IFBL B4.55.41), unloading quay for cereals at Cargill mill, two individuals, 02.07.2017, F. Verloove 13016 (BR0000027059562V);

Harbour of Ghent, Sifferdok at Bronsstraat (IFBL C3.53.33), ground heaps near grain storage, several dozen, 05.05.2019, F. Verloove 13488 (BR0000025861723V);

Harbour of Ghent, Sifferdok at Bronsstraat (IFBL C3.53.33), ground heap at grain mill, several dozen, 19.05.2019, F. Verloove 13500 (BR0000025861754V);

Antwerp, port area, E side of Kanaaldok (IFBL B4.55.41), rough ground at Cargill grain mill, 03.07.2022, F. Verloove 14357 (BR);

Ghent, port area, Moervaart, roadside at unloading quay for cereals Cargill, 20.08.2023, F. Verloove 14858 (BR0000026352497V).



Figure 3. *Oncosiphon pilulifer* near the Cargill grain mill at the Kanaaldok in the Antwerp port area in July 2022.

Panicum gilvum Launert (Fig. 4, 5)

In autumn 2024, several individuals of *Panicum gilvum* were discovered at the cereal unloading quay along the Sifferdok in the Port of Ghent. The species is native to Botswana, Namibia, and the Cape and Northern Provinces of South Africa (POWO 2024), and this marks its first formal record in Belgium. Since Belgium does not import grain from southern Africa, the most plausible ex-

planation is that the plants were introduced via Australian grain shipments. This is further supported by the simultaneous discovery of the Australian weed *Eragrostis parviflora* at the same site.

Although *P. gilvum* is a relatively obscure taxon, it turns out to have been present in Belgium for at least two decades, though consistently misidentified as the morphologically similar American species *P. dichotomiflorum*. Data presented in Hoste *et al.* (2026, this issue) indicate that *P. gilvum* has been naturalized in maize fields in the northern border region between East and West Flanders since at least 2007. Recent molecular analyses confirm that specimens collected in Belgium and in Dutch Limburg belong to *P. gilvum*. A thorough re-examination of historical herbarium specimens of *P. dichotomiflorum* and *P. schinzii* collected as wool aliens in the Vesdre valley, may yet uncover misidentified material of *P. gilvum*. Nevertheless, such findings would bear no relation to the recently naturalized populations in maize fields, which clearly originate from a distinct and more recent introduction route.

Panicum gilvum, *P. dichotomiflorum*, and *P. schinzii* all belong to *Panicum* sect. *Dichotomiflora*. Despite their close morphological resemblance, several subtle but consistent differences exist. *P. gilvum* is usually prostrate-ascending, with relatively small (2–10 cm long, sometimes longer), sparsely flowered panicles that typically remain enclosed within the upper leaf sheaths. Plants usually show a reddish tinge to the lower sheaths. Spikelets tend to be slightly shorter (c. 2.5–2.7 mm in Belgian material), with acute rather than acuminate apices. Notably, the palea of the lower floret is almost as long and wide as the fertile lemma — contrasting with *P. dichotomiflorum*, in which the palea is usually somewhat narrower. *P. chloroticum*, a rare casual alien, often has a vestigial palea. *P. schinzii*, by contrast, is erect in habit, has a fully exerted panicle at maturity, male lower florets, and generally blunter spikelets. While Launert (1970) originally described the lower floret of *P. gilvum* as “male (always?)”, examination of two syntypes preserved at the Naturalis herbarium in Leiden (Dinter #2544 and Seydel #2210) clearly shows the lower floret to be sterile. This observation aligns with more recent treatments (Fish *et al.* 2015; Zuloaga 2022). AusGrass2 (2024) also notes that Australian populations deviate from Launert's description in this respect.

Morphologically, *P. gilvum* closely resembles *P. dichotomiflorum*, leading F. Reijerse to consider the syntypes of *P. gilvum* to be conspecific with the latter (annotations on herbarium specimens, Naturalis, Leiden). However, recent molecular analyses (Verloove *et al.*, in prep.) place *P. gilvum* in a distinct clade more closely related to the southern African *P. schinzii* than to *P. dichotomiflorum*, which is native to the Americas. This phylogenetic relationship is also more biogeographically plausible.

Outside of its native range, *P. gilvum* has been recorded only sporadically. It was once reported in the British Isles as a wool alien (Clement 1981), but never established. In contrast, it is currently recognized as an agricultural weed in several Australian states, including New South Wales, Northern Territory, Queensland, Tasmania, and Victoria (AusGrass2 2024; various online sources). According to data from the *Atlas of Living Australia*, *P. gilvum* is at least twice as commonly recorded in Australia as *P. schinzii*.

These findings may also shed new light on the naturalization history of *P. schinzii* in Belgium. Initially recorded as an ephemeral wool alien in the Vesdre valley (last observed in 1953; Verloove 2001), *P. schinzii* has become a regular and naturalized maize field weed in Belgium since 1983. Its exact introduction pathway, however, has remained unclear. Most maize weeds are believed to have been introduced via animal manure containing undigest-

ed seeds from cattle feed (e.g. Sotiaux *et al.* 1981; Mt. Pleasant & Schlather 1994; Larney & Blackshaw 2003). Since cattle feed over the past half-century has largely been sourced from North America, it is unsurprising that many maize field weeds in Belgium are of North American origin, or widely naturalized there in crop fields [e.g., *Echinochloa muricata* (P.Beauv.) Fernald, *P. dichotomiflorum*, *Setaria faberi* R.A.W.Herrm.]. The confirmed presence of *P. gilvum* in Australia and its misidentification in Belgium since at least two decades now suggest that *P. gilvum* and *P. schinzii* may both have arrived via the same route: not directly from southern Africa, but from their secondary, weedy range in Australia. Unfortunately, the timeline of large-scale grain imports from Australia into Belgium is not well documented. However, the recurrent presence of another Australian endemic weed, *Echinochloa inundata* Michael & Vickery, near grain and cattle feed factories in Belgium since 1995 (Verloove & Vandenberghe 1996) strongly suggests that such imports already became significant during the 1990s. For earlier decades, notably the 1980s when *P. schinzii* first became established, this introduction route remains more speculative. Nevertheless, considering the absence of grain imports from southern Africa, introduction via Australia remains the most plausible explanation for the presence of both *P. gilvum* and *P. schinzii* in Belgium. Both species have long been established in Australia — records indicate their presence there since at least the 1930s–1940s — providing ample time for accidental introduction via Australian cereal imports.

Herbarium:

Ghent, port area, Sifferdok near Bronsstraat (IFBL C3.53.33), unloading quay for cereals, scattered individuals, prostrate plants with poorly-flowered inflorescences hardly exerted, 20.10.2024, F. Verloove 15172 (BR0000027059807V) and 15175 (BR0000027059791V).



Figure 4. *Panicum gilvum* on the grain unloading quay at the Sifferdok in the Ghent port area in October 2024. The prostrate stems with reddish lower leaf sheaths are very characteristic.



Figure 5. *Panicum gilvum* on the grain unloading quay at the Sifferdok in the Ghent port area in October 2024. The inflorescence is relatively small and long remains included in the upper leaf sheath. Spikelets are small and acute at apex.

Discussion and conclusion

In the past, the presumed origin of grain aliens in Belgium was often taken at face value: Mediterranean species were assumed to come from the Mediterranean, North American species from North America, and so on. Since grains and oilseeds have indeed been imported from these regions, little attention was given to possible alternative routes. However, owing to advances in understanding, such assumptions warrant reconsideration.

In recent years, canola or rapeseed imported into Belgium appears to originate largely from Australia. Remarkably, in 2022–2023, Belgium was the world's largest buyer of Australian rapeseed, importing nearly one million tons ([Grain Central](#)). This trade relationship invites a closer look at the typical weed flora of Australian canola fields (GRDC Grownotes 2015). The 16 most common weed species in such fields are — almost without exception — native to the Mediterranean region. They include classic grain aliens like *Hirschfeldia incana* (L.) Lagr.-Foss., *Rapistrum rugosum* (L.) All., and *Sisymbrium orientale* L., as well as less frequently observed but ecologically significant species such as *Brassica tournefortii* Gouan, *Echium plantagineum* L., and *Emex australis* Steinh. (now often treated as *Rumex hypogaeus* T.M.Schust. & Reveal). Notably, the South African species *Arctotheca calendula*, discussed earlier, is also among the most troublesome weeds in Australian canola crops.

These findings shed entirely new light on the potential origin of grain aliens in Belgian port areas. Species previously assumed to have arrived from the Mediterranean may, in fact, have reached Belgium via a much longer detour through Australia.

The most significant hotspot for these South African–Australian grain aliens is quay 880 of Euroports Belgium in the Ghent port area. It is worthwhile to examine which species have been recorded there in recent years: Mediterranean weeds like *Centaurea melitensis* L., *Echium plantagineum*, *Lolium rigidum* Gaudin, *Rumex pulcher* L., and *Sisymbrium erysimoides* Desf. — all of which are considered major agricultural weeds in Australia ([Weeds of Australia](#)) — may well have been introduced from there, rather than directly from the Mediterranean.

Now that the large-scale import of Australian grains and oilseeds into Belgium is a well-established fact — astonishing as it may seem, given the substantial grain production in Europe and tra-

ditional suppliers like North America — the interpretation of the Belgian grain alien flora requires a fresh perspective. Although such (massive) imports are a relatively recent phenomenon, they cannot account for the presence of Mediterranean exotics that have been established in Belgium for much longer. Nevertheless, in the years ahead, we can expect more Australian species to appear, whether endemic to that continent or naturalized from elsewhere.

As demonstrated here, it is necessary to critically reconsider the presumed geographic origins of many grain aliens, especially those with Mediterranean ancestry. Dozens of Mediterranean agricultural weeds are now widely naturalized in Australia and could easily have arrived in Belgium via Australian grain imports. This illustrates the complexity of globalization as a historical process, showing that human-mediated plant dispersal is not only a matter of recent trade but also reflects long-term, multi-directional exchanges. For species native to the Mediterranean, and for which both Mediterranean and Australian supply routes are plausible, pinpointing their precise origin remains difficult. In contrast, the southern African species discussed in this paper — due to their known secondary distributions in Australia and the absence of grain imports from southern Africa — can with much greater certainty be attributed to the Australian route.

Acknowledgements

Peter van der Maas (North Sea Port) is thanked for providing useful information regarding the origin of the grains imported into the Ghent port area. Ivan Hoste (Meise Botanic Garden) is thanked for his comments on an earlier version of the manuscript.

References

- AusGrass2 (2024) – Grasses of Australia. Online at: <https://aus-grass2.myspecies.info/> (accessed 28 October 2024).
- Brundu G., Lozano V., Manca M., Celesti-Grapow L. & Sulas L. (2015) – *Arctotheca calendula* (L.) Levyns: An emerging invasive species in Italy. *Plant Biosystems* 149: 954–957. <https://doi.org/10.1080/11263504.2015.1125963>
- Chapman D., Purse B.V., Roy H.E. & Bullock J.M. (2017) – Global trade networks determine the distribution of invasive non-native species. *Global Ecology and Biogeography* 26: 907–917. <https://doi.org/10.1111/geb.12599>
- Clement E.J. (1981) – Aliens and adventives. Three *Panicums*. *B.S.B.I. News* 27: 16–18. <https://archive.bsbi.org/BSBINews27.pdf>
- Facenda K. (2022) – Updates to the Hawaiian grass flora and selected keys to species: Part 1. *Bishop Museum Occasional Papers* 148: 41–98.
- Fish L., Mashau A.C., Moeaha M.J. & Nembudani M.T. (2015) – Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions. *Strelitzia* 36, SANBI, Pretoria.
- GRDC Grownotes (2015) – Canola Southern Region. December 2015.
- Hedrick P.W. & McDonald C.J. (2020) – Stinknet, A New Invasive, Non-native Plant in the Southwestern United States. *Desert Plants* 36(1): 5–16.
- Hoste I., Verloove F., Gonggrijp S. & Bomble W. (2026) – *Panicum gilvum* in België: jarenlang miskend, maar wijd verspreid. *Dumortiera* 127: 29–35. <https://doi.org/10.5281/zenodo.18334775>
- Hulme P.E. (2021) – Unwelcome exchange: International

trade as a direct and indirect driver of biological invasions worldwide. *One Earth* 4(5): 666–679. <https://doi.org/10.1016/j.oneear.2021.04.015>

- Khalil Y., Ashworth M.B., Han H., Qin Y., Rocha R.L., Pritchard B., Cameron D. & Beckie H.J. (2021) – Identification of the first glyphosate-resistant capeweed (*Arctotheca calendula*) population. *Pest Management Science* 77(5): 2568–2575. <https://doi.org/10.1002/ps.6295>
- Kolokoto R. & Magee A.R. (2018) – Cape stinkweeds: Taxonomy of *Oncosiphon* (Anthemideae, Asteraceae). *South African Journal of Botany* 117: 57–70. <https://doi.org/10.1016/j.sajb.2018.04.020>
- Larney F.J. & Blackshaw R.E. (2003) – Weed seed viability in composted beef cattle feedlot manure. *Journal of Environmental Quality* 32: 1105–1113. <https://doi.org/10.2134/jeq2003.1105>
- Launert E. (1970) – Miscellaneous taxa of Gramineae from South West Africa and adjacent areas. *Mitteilungen der Botanischen Staatssammlung Munchen* 8: 147–163. <https://doi.org/10.5281/zenodo.16079836>
- Lazarides M. (1997) – A Revision of *Eragrostis* (Eragrostideae, Eleusininae, Poaceae) in Australia. *Australian Systematic Botany* 10: 77–187. <https://doi.org/10.1071/SB96002>
- Lemerle D., Blackshaw R.E., Smith A.B., Potter T.D. & Marcroft S.J. (2001) – Comparative survey of weeds surviving in triazine-tolerant and conventional canola crops in south-eastern Australia. *Plant Protection Quarterly* 16(1): 37–40.
- Michael P.J., Borger C.P., MacLeod W.J. & Payne P.L. (2010) – Occurrence of Summer Fallow Weeds within the Grain Belt Region of Southwestern Australia. *Weed Technology* 24(4): 562–568. <https://doi.org/10.1614/WT-D-09-00060.1>
- Michael P.J., Yeoh P.B., Ota N. & Scott J.K. (2011) – Climate Change Impacts on Agricultural Weeds in Western Australia. RIRDC Publication No. 11/059.
- Mt. Pleasant J.M. & Schlather K.J. (1994) Incidence of weed seed in cow manure and its importance as a weed seed source for cropland. *Weed Technology* 8: 304–310. <https://doi.org/10.1017/S0890037X00038823>
- POWO (2024) Plants of the World Online. Royal Botanic Gardens Kew. Online at: <https://powo.science.kew.org/> (accessed 28 October 2024).
- Protopopova V.V., Didukh Y.P., Tkachenko V.S., Shevera M.V., Kucher O.O., Zavalova L.V. & Biatov A.P. (2021) – *Grindelia squarrosa* in Ukraine: current distribution and ecological and coenotic peculiarities. *Hacquetia* 20(2): 263–272. <https://doi.org/10.2478/hacq-2021-0014>
- Randall R. (2007) – The introduced Flora of Australia and its weed status. CRC for Australian Weed Management.
- Sakhraoui N., El Mokni R., Hadeif A., Rais H., Verloove F. & Essl F. (2024) – Current distribution and status of *Arctotheca calendula* (L.) Levyns (Asteraceae) in Algeria and Tunisia (North Africa). *BioInvasions Records* 13(2): 319–333. <https://doi.org/10.3391/bir.2024.13.2.03>
- Scott J.K. & Delfosse E.S. (1992) – Southern African plants naturalized in Australia: a review of weed status and biological control potential. *Plant Protection Quarterly* 7(2): 70–75.
- Scott J.K. & Panetta F.D. (1993) – Predicting the Australian Weed Status of Southern African Plants. *Journal of Biogeography* 20(1): 87–93. <https://doi.org/10.2307/2845742>

- Sotiaux A., Roegiers O. & De Zuttere Ph. (1981) – Un mode curieux d'introduction de phanérogames adventices par les fumures. *Dumortiera* 19-20: 26-28.
- Thompson I.R. (2007) – A taxonomic treatment of tribe Anthemideae (Asteraceae) in Australia. *Muelleria* 25: 21-58.
- Verloove F. (2001) – A Revision of the Genus *Panicum* (Poaceae, Paniceae) in Belgium. *Systematics and Geography of Plants* 71(1): 53-72. <https://doi.org/10.2307/3668753>
- Verloove F. (2006) – Catalogue of neophytes in Belgium (1800-2005). *Scripta Botanica Belgica* 39: 1-89.
- Verloove F., Gonggrijp S., Valentini S., Barker R., Gwynne-Evans D., Planchuelo A.M., Vandeloos F., Leliaert F. & Dana E.D. (2026) – Wool as an important vector for the unintentional introduction of plants: the case of the Vesdre valley in Belgium, after the floods of 2021. *Management of Biological Invasions*, in press.
- Verloove F. & Vandenberghe C. (1996) – Nieuwe en interessante voederadventieven voor de Belgische flora, hoofdzakelijk in 1995. *Dumortiera* 66: 11-32.
- Wood H. (1994) – The introduction and spread of capeweed, *Arctotheca calendula* (L.) Levyns (Asteraceae) in Australia. *Plant Protection Quarterly* 9(3): 94-100.
- Zuloaga F.O. (2022) – A revision of *Panicum* sect. *Dichotomi-flora* (Poaceae: Panicoideae: Paniceae). *Darwiniana* N.S. 10(2): 325-364. <https://doi.org/10.14522/darwiniana.2022.102.1048>

New observations of garden escapes in Meise Botanic Garden (Belgium), part 2

Anne RONSE

Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium
anne.ronse@plantentuinmeise.be

Filip VERLOOVE

Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium
filip.verloove@plantentuinmeise.be

Abstract. – As a continuation of previous studies on the subspontaneous flora of Meise Botanic Garden (MBG), this paper presents several new records of vascular plants that escaped from the garden. A total of 21 taxa not previously recorded are presented, seven of which have not been recorded before in the wild in Belgium. The naturalization status of these taxa varies from ephemeral to naturalized and potentially invasive. For each taxon, we provide information on its native distribution, invasiveness, occurrence within MBG collections and as escapes from the collections, its status in Belgium and beyond, and references to herbarium collections preserved at the Meise Botanic Garden (BR). Where relevant, additional information on related species is also given. A number of taxa are illustrated with photographs.

Résumé. – **Nouvelles observations d'espèces échappées des collections au Jardin Botanique de Meise (Belgique) : seconde partie.**

Plusieurs nouvelles observations intéressantes d'espèces de plantes vasculaires ont été faites dans le domaine du Jardin Botanique de Meise lors d'inventaires réalisés depuis 2011, en continuation d'études antérieures de la flore subspontanée. Cet article présente 21 nouveaux taxons, dont sept ont été observés pour la première fois en Belgique à l'état subspontané. Le degré de naturalisation de ces taxons varie d'éphémère à naturalisé, certaines espèces étant potentiellement envahissantes. Pour chaque taxon, nous mentionnons l'aire d'indigénat et le degré d'envahissement, leur présence au Jardin comme plante cultivée et échappée de culture, leur statut en Belgique et ailleurs, les collections conservées dans l'herbier du Jardin (BR) et, s'il y a lieu, des notes sur des espèces apparentées. Quelques taxons sont illustrés par des photos.

Samenvatting. – **Nieuwe waarnemingen van collectievlieders in het domein van Plantentuin Meise (België): deel 2.** Als een vervolg op eerdere studies over de subspontane flora van het domein van Plantentuin Meise worden 21 nieuwe taxa voorgesteld, waarvan zeven die nog niet eerder in België in het wild werden aangetroffen. De inburgeringsstatus van de waargenomen taxa varieert van efemer tot ingeburgerd en potentieel invasief. Van elk taxon wordt informatie gegeven over het herkomstgebied, hun al dan niet invasief karakter, hun aanwezigheid in de Plantentuin als gekweekte en ontsnapte soort, hun status in België en daarbuiten, herbariumspecimens bewaard in het herbarium van Plantentuin Meise (BR) en, waar relevant, notities over nauw verwante soorten. Enkele taxa zijn geïllustreerd met foto's.

Illustrations :

all photos by the first author, except Fig. 1 (O. Van de Kerckhove), Fig. 2 (K. Stevens) and Fig. 9 (P. Borremans).

Citation :

Ronse A. & Verloove F. (2026) – New observations of garden escapes in Meise Botanic Garden (Belgium), part 2. *Dumortiera* **127** : 10-28.

Introduction

A substantial proportion of invasive alien plant species worldwide originated as ornamental garden plants. For instance, more than half of the species listed among the world's 100 worst invasive organisms are garden escapes (Lowe *et al.* 2000). In countries such as Australia, New Zealand, and the United States, over 50% of all naturalized plants and weeds are former garden plants. This group of neophytes plays a major role in global plant introductions, with significant impacts on biodiversity (Downey & Glanznig 2006).

While escapes often originate from private gardens, botanic gardens can also act as sources of introduction. These institutions

maintain diverse and often globally unique collections, which may include taxa with invasive potential (Galera & Sudnik-Wójcikowska 2010). Recognizing this risk, various codes of conduct have been developed, such as the European Code of Conduct for Botanic Gardens on Invasive Alien Species ([European Botanic Gardens Consortium](#), accessed 14 February 2025), which emphasizes the importance of monitoring and documenting potential escapes.

Meise Botanic Garden (MBG), located near Brussels (Belgium), holds one of the most extensive living plant collections in Europe. Its diversity, size, and long cultivation history make it a valuable

case study to assess the behaviour of cultivated taxa outside managed settings.

This paper continues the inventory begun in *New observations of garden escapes in Meise Botanic Garden, Part 1* (Ronse & Verloove 2021). It presents 21 additional taxa that have escaped cultivation within MBG. For each species, we document its cultivation history at MBG, observed escapes, and spread within the domain, as well as its status as an escapee in Belgium. Herbarium specimens and spatial data are provided where available.

Material and methods

Study site — Meise Botanic Garden (MBG; formerly the National Botanic Garden of Belgium) is located approximately 15 km north of Brussels and covers a 92-hectare estate. The domain comprises a mosaic of habitats, including lawns, grasslands, woodland patches, and cultivated areas (Fig. 1). The garden was developed around two historical estates and includes both heritage buildings and modern infrastructure. Since 2021, several new areas have been added, such as the Green Ark greenhouse complex, the Medieval Garden, and the Island Garden. Some older collections have been renamed (e.g. the Herbetum is now the Cronquist Garden).

Botanical collections and monitoring — MBG maintains extensive living plant collections in both outdoor plantings and greenhouses. Since 2011, regular surveys of alien flora within the domain have been conducted by the first author. These surveys

focus on cultivated taxa that have escaped cultivation (i.e. garden escapes) and include data on location, population size, growth stage, and potential for spread.

Taxonomy and nomenclature — Scientific names follow *Plants of the World Online* (POWO), facilitated by the Royal Botanic Gardens, Kew, with date of access indicated. This source also provides the primary reference for native and introduced ranges, supplemented by additional literature where relevant.

Data collection and spatial mapping — For each taxon, the precise location of cultivated and escaped individuals was recorded using MBG's internal sector system, originally developed for garden management. This system has been updated to reflect recent infrastructural changes (Fig. 2).

To assess the most likely source of escape, the corresponding cultivated accessions were identified using the [Botanical Collections](#) online database, filtering for 'Living Collections' at MBG. Spatial relationships between cultivated and escaped individuals were analysed to infer possible origin points.

Additional distribution data — The occurrence of each taxon as a garden escape in Belgium was verified using the [Manual of the Alien Plants of Belgium](#), supplemented by additional sources on its status as a neophyte or invasive species globally.

When available, herbarium specimens were cited; all vouchers are housed in the herbarium of Meise Botanic Garden (acronym: BR).



Figure 1. Updated map of the domain of Meise Botanic Garden in Meise (province of Flemish Brabant).

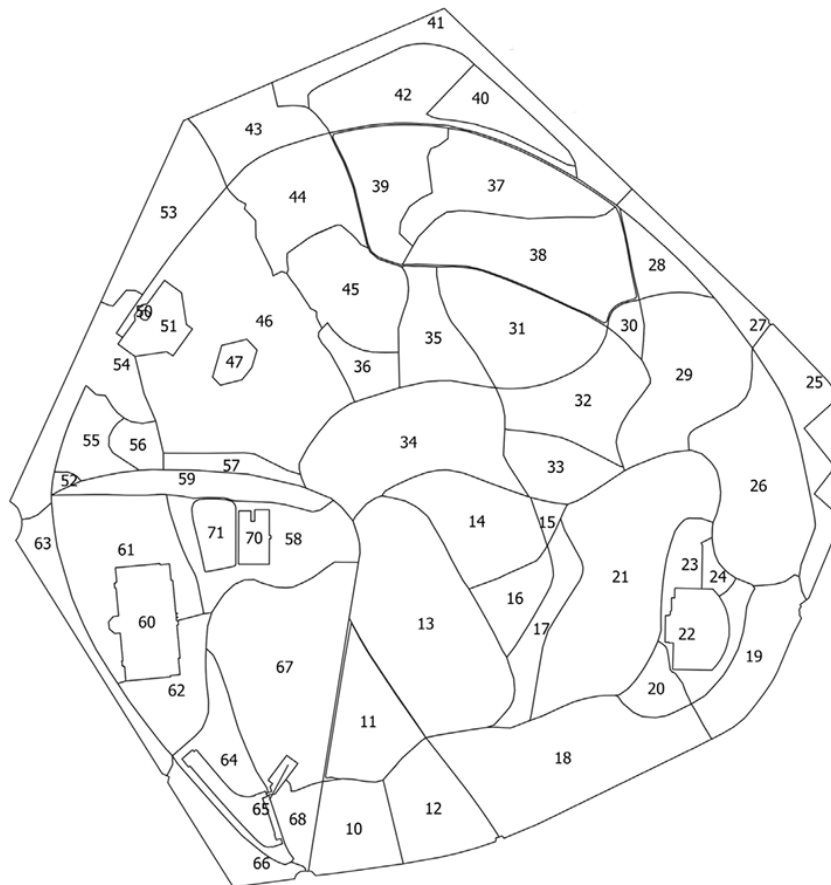


Figure 2. Division of the domain of Meise Botanic Garden into sectors. These divisions were used in the period 2011–2019 to process the data. Some recent adjustments of the boundaries have been ignored.

Results

› *Amorpha fruticosa* Nutt. (Fabaceae)

The genus *Amorpha* is native to the United States and northern Mexico, but has been introduced into dozens of countries across Europe and Asia, as well as parts of South America, including Uruguay and northern Argentina ([POWO](#)). The genus comprises 16 species characterized by small flowers with a reduced corolla consisting of a single petal, which makes species-level identification particularly challenging.

The most widespread species is *Amorpha fruticosa*, native to northwestern Mexico and 21 U.S. states, and introduced in nearly all regions where the genus is present ([POWO](#), accessed 12 February 2025). This species primarily inhabits desert and dry shrubland biomes, and its native range overlaps with that of all other *Amorpha* species, most of which have more restricted distributions (e.g., Isely 1998; Straub 2010; [Flora of the Southeastern United States](#), 2024 edition).

In the Meise Botanic Garden (MBG), 18 accessions representing ten putative species of *Amorpha* are under cultivation ([Botanical Collections](#), accessed 19 March 2025). However, based on taxonomic updates in POWO ([POWO](#), accessed 10 February 2025), several of these names are now considered synonyms, reducing the number of distinct species to seven: *A. californica*, *A. canescens*, *A. fruticosa* (partly listed as *A. croceolana*), *A. glabra*, *A. herbacea* (partly listed as *A. cyanostachya*), *A. nana*, and *A. paniculata*. In addition, *A. tomentosa* is cultivated, which is an unplaced species.

Escapes of *Amorpha* species have been recorded on several occasions within the garden. These typically involve seedlings emerging in close proximity to the cultivated parent plants, often in large numbers. For example, numerous seedlings of *A. californica*

were found in 2010 at distances of 3–5 meters from the cultivated plants in the Dahlgren Arboretum (Ronse 2011b), with similar observations repeated in July 2013. However, a recent critical review of the cultivated mother plants named *A. californica* showed them to be actually *A. fruticosa*.

This is the most frequently cultivated species in the garden, with four accessions recorded, though none of known wild origin. Several other escape events were observed for this species, for example in the long border east of the Plant Palace, where many seedlings were observed under *A. nana* plants: approximately thirty in October 2012 and hundreds of saplings up to 25 cm tall in July 2015.

While most of these seedlings were ephemeral—occurring in intensively managed and frequently weeded areas—a few individuals have successfully established beyond the immediate vicinity of cultivated beds. Since 2013, several larger plants have been recorded in Sector 13 around the Castle Lake. In October 2015, flowering specimens confirmed their identity as *A. fruticosa*. As of September 2025, at least two mature individuals, up to 3 meters tall, remained present in that area.

In Belgium, *Amorpha fruticosa* was first recorded in the wild in 1953, when it was found on uncultivated land in Antwerp (Verloove 2006; [Botanical Collections](#), accessed 2 July 2025). Notably, all early wild occurrences of the species were located in and around Antwerp, although these are doubtfully linked to the initial 1950s introduction. In 2002, a clonal stand was discovered on the abandoned quays along the River Scheldt, and from 2005 onwards, multiple shrubs were found growing among the basalt boulders along the riverbank at Antwerp–Linkeroever. Elsewhere on Linkeroever, where the species has also been planted, *A. fruti-*

cosa has frequently been found as a casual or naturalized escape (numerous collections by the second author; [Botanical Collections](#), accessed 2 July 2025). According to recent observations on [Waarnemingen.be](#) (accessed 2 July 2025), the species continues to be reported in this area, suggesting its local naturalization. Since 2011, small but persistent populations have been recorded at two sites in the Ghent port area: alongside a guardrail along Kennedylaan and at the southwestern edge of the Petroleum Dock. In 2014, a large clonal patch was also found on a railway embankment in Kortrijk (pers. obs. and collections FV). Since then, *A. fruticosa* has been observed at numerous sites across both Flanders and Wallonia. In the early 2000s, the species was still regarded as strictly ephemeral in Flanders (Verloove 2002), but this is clearly no longer the case. Of potential concern is its occurrence in (semi-) natural plant communities along major rivers, such as the Scheldt near Antwerp and the Meuse (Maas) in the province of Limburg, where it has been recorded since 2016 (Verloove 2023).

Herbarium: A. Ronse 2939, Meise Botanic Garden, s 13, 24.09.2013; A. Ronse 3843, Meise, domain of Botanic Garden, s 13, edge of lake, one plant, flowering, 12.10.2015; A. Ronse 3784, Botanic Garden Meise, s 63, hundreds of seedlings under mother plant, 21.08.2015; A. Ronse 6057, Meise, Botanic Garden, s 63, in border, cultivated since 1958, flowering bush of ca 1,8 m high, short inflorescences 2-2,5 cm, 03.09.2024; A. Ronse 6145, Meise, Botanic Garden, s 13, around castle lake, 2 bushes 2,5-3 m high, stipules 5 mm long, leaf rachis flattened, 11.09.2024; A. Ronse 6412, Meise, Botanic Garden, s 46, Dahlgren Arboretum, cultivated as *A. californica*, 26.06.2025 (det. F. Verloove, 07.2025).

› *Aquilegia vulgaris* L. (Ranunculaceae) (Fig. 3)

This species is native to most parts of Europe, except Scandinavia, but has been introduced in northern and eastern regions such as Scandinavia, Switzerland, and Russia, as well as in parts of North and South-America, Asia, Australia and New Zealand ([POWO](#), accessed 14 May 2024). It typically occurs in the temperate to cold biomes. Although many naturalized occurrences worldwide are recorded under the name *A. vulgaris*, it is likely that a significant proportion of these represent garden hybrids or cultivars rather than wild-type plants. In particular, cultivated forms often display double flowers or other ornamental traits not found in wild populations.

In the MBG, *A. vulgaris* is cultivated in the Cronquist Garden, from seed obtained in 1972 from a Czech botanical garden (Tabor H.B.), as well as near the castle, with material obtained from the Botanical Garden of Potsdam (Germany) in 1970.

Escapes have been recorded on several occasions across different sectors of the garden, with seedlings and flowering individuals recorded at distances of over 100 metres from the sites of cultivation. For example, individuals were found in sector 53 on 19 August 2010, and several flowering plants were still present there in 2024. This area is known to host several other escaped species from the Cronquist Garden, such as *Oenanthe pimpinelloides* (Ronse 2005), *Camassia leichtlinii*, *Clematis recta*, *Crocus tommasinianus* and *Muscari comosum* (see further in this contribution). The presence of a garden shed and a designated area for wheelbarrows with trimmings and plant debris from the adjacent Cronquist Garden may explain the local concentration of escaped species. It is plausible that seeds, bulbs, or plant fragments were inadvertently introduced to the area and subsequently established. Moreover, *A. vulgaris* has been observed repeatedly in the Castle Farm

Borders (sector 58) in 2016 and in 2018, probably escaped from the German accession cultivated nearby.

Although *A. vulgaris* is native to Belgium, it is not indigenous to Flanders. In that region, occurrences in the wild represent either escapes from cultivation or deliberate introductions. Spontaneous seedlings had already been documented by Ronse (2011b) within the Cronquist Garden as well as in the medicinal garden of MBG, where the species is also cultivated. In all locations in MBG, the escapes most likely derive from plants cultivated in botanical gardens but without known wild origin. It is, however, well possible that these came from genetically wild material rather than from horticultural stock. Indeed, in the seventies, the wild or cultivated provenance of the accessions in botanic gardens was mostly not recorded.

Herbarium: A. Ronse 5900, Meise Botanic Garden, s 54, in woody areas, half shade, 3 flowering plants, 08.05.2024.



Figure 3. Self-sown *Aquilegia vulgaris* in woody areas of the garden.

› *Berberis julianae* C.K.Schneid. (Berberidaceae) (Fig. 4)

The native range of this shrub is restricted to central China (from Chongqing to southeastern Shaanxi). It has been introduced in several parts of Europe, including the former Czechoslovakia, Great Britain, Ireland, and Romania, as well as in the the United States (Alabama, Maryland, New York) ([POWO](#), accessed 5 April 2024). In the USA, an *Invasive Plant Alert* has been issued to warn about the species' invasive potential (Speith & Frey 2012). It is also listed as invasive or potentially invasive in South Africa, where it is subject to active management measures (Keet *et al.* 2016).

In the MBG, three accessions of *B. julianae* are currently cultivated. Two are planted in the Dahlgren Arboretum (sector 46), and one in sector 58 near the ancient castle farm. The latter is an old accession of unknown provenance, already present in Meise before the collections were transferred from Brussels around 1930. Additionally, two accessions previously labelled as *B. julianae* in this sector have since been reidentified as *Berberis* aff. *julianae*. A fourth, now-dead accession was formerly present in sector 61, but has been recorded as lost since 1993.

In the Dahlgren Arboretum, several *Berberis* species, including *B. julianae*, have been observed germinating in large numbers in the immediate vicinity of cultivated individuals. These seedlings are typically removed by horticultural staff before they can mature. Nevertheless, spontaneous individuals of *B. julianae* have repeatedly been found throughout the domain, in locations far removed from cultivated specimens. These plants likely originate from bird-dispersed seeds, given the species' attractive and fleshy berries. In 2014, a sapling was found in the Conifers collection (for-

merly called *Coniferetum*; sector 54). In the same year and again in 2016, large, presumably older individuals were discovered in a woodland area at the westernmost boundary of the domain (sector 41). A particularly large individual grows atop the so-called English bridge in sector 61, a grotto and bridge complex believed to have been constructed around 1805-1810, when this part of the domain was redesigned as an English landscape garden, probably by François Verly (Vidts & Deneef 2011). Additional juvenile plants have been observed on the slope below this bridge (herb. A. Ronse 4585). None of these occurrences in sectors 41 and 61 are recorded in the collections database. In sector 58, two spontaneous shrubs measuring between 0.5 and 1 m in height have been present since 2018. They are situated at the bases of cultivated trees and are most likely derived from a nearby cultivated accession (number 10003799), located 60 and 110 m away, respectively. This accession also lacks documented provenance.

Although once confined to gardens, *Berberis julianae* is increasingly encountered in natural or semi-natural habitats in Belgium. Subspontaneous individuals have been recorded in areas surrounding the MBG (e.g., Grimbergen; Ronse 2024) as well as further afield.

The species is clearly naturalizing, with some populations persisting for over 20 years, such as in Roeselare. The ongoing spread and persistence of *B. julianae* in Belgium are documented in detail at [Alien Plants of Belgium](#) and [Waarnemingen.be](#).

Herbarium: A. Ronse 3077, Meise Botanic Garden, s 41, 1 (probably) planted, 13.03.2014; A. Ronse 3377, Meise Botanic Garden, s 54, 15.09.2014; A. Ronse 4153, Meise Botanic Garden, s 41, 1 large plant (cultivated?), 16.09.2016; A. Ronse 4506, Meise Botanic Garden, s 58, cultivated, 11.12.2018; A. Ronse 4508, Meise Botanic Garden, s 58, cultivated, 11.12.2018 (as aff. *julianae*); A. Ronse 4641, Meise Botanic Garden, s 67, between roots of tree, near stem, one seedling, 06.12.2018; A. Ronse 4585, Meise Botanic Garden, s 61, atop the English bridge, 20.02.2019; A. Ronse 5657, Meise APM, s 67, along stem of old tree, spontaneously grown, 15.03.2024; A. Ronse 5898, Meise Botanic Garden, s 58, atop the English bridge, planted (without n°?), 08.05.2024; A. Ronse 6236, Meise Botanic Garden, against stem of *Aesculus* tree, spontaneous, +/- small plant, some warts (only few, dark red), 04.04.2025; A. Ronse 6238, Meise Botanic Garden, s 58, cultivated n° 1000-...3799, flowering and fruiting, 04.04.2025; A. Ronse 6277, Meise Botanic Garden, on top of sector 58/61, large bush, fruiting, 18.04.2025.



Figure 4. (←) Self-sown plant of *Berberis julianae* growing against the stem of old *Aesculus*.

Figure 4. (→) Detail of a cultivated plant, that is probably the source of the self-sown plants.

› *Camassia leichtlinii* (Baker) S. Watson subsp. *leichtlinii* (Asparagaceae) (Fig. 5)

According to [POWO](#) (accessed 14 May 2024), *Camassia leichtlinii* is a bulbous geophyte with two recognized subspecies, subsp. *leichtlinii*, which is native to Oregon, specifically the area around Roseburg, and subsp. *suksdorfii*, with a wider native range from southern British Columbia to central California. While both subspecies are described and pictured with violet-blue flowers in POWO, the [Pacific Bulb Society](#) (accessed 14 May 2024) provides further clarification: subsp. *leichtlinii* typically bears pale creamy-yellow to white flowers, whereas subsp. *suksdorfii* produces darker violet-blue flowers.

This website also notes that subsp. *leichtlinii* can behave aggressively under favorable conditions. In the words of contributor R. Whitlock: “A pest in a favorable climate, almost as bad as bluebells (*Hyacinthoides non-scripta*). Every seed germinates and the bulbs bury themselves so deeply as to be very difficult to dig up. Fortunately, they do not form offsets.” Despite this potential for persistence and spread, POWO does not report *Camassia leichtlinii* as naturalized anywhere outside its native range. No additional global naturalization records could be found in the consulted literature or online floras. However, localized subspontaneous occurrences have recently been reported in Belgium.

The oldest accession of this species in the MBG was obtained in 1970 from the Botanical Garden of Potsdam (Germany) and planted in both the Cronquist Garden and the Orangery Garden. A more recent white-flowered accession from a Belgian grower was planted in 2018 in the Entrance Garden of the new Plant Palace. Given the geographic distance and relatively recent introduction, this latter accession is unlikely to be the source of the escaped plants. In contrast, several spontaneous plants—some flowering—have been observed since 2020 in a wooded edge of sector 53, at distances over 100 m from the Cronquist Garden. By 2024, several dozen individuals had been recorded, many in full bloom and all showing creamy-white flowers. These observations strongly suggest subsp. *leichtlinii* as the source. Moreover, this population appears to originate from seed: the web page for this accession in the [Botanical Collections](#) database (accessed 3 April 2025) explicitly mentions “open pollination” and includes an image of seeds.

In addition to this expansion, the species has become dominant in flower beds of the Cronquist Garden itself, where it has out-competed and largely replaced several other geophytes, including *Camassia quamash*, *Ornithogalum* spp., and *Hyacinthoides* spp. Its dense growth leaves little room for other plants. In March 2021, two non-flowering individuals were also spotted under trees in an adjacent part of the Dahlgren Arboretum, but these were swiftly removed by horticultural staff.

The number of *C. leichtlinii* observations in Belgium has significantly increased in recent years, as documented on [Waarnemingen.be](#) (accessed 24 March 2024). However, the majority of these sightings appear to concern cultivated plants, typically in urban green spaces or along roadsides. This is especially clear where *C. leichtlinii* occurs alongside other ornamental bulb species such as *Narcissus*. Field verifications by A. Ronse in Londerzeel (herbarium vouchers 5822 and 5824) confirmed such cultivated origins.

Probably all occurrences result from discarded bulbs or garden waste, there is no evidence of spontaneous establishment from seed. The 2013 observation by the second author in Kortrijk, where *C. leichtlinii* was found alongside *Leucojum aestivum* and

Eranthis at what was likely a garden waste dumping site, fits this pattern, as it also involved discarded plant material rather than true escape from cultivation (Waarnemingen.be).

Interestingly, all *C. leichtlinii* records currently documented on Waarnemingen.be concern the blue-flowered form, typically assumed to represent subsp. *suksdorfii*. Although the white-flowered subsp. *leichtlinii* is listed in the database, it has not (yet) been the subject of confirmed observations in the wild. This may reflect underreporting, limited tendency to escape from cultivation, or simply lower horticultural prevalence of this subspecies.

Herbarium: A. Ronse 4933, Meise Botanic Garden, Coniferetum s 53, forest understory, several plants, not flowering yet, 17.03.2021.



Figure 5. *Camassia leichtlinii* subsp. *leichtlinii* flowering in a forest edge in sector 53.

› *Chamaemelum nobile* (L.) All. (Asteraceae)

According to POWO (accessed 10 April 2024), *Chamaemelum nobile* is native to a broad Mediterranean-Atlantic region, including Algeria, France, Great Britain, Ireland, Morocco, Portugal (including Madeira and the Azores), and Spain. It has been introduced to numerous regions worldwide, such as Albania, Austria, the Baltic States, Belarus, Belgium, Bulgaria, Colombia, former Czechoslovakia, Germany, Haiti, Italy, Pakistan, Poland, Russia, South Australia, Switzerland, Ukraine and Crimea, the United States, and former Yugoslavia. Despite this wide cultivated and introduced range, additional modern data on its naturalized or weedy behavior remains scarce and scattered. The species is often cultivated as a medicinal or ornamental herb, but only rarely becomes persistent in non-cultivated settings.

At the MBG, *Chamaemelum nobile* is cultivated both in the Cronquist Garden and the Medicinal Garden, under the name of its synonym *Anthemis nobilis* L.. The current accession originates from a wild collection made in Hesse (Germany) and was provided by HB Krefeld in 1980.

Escapes of *Chamaemelum nobile* were found in laws in different parts of the garden. The species was first observed subspontaneously in 2010 in the lawns of the Dahlgren Arboretum, and subsequently in 2014 in sector 54. Both locations lie close to the Cronquist Garden and the Medicinal Garden. By 2017–2018, the species had spread significantly further: in 2017 close to the Plant Palace (sector 60), and in 2018 around the Orangery Lake (sec-

tor 21), as well as in different parts of sector 67, more than 600 meters from cultivated sources. At most of these locations, the plants formed dense mats of creeping, non-flowering individuals in lawns. Flowering was occasionally observed when mowing was less frequent, such as during the dry summer of 2018, when a few individuals managed to flower in sector 21. Some earlier, misidentified records may have been confused with *Anthemis arvensis*, a morphologically similar species already noted as an escape in MBG by Ronse (2011b). Nevertheless, none of these populations appear to have persisted over the long term; all observed occurrences seem to have disappeared after a few years.

Historically, *C. nobile* has occasionally been found as a casual alien in Belgium. According to Verloove (2006), the species was noted several times during the 19th century and was last recorded in 1985 before becoming largely absent from the flora. A recent and notable exception was recorded in 2020 in Antwerp, where a substantial population (estimated at over 100 plants) was discovered by Dirk De Beer in a lawn setting (Waarnemingen.be). Remarkably, this population was still present in 2025, suggesting a certain degree of persistence. Similar to the cases in MBG, this appears to involve spontaneous growth in short-cut lawns, but not necessarily long-term naturalization.

Herbarium: A. Ronse 4458, Meise Botanic Garden, s 67, in the lawn, flowering within dry lawn, 31.07.2018; A. Ronse 4460, Meise Botanic Garden, s 67, next to herbarium building, several square meters in two patches, 01.08.2018.

› *Clematis recta* L. (Ranunculaceae) (Fig. 6)

According to POWO (accessed 6 September 2024), *Clematis recta* is native to southern and eastern Europe, extending eastward to the Caucasus. It is reported as introduced in Belgium, Scandinavia, and parts of North America (notably New York and Ontario).

In the MBG, *C. recta* is cultivated in the Cronquist Garden. The accession originates from the former botanical garden in Brussels and was transferred to Meise in 1963. Additionally, two accessions labelled *C. recta* var. *mandshurica* were planted in the collections. One of these was received in 1967 from Geisenheim BG (Germany), and is planted in part of the Dahlgren Arboretum, less than 100 m from the plants in the Cronquist Garden. According to POWO (accessed 6 September 2024), the latter variety is a synonym of *Clematis terniflora* var. *mandshurica* (Rupr.) Ohwi, a taxon native to East Asia (parts of Russia, Mongolia, Korea, and China). This taxonomic clarification may complicate identification of spontaneous plants occurring near both accessions.

On 8 April 2016, several young plants of *Clematis* were observed in the Cronquist Garden in close proximity to the cultivated *Clematis recta*. Moreover, in 2020 a larger but non-flowering plant was found along a path between sectors 53 and 54, about 90 m away from the population in the Cronquist Garden. Given their location, these spontaneous plants may derive from either *C. recta* or *C. terniflora* var. *mandshurica*, though precise identification remains unresolved. Previously, *Clematis vitalba* — the native species — was reported in MBG by Ronse (2011a), specifically in sector 53. However, in light of more recent observations and potential confusion between taxa, it is not excluded that some earlier records attributed to *C. vitalba* may actually refer to *C. recta*.

Historically, *Clematis recta* was considered locally naturalized in Belgium, although its status has since been revised. According to Alien Plants of Belgium, the species was formerly listed as naturalized but is now regarded as extinct in the wild. The last

confirmed subspontaneous occurrences appear to date back to the early 20th century, and no recent naturalized populations are known.

Modern observations of the species in Belgium, such as those listed on [Waarnemingen.be](https://waarnemingen.be), almost exclusively concern cultivated plants in gardens or immediate surroundings. There is no strong evidence for persistent wild populations or recent in situ establishment outside of cultivation.

Herbarium: A. Ronse 4860, Meise Botanic Garden, s 53, 07.05.2020.



Figure 6. Subspontaneous plant of *Clematis recta* growing in a hedge in sector 54 (May 2020).

› *Crocus flavus* Weston (Iridaceae) (syn.: *C. aureus*, *C. maesiacus*) (Fig. 7)

Crocus flavus is a yellow flowering species native to the Balkans and western Turkey (the [Pacific Bulb Society](#) and [POWO](#), accessed 18 March and 25 March 2024 respectively). According to POWO, the species is introduced in former Czechoslovakia and in at least two U.S. states, including Arkansas, where its occurrence was documented by Serviss *et al.* (2016).

A species that may be confused with *C. flavus* is *C. chrysanthus*, another yellow-flowering *Crocus*, which differs by having a corm tunic with a pronounced long neck—absent in *C. flavus*. Although *C. flavus* is not recorded from the wild in the British Isles, *C. chrysanthus* was found naturalized in Surrey in 1983 and seems to be increasing in occurrence (see [BRC Plant Atlas](#), accessed 18 February 2022).

In the MBG, two accessions of *C. flavus* are present in the living collections. One accession, originating from BG Wuppertal (Germany), was obtained in 1967 and planted both in the Cronquist Garden and in sector 58. A second accession was received from HB Sofia (Bulgaria) and was planted in and around the Orangery Garden, on the opposite side of the garden domain.

In February 2022, two yellow-flowering *Crocus* individuals were observed in sector 54, amidst a larger population of subspontaneous blue-flowering *C. tommasinianus* (see further). The flowers had slender, pure yellow petals. One of the plants was collected and deposited in the herbarium. The diagnostic absence of a tunic neck on the corm confirmed identification as *C. flavus* rather than *C. chrysanthus*. Given their proximity to the Cronquist Garden, the plants likely originated from the 1967 German accession. No additional yellow-flowering *Crocus* were recorded at this site in 2024 or 2025. However, the presence of vegetative individuals cannot be ruled out, since many naturalized *Crocus* plants fail to flower regularly, as noted in repeated observations in MBG.

There are no confirmed cases of naturalized *Crocus flavus* in Belgium. The [Alien Plants of Belgium](#) website lists no records for this species as an escape from cultivation. This is in contrast with *C. chrysanthus*, which has reportedly become naturalized in several countries and is occasionally confused with *C. flavus*. Similarly, waarnemingen.be (accessed July 2025) does not include any observations of *C. flavus*. The individuals recorded in the MBG in 2022 therefore likely represent a rare case of short-term escape without evident persistence.

Herbarium: A. Ronse 5183, Meise Botanic Garden, s 54, undergrowth of trees, only two flowering plants, remote from each other, 17.02.2022.



Figure 7. A few yellow-flowering *Crocus flavus* were found among purple *C. tommasinianus* in 2024 (←); Flower of *C. flavus* (→).

› *Crocus tommasinianus* Herb. (Iridaceae) (Fig. 8, 9, 10)

Crocus tommasinianus, a lilac- to purple-flowering crocus, is native to parts of southeastern Europe, specifically the Balkans, former Yugoslavia and Hungary ([POWO](#), accessed 9 September 2024). The [Pacific Bulb Society](#) offers a more detailed distribution, listing Croatia, Serbia, Bosnia, Montenegro, Bulgaria, and Hungary, where it grows in open woods and shady hillsides. The species has been cultivated in Britain since 1847 and was first recorded from the wild there in 1963. Due to past confusion with *C. vernus*, however, it is difficult to trace historical changes in its distribution. Nevertheless, its popularity in horticulture, ease of cultivation, and tendency to self-seed suggest that it may be increasing in the wild (see [BRC Plant Atlas](#), accessed 18 February 2022). Outside of Europe, *C. tommasinianus* is also occasionally naturalized in the United States. For instance, it is documented as locally naturalized in parts of northeastern U.S., particularly in old garden areas, cemeteries, and parks (e.g. Missouri Botanical Garden, USDA PLANTS database). In many cases, long-term survival is attributed to vegetative persistence and limited sexual reproduction.

In the MBG, *C. tommasinianus* has been cultivated in the Cronquist Garden since 1971, based on plants obtained from Neuchâtel Botanic Garden (Switzerland; accession 19711255). This accession was grown alongside various other *Crocus* species, although by 2024, *C. tommasinianus* remained the sole surviving spring-flowering *Crocus* in the Cronquist Garden, spreading also into adjacent beds formerly occupied by other *Crocus* taxa.

In 2004 and 2007, cultivars of the species were additionally planted in sectors 66 and 67, near the main garden entrance, using bulbs from Dutch commercial growers.

From at least 2000 onward, spontaneous populations have developed in forested areas of sectors 54 and 53. These areas now host hundreds of flowering individuals, presumably derived from

the 1971 accession. This accession was propagated through open pollination, and spontaneous seed production is documented in both wild and cultivated plants. Notably, accession number 10003495—present in the Cronquist Garden and in sector 54—originated from such seedlings. The probable mechanism of escape involves seed dispersal from overblown flowers in the Cronquist Garden. These seeds may have germinated in trimmings and plant debris temporarily stored in the nearby woodland zones before being composted. Seed capsules observed on both escaped and cultivated plants (e.g. May 2020) support this hypothesis.

Since 2020, the self-sown population has been expanding steadily, covering approximately 500 m in 2024 across sectors 53 and 54. More recently, individuals have been observed in adjacent sectors 59 and 63, confirming an ongoing expansion.

The situation of *Crocus tommasinianus* in Belgium remains ambiguous. While the species is very frequently observed in gardens and parks—and widely reported on [Waarnemingen.be](https://www.waarnemingen.be)—most records likely represent planted specimens or garden escapes. Several issues complicate assessment of its naturalization status:

1. **Identification challenges:** The species is often confused with *C. vernus*, the more familiar and widespread "stinsenplant" in Belgium.
2. **Persistence vs. naturalisation:** While long-lived populations are known (e.g. in estate parks and older gardens), these may reflect long-term survival rather than true establishment or spread in the wild.
3. **Lack of robust data:** No published records confirm full naturalization of *C. tommasinianus* in Belgium (see also [Alien Plants of Belgium](#)). The species is absent from the list of fully naturalized crocuses.

Herbarium: A. Ronse 4926, Meise Botanic Garden, s 53/54, under trees, >1000 plants escaped from Herbetum, 04.02.2021; A. Ronse 5166, Meise Botanic Garden, s 54, wood margin, hundreds of individuals, 24.01.2022; A. Ronse 5182, Meise Botanic Garden, s 54, undergrowth of forest and edge, many hundreds-thousands, increasing, 17.02.2022.



Figure 10. Seed pods were present on many subspontaneous plants of *Crocus tommasinianus* in sectors 53/54 (May 2020)



Figure 8. Flowering plant of *Crocus tommasinianus* (17 February 2022).

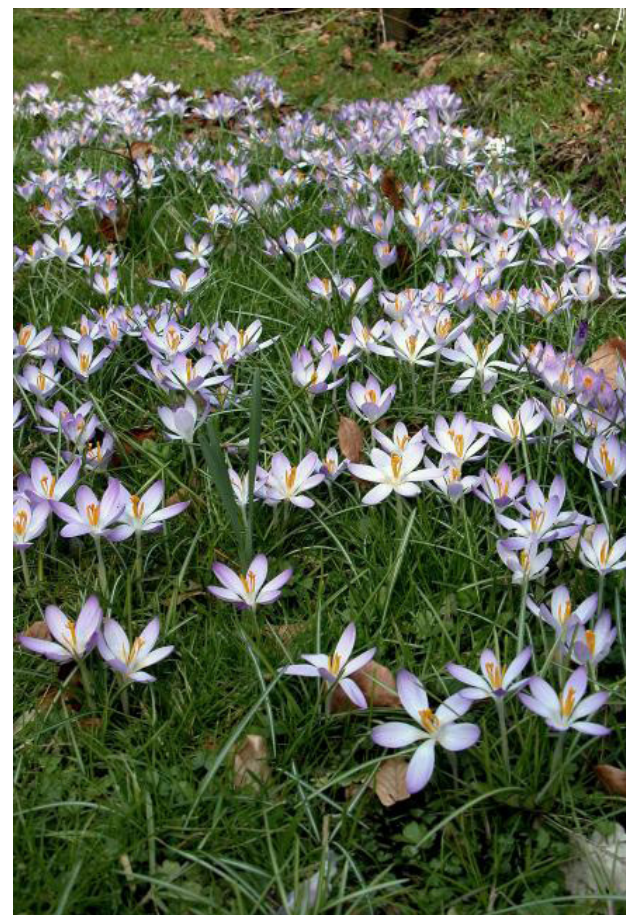


Figure 9. Flowering *Crocus tommasinianus* in sector 54 in the 1980s.

› *Cyclamen coum* Mill. (Primulaceae) (Fig. 11, 12)

Cyclamen coum is a low-growing tuberous herbaceous perennial native to a region spanning from eastern Bulgaria to the Caucasus and Israel. The species includes two recognized subspecies: *C. coum* subsp. *coum* and *C. coum* subsp. *caucasicum* (K.Koch) O.Schwarz. According to [POWO](#) (accessed 26 March 2024), *C. coum* subsp. *coum* is also introduced in Belgium, France, Germany, Great Britain, and Romania.

The species thrives in shaded to semi-shaded environments, forming attractive carpets of rounded to heart-shaped leaves, often beautifully silver-variegated on the upper surface. Flowers appear in winter, typically in February, ranging from deep pink to pale pink or nearly white.

Various accessions of *C. coum* have been introduced into MBG over the past decades. In 1966, plants of subsp. *caucasicum* were obtained from a Swiss botanic garden and planted in and around the Orangery Garden and in the Castle Farm borders (sector 58). In 1978, subsp. *coum* was planted near the Meise entrance using material from the Vienna Botanic Garden. In 1983, additional corms from commercial sources were added near the Orangery. In 2004, three accessions from a Belgian botanic garden were planted under *Hamamelis* in sector 63. These have since expanded both spontaneously and through deliberate propagation using locally collected seeds. In 2014 and 2018, further accessions were planted in sectors 10 and 63, including the white-flowered cultivar ‘Album’. These introductions have resulted in a number of flourishing populations, particularly in the Winter Garden (sector 63), with an impressive diversity of flower colors and leaf patterns (fig. 12).

Since a few years, *C. coum* has begun to escape from cultivation in the garden. Observations were mostly made during the flowering season (February–March), as non-flowering individuals are inconspicuous. In 2022, one flowering plant was observed in a shaded lawn behind the Plant Palace (sector 59), about 35 m from the cultivated population in sector 63. In 2023, this population had expanded significantly, with an estimated 50–100 individuals spread over roughly 60 m². By 2024, this same area contained at least 18 flowering and numerous non-flowering plants across over 1000 m². Additional spontaneous groups were recorded in sector 54, where five flowering individuals were found 35 m from the nearest cultivated plants. In sector 66, a new site was discovered near the staff entrance. These plants likely originated from the 1978 accession planted near the main entrance (Vlaamse hof), about 90 m away. These findings suggest that *C. coum* is able to naturalize locally within the MBG under favorable conditions, particularly in shaded lawns and woodland edges. Its spread appears to occur via seed, possibly assisted by ants (myrmecochory), a mechanism known in the genus *Cyclamen*.

The status of *Cyclamen coum* elsewhere in Belgium remains somewhat unclear. The species is increasingly popular in both private and public gardens, and its use in landscaping has surged in recent years. This popularity has led to a growing number of reports on [Waarnemingen.be](#), but many of these likely refer to cultivated or recently planted individuals.

Confirmed instances of *C. coum* becoming naturalized are limited, although isolated populations may persist in woodlands near residences or as relics of older plantings in estate parks and castle domains. These could result from discarded tubers or deliberate plantings, with subsequent limited natural spread.

Two important factors complicate assessments of its naturaliza-

tion: 1) Identification difficulties: Several *Cyclamen* species are cultivated in Belgium, and *C. coum* is not always easily distinguished from *C. hederifolium* or other species, especially outside the flowering period; 2) Lack of documentation: Despite frequent garden use, there is little published evidence of fully naturalized populations in the wild. The [Alien Plants of Belgium](#) website reports a few locations where the species appears to be naturalized.



Figure 11. Subspontaneous plants of *Cyclamen coum* in a shaded lawn in sector 59.



Figure 12. Display of cultivated *Cyclamen coum* in the Winter Garden (March 2024).

› *Cyclamen hederifolium* Aiton (Primulaceae) (Fig. 13)

This species comprises two subspecies: *Cyclamen hederifolium* subsp. *hederifolium*, native to Albania, Bulgaria, the East Aegean Islands, France, Greece, Italy, Switzerland, Turkey, and the former Yugoslavia, and introduced in several other regions including Belgium, Germany, Great Britain, Ireland, and Oregon (USA); and subsp. *crassifolium*, which is restricted to Greece ([POWO](#), accessed 27 March 2024). Commonly known as ivy-leaved cyclamen or sowbread, this species is a low-growing, tuberous perennial. Its foliage ranges from heart-shaped to narrowly arrow-shaped leaves, typically with 2–3 angled lobes on each side—mimicking the juvenile foliage of ivy, which explains its English vernacular name. Leaf coloration is variable, from entirely green to entirely silver, though the most frequent pattern is a hastate or marbled design in pewter or silver with green tones ([Wikipedia](#), accessed 27 March 2024).

The species can be reliably distinguished from *Cyclamen coum* in vegetative state by its larger and more deeply lobed leaves, and by its phenology: *C. hederifolium* flowers in late summer to early autumn, whereas *C. coum* blooms from late winter to early spring.

At Meise Botanic Garden, *C. hederifolium* has been cultivated in multiple locations, most prominently in and around the Orang-

ery Garden. Plantings include wild-sourced material from Turkey introduced in 1987, the cultivar 'Album' introduced in 1990, and a wild-collected accession from Palermo (Sicily) added in 1998. In 2015, additional corms from a commercial Dutch source were planted, not only in the Orangery Garden but also near the castle farm (sector 58), in the Cronquist Garden, and along the edge of sector 54.

A large clump of naturalized plants has been observed for several years in sector 54, flowering within a border of *Erica carnea* 'King George' along the Ring Road. These plants are located approximately 90 m from the nearest cultivated individuals and likely represent spontaneous establishment from earlier plantings.

In Belgium, *C. hederifolium* is not currently considered fully naturalized, but sporadic escapes and localized persistence have been documented. According to [Alien Plants of Belgium](#), the species is frequently cultivated and widely planted in both public and private gardens. Observations of wild-growing individuals are most often associated with garden waste disposal or seed dispersal from nearby cultivated sources.

Numerous observations are listed on [Waarnemingen.be](#), but most refer to plants in managed or semi-managed settings. Nevertheless, the species appears capable of forming locally persistent populations, especially in shaded and undisturbed habitats such as small woodland remnants or the understory of ornamental plantings near former estates.

As with *C. coum*, the exact extent of establishment is difficult to assess due to potential misidentification and the long-lived nature of tubers in suitable conditions. Its capacity to set seed, combined with high horticultural popularity, suggests that further spread is possible, though current evidence does not support widespread naturalization in fully natural habitats.

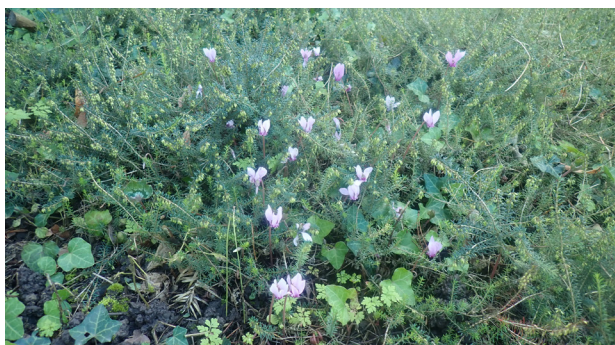


Figure 13. *Cyclamen hederifolium* flowering between planted *Erica carnea* (October 2024).

› *Muscari armeniacum* H.J.Veitch (Asparagaceae) (Fig. 14)

Muscari armeniacum is a bulbous geophyte native to Bulgaria, Greece, the North Caucasus, Transcaucasia, Turkey, and the former Yugoslavia. It is widely introduced in Western Europe, including Belgium, as well as in Austria, the former Czechoslovakia, the Falkland Islands, parts of Australia and New Zealand, and in the United States ([POWO](#), accessed 9 September 2024).

In the MBG, the species has been cultivated in several locations, mostly in the northern parts of the domain, such as in sectors 19, 20 (the Flower Theatre) and 22 (presently the Culinary Garden).

In MBG, spontaneous occurrences of the species have been documented on at least two occasions. The first was in May 2021, when several flowering individuals were observed in the Cronquist Garden, among plant beds containing other *Muscari* species. A sec-

ond observation was made in April 2024, when a few flowering plants were found growing freely among disused greenhouses within the Plant Palace complex.

In Belgium more broadly, *M. armeniacum* has long been the most frequently planted species of *Muscari* in both private gardens and public plantings. Due to its vigorous vegetative reproduction, surplus bulbs are often discarded with garden waste, frequently resulting in spontaneous establishment along roadsides, garden edges, or woodland margins near human habitation. In recent years, the species appears to be increasingly naturalized in such disturbed or semi-natural environments.

Herbarium: A. Ronse 5728, Meise Botanic Garden, spontaneously growing between empty greenhouses of Plant Palace, leaves up to 5 mm wide, longer than inflorescences, +/- pale green, 08.04.2024.



Figure 14. *Muscari armeniacum* flowering between empty greenhouses of the Plant Palace, April 2024 (←); the leaves are longer than the inflorescence (→); detail of flowers (↓).

› *Muscari azureum* Fenzl (Asparagaceae) (Fig. 15)

Muscari azureum, commonly known as azure grape hyacinth, is native to northern and eastern Turkey, where it grows in alpine meadows (Mathew 1987; Schauenberg 1965). Outside its native range, the species has been introduced in Austria, the former Czechoslovakia and Germany ([POWO](#), accessed 10 September 2024).

In the MBG, three accessions have been cultivated. The earliest, introduced in 1971 from the Horticultural and Botanical Garden of Cluj-Napoca (Romania), was planted in the Cronquist Garden. Two additional accessions from German botanical gardens were planted in the historic Orangery Garden. However, the latter two accessions disappeared in 2022 when the Orangery Garden underwent complete redesign and was transformed into the Culinary Garden. The population in the Cronquist Garden has gradually declined as well, and by 2023, only three inflorescences remained. Subspontaneous growth of *M. azureum* was first observed in March 2021 under an old *Castanea* tree on a slope in sector 53. This small population has persisted and flowered annually since then, producing between 8 and 15 inflorescences per year. Although at first sight it appeared to be a single plant, the group comprises several individuals forming a loose clump. Each plant is 4–15 cm tall, with two to three grey-green leaves per bulb, and bears a dense raceme of up to 60 bright blue flowers ([Wikipedia](#), accessed 10 September 2024). In 2025, two young individuals were recorded 25–30 cm from the main clump, one of which was flowering, suggesting successful sexual reproduction and seedling establishment.

The escaped population likely originated from the accession in the Cronquist Garden, situated approximately 160 m downslope. The fact that the spontaneous plants occur on higher ground may suggest dispersal by a biotic vector such as birds or small mammals.

In Belgium, *Muscari azureum* is a very rare escape from cultivation and is not listed in Verloove (2006). It has recently been reported near Durnal, where a small population was first discovered in 2019 and confirmed in 2021 ([Waarnemingen.be](#)). It remains uncertain whether these plants represent a truly naturalized population or are relics of a former garden planting.



Figure 15. A clump of *Muscari azureum* in a woody area of sector 54.

› *Muscari comosum* (L.) Mill. (Asparagaceae) (Fig. 16)

Muscari comosum, commonly referred to as tassel hyacinth or tassel grape hyacinth, is a bulbous geophyte primarily associated with the temperate biome. Its native distribution ranges from the Canary Islands to Central Europe and Iran, encompassing most of southern, western, and eastern Europe, but excluding the British Isles, Belgium, the Netherlands, and Scandinavia. It is considered introduced in Belgium, Denmark, Great Britain, The Netherlands, Poland, South Australia and parts of the United States ([POWO](#),

accessed 9 April 2024). In its native range, it typically grows in rocky soils and disturbed areas, such as cornfields and vineyards in the Mediterranean area. It naturalizes easily and may become invasive, with northward expansion from its original distribution having already occurred in parts of Europe as early as the 16th century, including in the British Isles ([Wikipedia](#), accessed 1 March 2024).

At the MBG, the species is grown in the Cronquist Garden since 1967, originating from an accession of unknown wild provenance from the Botanical Garden of Trieste (Italy). Additionally, a horticultural form, *M. comosum* ‘Plumosum’ (also known as feather hyacinth), with characteristically modified, plume-like inflorescences, has been planted in sector 21 at the opposite side of the domain, using material from a Dutch commercial source.

Since 2021, several plants of *M. comosum* have been found subspontaneously in shaded lawns and under trees in sector 54. The species has continued to thrive at this location, forming a stable subspontaneous population. These individuals likely originated from the plants in the Cronquist Garden, located approximately 110 m away, where the species is cultivated and where some escapes from the designated planting beds into adjacent plant collections had previously been noted—up to 5 m distance in 2021.

In Belgium, *Muscari comosum* is generally not considered native. According to Verloove & Van Rossum (2023), it is not part of the indigenous flora, although a few possibly subspontaneous populations have been recorded, especially in the Maritime district. Distribution maps by Van Landuyt *et al.* (2006) show its presence in the northernmost parts of Flanders, but not in the loamy area around Meise. However, some of these populations—particularly coastal sites known from before 1950—do not fit the typical pattern of recent garden escapes. This suggests that certain populations may be archaeophytes, with a longer history in Belgium and neighboring parts of northwest France, where the natural range extends to the Somme region. The population in Meise is almost certainly not natural and likely results from a more recent introduction.

Herbarium: A. Ronse 4962, Meise Botanic Garden, s 51, herbetum, under trees, 26.05.2021; A. Ronse 5266, Meise Botanic Garden, herbetum, cultivated, 05.04.2023.



Figure 16. *Muscari comosum* flowering in halfshade.

› *Phyllanthus tenellus* Roxb. (Phyllanthaceae) (Fig. 17)

This species is native to Comoros, Madagascar, Mauritius, Mozambique, Réunion, Saudi Arabia, Tanzania and Yemen. It is widely introduced in tropical and subtropical regions around the world, including Angola, Australia, New Caledonia and New Guinea, Japan, India, Sri Lanka, Iran, several states of the United States, Mexico, Argentina, Brazil, Costa Rica and Venezuela. In Europe, it is only known as an alien in Italy (including Sicily and Sardegna), and from the Canary Islands and Madeira. It is an annual and grows primarily in the seasonally dry tropical biome ([POWO](#), accessed 7 May 2025).

This species is not cultivated at MBG. However, in August 2010, several dozen flowering and fruiting individuals of *Phyllanthus tenellus* were found growing in the open nearby a dumping site of organic waste from the collection and propagation greenhouses in sector 59. These plants likely originated from specimens that had established as weeds inside the greenhouses and were subsequently discarded along with organic waste. Germination and successful development into flowering and fruiting plants presumably followed shortly thereafter. The species did not persist beyond that year, most likely due to its inability to survive winter temperatures under open-air conditions in Belgium. The event is noteworthy, as it represents the first documented outdoor occurrence of *P. tenellus* in Belgium. The only prior national record dates back to 2003, when the species was observed growing prolifically as a weed inside the greenhouses of the Ghent University Botanic Garden (*F. Verloove* 5704 in private herbarium *F. Verloove*).

Herbarium: A. Ronse 2202, Meise, domain of National Botanic Garden, s 59, several dozen individuals nearby a dumping site of organic waste from the collection and propagation greenhouses, 19.08.2010.



Figure 17. Plants of *Phyllanthus tenellus* growing in the open near a dumping site for organic waste (August 2010).

› *Richardia brasiliensis* Gomes (Rubiaceae) (Fig. 18)

This species is an annual or short-lived subshrub native to South America, with a natural distribution from Ecuador to northern Argentina. It grows primarily in the seasonally dry tropical biome. Outside its native range, it is widely naturalized especially in central and southeastern Africa, and has also become established in parts of the United States, Guatemala, Mexico, India, and Sri Lanka ([POWO](#), accessed 28 April 2025). In much of this introduced range, it is considered an invasive weed ([Wikipedia](#), accessed 24 June 2025).

At MBG, *R. brasiliensis* has been cultivated since 1995, from an accession of unknown wild provenance obtained via the Botanic Garden of Nantes (France). Five plants were initially established in a former propagation greenhouse (KK15), with an additional two planted in a smaller greenhouse within the Plant Palace. Remarkably, all original individuals have survived to the present day in the greenhouse collections, in contrast to many other species cultivated under similar conditions. This demonstrates the species' exceptional vigor and adaptability.

In September 2016, a flowering individual of *R. brasiliensis* was found growing in pavement crevices near the eastern entrance of the former propagation greenhouses. A voucher specimen was collected for the herbarium. Five years later, on 16 March 2021, another flowering plant was observed in the same area, again growing outdoors. These findings suggest that *R. brasiliensis* may have survived multiple winters under local conditions, despite its tropical origin.

This observation represents the first documented occurrence of *R. brasiliensis* in the wild in Belgium, and probably in Europe.

Herbarium: A. Ronse 4138, Meise, domain of botanic garden, s 70, between greenhouses KK1 and KK2, 02.09.2016.



Figure 18. *Richardia brasiliensis* (Rubiaceae) flowering between pavements close to the propagation greenhouses on 16 March 2021.

› *Rosa multiflora* Thunb. (Rosaceae) (Fig. 19)

Rosa multiflora is native to northeast India, parts of China, Korea and Japan. It has been introduced in various parts of the world, including New Zealand, India, Pakistan, Kazakhstan, Uzbekistan, parts of the United States, Mexico, Guatemala, Argentina, Morocco, and several European countries, including Belgium ([POWO](#), accessed 13 May 2025).

The species was introduced to the United States as early as the late 18th century and has since been used ornamentally, as erosion control, and as a living fence (Amrine 2002). However, it has become a problematic invasive in many areas, forming dense thickets that outcompete native vegetation and reduce pasture quality (Munger 2002). Diagnostic features of this rose include clusters of up to 20 relatively small white flowers, leaves with fringed stipules, leaflets measuring 2.5 to nearly 4 cm long, and nearly glabrous seeds contained in small, red, pea-sized hips that often persist throughout winter. Plants are almost spineless and may grow up to 5 m high when supported by other vegetation ([USDA National Invasive Species Information Center](#), accessed 28 Octo-

ber 2024; [Nature Today](#), accessed 1 August 2020).

At the MBG, self-sown individuals of *Rosa multiflora* have repeatedly been observed since 2011, appearing in multiple sectors throughout the domain. However, a notable case was observed at the woodland edge of sector 44, part of the 'Wild Meise' area. There, a robust specimen reached a height of at least 5 m—approximately half the height of the surrounding trees—with a main stem exceeding 5 cm in diameter. Although this individual was cut down and removed, numerous root suckers and saplings have since emerged in the same area, suggesting local persistence and potential for further spread.

The naturalization of *Rosa multiflora* in Flanders is relatively recent, as documented by Verloove (2002). The species is still frequently used in public landscaping, particularly in urban and suburban green spaces. Almost everywhere it has been planted, it readily escapes from cultivation and becomes naturalized.

Herbarium: A. Ronse 1292, Meise, domain of botanic garden, s 44, 05.09.2002; A. Ronse 2230, Meise, Domain of National Botanic Garden, s 38, wood margin, 28.03.2011; A. Ronse 5332, Meise Botanic Garden, s 67, plant ca. 30 cm tall, under poplars, 12.04.2023.



Figure 19. *Rosa multiflora* reaching a height of approximately five meter in 'Wild Meise' (March 2014).

› *Solanum atropurpureum* Schrank (Solanaceae) (Fig. 20)

This species is native to Argentina, Brazil, Colombia, Paraguay and Uruguay ([POWO](#), accessed 10 April 2024). According to [Wikipedia](#) (accessed 12 April 2024), it is commonly known by evocative names such as “malevolence”, “purple devil” and “five-minute plant”. This short-lived perennial herb lives 3 to 5 years and grows up to 1.2 to 1.8 meters tall. It is particularly notable for its dense covering of striking purple-green thorns (~2 cm long), which line the stems and leaves and lend the species its common name. The plant produces yellow-to-white flowers in late spring to mid-summer, followed by small (1–2 cm wide), orange, alkaloid-rich fruits

that make the plant toxic to touch and ingest.

In the MBG, this species has been cultivated since 2004 in the Anthropogenic Biome Glasshouse (economic plants collection), sourced from the Belgian commercial nursery l'OrtieCulture.

In October 2013, one spontaneous non-flowering individual was observed in sector 63, over 200 meter distant from the greenhouse plants. This specimen, standing over 1 m tall, bore the same fierce purple thorns and was growing in temporarily fallow ground alongside a mixture of species from a commercial wildflower-grass seed blend. Although initially suspected to have arrived via the seed mix, the species is not known to be included in it, and is rarely cultivated in the wild. Instead, further investigation revealed that the greenhouse accession was occasionally placed outdoors during summer months, including in 2012 (evidenced by a dated photograph). We therefore postulate that local birds or other frugivores consumed the fruits and dispersed the seeds to the fallow area approximately 225 m away.

This represents the first recorded occurrence of *S. atropurpureum* outside cultivation in Belgium. We are not aware of other instances of the species as an adventive or escaped plant elsewhere outside its native range.

Herbarium: A. Ronse 3011, Meise Botanic Garden, s 63, one non-flowering plant, erect, >1 m tall, 22.10.2013.



Figure 20. The stems and leaves of the Purple Devil (*Solanum atropurpureum*) are densely covered with long purple thorns.

› *Solanum aviculare* G.Forst. (Solanaceae) (Fig. 21)

This species, commonly known as kangaroo apple or New Zealand nightshade, is native to New Zealand and the Australian states of Queensland and Victoria, as well as Norfolk Island. It has been introduced in South and Western Australia, New Guinea, New Caledonia, Vanuatu, the United States (California, Oregon and Hawaii), and parts of the North Caucasus and Transcaucasus (Russia, Georgia, Azerbaijan and Armenia) ([POWO](#), accessed 20 May 2025).

At MBG, a single accession of *S. aviculare*—originally sourced from the La Mortola Botanical Garden, Italy—is cultivated since 1977 across multiple greenhouses in the Plant Palace complex (Evolution House PPB, Subtropical Rainforest House PPA, and formerly in greenhouses PP5 and PP20).

In May 2018, approximately half-meter-tall seedlings emerged in the inner courtyard of the Herbarium building—a partially enclosed courtyard featuring a central water element. By September 2019, several plants had grown to around 1.7 m in height and were

fruiting. The presence of ripe fruits confirmed species identification, but subsequent removal of the vegetation in 2020 eliminated the plants. In August 2025, more than ten seedlings, measuring between 1 and 1.5 m tall, were also observed in greenhouse PP15. This is one of the few inner greenhouses of the Plant Palace where not all collection plants have been completely removed.

Morphological traits distinguishing *S. aviculare* from the related *S. laciniatum* include: orange-red to scarlet fruits (rather than yellow-orange), smoother fruit surface due to smaller stone cells, and long-acuminate leaf tips (versus the shorter acuminate tips of *S. laciniatum*) (Symon 1981).

This marks the first documented occurrence of *Solanum aviculare* outside cultivation in Belgium. The temporary occurrence of *S. aviculare* at MBG demonstrates the species' capacity for spontaneous emergence and reproductive viability—but its survival in temperate outdoor environments is limited. Its current status in Belgium therefore remains as a singular, first-recorded escape with no signs of broader naturalization.

Herbarium: A. Ronse 4349, Meise Botanic Garden, s 65, 31.05.2018; A. Ronse 4799, Meise Botanic Garden, s 65, inner courtyard, 27.09.2019.



Figure 21. *Solanum aviculare* in the inner courtyard of the Herbarium building: seedling on 31 May 2018; larger plants on 27 September 2019.

› *Tellima grandiflora* (Pursh) Douglas ex Lindl. (Saxifragaceae) (Fig. 22)

This species is native to western North America, from the Aleutian Islands and coastal Alaska to the western United States. It is introduced and locally naturalized in parts of northern and western Europe, including Denmark, Germany, Great Britain, Ireland and Norway ([POWO](#), accessed 23 April 2024). It is sometimes confused with *Tolmiea menziesii*, also a member of the Saxifragaceae family and originating from western North America, which has also become naturalized in parts of Europe. In the vegetative state, *T. menziesii* can be distinguished by its terminally pointed leaves, in contrast to the more rounded leaf apex in *Tellima grandiflora* ([Botany in Scotland](#), accessed 23 April 2025).

At Meise Botanic Garden, plants of *T. grandiflora* with no known wild origin were first introduced in 1963 from the Ghent University Botanical Garden (HBU). These were planted in the Cronquist Garden as well as along the Orangery Pond (sector 21). A second accession, planted in the same sector in 1990, has since disappeared.

Spontaneous individuals have been recorded in the garden since 2008, occurring in various wooded areas. The first cluster of records comes from central sectors of the domain (sector 14 in May 2008; sectors 15 and 33 in May 2012; and sector 34 in April 2024), likely originating from the cultivated population in sector 21. A second cluster lies in the southern part of the domain, with observations from sectors 54 and 63 dating back to April 2009. Here, especially in the Woodland Garden (part of sector 54), plants have steadily expanded their range over more than 200 meters. The local abundance of the species even gives the impression of intentional planting, although it is more likely the result of spread from cultivated individuals in the Cronquist Garden.

In recent years, an increasing number of grazed inflorescences have been observed in this area, with only the basal parts of the flowering stalks remaining. This damage is likely caused by roe deer (*Capreolus capreolus*), which are common in the garden and appear to be particularly fond of the flowering shoots of this species.

The naturalization of *Tellima grandiflora* in Flanders appears to be relatively recent. According to Verloove (2002), the species was still in the early stages of establishment at the beginning of the 2000s, with only a few more or less persistent locations, and its naturalized status was still considered doubtful. The species was not yet included in the *Atlas van de Flora van Vlaanderen* (Van Landuyt et al. 2006), indicating that it had not yet become a permanent component of the regional flora at that time. However, over the past two decades, *T. grandiflora* has become firmly and relatively widely established, with prominent clusters of occurrence, for instance, in the Antwerp Kempen and the Bruges area ([waarnemingen.be](#)).

These records confirm that *Tellima grandiflora* has transitioned from a cultivated ornamental to a well-established naturalized species in parts of Belgium, particularly in moist, shaded woodland habitats.

Herbarium: A. Ronse 1709, Meise Botanic Garden, s 15, half shade, under trees, three individuals, with *Hieracium lachenalii*, 20.05.2008; A. Ronse 3395, Meise Botanic Garden, s 54, 15.09.2014; A. Ronse 5764, Meise Botanic Garden, s 34, wood margin, 19.04.2024.



Figure 22. The flowering shoots of *Tellima grandiflora* appear to be a true delicacy for the roe deer.

› *Tradescantia fluminensis* Vell (Commelinaceae) (Fig. 23)

This species is native to southeastern Brazil through to North Argentina. It is widely introduced in various regions across the globe, including Bolivia, several U.S. states, Australia, New Zealand, Morocco, Tunisia, South Africa, as well as numerous Asian countries. In Europe, it occurs in Cyprus, France, Great-Britain, Greece, Italy, Portugal, Romania and Spain ([POWO](#), accessed 15 April 2025).

Tradescantia fluminensis is considered an invasive species, noxious weed, or pest plant in many regions and has been the subject of targeted eradication efforts. It is particularly problematic in Australia, New Zealand, the southeastern United States, and Portugal (including the Azores and Madeira) (e.g., Dugdale *et al.* 2015). In South Africa, it is classified as a Category 1b Invasive Species, meaning it may no longer be planted, propagated, or allowed to be dispersed. Trade in its seeds, cuttings, or other propagative material is strictly prohibited in both urban and rural areas ([Wikipedia](#), accessed 29 March 2024).

Three accessions of *T. fluminensis* have been cultivated in the greenhouses of the Plant Palace. Two of these were grown in greenhouse PP20: one of unknown origin accessed in 1907, and another obtained from HBU Strasbourg (France), also without a known wild provenance. A third accession was cultivated in the Tropical Rainforest House (PPE). All of these cultivated specimens are now listed as dead.

Despite this, *T. fluminensis* has been found as escape in the inner court of the Herbarium Building in 2018. A significant population was present there with flowering individuals covering several square meters. This courtyard is an enclosed area, inaccessible to the public and only sporadically visited by staff. All species occurring there are spontaneous, having arrived via wind dispersal or ornithochory. During the COVID-19 pandemic in 2020, the area was cleared of herbaceous vegetation (including *T. fluminensis*) and temporarily used as an outdoor dining space for staff. The species has not been seen there again afterwards.

Until recently, *Tradescantia fluminensis* was thought to be the only creeping species of its genus with white flowers occurring in the wild in Belgium. However, during our research we also found a closely resembling species in MBG, which can be reliably distinguished based on vegetative characters (see *T. mundula* further below). Both *T. fluminensis* and *T. mundula* rarely flower outdoors, and they are sometimes misidentified as *Commelina communis*, a summer annual sometimes seen in urban habitats in Belgium.

However, both *Tradescantia* species are perennials with on average smaller leaves featuring ciliolate margins (*T. mundula* additionally has hairs on stems and leaves), whereas *C. communis* has larger leaves with glabrous margins ([Alien plants of Belgium](#), accessed 29 March 2024).

The species was first reported in the wild in Belgium in 1988 (Verloove 2006). Since then, it has become clearly naturalized in several urban centers, especially in and around the larger cities of Antwerp, Brussels, and Ghent, as shown by the distribution heatmap on [waarnemingen.be](#). It is often found in thermally favorable microhabitats such as basement wells, at the foot of south-facing walls, or in other sheltered urban niches. In some of these locations, it has persisted for nearly two decades, forming stable, often dense vegetative mats. However, our present study has revealed the presence in Belgium of *Tradescantia mundula*, a morphologically similar species that had long gone unnoticed. As critical diagnostic characters (such as the presence and distribution of hairs) are often difficult or impossible to assess in photographs, it cannot be ruled out that some records identified as *T. fluminensis* may in fact refer to *T. mundula*.

Herbarium: A. Ronse 4357, Meise Botanic Garden, s 65, 31.05.2018.



Figure 23. *Tradescantia fluminensis* (large-leaved) and possibly *T. mundula* (small-leaved) growing in the inner courtyard of the Herbarium building, May 2018. The smaller-leaved individuals resemble *T. mundula*, which typically has consistently smaller leaves.

› *Tradescantia mundula* Kunth (Commelinaceae) (Fig. 24, 25)

This species is native to Argentina, Brazil, and Uruguay ([POWO](#), accessed 31 July 2025). While this source does not mention any naturalized occurrences outside its native range, records in [GBIF](#) suggest otherwise. *Tradescantia mundula* has clearly been overlooked in warm-temperate and subtropical regions around the world. For example, in New Zealand it has been recorded naturalized from Chatham Islands. Interestingly, it is self-compatible and reproduces from seed, contrary to *T. fluminensis* that spreads by vegetative ramets (Heenan *et al.* 2022). Seedlings have also been observed in the Meise Botanic Garden (Fig. 24), further confirming its ability to reproduce sexually. GBIF also lists occurrences in Japan and England, although the context of these records remains uncertain and the identifications may require confirmation. Nonetheless, it is likely that increased attention to this species will reveal many more records in the coming years.

At Meise Botanic Garden, one accession of this species has been

cultivated since 1968 under the name of *Tradescantia albiflora* Kunth emend. G.Brückn. 'Albovittata'. The plants were obtained from the Botanic Garden of Duisburg (Germany), without any known wild provenance, and were present in two of the Plant Palace collection greenhouses (PP20 and PPI), as well as in two greenhouses of the former nursery greenhouses. The individuals in the Plant Palace have since been recorded as dead, while those in the nursery greenhouses were removed during the construction of the Green Ark.

In August 2011, several dozen flowering individuals of *T. mundula* were found growing spontaneously outdoors, in the vicinity of the former propagation greenhouses. The species was seen again in the same area in August 2016. It was later also recorded as a weed in greenhouse PP11 in the Plant Palace. This infestation clearly originated from the cultivated plants in PP20, one of the smaller collection greenhouses at the center of the Plant Palace complex. During a visit to these greenhouses in 2019, we frequently found it as a persistent greenhouse weed, either growing among cultivated plants on benches, on the ground beneath them, or in shaded corners. Following the relocation of the collections to the newly constructed Green Ark, a multitude of plants of *T. mundula* were found thriving both inside and outside the now-empty greenhouses (Fig. 25), where they remain present today.

This species has not previously been recorded in the wild in Belgium. The massive growth observed in Meise demonstrates its invasive behavior, at least under sheltered and climatologically favorable microhabitats in the immediate vicinity of greenhouse infrastructure. It cannot be ruled out, however, that some urban populations in Belgium currently attributed to *T. fluminensis* may in fact belong to this species, given the close morphological similarity between the two.

The most notable difference lies in the indumentum. *T. mundula* is consistently and conspicuously strigose—its stems, leaves, and pedicels are covered with erect to appressed hairs. In contrast, *T. fluminensis* is usually entirely glabrous or only very sparsely pubescent (appearing hairless to the naked eye), with glabrous leaf surfaces. In most cases, this difference is readily apparent, and typical representatives of both species have been found escaped. One sample, however—A. Ronse 4610, collected in collection greenhouse 16 of the Plant Palace—shows somewhat intermediate characteristics. It remains unclear whether this points to potential hybridization, or simply represents less typical individuals of one of the two species. In addition, the abaxial leaf surface in *T. mundula* is consistently purplish, whereas in *T. fluminensis* it is typically green, only occasionally becoming darker.

Herbarium: A. Ronse 2284, Meise Botanic Garden, between greenhouses, 25-30 plants, translucent filaments, 29.08.2011; A. Ronse 4124, Meise Botanic Garden, s 70, between greenhouses, 30.08.2016; A. Ronse 4610, Meise Botanic Garden, PP 11, 01.09.2019; A. Ronse 6413, Meise Botanic Garden, in empty greenhouse PP 16 in Plant Palace, hairy leaves, 28.07.2025; A. Ronse 6414, Meise Botanic Garden, between empty greenhouses of Plant Palace, weed, 08.08.2025; A. Ronse 6421, Meise Botanic Garden, in empty collection greenhouses of Plant Palace (PP 16), hairy leaves, 28.07.2025.



Figure 24. Young self-sown seedling of *Tradescantia mundula* growing outdoors between greenhouses of the Plant Palace, September 2011.



Figure 25. *Tradescantia mundula* outside the greenhouses of the Plant Palace (↑) and in empty and unheated collection greenhouses of the Plant Palace (↓), both April 2024.

Table 1. Taxa found as escapes from cultivation in MBG. – First mention: ‘–’, In Belgium also known from outside MBG; ‘B’, first mention for Belgium as garden escape; ‘W’, first mention worldwide as garden escape. ‘Persistent’, observed during at least 5 years in MBG.

Species	First mention	Native to Belgium	Persistent
<i>Amorpha fruticosa</i>	–	No	Y
<i>Aquilegia vulgaris</i>	–	Yes	Y
<i>Berberis julianae</i>	–	No	Y
<i>Camassia leichtlinii</i> subsp. <i>leichtlinii</i>	B	No	Y
<i>Chamaemelum nobile</i>	–	No	N
<i>Clematis recta</i>	–	No	Y?
<i>Crocus flavus</i>	B	No	N?
<i>Crocus tommasinianus</i>	–	No	Y
<i>Cyclamen coum</i>	–	No	Y
<i>Cyclamen hederifolium</i>	–	No	Y
<i>Muscari armeniacum</i>	–	No	Y
<i>Muscari azureum</i>	–	No	Y
<i>Muscari comosum</i>	–	No?	Y
<i>Phyllanthus tenellus</i>	B	No	N
<i>Richardia brasiliensis</i>	B	No	Y
<i>Rosa multiflora</i>	–	No	Y
<i>Solanum atropurpureum</i>	B + W	No	N
<i>Solanum aviculare</i>	B	No	Y?
<i>Tellima grandiflora</i>	–	No	Y
<i>Tradescantia fluminensis</i>	–	No	Y
<i>Tradescantia mundula</i>	B	No	Y

Discussion and conclusion

This study reports on 21 taxa of flowering plants that have escaped from cultivation within the domain of Meise Botanic Garden. These are listed in Table 1, including details on their occurrence as garden escapes, their native status in Belgium, and their apparent ability to persist if not actively removed.

Most taxa are geophytes—mainly bulbs and corms—while a smaller number are woody shrubs; no (large) trees are included in the present selection. With the exception of *Aquilegia vulgaris* and possibly also *Muscari comosum*, which is native to the southern part of Belgium, all species are non-native to the country.

Seven taxa (*Camassia leichtlinii* subsp. *leichtlinii*, *Crocus flavus*, *Phyllanthus tenellus*, *Richardia brasiliensis*, *Solanum atropurpureum*, *Solanum aviculare*, and *Tradescantia mundula*) are here reported for the first time as garden escapes in Belgium. Six taxa are clearly naturalized in Belgium and appear to be increasing in frequency. The remaining are only locally naturalized or merely ephemeral relics from cultivation in Belgium.

Approximately 70% of the taxa discussed here have shown persistent behavior in Meise, surviving for at least five years unless removed or their habitat was disturbed. For some species, such persistence is uncertain—for example, *Clematis recta* has been observed multiple times in different locations, but was repeatedly cut down or dug out shortly after each appearance. Still, most of the persistent taxa have previously been reported elsewhere in Belgium, except for *Camassia leichtlinii* subsp. *leichtlinii*, which appears to be restricted to Meise.

Species that are clearly expanding within various parts of the garden include *Rosa multiflora*, *Aquilegia vulgaris*, *Tellima grandiflora*, *Crocus tommasinianus*, and *Cyclamen coum*. Some of these have shown invasive tendencies at other locations in Belgium as well.

On a global scale, most taxa reported here are known elsewhere as weeds or escapes, with varying levels of invasiveness or weed risk. Eleven of them are considered invasive in at least some parts of the world, while eight others are naturalized but pose a relatively low weed risk. For one species—*Solanum atropurpureum*—no previous records as escapes were found. It appears to have been a casual escape from the greenhouses and did not survive the winter.

In comparison with the earlier study conducted in Meise Botanic Garden (Ronse & Verloove 2021), this study predominantly shows a continuity in the pattern of the discussed garden escapes. Both contributions mainly treat non-woody species. A second similarity is that the majority of the taxa is persistent in both, even when taking into account the fact that the definition of persistency was altered in the present contribution from at least two years to at least five years. A third resemblance is that both studies show between 35% and 40% new taxa for Belgium, and moreover few new mentions on a global scale.

Several species in the current dataset show signs of local expansion and increasing persistence, particularly *Rosa multiflora* and *Tellima grandiflora*, but also *Berberis julianae*, *Crocus tommasinianus* and *Cyclamen coum*, and in thermophilic environments *Tradescantia fluminensis* and *T. mundula* as well. Overall, the findings support the earlier conclusion that ongoing monitoring remains essential, especially as some taxa, once thought to be merely ephemeral, may persist or even spread under favorable conditions.

Acknowledgements. – We thank Mieke Van Rossem for entering herbarium and observation records into the databases, Henry Engledow and Wesley Tack for their assistance in retrieving data from the collections database, Steven Desein for the identification of *Richardia brasiliensis*, and Omer Van de Kerckhove and Kenny Stevens for preparing the maps of the MBG domain.

References

- Amrine J.W. Jr. (2002) – Multiflora Rose. In: Van Driesche R., Lyon S., Blossey B., Hoddle M. & Reardon R. (eds.), Biological control of invasive plants in the eastern United States. USDA Forest Service Publication FHTET-2002-04, Morgantown, West Virginia.
- Downey P.O. & Glanznig A. (2006) – Understanding and managing the risk of garden escapes to Australia's native flora: which future weed candidates are already here? In: Preston C., Watts J.H. & Crossman N.D. (eds.), Managing Weeds in a Changing Climate. Proceedings of the 15th Australian Weeds Conference, Adelaide: 723-726. Weed Management Society of South Australia, Adelaide.
- Dugdale T.M., McLaren D.A. & Conran J.G. (2015) – The Biology of Australian Weeds 65. *Tradescantia fluminensis* Vell. *Plant Protection Quarterly* 30(4): 116-125.
- Galera H. & Sudnik-Wójcikowska B. (2010) – Central European botanic gardens as centres of dispersal of alien plants. *Acta Societatis Botanicorum Poloniae* 79(2): 147-156. <https://doi.org/10.5586/asbp.2010.020>
- Heenan P.B., Cheeseman D.F., Mitchell C.M., Dawson M.I., Smith L.A. & Houlston G.J. (2023) – Genetic diversity of *Tradescantia fluminensis* complex (Commelinaceae) naturalised in Australia, New Zealand and South Africa. *New Zealand Journal of Botany* 61(1): 23-37. <https://doi.org/10.1080/0028825X.2022.2055479>
- Isely D. (1998) – Native and Naturalized Leguminosae (Fabaceae) of the United States (exclusive of Alaska and Hawaii). Brigham Young University, Provo, Utah.
- Keet J-H., Cindi D. & du Preez P.J. (2016) – Assessing the invasiveness of *Berberis aristata* and *B. julianae* (Berberidaceae) in South Africa: Management options and legal recommendations. *South African Journal of Botany* 105: 288-298. <https://doi.org/10.1016/j.sajb.2016.04.012>
- Lowe S., Browne M., Boudjelas S. & De Poorter M. (2000) – 100 of the world's worst invasive alien species. A selection from the Global Invasive Species Database. Invasive Species Speciality Group, Auckland (New Zealand).
- Mathew B. (1987) – The smaller bulbs. B.T. Batsford Ltd., London.
- Munger G.T. (2002) – *Rosa multiflora*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.
- Ronse A. (2005) – *Oenanthe pimpinelloides*: bedreigde soort of invasieve neofyt? *Dumortiera* 84: 11-14.
- Ronse A. (2011a) – The wild flora of the Botanic Garden: an introduction. In: Hoste I. (ed.), The spontaneous flora of the National Botanic Garden of Belgium: 27-58. *Scripta Botanica Belgica* 47. National Botanic Garden of Belgium, Meise.
- Ronse A. (2011b) – Botanic garden escapes from the living collections at the Botanic Garden. In: Hoste I. (ed.), The spontaneous flora of the National Botanic Garden of Belgium: 89-111.

Scripta Botanica Belgica 47. National Botanic Garden of Belgium, Meise.

- Ronse A. (2024) – De plantendiversiteit van het historische domein Ter Tommen (Grimbergen; provincie Vlaams-Brabant, België). *Dumortiera* 124: 35-46. <https://doi.org/10.5281/zenodo.14186243>
- Ronse A. & Verloove F. (2021) – New observations of garden escapes in Meise Botanic Garden (Belgium), part 1. *Dumortiera* 117: 11-25. <https://doi.org/10.5281/zenodo.4541030>
- Schauenberg P. (1965) – The Bulb Book. Frederick Warne & Co Ltd, London.
- Serviss B.E., Peck J.H. & Benjamin K.R. (2016) – A new genus and species of non-native Iridaceae for the Arkansas (U.S.A.) flora. *Journal of the Botanical Research Institute of Texas* 10(2): 513-516.
- Speith E. & Frey M. (2012) – Invasive Plant Alert: Wintergreen barberry – *Berberis julianae* C.K. Schneid.
- Straub S.C.K. (2010) – Molecular phylogenetics of *Amorpha* L. (Fabaceae) and conservation genetics of rare *Amorpha* species. Cornell University, Dissertation.
- Symon D.E. (1981) – A revision of the genus *Solanum* in Australia. *Journal of The Adelaide Botanic Garden* 4: 1-367.
- Van Landuyt W., Hoste I., Vanhecke L., Van den Brecht P., Verduyck E. & De Beer D. (2006) – Atlas van de Flora van Vlaanderen en het Brussels Gewest. INBO, Nationale Plantentuin van België en Flo.Wer, Brussel & Meise.
- Verloove F. (2002) – Ingeburgerde plantensoorten in Vlaanderen. Mededelingen van het Instituut voor Natuurbeschoud 20. Instituut voor Natuurbeschoud, Brussel.
- Verloove F. (2006) – Catalogue of neophytes in Belgium (1800-2005). *Scripta Botanica Belgica* 39: 1-89.
- Verloove F. (2023) – The seventh edition of the Nouvelle Flore de la Belgique: chorological adjustments. *Dumortiera* 122: 5-98. <http://dx.doi.org/10.5281/zenodo.8195260>
- Verloove F. & Van Rossum F. (coll. Devriese H., Matysiak J.-P., Ronse A., van de Beek A. & Zwaenepoel A.) (2023) – Flora van België, het Groothertogdom Luxemburg, Noord-Frankrijk en de aangrenzende gebieden. Vierde editie. Plantentuin Meise, Meise.
- Vidts S. & Deneef R. (2011) – Meise (Meise) Domein van Bouchout - Nationale Plantentuin van België. In: Deneef R. (ed.), Historische tuinen en parken van Vlaanderen - Noordwestelijk Vlaams-Brabant: Affligem, Asse, Grimbergen, Kapelle-op-den-Bos, Londerzeel, Meise, Merchtem, Opwijk, Wemmel. *M&L Cahier* 20: 190-214.

Panicum gilvum in België: jarenlang miskend, maar wijd verspreid

Ivan HOSTE

Agentschap Plantentuin Meise, Nieuwelaan 38, B-1860 Meise, België
ivan.hoste@plantentuinmeise.be

Filip VERLOOVE

Agentschap Plantentuin Meise, Nieuwelaan 38, B-1860 Meise, België

Sipke GONGGRIJP

Pastoor van Kleefstraat 1, 1931 BL Egmond aan Zee, Nederland

F. Wolfgang BOMBLE

Seffenter Weg 37, D-52074 Aachen, Deutschland

Abstract. – *Panicum gilvum* in Belgium: overlooked for years, but widespread. *Panicum gilvum* Launert was first noticed in Belgium in 2007, but remained unrecognised for years due to confusion with *P. dichotomiflorum*. Although *P. gilvum* is a South African species, it is naturalised in Australia and was introduced into Belgium in 2024 as a grain alien from Australia. Its association with other Australian arable weeds found at the same site ultimately enabled its correct identification using Australian floras. In the summer of 2025, it became clear that *P. gilvum* is a well established species in Belgium which, like *P. dichotomiflorum* and *P. schinzii*, is mainly found as a weed in maize fields. This paper recounts at length the discovery of this species in Belgium – illustrative of the often belated discovery of a ‘new’ exotic species – and describes how *P. gilvum* can be distinguished from other naturalised *Panicum* species.

Samenvatting. – *Panicum gilvum* Launert werd in België al in 2007 opgemerkt, maar bleef door verwarring met *P. dichotomiflorum* jarenlang volkomen miskend. Hoewel *P. gilvum* een Zuid-Afrikaanse soort is, is ze ingeburgerd in Australië en in 2024 als graanadventief vanuit Australië in België geïntroduceerd. De aanwezigheid van andere Australische akkeronkruiden op dezelfde locatie maakte het uiteindelijk mogelijk de soort correct te identificeren aan de hand van Australische flora's. Inmiddels is in de zomer van 2025 vastgesteld dat *P. gilvum* in België een frequent voorkomende soort is die, net als *P. dichotomiflorum* en *P. schinzii*, vooral gevonden wordt als onkruid in maïsakkers. Deze bijdrage verhaalt de ontdekking van deze soort in België – illustratief voor de vaak laattijdige ontdekking van een ‘nieuwe’ exoot – en beschrijft hoe *P. gilvum* kan onderscheiden worden van andere ingeburgerde *Panicum*-soorten.

Résumé. – *Panicum gilvum* en Belgique : longtemps méconnu, mais largement répandu. *Panicum gilvum* Launert a été observé en Belgique dès 2007, mais est resté totalement méconnu pendant des années en raison d’une confusion avec *P. dichotomiflorum*. Bien que *P. gilvum* soit une espèce sud-africaine, elle est naturalisée en Australie et a été introduite en Belgique en 2024 comme adventice grainière en provenance d’Australie. C’est l’association avec plusieurs autres adventices australiennes présentes sur le même site qui a finalement permis son identification correcte à l’aide des flores australiennes. Entre-temps, au cours de l’été 2025, il est rapidement devenu évident que *P. gilvum* est une espèce bien établie en Belgique, et qui, tout comme *P. dichotomiflorum* et *P. schinzii*, se rencontre principalement comme adventice dans les champs de maïs. Cet article relate la découverte de cette espèce en Belgique – illustrative de la découverte souvent tardive d’une « nouvelle » espèce exotique – et décrit comment la distinguer des autres espèces de *Panicum* naturalisées.

Illustraties:

Foto's IH, behalve Fig. 10 (Iris Van der Beeten).

Citering:

Hoste I., Verloove F., Gonggrijp S. & Bomble F. W. (2026) – *Panicum gilvum* in België: jarenlang miskend, maar wijd verspreid. *Dumortiera* **127**: 29-35.

Inleiding

In 2024 werd in België *Panicum gilvum* Launert voor het eerst als exoot correct benoemd naar aanleiding van een vondst in de haven van Gent (Verloove & Gonggrijp 2026). De soort was echter al in 2007 opgemerkt als een onkruid in maïsakkerranden, maar

bleef jarenlang onbenoemd wegens verwarring met *P. dichotomiflorum*. In deze bijdrage schetsen we de voorgeschiedenis van *P. gilvum* als nieuwkomer in de Belgische flora. Dit verhaal is illustratief voor het belang van correcte informatie over het herkomstgebied voor wie een nieuw opgedoken niet inheemse plant

wil identificeren. Vervolgens beschrijven we beknopt hoe de soort kan herkend worden en waarin ze verschilt van twee andere wijd verspreide *Panicum*-soorten in België, *P. dichotomiflorum* en *P. schinzii*. Tenslotte geven we aan wat de consequenties zijn van deze toevoeging van een extra soort aan het lijstje van C₄-grassen in maïsakkers.

De ontdekking van een neofyt: vragen over herkomst en identiteit

Dat een al in 2007 opgemerkte en in tal van akkerranden voorkomende soort bijna twee decennia lang verward werd met *Panicum dichotomiflorum*, wekt het vermoeden dat het twee moeilijk te onderscheiden soorten zijn. Dat blijkt bij nader inzien gelukkig niet echt het geval te zijn. De lange voorgeschiedenis in de coulissen en uiteindelijke positieve herkenning van *P. gilvum* in België is deels verklaarbaar door het specifieke karakter van exotenfloristiek in vergelijking met de studie van de inheemse flora.

Wie in West-Europa als ervaren veldflorist een plant aantreft waar hij/zij niet direct mee vertrouwd is, kan de soort doorgaans determineren met de hulp van een van de vele nationale flora's – of kan het proberen met een app als ObsIdentify of iNaturalist. De inheemse flora van België en de omgevende landen, inclusief archeofyten, is in de regel goed bekend en alle soorten kunnen – eventueel op een paar merkwaardigheden na – op naam worden gebracht met behulp van de sleutels in de standaard flora's. Lukt uitsleutelen niet, dan kan dat meerdere oorzaken hebben, bijvoorbeeld: de plant vertoont een zeldzame afwijking waar de flora geen rekening mee houdt of de gevonden soort, veelal een adventiefplant, werd al decennialang niet meer waargenomen en werd daarom uit de sleutels geschrapt. Rest ten slotte de mogelijkheid dat de soort nieuw is voor het gebied van de flora!

Laten we ontsnapte sierplanten of andere gekweekte planten buiten beschouwing, dan is het heel waarschijnlijk dat een plant die niet op naam kan worden gebracht met behulp van de sleutels een nieuwkomer is. Zeer zeldzame adventiefplanten en nauwelijks ingeburgerde zeldzaamheden worden in flora's soms genegeerd of alleen vermeld in een opmerking, al dan niet vergezeld van een korte beschrijving van onderscheidende kenmerken. Daarnaast duiken met de regelmaat van een klok exoten op die in het gebied van de flora niet eerder werden opgemerkt. Dan brengt een flora van een van de buurlanden eventueel de oplossing. Wordt een 'nieuwe' niet inheemse plantensoort aangetroffen, dan is de kans immers vrij groot dat ze al eerder in een van de buurlanden werd gevonden en op grond daarvan is opgenomen in de flora van dat land. Maar soms levert ook dat niets op. Waar vind je dan informatie om de plant te determineren? Is het geslacht waartoe de plant behoort bekend, dan bestaat er mogelijk een (wereld-)monografie van het genus, al is het gebruik daarvan in het geval van een groot genus dikwijls een hele klus. Een flora van het gebied van oorsprong kan de oplossing brengen indien de mogelijke of waarschijnlijke geografische herkomst van de onbekende plant bekend is. Door een gelukkige samenloop van omstandigheden, leidde het in dit geval tot de juiste identificatie van *P. gilvum*.

Panicum gilvum: een verhaal van voortschrijdend inzicht en het belang van associatief redeneren

Vanaf eind de jaren 1990 besteedde IH veel tijd aan het inventariseren van C₄-grassen in maïsakkers in het gebied tussen Brugge en Gent; zie o.a. Hoste & Verloove (2001) en Hoste (2003). Van het genus *Panicum* werden vooral talrijke populaties aangetroffen van *P. dichotomiflorum* (oorspronkelijk uit Amerika) en, in veel geringere mate, van *P. schinzii* (uit zuidelijk Afrika). In het grens-

gebied van West- en Oost-Vlaanderen, in de driehoek Oedelem-Sijsele-Maldegem, vond hij in september 2007 meerdere populaties van wat hij in zijn notities omschreef als een vorm van *P. dichotomiflorum* met een afwijkende habitus. Op een paar plaatsen werd materiaal ingezameld:

– Oedelem (Beernem), Vullaertstraat, IFBL C2.33.41, rand maïsakker, 22.09.2007, herbarium I. Hoste s.n.

– Sijsele (Damme), IFBL C2.24.33, rand maïsakker, 26.09.2007, herbarium I. Hoste s.n.

– Sijsele (Damme), Schardauwstraat, IFBL C2.24.33, rand maïsakker, 26.09.2007, herbarium I. Hoste s.n.

In dezelfde driehoek waren overigens ook populaties van 'typische' *P. dichotomiflorum* aanwezig. De collecties van de variant werden voorgelegd aan FV. Na consultatie van verschillende flora's concludeerden we dat de planten de deels genetisch bepaalde veelvormigheid illustreerden van *P. dichotomiflorum*, zoals beknopt aangegeven in *Flora of North America*: "Its size and habit may be partly under genetic control." (Freckmann & Lelong 2003). Dit kon, zo dachten we, de aanwezigheid van een vorm met afwijkende kenmerken in een deel van het secundaire areaal van *P. dichotomiflorum* in Vlaanderen verklaren. Zelfs in afwezigheid van herbariummateriaal kan alleen al uit de notities die IH in 2007 naar aanleiding van de verwarrende waarnemingen maakte, anno 2025 afgeleid worden dat het *P. gilvum* betrof. Helaas verwees niets in de geconsulteerde literatuur ons toen naar die soort.

De driehoek Oedelem-Sijsele-Maldegem behoorde niet tot het kerngebied waar IH in latere jaren aandacht besteedde aan C₄-grassen. De afwijkende vorm van *P. dichotomiflorum* was in het kerngebied blijkbaar minder opvallend aanwezig en/of er werd verder geen aandacht aan geschonken. In 2008 vond FV planten met een gelijkaardige habitus in de omgeving van Torhout (West-Vlaanderen), eveneens als maïsakkeronkruid. Ook die planten benoemde FV toen uiteindelijk als *P. cf. dichotomiflorum* (F. Verloove #7444).

In de volgende jaren verschenen nergens artikelen over de aanwezigheid van een mogelijke dubbelganger van *P. dichotomiflorum* in België en de buurlanden. Eerder was wel een kort stukje gepubliceerd over *P. gilvum* als woladventief in Groot-Brittannië (Clement 1981). Op basis van die oude waarnemingen werd *P. gilvum* opgenomen in *Alien grasses of the British Isles* (Ryves et al. 1996), maar een foutje in de determinatiesleutel voor het genus *Panicum* – het kenmerk "glumes separated by a minute rachilla" geldt niet voor *P. gilvum* – verhinderde een correcte determinatie van het Belgische materiaal van de afwijkende *P. dichotomiflorum* als *P. gilvum*. Bovendien lag het niet voor de hand om een Zuid-Afrikaanse woladventief en een onbekend C₄-gras in Vlaamse akkers met elkaar in verband te brengen.

De herinneringen aan een afwijkende vorm van *P. dichotomiflorum* waren ruim tien jaar later zo goed als compleet vervaagd. In augustus 2021 ontving FV echter een e-mail waarin WB hem een vraag voorlegde waarmee hij al sinds enkele jaren worstelde. Kon FV hem helpen om een onbekende *Panicum*, met kenmerken die hij omschreef als intermediair tussen *P. dichotomiflorum* en *P. schinzii*, correct te benoemen? Hij schreef dat hij zelf tot de conclusie was gekomen dat het een aparte soort was, mogelijk *P. gilvum*, al leken ook voor deze soort niet alle kenmerken te kloppen. De plant was niet zo maar een floristisch curiosum, want her en der in de omgeving van Aken en aangrenzend Nederland kende WB populaties met honderden of zelfs duizenden exemplaren. Deze duidelijke hint vanuit Duitsland werd in België echter goeddeels

genegeerd, enerzijds omdat FV in die jaren de handen vol had met het finaliseren van het manuscript van een nieuwe editie van de Belgische flora, anderzijds omdat IH de voorgaande jaren minder aandacht was gaan besteden aan C₄-grassen.

Op 6 oktober 2024 vond FV bij het Sifferdok, in de haven van Gent, een veelstengelige plant met sterk liggende habitus die hij aanvankelijk, maar met enige twijfel, benoemde als *P. dichotomiflorum*. Op dezelfde plek zag hij diezelfde dag ook *Eragrostis parviflora*, een Australische soort die voor zo ver bekend elders in de wereld nergens als exoot is ingeburgerd. Was de onbekende *Panicum* dan misschien – net als *E. parviflora* – aangevoerd met graan uit Australië? Deze kleine biogeografische gok was een keerpunt. Consultatie van een paar Australische digitale flora's ([Flora of New South Wales](#); [Flora of Victoria](#)) bracht de oplossing: de onbekende *Panicum* was *P. gilvum*, een soort uit zuidelijk Afrika, die op grote schaal is ingeburgerd in Australië. Voor zo ver nog nodig, bracht de Zuid-Afrikaanse flora van Fish *et al.* (2015) extra bevestiging.

Gesterkt door het beeld dat hij zich inmiddels had gevormd van *P. gilvum*, zocht en vond FV in 2025 op Waarnemingen.be foto's bij enkele waarnemingen van '*P. dichotomiflorum*' die hij interpreteerde als vermoedelijk *P. gilvum*. In juli checkte IH ter plaatse een van die populaties in Oedelem. Ze was in oktober 2024 gepost door Hilde Fontier (<https://waarnemingen.be/observation/330883469/>) en lag midden in de regio waar hij in 2007 in de war was gebracht door een afwijkende vorm van *P. dichotomiflorum*. Het was inderdaad *P. gilvum*. Vervolgens bezocht IH in de regio tussen Brugge en Gent een groot aantal locaties met '*P. dichotomiflorum*'. Hij vond binnen de kortste keren meerdere populaties van *P. gilvum* in maïsakkerranden, geregeld in eenzelfde perceel samen met *P. dichotomiflorum*. Mede door die verrassende vaststelling, herhaalde hij in 2025 een eerder uitgevoerde inventarisatie van 24 IFBL km-hokken in Bellem en directe omgeving. Resultaat: *P. dichotomiflorum* werd gevonden in alle 24 hokken, *P. gilvum* in 16 hokken en *P. schinzii* in 1 hok. Enkele waarnemers hadden ondertussen de soort leren kennen en postten waarnemingen uit diverse delen van Vlaanderen op Waarnemingen.be.

Controle van het herbariummateriaal van *Panicum dichotomiflorum* in Meise (BR) door FV bracht in 2025 enkele collecties van *P. gilvum* aan het licht. Geen enkele ervan blijkt ouder te zijn dan deze in het privé herbarium van IH uit 2007. Dat *P. gilvum* in 2007 in het noordelijke grensgebied van West- en Oost-Vlaanderen op meerdere plaatsen werd waargenomen en een jaar later ook in Torhout, suggereert dat de soort al meerdere jaren daarvoor in maïsakkers in West- en Oost-Vlaanderen was terechtgekomen. Wanneer ze precies werd geïntroduceerd, zullen we wel nooit met zekerheid weten. Het feit dat IH en FV tijdens veldwerk in maïsakkers in de wijde omgeving van Aalter in 1999 – waar *P. gilvum* nu algemeen voorkomt – meerdere herbariumcollecties van *P. dichotomiflorum* verzamelden die vandaag inderdaad alle tot die soort blijken te behoren, wijst er evenwel op dat *P. gilvum* toen nog niet op grote schaal voorkwam.

Ondertussen is uit genetisch onderzoek gebleken dat een selectie van stalen uit België en Nederland (Zuid-Limburg) wel degelijk correspondeert met materiaal van *P. gilvum* uit Zuid-Afrika. Bovendien kwam door middel van genetisch onderzoek ook een spiegelbeeld van het West-Europese lookalike verhaal van het duo *P. dichotomiflorum/gilvum* aan het licht. Tot voor kort werd gedacht dat in Australië alleen *P. gilvum* was ingeburgerd (zie de voornoemde flora's, maar bv. ook Chen *et al.* 2021), maar nu blijkt dat ook *P. dichotomiflorum* daar is ingeburgerd, maar altijd verkeerd werd benoemd als *P. gilvum*. De resultaten van lopend

genetisch onderzoek van materiaal uit West-Europa en Australië zullen het voorwerp uitmaken van toekomstige publicaties.

Daarmee is de verborgen geschiedenis van *Panicum gilvum* als dubbelganger van *P. dichotomiflorum* ten dele ontrafeld. Gelet op de aanvoerroutes van graan in West-Europa, is de kans groot dat niet alleen de vondst van 2024 aan het Sifferdok kan gelinkt worden aan de aanvoer van graan uit Australië, maar ook – sinds minstens een paar decennia – de populaties in maïsakkers; zie Verloove & Gonggrijp (2026). Ongetwijfeld zullen in de nabije toekomst verdere aanvullingen volgen.

Eens te meer illustreert dit verhaal van voortschrijdend inzicht dat processen van invoer en inburgering van nieuwkomers zich vaak initieel afspelen in de coulissen, zonder dat iemand merkt dat een neofyt bezig is zich een plekje te veroveren als inburgerende soort. Bovendien illustreert *P. gilvum* dat exoten dikwijls niet via de kortste weg vanuit hun natuurlijke oorsprongsgebied bij ons terechtkomen.

***Panicum gilvum*: beschrijving en herkenning**

Van de zes in de Belgische flora (Verloove & Van Rossum 2023) in de sleutel opgenomen *Panicum*-soorten hebben, net zoals *P. gilvum*, alleen *P. dichotomiflorum* en *P. schinzii* een onderste kelkkafe waarvan de lengte hooguit $\frac{1}{4}$ ($-\frac{1}{3}$) bedraagt van de lengte van het aartje. Voor een correcte determinatie van *P. gilvum* is het vooral van belang de verschillen ten opzichte van die beide soorten te kennen. De literatuur bevat verwarrende tegenstrijdigheden, zowel in de sleutels als de beschrijvingen. Voor een gedetailleerde analyse hiervan verwijzen we naar Verloove *et al.* (ingediend). Hier beperken we ons tot de voor de veldflorist relevante kenmerken, gebaseerd op de literatuur – vooral Fish *et al.* (2015), Zuloaga (2022), [Flora of New South Wales](#), [Flora of Victoria](#) – en eigen waarnemingen.

Hoewel nauwer verwant met *P. schinzii* en oorspronkelijk eveneens afkomstig uit zuidelijk Afrika, zal *P. gilvum* toch eerder verward worden met de Amerikaanse soort *P. dichotomiflorum*. De bloeiwijze van *P. schinzii* is een ijle, open pluim waarin de aartjes mooi gelijkmatig verdeeld zijn. De pluim lijkt daardoor op deze van bijvoorbeeld *P. capillare*. Bij *P. dichotomiflorum* en *P. gilvum* zijn de kort gesteelde aartjes minder afstaand, waardoor ze in de pluim ruimtelijk minder gelijkmatig verdeeld zijn. Ze vormen lijntjes van bijeen staande aartjes, al zijn die lijntjes bij *P. gilvum* globaal wat armbloemiger dan bij *P. dichotomiflorum* (Fig. 1). *Panicum gilvum* onderscheidt zich vooral van *P. dichotomiflorum* door de in de regel deels door de bovenste bladschede omgeven bloeiwijze (Fig. 2), die bovendien meestal kleiner is, met minder wijd uitstaande takken, en doorgaans armbloemiger, met verder uiteen staande aartjes. Bij het beoordelen van het al dan niet door de bovenste bladschede omsloten zijn van de bloeiwijze is het van belang zich ervan te vergewissen dat de eidelingsse bloeiwijze volledig is uitgegroeid. Wie eenmaal enige ervaring heeft opgedaan met de beide soorten, zal goed ontwikkelde *P. dichotomiflorum* niet vlug verwarren met *P. gilvum*. Bij jonge planten met nauwelijks buiten de bovenste bladschede uitstekende bloeiwijzen moet men er echter altijd op beducht zijn de plant niet te vlug te benoemen als *P. gilvum*.

De aartjes van *P. dichotomiflorum* zijn in de regel iets slanker, spits en langer (ca. 3 mm) dan de kortere aartjes van *P. gilvum* (ca. 2,5 mm), maar de verschillen zijn verre van absoluut (Fig. 3). De literatuur is wat de lengte van de aartjes betreft behoorlijk tegenstrijdig. Vermoedelijk vertoont het in België – en elders in West-Europa? – aangetroffen materiaal slechts een gedeelte van

de globale variatie van de soort. Hier kan worden aangestipt dat volgens Webster (1987) *P. gilvum* in Australië – het veronderstelde herkomstgebied van de in België aangetroffen populaties – eerder korte aartjes heeft in vergelijking met de variatie die bekend is van zuidelijk Afrika.



Figuur 1. Fragmenten van de bloeiwijzen van drie *Panicum*-soorten. Bij *P. dichotomiflorum* (A) en *P. gilvum* (B) staan ze meer geclusterd in lijntjes, bij *P. schinzii* (C) zijn de aartjes gelijkmatig verdeeld over de pluim.



Figuur 2. Een eidelingse bloeiwijze van *Panicum gilvum*, deels ingesloten in de bladschede en met stijf rechtopstaand gevouwen blad.



Figuur 3. De aartjes variëren van eerder spits en slanker bij *P. dichotomiflorum* (A), tot eerder stomp bij *P. gilvum* (B) en *P. schinzii* (C).

Qua habitus is *Panicum gilvum* zeer variabel, afhankelijk van de context waarin de soort wordt aangetroffen. In maïsakkerranden kunnen planten die de ruimte krijgen, uitgroeien tot forse exemplaren met vele tientallen liggend-opstijgende bloeistengels (Fig. 4). Staan de exemplaren dicht opeen, dan kunnen de planten een veel meer rechtopstaande habitus vertonen en zijn ze al dan niet veelstengelig (Fig. 5). De soort wordt ook geregeld buiten maïsakkers gevonden, onder meer in de voegen tussen de plaveien van voetpaden of langs wegranden. In dit geval zien de planten er vaak armoediger uit, met slechts enkele tegen de grond aangedrukte korte bloeistengels (Fig. 6). Vaak zijn de stengels van *P. gilvum* rood of paars aangelopen (Fig. 6, 7). De in deze alinea beschreven habitus- en kleurkenmerken komen, zij het in mindere of meerdere mate, ook voor bij *P. dichotomiflorum* en – vooral – *P. schinzii* en hebben daarom een geringe waarde als onderscheidende kenmerken.



Figuur 4. Exemplaren van *Panicum gilvum* die de ruimte krijgen vormen veelstengelige planten met tientallen liggend-opstijgende stengels. [Lotenhulle (Aalter), Prinsenstraat.]



Figuur 5. Dicht bijeen groeiende planten van *Panicum gilvum* vormen bundels van opstijgende tot vrijwel rechtopstaande stengels. [Adegem (Maldegem), Gouden Dries.]



Figuur 6. Een aan een stoeprand groeiend exemplaar van *Panicum gilvum* met vrijwel plat liggende stengels. (Aalter, Bellemstraat.)



Figuur 7. De stengels van *Panicum gilvum* [Adegem (Maldegem), Gouden Dries] zijn vaak sterk rood gekleurd, een kenmerk dat deze soort deelt met *P. schinzii*.

De beide soorten komen frequent door elkaar voor in eenzelfde akkerrand. Omdat de bloeiwijzen van *P. gilvum* in de regel kleiner zijn en minder opvallen, wordt in dergelijke gemengde populaties aanvankelijk dikwijls alleen *P. dichotomiflorum* opgemerkt. Dichte populaties van *P. dichotomiflorum* vallen meestal op door de meer geelgroen gekleurde ijle 'sluier' van boven de bladeren uitstekende bloeiwijzen (Fig. 8). De jonge laterale bloeiwijzen van *P. dichotomiflorum* doen gemakkelijk denken aan de deels in de bladschede ingesloten bloeiwijzen van *P. gilvum* en daarom is het altijd zaak om niet te vlug te concluderen dat in een akkerrand de beide soorten samen aanwezig zijn.



Figuur 8. Een populatie van *Panicum dichotomiflorum* in de buitenrand van een maïsakker, met een kenmerkende gele 'sluier' van bloeiwijzen. [Ursel (Aalter), Gottebeekstraat.]

In de sleutel voor *Panicum* in de Belgische flora (Verloove & Van Rossum 2023) kan dichotomie 5 worden vervangen door de volgende tekst:

- 5 Onderste bloem mannelijk [maar soms met (sterk) gereduceerde helmknoppen], met het bovenste kroonkasje altijd aanwezig; aartjes eerder stomp (Fig. 3). (Opgelet: indien de helmknoppen zijn afgevallen, blijven alleen de heel dunne en erg onopvallende helmraden achter) *P. schinzii*
Onderste bloem steriel, met het bovenste kroonkasje aanwezig of ontbrekend (indien ontbrekend: *P. dichotomiflorum* var. *chloroticum*; zeer zeldzaam, adventief); aartjes eerder spits tot eerder stomp 6

- 6 Eindelingse bloeiwijze bij goed ontwikkelde planten duidelijk buiten de bovenste bladschede stekend; bovenste bladschijf grotendeels vlak, vaak teruggebogen (Fig. 9); aartjes eerder slank en spits, ca. 3 mm lang of langer (Fig. 3); secundaire assen van de bloeiwijze bezet met minuscule stekeltjes en daardoor ruw aanvoelend (Fig. 10); onderste kelkkafe van jonge bloemen in verse toestand meestal met 1-3 duidelijke nerven *P. dichotomiflorum*

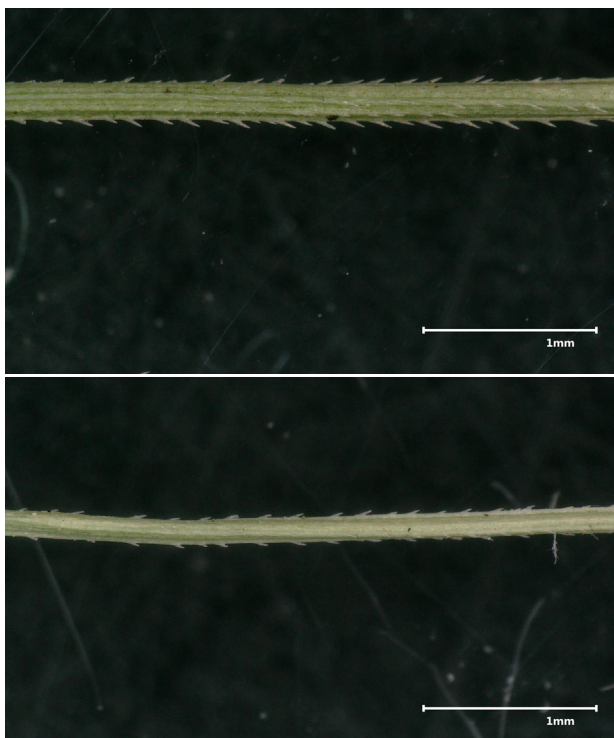
Eindelingse bloeiwijze bij goed ontwikkelde planten deels omsloten door de bovenste bladschede; bovenste bladschijf doorgaans gevouwen en stijf rechtopstaand (Fig. 11); aartjes eerder wat plomper en stomp, ca. 2,5 mm lang (Fig. 3); secundaire assen van de bloeiwijze bezet met rudimentaire stekeltjes en daardoor nauwelijks ruw aanvoelend (Fig. 10); onderste kelkkafe van jonge bloemen in verse toestand meestal met 1 (-3) minder duidelijke nerven *P. gilvum*

Het algemene voorkomen van de plant en de – vooral eindelingse – bloeiwijze biedt een goede indicatie voor het onderscheiden van

P. dichotomiflorum en *P. gilvum*. Gecombineerd met elkaar, bieden de in de sleutel vermelde 'kleine' kenmerken extra zekerheid, maar afzonderlijk gebruikt kunnen ze leiden tot een foutieve determinatie. De kenmerken van het onderste kelkafje en van de stekeltjes op de assen van de bloeiwijze zijn eerder subtiel, net zoals deze van de aartjes (vorm, overlappende lengte). Om ze correct te kunnen toepassen is het belangrijk om eerst ervaring op te doen met de beide soorten.



Figuur 9. Bovenste blad van *Panicum dichotomiflorum*.



Figuur 10. Detail van de stekeltjes op de assen van de vertakkingen van de bloeiwijze bij *P. dichotomiflorum* (boven) en *P. gilvum* (onder).



Figuur 11. Eindelingse bloeiwijze van *Panicum gilvum* met gevouwen blad.

Besluit

Een kwarteeuw geleden werd duidelijk dat in maïsakkers niet alleen *Echinochloa crus-galli* zeer talrijk voorkwam, maar ook de Amerikaanse soort *E. muricata* (Hoste 2004). Naderhand is gebleken dat de jarenlange verwarring van de beide soorten er niet toe heeft geleid dat het globale beeld van de verspreiding van *E. crus-galli* moest bijgesteld worden. De soort is anno 2025 nog altijd zowat overal aanwezig – al heeft veranderend herbicidegebruik recent de populaties in maïsakkers doen inkrimpen.

Vandaag dient de vraag gesteld wat het effect zal zijn van de ontdekking van *Panicum gilvum* als maïsonkruid op de verspreidingskaart van *P. dichotomiflorum*. Op veel plaatsen komen de beide soorten samen voor, maar het lijkt erop dat in sommige delen van Vlaanderen het verspreidingsbeeld van *P. dichotomiflorum* zal moeten bijgesteld worden, omdat plaatselijk mogelijk alle bekende waarnemingen van 'P. dichotomiflorum' in werkelijkheid *P. gilvum* zullen blijken te zijn. Dit lijkt met name het geval in grote delen van West-Vlaanderen. Met andere woorden: het verdient aanbeveling om overal de oudere data met betrekking tot *P. dichotomiflorum* te bevestigen – of eventueel te corrigeren.

Alles wijst erop dat *P. gilvum* een recentere nieuwkomer is in maïsakkers dan *P. dichotomiflorum*. Door de late ontdekking van de soort is het moeilijk om vandaag een uitspraak te doen over de snelheid waarmee ze zich verspreidt. Mogelijk dient er ook rekening mee gehouden dat – zoals bij de twee variëteiten van *Setaria verticillata* – een verschil in gevoeligheid voor herbiciden een rol speelt in de veranderende frequentie en verspreidingspatronen van de beide soorten. In het voorbije decennium heeft de 'vanouds' aanwezige *S. verticillata* var. *verticillata* een opvallende terugval gekend, terwijl de pas in 1990 voor het eerst in België waargenomen var. *ambigua* (Lambinon et al. 1993; Verloove & Hoste 1999) minstens in sommige regio's de andere variëteit recent volkomen overvleugeld heeft. De onkruidgemeenschappen van maïsakkers – en onze kennis ervan – blijven bijzonder dynamisch evolueren en verdienen daarom de aandacht van floristen en agronomen.

Dankwoord

De auteurs danken Iris Van der Beeten (Plantentuin Meise) voor het aanleveren van Figuur 10.

Literatuur

- Chen Y., Zhu X., Loukopoulos P., Weston L.A., Albrecht D.E. & Quinn J.C. (2021) – Genotypic identification of *Panicum* spp. in New South Wales, Australia using DNA barcoding. *Scientific Reports* vol. 11, article number 16055. <https://doi.org/10.1038/s41598-021-95610-6>
- Clement E.J. (1981) – Aliens and adventives. Three *Panicums*. *B.S.B.I. News* 27: 16-18. <https://archive.bsbi.org/BSBINews27.pdf>
- Fish L., Mashau A.C., Moeaha M.J. & Nembudani M.T. (2015) – Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions. SANBI, Pretoria. [*Strelitzia* 36], SANBI, Pretoria.
- Freckmann R.W. & Lelong M.G. (2003) – *Panicum*. In: Barkworth M.E. et al. (eds.), *Flora of North America North of Mexico*, vol. 25: 450-488. Oxford University Press, New York.
- Hoste I. (2003) – Maïsakkers en biodiversiteitsonderzoek: zin of onzin? In: Rappé G. et al. (eds.), *BBB 2001 Botanical Biodiversity and the Belgian expertise*: 29-38. National Botanic Garden of Belgium, Meise. [*Scripta Botanica Belgica* 24]
- Hoste I. (2004) – The naturalisation history of *Echinochloa muricata* in Belgium. With notes on its identity and morphological variation. *Belgian Journal of Botany* 137(2): 163-174. <https://www.jstor.org/stable/20794550>
- Hoste I. & Verloove F. (2001) – De opgang van *C₄*-grassen (Poaceae, Paniceae) in de snel evoluerende onkruidvegetaties in maïsakkers tussen Brugge en Gent (Vlaanderen, België). *Dumortiera* 78: 2-11.
- Lambinon J., Heyneman G. & Goetghebeur P. (1993) – Découverte en Flandre de *Setaria verticillata* (L.) P. Beauv. var. *ambigua* (Guss.) Parl., graminée nouvelle pour la flore belge. *Soc. Ech. Pl. Vasc. Eur. Bass. Médit., Bull.* 24: 85-86.
- Ryves T.B., Clement E.J. & Foster M.C. (1996) – Alien grasses of the British Isles. Botanical Society of the British Isles, London.
- Verloove F. & Gonggrijp S. (2026) – Globalization reflected in alien floras: uncovering the Australian origin of South African grain aliens in Belgium. *Dumortiera* 127: 3-9. <https://doi.org/10.5281/zenodo.18334598>
- Verloove F., Gonggrijp S., Hoste I. & Bomble F.W. (ingediend) From overlooked to established: the case of *Panicum gilvum* (Poaceae) in the Netherlands. *Gorteria*.
- Verloove F. & Hoste I. (1999) – Kale gierst in Oost-Vlaamse maïsvelden: verslag van een excursie tussen Aalter en Maldegem. *Natuurcontact, Natuurhistorisch tijdschrift voor de regio Aalter-Knesselare-Nevele* 15(3): 34-39.
- Verloove F. & Van Rossum F. (2023) – Flora van België, het Groothertogdom Luxemburg, Noord-Frankrijk en de aangrenzende gebieden. Vierde druk. Plantentuin Meise, Meise.
- Webster R.D. (1987) – The Australian Paniceae (Poaceae). J. Cramer, Stuttgart.
- Zuloaga F.O. (2022) – A revision of *Panicum* sect. *Dichotomiflora* (Poaceae: Panicoideae: Paniceae). *Darwiniana*, nueva serie 10(2): 325-364. <https://doi.org/10.14522/darwiniana.2022.102.1048>

The *Portulaca oleracea* complex in Belgium: an update

Filip VERLOOVE

Meise Botanic Garden, Nieuwelaan 38, B-1860 Meise, Belgium
filip.verloove@plantentuinmeise.be

Michael HASSLER

Weiherbergstrasse 77, D-76646 Bruchsal, Germany
hassler.michael@t-online.de

Dominik VOGT

Gotenstrasse 4, D-75196 Remchingen, Germany
hassler.michael@t-online.de

Samenvatting. – Het *Portulaca oleracea*-complex in België: een update. Sinds de publicatie van een voorlopig overzicht van de in België gevonden (micro-)soorten van het *P. oleracea*-complex, ondertussen tien jaar geleden, is de kennis met betrekking tot deze groep verder toegenomen. Nieuw onderzoek heeft aangetoond dat *P. granulostellulata* en *P. nitida* (voordien onderscheiden op basis van zaaddiameter en verondersteld ploïdie-niveau) synoniemen zijn van respectievelijk *P. papillatostellulata* en *P. oleracea* s.str. Bovendien slopen in het eerdere overzicht fouten in de benoeming van de SEM-foto's (zo werden de zaden van *P. cypria* en *P. papillatostellulata* verwisseld). Tenslotte maakt een nieuwe, eenvoudige techniek het beoordelen van de versiering van de zaadhuid mogelijk, zonder dat SEM-fotografie nodig is. Omdat dit mogelijk tot een betere kennis met betrekking tot dit complex kan leiden, wordt een nieuwe determinatiesleutel met nieuwe foto's voorgesteld.

Résumé. – Le complexe de *Portulaca oleracea* en Belgique : une mise à jour. Depuis la publication, il y a dix ans, d'un aperçu préliminaire des (micro-) espèces du complexe *P. oleracea* trouvées en Belgique, les connaissances sur ce groupe ont augmenté. De nouvelles recherches ont montré que *P. granulostellulata* et *P. nitida*, auparavant distingués uniquement sur la base du diamètre des graines et du niveau de ploïdie présumé, sont conspécifiques avec *P. papillatostellulata* et *P. oleracea* s.str., respectivement. De plus, dans l'aperçu précédent, certaines images MEB ont été mal étiquetées (par exemple, les graines de *P. cypria* et de *P. papillatostellulata* ont été confondues). Enfin, une nouvelle technique simplifiée permet d'évaluer l'ornementation de la surface tégumentaire des graines sans avoir recours à la photographie MEB. Afin d'améliorer la connaissance de ce complexe, une nouvelle clé de détermination avec de nouvelles photographies est proposée.

Abstract. – Since the publication, ten years ago, of a preliminary overview of the (micro-) species of the *P. oleracea* complex found in Belgium, knowledge about this group has increased. New research has shown that *P. granulostellulata* and *P. nitida* (which were distinguished only by seed diameter and presumed ploidy level) are conspecific with *P. papillatostellulata* and *P. oleracea* s.str. respectively. Furthermore, in the previous overview some of the SEM images were mislabeled (e.g. the seeds of *P. cypria* and *P. papillatostellulata* were intermingled). Finally, a new, simple technique allows the assessment of the ornamentation of the seed coat, without the need for SEM photography. Because this could possibly lead to a better knowledge about this complex, a new identification key and new photos are presented.

Illustrations:

Elena Bulakh and Aleksandr Terebilenko (Fig. 1, 2, 4), Hans Reichert (Fig. 3, 5) and Dominik Vogt (Fig. 6).

Citation:

Verloove F., Hassler M. & Vogt D. (2026) – The *Portulaca oleracea* complex in Belgium: an update. *Dumortiera* **127**: 36-40.

Introduction

Portulaca oleracea L. is a troublesome weed in the temperate and tropical regions of the world. Supposedly as a result of a changing climate, it has considerably spread northwards in recent decades, to the extent that it is now considered naturalized in Belgium and neighboring areas (Verloove & Van Rossum 2024). Until recently it was an ephemeral alien that normally did not survive the average Belgian winters (Verloove 2002).

Almost 100 years ago already, it was pointed out that the species was composed of several autogamous taxa (morphotypes), which could be distinguished on the basis of the ornamentation of the seed surface (Poellnitz 1936a). Avinoam Danin & co (numerous references, for an overview see e.g. Danin & Raus 2012; Hassler et al. 2024) have studied the issue since the 1970s. As a result, eventually about 20 taxa were distinguished worldwide which, depending on the author, were considered separate spe-

cies ('micro-species'), subspecies or varieties. In addition to seed surface ornamentation, seed size was also taken into account to distinguish taxa, with tetraploid taxa being assumed to have small seeds (diameter < 0.85 mm) and hexaploid taxa large seeds (diameter > 0.85 mm). However, the correlation between ploidy level and seed diameter was never tested systematically.

As far as Belgium is concerned, a preliminary overview was published ten years ago by Danin & Verloove (2015). Seven taxa were distinguished and these were accepted at species level: *Portulaca cypria* Danin, *P. granulatostellulata* (Poelln.) Ricceri & Arrigoni, *P. nitida* (Danin & H.G.Baker) Ricceri & Arrigoni, *P. oleracea* s.str., *P. papillatostellulata* (Danin & H.G.Baker) Danin, *P. sativa* Haw. and *P. trituberculata* Danin, Domina & Raimondo. The sample was based on about sixty, historical as well as recent collections, and thus relatively limited; nevertheless, it turned out that *P. granulatostellulata* was by far the most frequently collected species.

Since the publication of this paper, knowledge about the complex has improved considerably. Although the rank that should be given to these taxa is still under discussion, a number of other problems have been solved. Very shortly after the publication of Danin & Verloove (2015), a cytogenetic study by Walter *et al.* (2015) was published. This showed that there is no correlation at all between seed coat ornamentation and seed diameter and therefore that putative tetra- and hexaploid taxa cannot be distinguished on the basis of seed size. This means that taxa with similar ornamentation of the seed coat that differ only in seed size belong to one and the same taxon. As a result, several taxa were reduced to synonymy of others. Also, Walter *et al.* (2015) were not able to confirm any tetraploid counts in Europe and around the Mediterranean, even in populations which were assumed to be tetraploid previously, and in seeds of supposedly tetraploid taxa supplied by Danin. Therefore, all European populations must be considered homogeneously hexaploid.

Another interesting novelty is that Reichert (2023) proposed a technique that can, in many cases, render the use of SEM photography — a tool inaccessible to most botanists — unnecessary. By making nail varnish impressions of the seeds, a detailed imprint of the seed surface can be obtained. The technique is explained in detail in the aforementioned article, the link to which is provided in the literature reference. Nevertheless, it should be noted that certain minute structural details can only be observed with SEM photographs.

On the other hand, it needs to be emphasized that a genetic study demonstrates that *P. oleracea* should be considered a polymorphic species, indivisible into micro-species on the basis of seed ornamentation and size (El-Bakatoushi *et al.* 2013). Therefore, and also because local knowledge of micro-species has not increased despite and since the publication of Danin & Verloove (2015), no attention has been paid to these taxa in the most recent edition of the Belgian Flora (Verloove & Van Rossum 2024). Also, in the most recent editions of the Dutch and British floras, micro-species were left unmentioned (Stace 2019; Duistermaat 2020). However, in other recent floras of neighboring countries the micro-species are treated in detail (e.g. in France and Germany; Tison & de Foucault 2014; Hassler *et al.* 2024) and new national or regional studies dealing with the micro-species are still regularly being published, recently e.g. for Poland and the Balkans (Bulakh *et al.* 2022; Peregrym & Dragičević 2024). As mentioned previously, it remains disputed at which taxonomic rank these apomictic taxa should be treated. However, they can be clearly and reliably separated by analysis of their seed coat pattern.

Because the aforementioned new research sheds new light on Danin & Verloove (2015), it seemed useful to propose a short update for Belgium

Portulaca oleracea and its micro-species in Belgium: an update

Portulaca sativa

Reichert (2023) found out that in Germany commercial seed samples of cultivated purslane mostly belonged to *P. edulis* Danin & Bagella, a micro-species from the eastern Mediterranean area and Africa (Cyprus, Lebanon, Sudan and Turkey), not to *P. sativa*. *P. edulis* has 10-15 papillae on each epidermal cell, whereas *P. sativa* only has 1 or 2 bigger tubercles on each cell, resulting in a quite regular pattern on the seed surface (as depicted by Danin & Bagella 2012).

It can be assumed that both taxa are also confused in Belgium and that this issue needs to be investigated. Also, it needs to be tested whether *P. edulis* is really a valid species or simply belongs to the variation of *P. sativa*.

Portulaca granulatostellulata and P. papillatostellulata

Portulaca granulatostellulata was described based on plant material from the Hawaiian Islands (Poellnitz 1936b). According to Danin *et al.* (1979) it is a tetraploid. However, European and Mediterranean specimens of this species, named as such by Danin, turned out to be hexaploid (Walter *et al.* 2015). It seems that the name of this subtropical species (by far the most common in western Europe!) has been wrongly applied to our plants. In the key for the species found in Belgium (Danin & Verloove 2015), this species differed from *P. papillatostellulata* only in seed diameter; it is now assumed that all these plants belong to a single species for which the name *P. papillatostellulata* (Danin & H.G.Baker) Danin [= *P. granulatostellulata* auct. non (Poelln.) Ricceri & Arrigoni] should be used. Plants from the Belgian-German border area, named *P. granulatostellulata* by Bomble (2013), also belong here.

Portulaca nitida and P. oleracea s.str. (= P. stellata)

This case is similar to the previous one. Plants with seeds similar in ornamentation to those of *P. oleracea* s.str. but with smaller seeds and supposedly tetraploid, were separated by Danin & Baker (Danin *et al.* 1979) as *P. nitida*. However, Walter *et al.* (2015) showed that these plants are hexaploid and thus essentially indistinguishable from *P. oleracea* s.str. Minor reported differences in seed coat patterns between both taxa are negligible and can be attributed to drying conditions and freshness of the seeds. Plants from the Belgian-German border area, named *P. nitida* by Bomble (2013), also belong to *P. oleracea* s.str.

This species was frequently treated as "*P. stellata* Danin & H.G.Baker". However, a recent analysis of SEM photographs of seeds of the lectotype of *P. oleracea* L. in the LINN Herbarium confirmed the assumption of Danin *et al.* (2008) that the seeds of the lectotype are identical with the seeds of the species once called *P. stellata*, which renders this name superfluous and reduces it to a synonym of *P. oleracea* (see Uotila *et al.* 2012 and Hassler *et al.* 2024 for details).

Illustrations in Danin & Verloove (2015)

The SEM photographs shown in the overview of the *Portulaca oleracea* complex in Belgium were provided by the first author and did not depict Belgian plant material. Unfortunately, two photos

apparently got interchanged: photo 6, labeled *P. papillatostellulata*, shows the typical seed of *P. cypria*, with one or two tubercles but no papillae. Photo 1, labeled *P. cypria*, shows a seed surface with papillae but without tubercles, typical of *P. papillatostellulata*. Also, some of the other photos showed at least abnormal seeds or were possibly also incorrect.

To avoid any doubt, new SEM photographs are here presented for the four taxa occurring spontaneously in Belgium. For *P. sativa*, which is only cultivated or occasionally escapes and differs mainly by its larger seeds, no new SEM photographs are provided. In addition, for some taxa, seed surface features are illustrated by nail-varnish impressions.

A schematic drawing is also included (Fig. 6), showing a detail of a testa cell with clearly indicated papillae and tubercles, to help clarify the morphological terminology and visual distinction between these structures.

Revised identification key

Based on the above, the key of Danin & Verloove (2015) can be simplified as follows:

- 1 Seed diameter 1.1-1.3 mm*Portulaca sativa* / *P. edulis*
Seed diameter 0.65-1.1 mm2
- 2 Seeds shiny, smooth (without papillae nor tubercles), testa cells star-shaped (Fig. 1)
. *P. oleracea* s.str. (= *P. stellata*, *P. nitida*)
At least some testa cells with papillae and/or tubercles3
- 3 Testa cells star-shaped, largely covered with papillae at the end of the arms, without tubercles (Fig. 2)
. *P. papillatostellulata* (= *P. granulatostellulata* auct.)
Testa cells with at least one tubercle4
- 4 Testa cells star-shaped, about as long as wide, in the middle of each cell with 1(-2) tubercles (Fig. 3) *P. cypria*
Testa cells not star-shaped, clearly longer than wide, each cell with 2-3 tubercles (Fig. 4, 5) *P. trituberculata*



Figure 1. SEM photo of a seed of *Portulaca oleracea*.

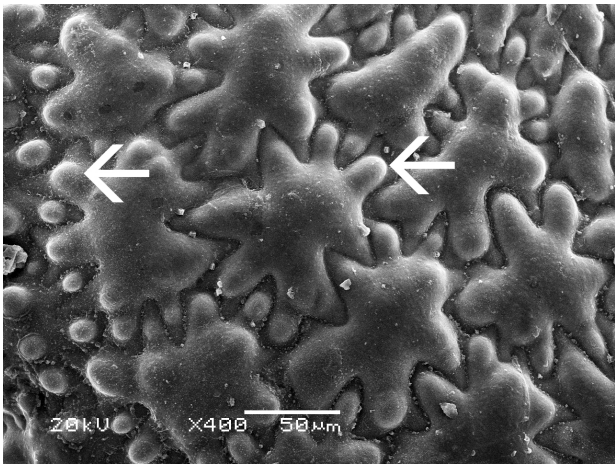


Figure 2. SEM photo of a seed of *Portulaca papillatostellulata*. Papillae are indicated by arrows.

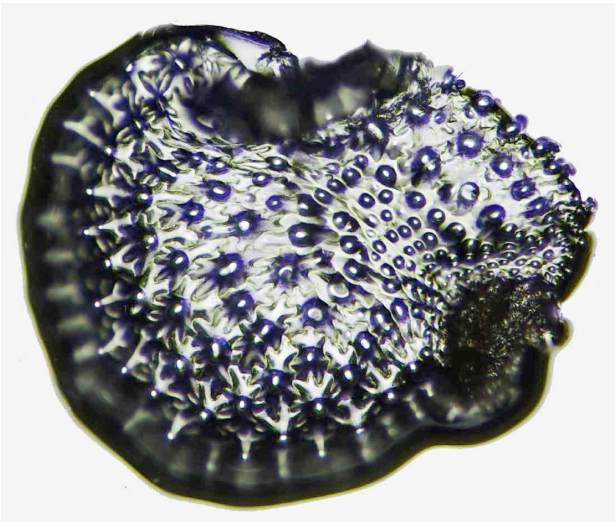


Figure 3. Nail-varnish impression of a seed of *Portulaca cypria*.

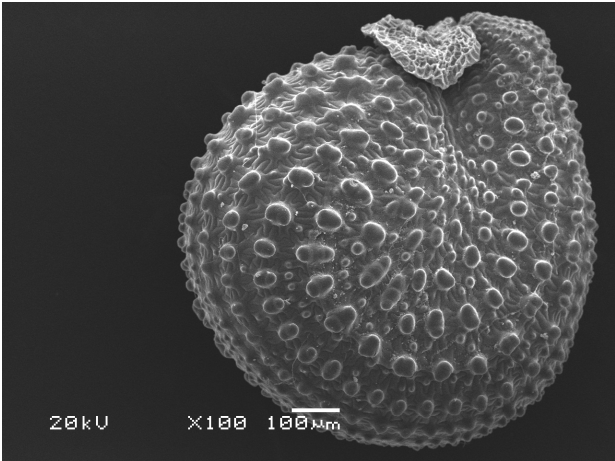


Figure 4. SEM photo of a seed of *Portulaca trituberculata*.

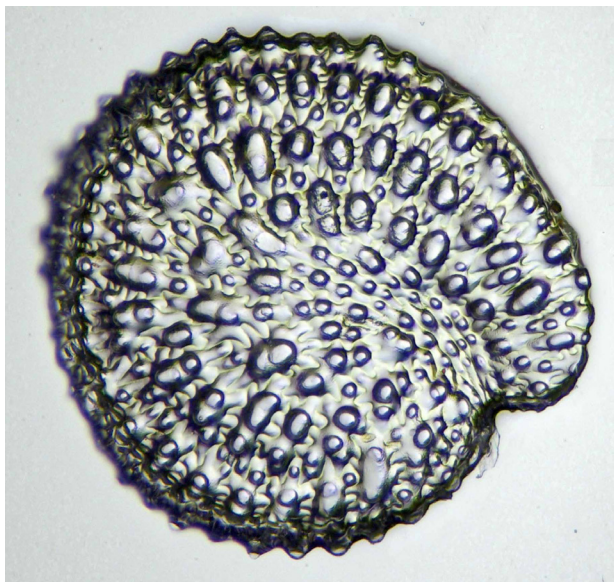


Figure 5. Nail-varnish impression of a seed of *Portulaca trituberculata*.

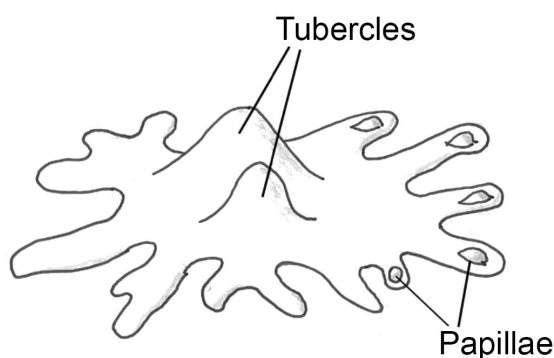


Figure 6. Schematic drawing of the seed coat of a seed of *Portulaca*, showing a detail of a testa cell with clearly indicated papillae and tubercles.

Frequency and distribution in Belgium

The frequency with which the micro-species are observed in Belgium is roughly the same as in Germany (Hassler *et al.* 2024). *Portulaca papillatostellulata* is by far the most common species (probably in the range of 90% of all occurrences), and it is prevalent in anthropogenic habitats such as nurseries, gardens, roadsides, etc. *P. oleracea* is the second most common species, but accounts for only 5-10% of all cases. *P. trituberculata* remains very rare and *P. cypria* is only found exceptionally.

Conclusion

This update clarifies several issues in the treatment of the *Portulaca oleracea* complex in Belgium. The distinction of putative tetraploid and hexaploid taxa based on seed size is no longer tenable, which leads to the synonymization of *P. granulatostellulata* with *P. papillatostellulata* and of *P. nitida* with *P. oleracea* s.str. The lectotypification of *P. oleracea* further renders the name *P. stellata* superfluous. Confusion between *P. sativa* and *P. edulis* remains unresolved and requires further study.

The corrected SEM photographs and additional nail-varnish impressions presented here provide reliable documentation of the Belgian taxa and allow for a simplified and more accurate identification key. Although nail-varnish impressions are a useful and

accessible technique, SEM photography remains indispensable for detecting minute structural details.

In Belgium, *P. papillatostellulata* is by far the most widespread taxon, while *P. oleracea* s.str. is much less frequent, and *P. trituberculata* and *P. cypria* are rare to exceptional. This overview may serve as a practical reference for future floristic and taxonomic work on *Portulaca* in the region.

Acknowledgements

Elena Bulakh and Aleksandr Terebilenko (Ukraine) and Hans Reichert (Germany) are thanked for providing images of the taxa relevant to this paper.

References

- Bomble W. (2013) – Funde von *Portulaca granulatostellulata*, *P. nitida* und *P. papillatostellulata* in Nordrhein-Westfalen. *Veröffentlichungen des Bochumer Botanischen Vereins* 5(4): 36-43.
- Bulakh E.V., Shevera M.V., Szkudlarz P., Bulakh P.Y. & Celka Z. (2022) – Identification of New Taxa of *Portulaca oleracea* L. Aggregate From Poland Based on Seed Coat Micromorphological Characteristics. *Acta Societatis Botanicorum Poloniae* 91: Article 9118. <https://doi.org/10.5586/asbp.9118>
- Danin A. & Bagella S. (2012) – A new cultivar microspecies of the *Portulaca oleracea* aggregate from the E Mediterranean. *Willdenowia* 42: 63-65. <https://doi.org/10.3372/wi.42.42106>
- Danin A., Baker I. & Baker H.G. (1979) – Cytogeography And Taxonomy Of The *Portulaca oleracea* L. Polyploid Complex. *Israel Journal of Botany* 27: 177-211.
- Danin A., Domina G. & Raimondo F.M. (2008) – Micro-species of the *Portulaca oleracea* aggregate found on major Mediterranean islands (Sicily, Cyprus, Crete, Rhodes). *Flora Mediterranea* 18: 89-107.
- Danin A. & Raus T. (2012) – A key to 19 microspecies of the *Portulaca oleracea* aggregate. In: Timonin A.K., Sukhorukov A.P., Harper G.H. & Nilova M.V. (Eds.), *Caryophyllales: New insights into phylogeny, systematics, and morphological evolution of the order*. Lomonosov State University, Moscow: 70-83.
- Danin A. & Verloove F. (2015) – De microsoorten van *Portulaca oleracea* (Portulacaceae) in België: een voorlopig overzicht. *Dumortiera* 106: 48-52.
- Duistermaat L. (2020) – Heukels' Flora van Nederland. 24^{ste} druk. Noordhoff Uitgevers, Groningen/Utrecht.
- El-Bakatoushi R., Alframawy A.M., Samer M., El-Sadek L. & Botros W. (2013) – Evolution of the *Portulaca oleracea* L. aggregate in Egypt on molecular and phenotypic levels revealed by morphology, inter-simple sequence repeat (ISSR) and 18S rDNA gene sequence markers. *Flora* 208(7): 464-477. <https://doi.org/10.1016/j.flora.2013.07.008>
- Hassler M., Vogt D. & Reichert H. (2024) – Das *Portulaca oleracea*-Aggregat (Portulak). In: Hassler M. (ed.), *Flora Germanica*. Band 3. Kritische Gattungen 1. Verlag Regionalkultur, Ubstadt-Weiher: 745-752.
- Peregrym M. & Dragičević S. (2024) – The current knowledge about the distribution of *Portulaca* species (Portulacaceae) within the Balkan Peninsula. *Biologia* 79: 2665-2683. <https://doi.org/10.1007/s11756-024-01724-3>
- Poellnitz K. von (1936a) – Versuch einer Monographie der Gattung *Portulaca* L. *Repertorium novarum specierum regni vegetabilis* 37(14-20): 240-320. <https://doi.org/10.1002/>

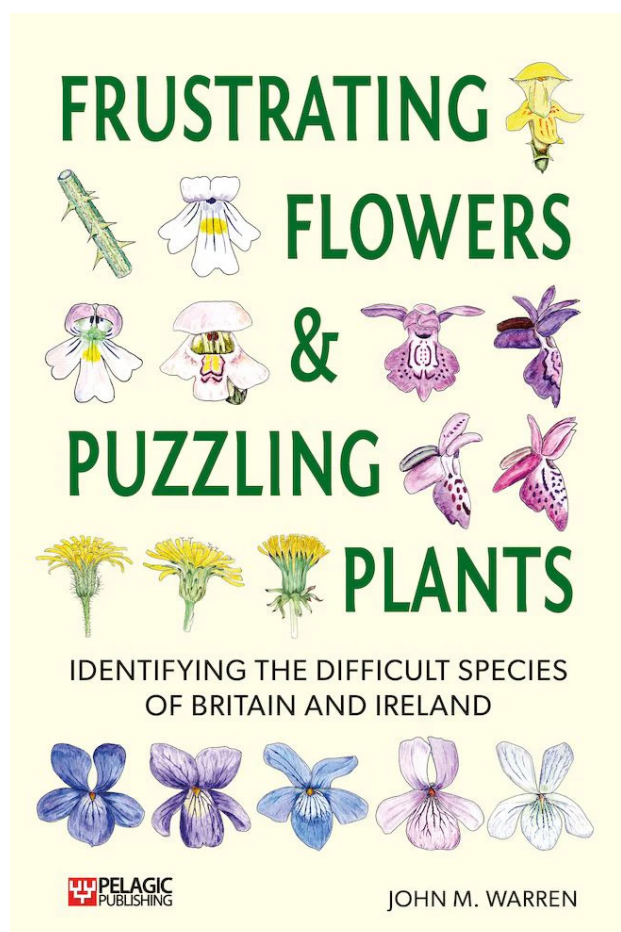
- Poellnitz K. von (1936b) – New species of *Portulaca* from south-eastern Polynesia. *Occasional Papers of the Bishop Museum* 12(9): 1-6.
- Reichert H. (2023) – Morphologisch unterscheidbare Sippen von *Portulaca oleracea* s. l. – bestimmt anhand von Lackabdrücken der Samen. *Kochia* 16: 55-72. <https://doi.org/10.21248/kochia.v16.165>
- Stace C. (2019) – New Flora of the British Isles. 4th edition. C & M Floristics, Suffolk.
- Tison J.-M. & de Foucault B. (2014) – Flora Gallica. Flore de France. Biotope Editions, Mèze.
- Uotila P., Sennikov A.N. & Danin A. (2012) – The nomenclature of *Portulaca oleracea* and *P. sativa* (Portulacaceae). *Willdenowia* 42: 25-28. <http://dx.doi.org/10.3372/wi42.42102>
- Verloove F. (2002) – Ingeburgerde plantensoorten in Vlaanderen. Mededeling van het Instituut voor Natuurbehoud 20. INBO, Brussel.
- Verloove F. & Van Rossum F. (coll. Devriese H., Matysiak J.-P., Ronse A., van de Beek A. & Zwaenepoel A.) (2024) – Nouvelle Flore de la Belgique, du Grand-Duché de Luxembourg, du Nord de la France et des Régions voisines. Septième édition. Jardin botanique de Meise, Meise.
- Walter J., Vekslyarska T. & Dobeš C. (2015) – Flow cytometric, chromosomal and morphometric analyses challenge current taxonomic concepts in the *Portulaca oleracea* complex (Portulacaceae, Caryophyllales). *Botanical Journal of the Linnean Society* 179: 144-156. <https://doi.org/10.1111/boj.12309>

Boekbespreking

I. Hoste

Agentschap Plantentuin Meise, Nieuwelaan 38, B-1860 Meise, België
ivan.hoste@plantentuinmeise.be

Warren John M. (2024) – *Frustrating flowers & puzzling plants. Identifying the difficult species of Britain and Ireland*. Pelagic Publishing. 299 p., illustraties in kleur en zwart-wit. Paperback, ISBN 9781784273316. Prijs € 41,95.



Elke florist met enige veldervaring weet dat de taxa in sommige plantenfamilies of -genera moeilijker op naam te brengen zijn dan deze in andere, meer 'gemakkelijke' families of genera. Dat kan verschillende redenen hebben, zoals een grote soortenrijkdom, het frequent voorkomen van kruisingen of verschillen in de reproductiebiologie, om nog te zwijgen van de door een stekende dwanggedachte gedreven *splitter* die zich tot doel stelt om tot het gaatje te gaan. Mijn nieuwsgierigheid was daarom meteen gewekt toen ik een nieuw determinatiewerk zag gepromoot worden als "a

fresh approach to identifying difficult plants by giving an understanding of the biology behind their complexity".

In een regio – West-Europa – waar niet direct een gebrek bestaat aan determinatiewerken voor vaatplanten (inclusief digitale hulpmiddelen) kan je als auteur maar beter duidelijk maken waarin jouw nieuwe boek verschilt van de andere en wat de voordelen zijn van jouw aanpak. In een korte inleiding (p. ix-xii) legt John Warren de lat alvast behoorlijk hoog. Hij ambieert "new and simple ways" aan te reiken om sterk gelijkende soorten van elkaar te onderscheiden. Het tijdrovende werk met dichotome sleutels zint hem niet; hij vervangt het door in tabellen gegoten informatie en beknopte soortbeschrijvingen. Zijn doelgroep van gebruikers omvat zowel (relatieve) beginners als ervaren botanici, die blijkbaar niet terugdeinzen voor een kleine uitdaging, want "essentially though, this book is a guide to splitting for lumpers".

De 23 hoofdstukken, die samen nog geen 300 pagina's beslaan, zijn verdeeld over vijf secties. Sectie 1 (apomictische soorten) behandelt de genera *Rubus*, *Taraxacum*, *Alchemilla*, *Limonium* en *Sorbus* en een verzameling composieten met paardenbloemachtige bloemhoofdjes. Sectie 2 (hybriden) behandelt de genera *Rumex*, *Potamogeton*, *Rosa*, *Dactylorhiza*, *Salix* en *Ranunculus* subgenus *Batrachium*. Sectie 3 (routineuze zelfbestuivers) behandelt de genera *Euphrasia*, *Fumaria*, *Viola* en twee groepen cruciferen met respectievelijk kleine soorten met witte bloemen en hoger opschietende soorten met gele bloemen. In sectie 4 (polyploïden en snel evoluerende soorten) komen de genera *Orobancha* (incl. *Phe-lipanche*), *Myosotis* en *Veronica* aan bod. Sectie 5 is voorbehouden voor de soortenrijke lipbloemenfamilie en schermbloemenfamilie en het genus *Vicia* (incl. *Ervilia* en *Ervum*). Alles bijeen een ruime en gevarieerde selectie, waar elke florist zijn eigen commentaar zal bij hebben: waarom deze soortengroep wel en een andere niet? En bovenal rijst de vraag: Hoe krijg je het in een boek van 300 pagina's voor elkaar om – met de ambitie van de splitter! – de vele taxa in al die complexe groepen van elkaar te onderscheiden? Over het determineren van 'grasachtige' planten wordt overigens met geen woord gerept.

Elke sectie wordt ingeleid door een korte tekst die uitlegt waarom het correct benoemen van soorten binnen deze sectie lastig kan zijn. De 23 hoofdstukken hebben alle dezelfde structuur. Eerst wordt, met verwijzing naar de inleiding tot de sectie, uitgelegd waarom de beschreven groep complex is. Daarna volgt een overzichtje van de punten waarop je moet letten bij het determineren, tabellen met informatie over een selectie van kenmerken van alle soorten en korte beschrijvingen van elke soort, telkens vergezeld van één of een paar tekeningen. Aan het slot stipt de auteur sum-

mier aan hoe vroegere botanici aankeken tegen de variatie binnen de beschreven groep. Dit beperkt zich niet zelden tot een verwijzing naar de 19^{de}-eeuwse Britse flora van Bentham en Hooker, die gekenmerkt was door een sterke neiging tot *lumpen*. Tot slot geeft de auteur aan waar geïnteresseerden meer diepgaande informatie kunnen vinden, bijvoorbeeld in meerdere volumes van de welbekende serie BSBI handboeken.

Na een beetje virtueel uittesten, thuis in de zetel, met soorten waarmee ik goed vertrouwd ben, concludeer ik al snel dat de “new and simple ways” mij maar matig bekoren. Mijn bedenkingen betreffen twee heel verschillende punten. In de eerste plaats heb ik de indruk dat de auteur aanneemt dat ‘moeilijke’ soorten mits toepassing van de juiste ‘trucjes’ best wel doeltreffend én snel correct kunnen gedetermineerd worden. De in tabellen gepresenteerde informatie houdt dikwijls weinig rekening met goed bruikbare specifieke kenmerken die vlot toelaten om één of meerdere soorten te onderscheiden van alle andere in de groep. Bovendien herleidt de auteur sterk variërende kenmerken (zoals afmetingen of aard en densiteit van beharing) in de tabellen vaak tot slechts een paar eerder willekeurig begrensde categorieën (bv. bladlengte van de langste bladeren <5cm, 5-10 cm of >10 cm bij het genus *Salix*), waardoor nuance verloren gaat. De mozaïek van lege en gevulde hokjes in de tabellen creëert een wat warrig, niet vlot ‘leesbaar’ beeld. Beschrijvingen van sterk gelijkende soorten staan soms ver uit elkaar, wat de kans op het maken van foute keuzes vergroot. Zo is *Galeopsis bifida* (p. 211) ondergebracht bij de soorten “with purple or blue flowers”, maar *G. tetrahit* (p. 215) moet je zoeken bij de soorten “with white, pink or yellow flowers”; bij geen van beide staat een verwijzing naar de andere soort. Bijna hallucinant in een boek dat hulp wil bieden voor het determineren van moeilijke taxa is wat de auteur schrijft over het genus *Salix* (p. 101-102): “... no attempt is made to cover the hybrids here, but hopefully the use of tabular keys will help you identify potentially hybrid individuals.” Tja, dan is het woord *frustrating* in de titel van het boek op zijn plaats. Voor wat louter het aspect determinatie betreft, is het me niet helemaal duidelijk voor welke doelgroep het boek een reële meerwaarde biedt: wellicht toch meer voor de gemotiveerde beginner dan voor de ervaren florist. Het boek behoort niet tot de categorie van determinatiewerken voor gevorderden. Het leest eerder als een oproep om de moeilijkere groepen aan te pakken, maar biedt daarvoor zelf niet voldoende kritisch materiaal aan. De hele aanpak van het luik determinatie in het boek illustreert het spanningsveld tussen het optimistische “yes you can” van de auteur en de soortenrijkdom van de wilde planten en hun verbluffende fenotypische plasticiteit.

Een tweede punt dat bedenkingen oproept is de poging van de auteur om het identificeren van planten te verbinden met de biologische processen die verklaren waarom sommige planten moeilijker op naam te brengen zijn dan andere. De inleidende toelichting bij elk van de vijf secties is beknopt en bevat helaas geen referenties of literatuursuggesties. De auteur stelt twee heel verschillende vragen: enerzijds ‘Hoe herken ik deze of gene plant?’ en anderzijds ‘Waarom vormen sommige groepen zo’n moeilijk kluwen van soorten (of taxa)?’. Helaas levert het samenbrengen van die beide vragen in één boek weinig op. De beschreven biologische processen, zoals apomixie en hybridisatie, mogen dan wel verklaren waarom het determineren van sommige planten niet eenvoudig is, maar echt helpen om de correcte naam te vinden doet het niet. Hoogstens kan je als florist uit die kennis enige troost putten wanneer het niet lukt. De inleidingen tot de secties doen me overigens wel dromen van een boek waarin die thema’s grondiger uitgewerkt worden en geïllustreerd aan de hand van goed uitgewerkte voorbeelden ontleend aan de wilde flora van West-Europa.

De lectuur van *Frustrating flowers & puzzling plants* bracht me niet wat ik ervan verwachtte: het overtuigt me niet als determinatiewerk voor moeilijke taxa en na de lectuur van de inleidende stukjes biologische informatie blijf ik op mijn honger zitten. Bovendien maakt de auteur nergens duidelijk hoe het samenbrengen van de beide hoofdthema’s (determinatie en biologie) in één boek *wékelijk* helpt om een plant correct op naam te brengen. Wellicht koesterde ik vooral wat dit laatste betreft te hoge – of gewoon onterechte? – verwachtingen en liet ik me misleiden door het tweede deel van de titel van het boek. Of je wel of niet de achterliggende biologische processen begrijpt die de verschillen of gelijkenissen tussen taxa verklaren, is op zich weinig relevant wanneer je aan de slag gaat met een onbekende plant: soms is het determineren een lastige en tijdrovende klus – zeker indien je de digitale apps en AI negeert. Hopen op of toegeven aan een eenvoudige en snelle manier om de ‘juiste’ naam te vinden is menselijk, net zozeer als – vind ik persoonlijk... – de charme van het koppig proberen om een weerbarstige soort te benoemen met behulp van een loepje en/of bino, een keur aan sleutels en – als afsluitende toets – een overvloed aan digitale illustraties. Dat heeft manifest het voordeel dat je niet alleen de naam van de plant leert kennen, maar ook diverse structuurtjes en eigenaardigheden ervan: haren, kliertjes, kroon-, kelk- en steunblaadjes, enz. De vreugde van het eureka-moment én het gevoel een plant beter te hebben leren kennen zou moeten volstaan om frustratie op een afstand te houden, ook al lukt het niet altijd om elke plant op naam te brengen.