

The genus *Amsinckia* (Boraginaceae) in Belgium: historical records, recent findings, and taxonomic clarifications

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Abstract. – All known Belgian herbarium specimens of the genus *Amsinckia*, housed in the three largest public herbaria (BR, LG, and GENT) and in selected private collections, were critically revised. Six species were identified: *A. eastwoodiae*, *A. intermedia*, *A. lycopsoides*, *A. micrantha*, *A. retrorsa*, and *A. tessellata*. Of these, *A. eastwoodiae*, *A. retrorsa* and *A. tessellata* are only known from historical collections, with no records after 1953. *A. intermedia* and *A. lycopsoides*, though mostly recorded in the past, have recently been rediscovered. The most recent introduction is *A. micrantha*, first observed in 1979, which has since become clearly naturalised, particularly on sandy soils in the northern part of the country. Its earliest stable populations date to the late 1980s.

Taxonomic and nomenclatural issues are addressed, including the distinction between *A. micrantha* and its South American relative *A. calycina*, and the invalidity of the widely used name *A. menziesii* for *A. micrantha*. Selected recent specimens were subjected to molecular analysis. A key for the identification of all Belgian *Amsinckia* species is provided, along with SEM images of nutlets, as well as photographs of recently observed taxa.

Samenvatting. – **Het geslacht *Amsinckia* (Boraginaceae) in België: historische gegevens, recente vondsten en taxonomische verduidelijkingen.** Alle Belgische herbarium-specimens van het geslacht *Amsinckia*, bewaard in de drie grootste publieke herbaria (BR, LG en GENT) en in enkele private collecties, werden kritisch herzien. Zes soorten werden geïdentificeerd: *A. eastwoodiae*, *A. intermedia*, *A. lycopsoides*, *A. micrantha*, *A. retrorsa* en *A. tessellata*. *A. eastwoodiae*, *A. retrorsa* en *A. tessellata* zijn uitsluitend bekend van historische collecties, zonder waarnemingen na 1953. *A. intermedia* en *A. lycopsoides* werden voornamelijk in het verleden waargenomen, maar recent opnieuw gevonden. De meest recente introductie is *A. micrantha*, voor het eerst waargenomen in 1979. Deze soort heeft zich sindsdien duidelijk gevestigd, vooral op zandige bodems in het noorden van het land. De oudste stabiele populaties dateren uit de tweede helft van de jaren 1980.

Taxonomische en nomenclatorische kwesties worden besproken, waaronder het onderscheid tussen *A. micrantha* en de Zuid-Amerikaanse verwante soort *A. calycina*, en de ongeldigheid van de naam *A. menziesii*, hoewel deze nog vaak voorkomt in de hedendaagse Amerikaanse literatuur. Een aantal recente collecties zijn moleculair onderzocht. Een sleutel voor de determinatie van de Belgische *Amsinckia*-soorten wordt voorgesteld, evenals SEM-beelden van de nootjes en foto's van de recent waargenomen soorten.

Résumé. – **Le genre *Amsinckia* (Boraginaceae) en Belgique : données historiques, découvertes récentes et clarifications taxonomiques.**

Tous les spécimens belges du genre *Amsinckia*, conservés dans les trois plus grands herbiers publics (BR, LG et GENT) ainsi que dans quelques collections privées, ont été révisés de manière critique. Six espèces ont été identifiées : *A. eastwoodiae*, *A. intermedia*, *A. lycopsoides*, *A. micrantha*, *A. retrorsa* et *A. tessellata*. Parmi celles-ci, *A. eastwoodiae*, *A. retrorsa* et *A. tessellata* ne sont connues que de collections historiques, sans données postérieures à 1953. *A. intermedia* et *A. lycopsoides*, bien que surtout enregistrées dans le passé, ont été récemment redécouvertes. L'espèce la plus récemment introduite est *A. micrantha*, observée pour la première fois en 1979, et désormais clairement naturalisée, notamment sur sols sableux dans le nord du pays. Ses premières populations stables datent de la fin des années 1980.

Des questions taxonomiques et nomenclaturales sont abordées, notamment la distinction entre *A. micrantha* et l'espèce sud-américaine apparentée *A. calycina*, ainsi que l'invalidité du nom *A. menziesii*, encore largement utilisé dans la littérature américaine contemporaine. Certains spécimens récents ont fait l'objet d'analyses moléculaires. Une clé d'identification des espèces belges d'*Amsinckia* est proposée, ainsi que des images MEB des akènes et des photographies des espèces récemment observées.

Illustrations:

All illustrations were prepared by the authors, except for SEM photos 2, 3, 13–15, 19–23, and 26 (Marcel Verhaeghe); SEM photos 7 and 8 (Iris Van der Beeten); photos 9–12 (Rutger Barendse); photos 16 and 17 (Ward Vercruysse); photo 18 (Daan Van Eenaeme); and photo 24 (Iris Van der Beeten).

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INTRODUCTION

The genus *Amsinckia*: characteristics and taxonomic complexity

The genus *Amsinckia* Lehm. is a well-defined member of the Boraginaceae family, characterised by annual herbs with scorpioid cymes that uncoil as the plant matures, corollas with included stamens, and generally lacking hairy appendages in the corolla throat (except in *A. lycopsoides* Lehm.). The nutlets are laterally attached, and the deeply two-lobed cotyledons—often misinterpreted as four-lobed—are also distinctive. Among Belgian representatives, the genus is notable for its vivid yellow to orange corollas.

Amsinckia has long been considered taxonomically difficult. Early researchers such as Macbride (1917), who described it as “the most perplexing group I have studied,” and Johnston (1924), who referred to its “exceptional and baffling complexity,” emphasised this challenge. Chater (1975) later called it “a taxonomic and nomenclatural nightmare”.

The genus has undergone a turbulent taxonomic history, with an initial proliferation of species names followed by later consolidation. In 1878, A. Gray recognised six species and two varieties. Macbride (1917) raised this to 21 species, emphasising leaf shape, corolla size, and hair type as diagnostic characters, though he found fruit traits unreliable—despite using them extensively. Taking a radically different approach, Suksdorf (1931) proposed as many as 235 species, including 200 newly described ones, based on a single journey through the western United States. Brand (1931), in contrast, prioritised nutlet characters (size, shape, ornamentation) and recognised 41 species across western North and South America. Johnston (1927) accepted only two species for South America: the alien *A. tessellata* and the widespread *A. hispida* (= *A. calycina*).

Today, 15 species are generally accepted ([Amsinckiinae Working Group](#)). Recent advances in molecular and biogeographic research (Guilliams *et al.* 2017; Simpson *et al.* 2017) have clarified species limits, and an updated taxonomy and identification key are now available via the [Amsinckiinae Working Group](#)'s website.

Distribution and pathways of introduction

The centre of diversity for *Amsinckia* lies along the west coast of North America, particularly California. Some species are endemic, while others have broader ranges, extending north to British Columbia, Saskatchewan, and Yukon in Canada, and south to Patagonia. A few weedy species have spread worldwide, including to Europe, Australia, and Africa, where they have sometimes become problematic invasive weeds. These introductions occurred independently and at different times, often involving different species.

The seeds of *Amsinckia*, similar in size to wheat grains, are easily co-transported with cereal grains or forage seed, allowing long-distance dispersal. According to Thellung (in a letter to Macbride), *Amsinckia* species likely entered Europe with American grain imports—a theory supported by the timing of their first records and their frequent occurrence near flour mills, railway depots, and port facilities (e.g. Baguet 1883; Verhulst 1909). In Belgium and other European countries, their occurrence often paralleled grain-trade activity; when these imports declined, *Amsinckia* records diminished as well.

The earliest known European record of *Amsinckia* appears to be from Tarn-et-Garonne, France, in 1843 or 1845 (Coste 1903; Lawal-

rée 1950). Delogne (1888) suggested that the genus was already present in Europe around 1830, although he provided no supporting evidence. By the late 19th century, the genus was known from many European countries, including Denmark, Germany, the Netherlands, Norway, Sweden, and Switzerland (Hegi 1925; Faegri 1929; Van Ooststroom & Reichgelt 1961a).

The history of *Amsinckia* in Belgium

In Belgium, the earliest known collection of *Amsinckia* dates to 1874, when E. Marchal gathered a specimen in Vilvoorde (Durand 1882, under the name *A. angustifolia*, now considered a synonym of the South American *A. calycina*). The species was initially thought to originate from Chile, a view likely based on misidentification, as the specimen was later correctly assigned to the North American *A. lycopsoides*. As a result of this early confusion, Belgian authors long regarded *Amsinckia* as South American in origin.

This idea was not entirely implausible—raw materials such as wool were indeed imported from South America into the Vesdre Valley in the 19th century (Visé 1942, 1958). The same goes for guano, a natural fertiliser rich in nitrogen, phosphorus, and potassium, derived from seabird, bat, and seal excrement, that was introduced from Peru. However, herbarium labels suggest otherwise: most Belgian *Amsinckia* collections are associated with flour mills and grain-processing facilities, indicating a North American origin, consistent with patterns observed elsewhere in Europe (see above).

Cogniaux (1883) included *Amsinckia* in his *Petite Flore de la Belgique*, and Crépin (1884) mentioned it only after Durand's publication. A more critical treatment began with Devos (1885), who accurately described the genus and identified a second species, *A. lycopsoides*. His detailed diagnosis—especially the reference to the species' distinctive floral character (“corolle barbue à la gorge”)—confirms that his identification was correct and remains consistent with current taxonomy. Devos also suggested a Californian origin for the species, further implying an early European presence around 1830.

By the late 19th century, four of the six *Amsinckia* species now known from Belgium had already been recorded (*A. intermedia*, *A. lycopsoides*, *A. retrorsa*, and *A. tessellata*), though their identities were often confused. Durand (1899) corrected earlier misattributions, identifying Belgian material as *A. lycopsoides*, though he incorrectly linked it to Chile—an error repeated by Pâque (1902). Cluysenaar (1889) reported specimens from Huy as *A. lycopsoides* that are now recognised as *A. retrorsa*. Conversely, several specimens labelled *A. angustifolia* correspond to *A. lycopsoides*. Gofart (1935) was the first to clearly distinguish *A. lycopsoides* (North American) from *A. angustifolia* (South American), although supposed records of the latter ultimately proved to belong to various North American taxa.

Lawalrée (1950) revised all Belgian *Amsinckia* collections following Brand's taxonomy and identified most as *A. intermedia*, a presumed cultivated European derivative of *A. campestris*. He also recognised *A. parishii*, though this was based on a single cultivated specimen now known as *A. eastwoodiae*. Curiously, *A. tessellata*, already collected in Belgium and easy to identify, was omitted.

Subsequent floras adopted Lawalrée's treatment, but a note was added stating “formerly cultivated,” apparently without evidence. This note persisted until the fourth edition of the *Nouvelle Flore* (Lambinon *et al.* 1992). From the 1973 edition onward, however, a more critical approach emerged: the need to re-examine Belgian

Amsinckia material was explicitly acknowledged. Dutch floras (*Flora Neerlandica*, *Heukels' Flora*) began including additional species such as *A. lycopsoides*, *A. menziesii*, and *A. tessellata*. Only in the fifth edition of the Belgian flora (Lambinon *et al.* 2004) was *Amsinckia* finally treated correctly, largely thanks to the contribution of one of the authors of this paper, LV (Lambinon 2005).

As elsewhere, *Amsinckia* in Belgium was initially thought to be on the verge of naturalisation. Numerous locations were reported (e.g. Durand 1882; Baguet 1883; Troch 1895), but the species failed to form self-sustaining populations. Repeated records from the same locality are rare. Even by the late 20th century, the genus remained mostly ephemeral and transient in Belgium.

Rationale for the present study

The impetus for this study dates back to 1987, when one of the authors (LV) discovered *A. micrantha* in Belgium. This led to a revision of herbarium material, coinciding with Lassen's (1988) renewed interest in the genus in Scandinavia. However, difficulties in identifying several ambiguous specimens caused delays, and the manuscript was eventually shelved.

With the advent of improved molecular and biogeographic data (Guilliams *et al.* 2017; Simpson *et al.* 2017), the time has come to revisit and complete the study. Preliminary findings were already published in Lambinon *et al.* (2004), Lambinon (2005), and Verloove (2006). Now, supported by a comprehensive identification key and a global taxonomic consensus ([Amsinckiinae Working Group](#)), we can present a more definitive account. In addition, the taxonomy and nomenclature of the most common—and only naturalised—species in Belgium, *A. micrantha*, warranted renewed scrutiny. Several long-unrecorded taxa have also recently been rediscovered.

MATERIALS AND METHODS

Herbarium material

This study is based primarily on the examination of *Amsinckia* specimens from Belgian herbarium collections. Public herbaria revised for this purpose include those of Meise Botanic Garden (BR) and the botanical institutes of the Universities of Liège (LG) and Ghent (GENT) (herbarium acronyms follow Thiers 2025). In addition, several private herbaria (A. Vermeijen, W. White, I. Hoste) were consulted. In total, more than 100 collections were examined.

Herbarium labels from all examined specimens were translated into English by the authors in the overview provided below. Under

each species, examined herbarium collections are listed chronologically and grouped by phytogeographic district (abbreviated as MAR = maritime, VL = Flemish, KEMP = Campine, BRA = Brabant, MOSAN = Meuse, and ARD = Ardennes). For each specimen, the corresponding IFBL coordinate (4 km² or 1 km² grid square) is provided, based on the locality information on the original label. When an exact location was indicated, the precise grid cell is given; otherwise, the coordinate was estimated from the available data. For details on the IFBL system, see the [IFBL data portal](#).

Each specimen was analysed with particular focus on floral morphology. Observations included sepal characters, the number of veins in the corolla tube below the stamen insertion point, the position and type of stamen insertion, the presence or absence of a constriction in the corolla tube, the occurrence of hairy appendages (invaginations) in the corolla throat, the presence or absence of heterostyly, and the indumentum within and below the inflorescence. For each specimen, one opened or unopened flower was drawn using a camera lucida.

Initially, following Lassen's European species key, fruit morphology was not emphasised. However, for completeness, a follow-up investigation was undertaken in which all available fruits were re-examined. About 20 collections (Table 1), covering all species treated in this study, were selected for observation under a scanning electron microscope (SEM).

The terminology traditionally used in the literature to describe nutlet surface ornamentation (e.g. "tessellate," "muricate," "rugose"; see older American sources and Chater 1972) is often ambiguous. This is largely because the ornamentation is derived from the same basic structural elements—papillae—that vary mainly in size, density, and degree of fusion into larger structures. As a result, the diagnostic value of these descriptive terms is limited. Attempts to define or categorise the many combinations and transformations of papillae and ridges often prove artificial and inadequate, and are therefore probably of limited taxonomic use.

Visual representations also frequently fail to capture relevant distinctions: illustrations are often too greatly reduced in size, obscuring subtle features such as papilla dimensions. Without a consistent frame of reference, such comparisons are difficult to make. Absolute nutlet size shows substantial overlap among the species examined, and colour is also variable. Nevertheless, as subtle interspecific differences may exist, we have briefly described the observed variation and, more importantly, illustrated it with scanning electron micrographs (SEM). Fruits were examined at four magnifications (×40, ×120, ×430, and ×2200), and representative images were taken for each species.

No	Species Name	Collector & Collection Number	Location	Date	Herbarium
1	<i>Amsinckia micrantha</i>	F. Verloove 5987	Evergem	2005	BR12291298
2	<i>A. micrantha</i>	L. Vanhecke s.n.	Zeebrugge	1987	BR
3	<i>A. micrantha</i>	J. Packet s.n.	Zulte	1994	BR24393768
4	<i>A. micrantha</i>	A. Vermeijen 87/8	Arendonk	1987	BR24393683
5	<i>A. micrantha</i>	H. Ruysseveldt 2347	Lichtervelde	1999	BR24393645
6	<i>A. retrorsa</i>	A. Charlet s.n.	Huy, Gare du Sud	1913	LG
7	<i>A. retrorsa</i>	A. Mansion s.n.	Huy, Gare du Nord	1885	LG
8	<i>A. retrorsa</i>	P. Troch s.n.	Neder-over-Heembeek	1891	BR24393478
9	<i>A. retrorsa</i>	Ch. Baguet s.n.	Louvain	1882	BR1254749
10	<i>A. retrorsa</i>	F. Devyver s.n.	Louvain	1916	BR24393409
11	<i>A. intermedia</i>	F. Verloove	Harbour of Ghent	2021	BR0000027060360V
12	<i>A. eastwoodiae</i>	H. Van Roost s.n.	Werchter	1924	BR24394048

No	Species Name	Collector & Collection Number	Location	Date	Herbarium
13	<i>A. tessellata</i>	G. Polchet s.n.	Philippeville	1877	BR24393355
14	<i>A. tessellata</i>	P. Halin s.n.	Bois-Godin, Gerbaut, Vesdre	1894	LG
15	<i>A. lycopsoides</i>	Ch. Baguet s.n.	Wilsele	1893	LG
16	<i>A. lycopsoides</i>	J. Hennen s.n.	Antwerp	1886	BR24393966
17	<i>A. lycopsoides</i>	J. Duvigneaud s.n.	Roly	1953	BR1227248
18	<i>A. lycopsoides</i>	P. Halin s.n.	Ensival	1920	LG
19	<i>A. lycopsoides</i>	Ch. Baguet s.n.	Wilsele	1893	BR24393836
20	<i>A. lycopsoides</i>	M. Halin s.n.	Ensival	1895	BR24393843

Table 1: Summary of *Amsinckia* specimens selected for SEM analysis of nutlet morphology. Specimens are listed with species name, collector and collection number, locality, date, and associated herbarium.

Additionally, stem indumentum was studied in detail. In the literature, hair characteristics are often cited as diagnostic features, and they are frequently mentioned as conspicuous during collecting or weeding. However, the diagnostic value of the various hair types is difficult to assess with precision. To better understand the nature and taxonomic relevance of these trichome types, particular attention was paid to stem indumentum both within and below the inflorescence.

Two main hair types were distinguished:

1. softer, shorter hairs that, when dense, form a more or less continuous felt-like layer, and
2. stiff, spreading bristles, each arising from a multicellular base.

Special attention was given to hair orientation relative to the stem: for the long bristles, this was categorised as antrorse, spreading, erect, or retrorse; for the shorter felt-like hairs, as either *chaotic* (projecting in all directions, especially when sparse) or *crisped* (dense and interwoven, forming a coherent felt).

Literature review

In addition to herbarium material, all relevant Belgian literature on *Amsinckia* was reviewed, with particular attention to older volumes of the *Bulletin de la Société Royale de Botanique de Belgique* and successive editions of the principal Belgian floras.

Molecular analyses

To confirm the identity of naturalised *Amsinckia* species in Belgium, leaf material from two collections of *A. intermedia* (F. Verloove 14027 and 14974) and one collection of *A. micrantha* (F. Verloove 10670) was analysed. DNA sequences were obtained for the nuclear ITS region (White *et al.* 1990) and the plastid markers *rps16* (Shaw *et al.* 2007) and *trnL-F* (Taberlet *et al.* 1991), and compared with published reference sequences to verify species identity.

RESULTS

Six species of *Amsinckia* were identified in Belgian herbarium collections. They are treated alphabetically below.

All six taxa are currently accepted by recent taxonomic studies, including those incorporating molecular phylogenetic evidence ([Amsinckiinae Working Group](#)). It should be noted, however, that apart from two morphologically distinct species (*A. lycopsoides* and *A. tessellata*), the remaining taxa can be challenging to identify. While typical individuals are generally well differentiated, specimens displaying intermediate morphological features are not uncommon. These complexities are addressed in more detail in the taxonomic notes of the concerned taxa below and in the

Discussion section.

1. *Amsinckia eastwoodiae* J.F.Macbr., Contr. Gray Herb. 49: 14 (1917) (Fig. 1-3)

Native range. California and northern Mexico (Baja California). This is a rare species with a relatively limited geographic range.

Diagnostic characteristics. *Amsinckia eastwoodiae* is characterised by its large, narrowly trumpet-shaped corollas with an abruptly expanded limb, reaching up to 15 mm in length and 10 mm in width, and measuring up to 2.5 times the length of the calyx in the Belgian specimen. The style is often exerted from the corolla throat, and the anthers are typically inserted below the stigma and not appressed to it.

Nutlet morphology. Only a single nutlet was available for study. It exhibits a distinctive, species-specific pattern of sharp, irregularly folded transverse ridges—markedly higher than wide in cross-section—combined with a regular distribution of smaller conical protuberances.

Occurrence in Belgium. This species has been recorded only once, in 1924, in a garden in Werchter. Given its large flowers, it may have been deliberately sown as an ornamental, although there is no evidence of its cultivation as such in Western Europe (e.g., Jäger *et al.* 2008; <https://plantago.nl/home.html>). In general, species of *Amsinckia*—despite their bright yellow flowers—are rarely grown as ornamentals. Huxley (1999) listed *A. calycina*, *A. intermedia*, and *A. lycopsoides*, but not *A. eastwoodiae*. According to the herbarium label, the specimen was collected from a ruderal garden habitat. Accidental introduction via contaminated grain (e.g., birdseed) cannot be ruled out and may, in fact, be more likely. A similar case was reported from Denmark, where the species was found in a clover field (Lassen 1988).

Specimen examined.

BRA — Werchter, IFBL D5.43, collected in a garden as a ruderal plant along with *Capsella bursa-pastoris* etc., 9 June 1924, H. Van Roost s.n. ([BR0000024394048](#)).

Taxonomic notes. *Amsinckia eastwoodiae* is morphologically similar to *A. inepta* J.F.Macbr., with which it may be confused. However, the nutlets of the Belgian specimen are coarsely tuberculate with prominent ridges, consistent with *A. eastwoodiae*. In contrast, *A. inepta* has finely and low-tuberculate nutlets.

Due to its comparatively large corollas, often accompanied by an exerted style, *Amsinckia eastwoodiae* is relatively easy to distinguish. Nevertheless, some European authors have subsumed it under *A. micrantha*, along with *A. intermedia* and *A. retrorsa* (e.g., Clement & Foster 1994). These species are indeed closely related, as also suggested by molecular data (Guilliams 2015).

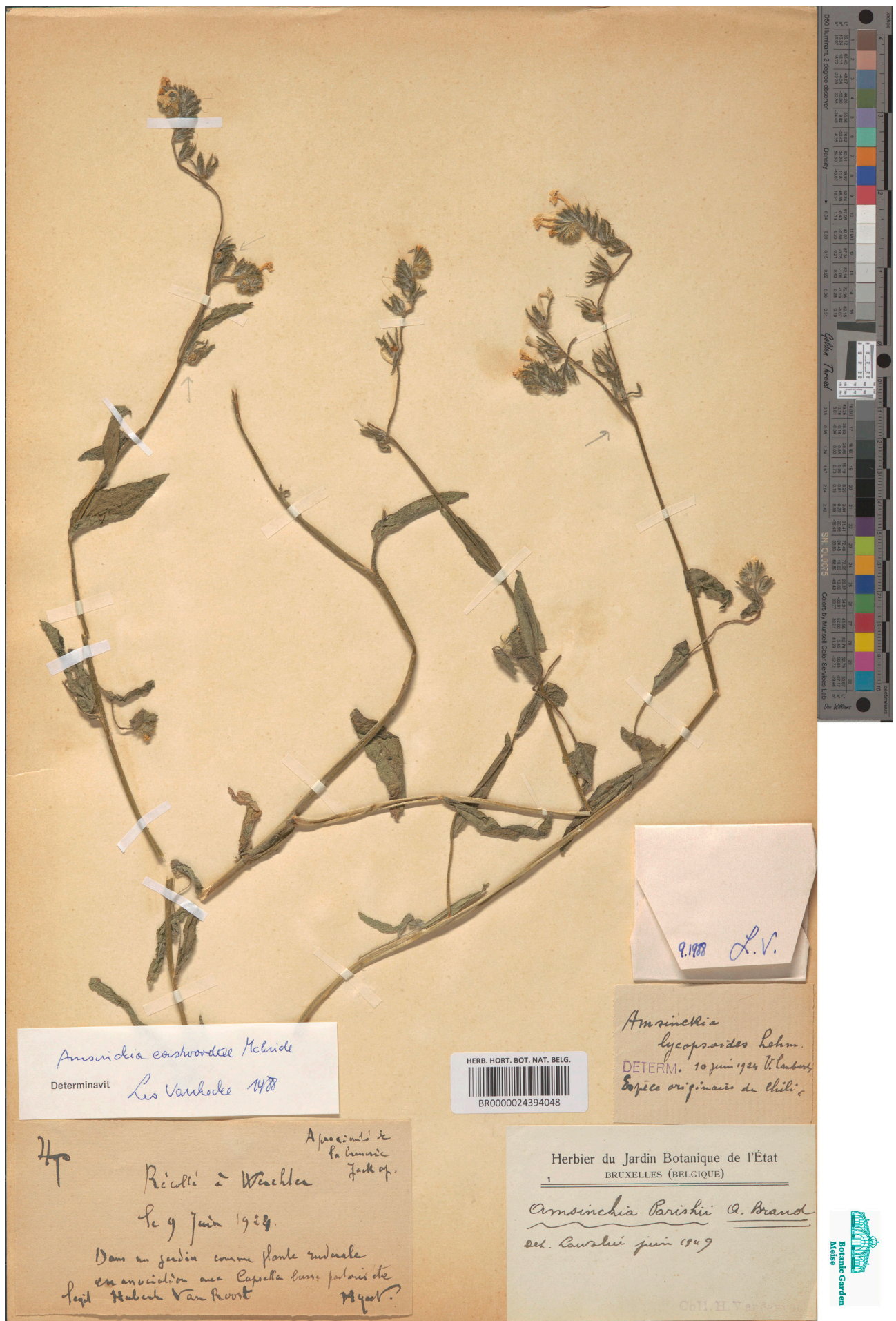


Figure 1: The only herbarium specimen of *Amsinckia eastwoodiae* known from Belgium, collected by Van Roost in Werchter in 1924 and preserved in the herbarium of Meise Botanic Garden (BR0000024394048). The large, narrowly trumpet-shaped corollas with an abruptly expanded limb are characteristic.

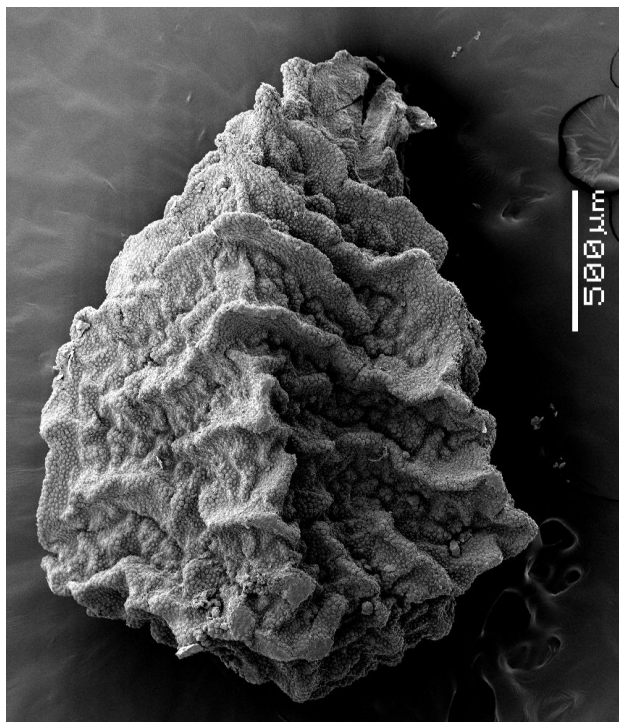


Figure 2: SEM image of a nutshell of *Amsinckia eastwoodiae* from the Van Roost collection. A pattern of sharp, irregularly folded transverse ridges—markedly higher than wide in cross-section—combined with a regular distribution of smaller, conical protuberances is evident.

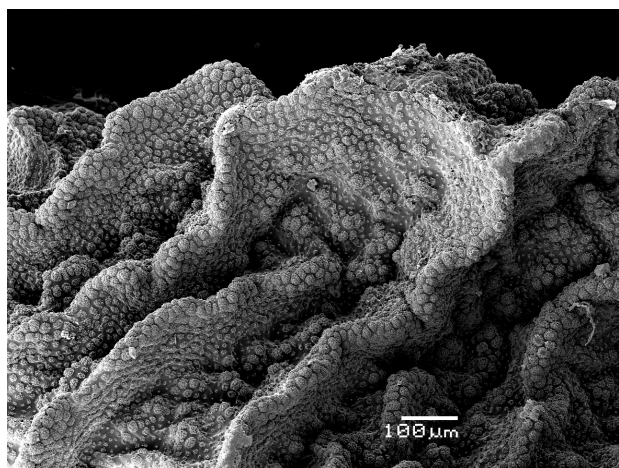


Figure 3: SEM image of the seed coat of a nutshell of *Amsinckia eastwoodiae* from the Van Roost collection.

2. *Amsinckia intermedia* Fisch. et C.A.Mey., Index Seminum (LE, Petropolitanus) 2: 26 (1836) (Fig. 4-8)

Native range. From western Canada to Mexico (Baja California, Sonora, Guadalupe). Recorded from Alberta, Arizona, British Columbia, California, Connecticut, Idaho, Maine, Manitoba, Massachusetts, Mexican Pacific Islands, northwestern Mexico, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Oregon, Pennsylvania, Saskatchewan, Texas, Utah, Virginia, Washington, Wyoming, and Yukon.

Diagnostic characteristics. *Amsinckia intermedia* closely resembles *A. micrantha* in overall habit. It can be most readily distinguished by its deeper yellow, longer corollas (7–11 mm vs. 4–7 mm) and significantly broader limb (4–10 mm across vs. up to 3 mm in *A. micrantha*). These larger, often more orange-ish flowers tend to protrude conspicuously beyond the calyx. In the relatively few Belgian herbarium specimens examined, the

stem at the level of the inflorescence bears both long, stiff (often reddish) bristles and a dense covering of short, more or less appressed or upward-pointing hairs. This type of short indumentum is generally absent in *A. micrantha* but is highly characteristic of *A. retrorsa*.

Nutlet morphology. The pattern of ridges and conical bulges appears intermediate between *A. retrorsa* and *A. lycopsoides*, showing fewer individual conical projections and lacking the brush-like appendages typical of *A. retrorsa*, while also exhibiting less developed, flattened-conical to pyramidal bulges than observed in *A. lycopsoides*.

Occurrence in Belgium. Only three historical records of *Amsinckia intermedia* are known from Belgium, all from the Brabant district and dating between 1883 and 1949. All these specimens were collected in or near Brussels. Until recently, the last known Belgian record of *A. intermedia* dated from 1949 (Vilvoorde). However, since 2019, the species has been recorded annually in large numbers at the Eurosilo grain handling and storage facility near the Rodenhuidok in the port of Ghent. Notably, a second species, *A. micrantha*, has been present at the same site since 1987, allowing direct morphological comparisons in the field (see also below).

Specimens examined.

VL — Ghent, Rodenhuidok, rough ground at the Ghent Grain Terminal, 19 May 2019, F. Verloove 13731 (BR). — Ghent, Rodenhuidok, IFBL C3.43.42, rough ground at Eurosilo granary, common since 2019, 23 May 2021, F. Verloove 14027 (BR).

BRA — Uccle (Stalle), IFBL E4.45, June 1883, A. Douret (BR0000024394024). — Louvain, IFBL E5.13, waste ground, 1885, Ch. Baguet (BR0000024394031). — Vilvoorde, IFBL D4.56, construction site of a factory, July 1949, C. Pelgrims (BR0000024394017).

Taxonomic notes. *Amsinckia intermedia* and *A. micrantha* are morphologically very similar and closely related. Nonetheless, most authors consistently treat them as separate species, in contrast to the more ambiguous taxonomic treatment of *A. retrorsa* (e.g., Ray & Chisaki 1957, who included *A. retrorsa* in *A. micrantha*). *A. intermedia* is generally distinguished by its consistently larger, deeper yellow to orange-hued corollas, with a broader limb and a corolla tube that extends more prominently beyond the calyx. The two species are sometimes reported to differ in growth habit: *A. micrantha* with decumbent to ascending stems, and *A. intermedia* with ascending to erect stems (*Amsinckiinae Working Group*). However, such differences in growth form were not evident in the Belgian material examined (see also Welsh *et al.* 2017).

The Vilvoorde specimen is particularly noteworthy for its unusually large, slightly asymmetrical (bilaterally compressed) corollas—a feature otherwise known from the rare and threatened *A. lunaris* J.F.Macbride. Nevertheless, based on the floral illustrations in Ray & Chisaki (1957), the specimen is here assigned to *A. intermedia*. Its inflorescences are further characterised by conspicuous, stiff, reddish-brown bristles emerging prominently from the deeply lobed calyces.

The recently observed populations in the Ghent port area, which have persisted since 2019, are remarkable for their relatively large, distinctly spotted corollas—a feature occasionally seen in *A. micrantha*, but seldom, if ever, in naturalised populations. Interestingly, the very first Belgian record of *A. micrantha* (1979) also noted spotted corollas. The taxonomic placement of the Ghent plants was initially uncertain, as the stems bore both long, spreading bristles and short, appressed hairs—features characteristic of

A. retrorsa. However, the stamens were inserted at equal levels within the corolla tube, in contrast to *A. retrorsa*, where they are inserted unequally.

To resolve this uncertainty, one individual from the Ghent population was subjected to molecular analysis. ITS sequencing confirmed the genetic distinctness between the commonly naturalised species *A. micrantha* (= *A. menziesii* auct.) (collection Verloove F. 10670; sequence M24-0166 ITS) and the Ghent specimen (Verloove F. 14974; sequence M24-0792 ITS), as the two fall into separate clades. The latter clusters with a specimen identified as *A. intermedia* (Guilliams C.M. 868; sequence KX229074.1), as published in an authoritative phylogenetic study by Guilliams (2015). In the same study, a sequence for *A. retrorsa* (collection Rebman J.P. & Gregory J. 8354, San Diego County, California; sequence KX229075.1) was found in a different clade, clustering with '*A. menziesii*', a very closely related (and potentially conspecific) species. Plastid markers such as *rps16* and *trnL-F* proved uninformative for species delimitation within this complex.

In conclusion, the Ghent specimen is genetically and morphologically distinct from the widespread naturalised weed *A. micrantha*, and should be attributed to *A. intermedia* rather than to *A. retrorsa*.



Figure 4: *Amsinckia intermedia* in the Ghent port area, 19 May 2019, F. Verloove. Corollas are deep yellow, often with reddish markings in the throat.



Figure 5: *Amsinckia intermedia* in the Ghent port area, 23 May 2021, F. Verloove. Just below the inflorescence, the stem bears rigid, patent bristles and very sparse, short, appressed hairs



Figure 6: *Amsinckia intermedia* in the Ghent port area, 5 May 2024, F. Verloove. As is often the case in *Amsinckia*, the species is a rapid coloniser that may form dense patches.

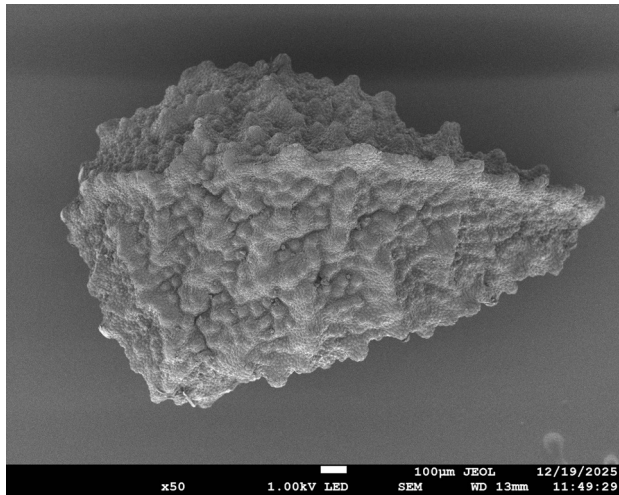


Figure 7: SEM image of a nutshell of *Amsinckia intermedia* collected in Ghent in 2021 by F. Verloove (herb. BR0000027060360V).

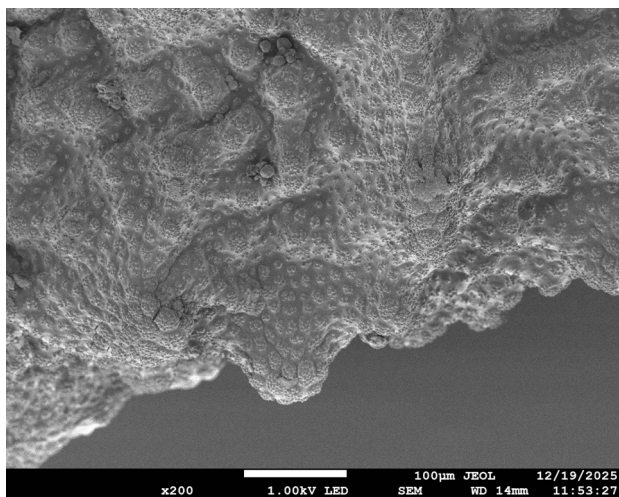


Figure 8: SEM image of the seed coat of a nutshell of *Amsinckia intermedia* from the F. Verloove collection.

3. *Amsinckia lycopsoides* Lindl. ex Lehm., Index Seminum (HBG, Hamburgensis) 1831: 7 (1831) (Fig. 9-14)

Native range. Western North America, from British Columbia to California, and extending eastward to various U.S. states including Connecticut, Idaho, Massachusetts, Mississippi, Missouri, Montana, Nebraska, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Texas, Utah, Washington, Wisconsin, and Wyoming.

Diagnostic characteristics. *Amsinckia lycopsoides* can be readily distinguished by the presence of five hairy appendages partially occluding the corolla throat—a feature not observed in any other species of the genus. The corolla tube is distinctly constricted in its lower half, and the stamens are inserted below the midpoint of the tube. These characters allow reliable identification of *A. lycopsoides*.

Additional distinguishing features were also observed. In contrast to *A. micrantha*, the corolla of *A. lycopsoides* is clearly exerted beyond the calyx, exposing part of the corolla tube above the calyx lobes. In recently observed Belgian populations of both species, corollas of *A. lycopsoides* tend to exhibit a darker, more orangish-yellow hue. The corolla limb typically measures 2–4(–5) mm in diameter, with the overall corolla length ranging from (6–)7–9(–11) mm. The long, narrow sepals are densely covered

with short, evenly sized, upward-pointing hairs, often interspersed with larger, firmer, antrorse hairs with multicellular bases. This indumentum clearly differentiates *A. lycopsoides* from *A. micrantha*. Although *A. tessellata* also has elongate sepals, in that species the sepals typically converge at the apex.

Nutlet morphology. The nutlets show considerable variation in surface ornamentation. They are typically 2.0–2.7 mm long and exhibit a pronounced relief of more or less flattened, conical to pyramidal protrusions that often merge into spine-like structures, particularly along the dorsal tangents. At low magnification, a distinctly rugose (wrinkled) pattern is visible. Despite the variability in ornamentation, the nutlets are generally easily distinguished from those of *A. micrantha* and *A. retrorsa*, which show transitions from rugose to muricate surfaces with fused papillae.

Occurrence in Belgium. The earliest Belgian records of *Amsinckia*—from 1874 (Vilvoorde) and 1877 (Kessel-Lo)—are attributable to *A. lycopsoides* (Devos 1885). It is the most consistently documented species of the genus in Belgium, with records in every decade from 1874 to 1953. The highest frequency of observations occurred between 1880 and 1895, accounting for about half of all known herbarium specimens. It remains uncertain whether the species was unusually frequent during this period or whether its novelty led to better documentation.

In 1953, the long series of sightings ended with a final observation in Roly. Since then, the species has only rarely been recorded, notably in 1970 (Kaulille, in a newly sown lawn) and between 2018 and 2021 (Wasmès-Audemèze-Briffœil, on a sandy, worked-up railway siding). A similar decline has been documented in other Western European countries, including the British Isles (Clement 1999) and the Netherlands (Vermeulen 1997).

A. lycopsoides has been reported from over 25 IFBL 4 km² grid squares and from all phytogeographical districts except Lorraine. Nonetheless, almost 75% of all records are from the Brabant (≈50%) and Mosan (≈25%) districts. At some sites, it was observed over multiple consecutive years (e.g., in Brugelette in 1884, 1885, 1889; in Wilsle in 1893–1894). In the Vesdre Valley, it was seen repeatedly—though not annually—between 1894 and 1920. More recently, a population persisted at Péruwelz from 2018 to 2021, though declining. While the species may still survive locally, it likely never became fully naturalised in Belgium.

The species has been documented in a range of disturbed habitats, including rough ground, waste land, gardens, hedgerows, lawns, fallow fields, embankments, roadsides, coal spoil heaps, and gravel banks. Most herbarium labels refer to ruderal settings, and many specimens were collected near flour or grain mills, suggesting introduction with cereals. Records from the Vesdre Valley may represent wool aliens, although hardly any wool was introduced from North America (Visé 1942). Grain aliens, however, were also documented in that area (van Ooststroom & Reichgelt 1961b), representing a more likely introduction pathway.

In recent decades, introductions in the British Isles and Scandinavia (Lassen 1988, Clement 1999) have been linked to contaminated grass seed—an introduction vector that also applies to the 1970 Belgian record and possibly the most recent observations as well.

Specimens examined (per district).

MAR — Sas-Slijkens (Oostende), IFBL C1.25, wasteland, 23 June 1923, A. Isaäcson (BR0000024393973).

VL — Antwerpen, IFBL C4.26, uncultivated land, 3 June 1886, J. Hennen (BR0000024393966). – Lier, IFBL C5.41, near Hellemans flour mill, May 1938, C. Pelgrims (BR0000024393799). – Brugge,

city ramparts, IFBL C2.22, undated (acc. 1942), Wodon-Rousseau ([BR0000024393997](#)).

KEMP — Kaulille, IFBL C7.32, in newly sown lawn, June 1970, H. Rabijns ([BR0000024393829](#)).

BRA — Vilvoorde, IFBL D4.56, grasslands, June 1874, E. Marchal ([BR0000024393928](#)). — Kessel-Loo, IFBL E5.14, waste ground, 1877, Ch. Baguet ([BR0000024393782](#)). — Laeken, IFBL E4.15, July 1880, coll. unknown ([BR0000024393904](#)). — Court-Saint-Étienne, IFBL F5.31, along a hedge, July 1882, Stroobants ([BR0000012431939](#)). — Oultre near Ninove (= Outer), IFBL E3.27, 19 May 1883, E. Steppé ([BR0000024393874](#)). — Brugelette, IFBL F3.44, 25 May 1884, J.-C. Fontaine in herb. J. Van de Put (GENT). — Brugelette (Tournai), IFBL F3.44, cultivated fields, May–June 1885, H. Bernimolin (LG). — Schaerbeek, IFBL E4.26, embankment, 22 May 1885, Guelton 1046 (rec.) and Herlant (com.) in herb. G. Dutrannoit ([BR0000012214778](#)). — Nivelles, spontaneous in garden, IFBL F4.45, June 1888, F. Pietquin ([BR0000024393959](#)). — Nivelles, garden of F. Pietquin, IFBL F4.45, June 1888, G. Dens ([BR0000012432103](#)). — Brugelette, IFBL F3.44, June 1889, J. Henry ([BR0000024393881](#)). — Wilsele, IFBL E5.13, near Bodart mill, 22 May 1893, Ch. Baguet ([BR0000024393836](#); dupl. LG); also: Wilsele, waste ground and grassland, May–July 1893–1894, Ch. Baguet (LG; dupl. [BR0000024393775](#)). — Pecq (Tournai), IFBL F2.23, cultivated field, 19 June 1889, J. Hennen ([BR0000024393850](#)). — Couture-Saint-Germain, IFBL F4.27, near Aywières abbey, cinder heaps, 14 September 1895, G. Polchet ([BR0000024393935](#)). — Trockay (Trôckâ), IFBL G6.11, rubble near mill, 5 July 1906, V. Lambert (LG). — Courcelles, spoil heap, IFBL G4.35, 12 June 1939, A. Dijon & H. Matagne (GENT). — Vilvoorde, IFBL D4.56, rubble, August 1945, C. Pelgrims ([BR0000024394000](#)). — Péruwelz, Wasmes-Audemez, Rue de la Croisette, IFBL F2.57.33, sandy railway slope, 6 May 2018, F. Verloove 13198 ([BR0000025416121V](#)). — Wasmes-Audemez-Briffueil, IFBL F2.57.33, sandy soil under railway bridge, 6 June 2021, F. Verloove 13993 (BR).

MOSAN — Seilles, IFBL G6.22, embankment, 1887, H. Belhaise in H. Vandenbrouck (BR). — Kinkempois, IFBL F7.43.14, May 1903, C. Aigret ([BR0000027558669V](#)). — Seraing (Val St. Lambert), IFBL F7.41, 10 July 1916, R. Etienne ([BR0000024393980](#)). — Moresnet, near mill, IFBL F8.12, 3 August 1927, A. Visé (LG). — Roly, near new grotto (Chapel N.D.), IFBL J4.28.42, disturbed woodland edge, June 1953, J. Duvineaud ([BR0000021891410](#); [BR0000012272488](#)).

ARD — Spa, IFBL G7.28, garden hedge, June 1889, L. Piré ([BR0000024393942](#)). — Bois-Godin (Gerbaut), Vesdre gravel, IFBL F7.57, waste ground, 24 July 1894, P. Halin (LG). — Ensival, Vesdre banks, IFBL F7.58, 23 June 1895, M. Halin (in herb. Sladden) ([BR0000024393843](#)). — Ensival, Vesdre banks, IFBL F7.58, August 1902, coll. unknown (LG). — Verviers, waste ground near Hougnés, IFBL F7.48.43, 8 August 1920, P. Doubleman (LG). — Ensival, gravel, IFBL F7.58, August 1920, P. Halin (LG).

Taxonomic and other notes. Although *Amsinckia lycopsoides* may superficially resemble other weedy, small-flowered species—particularly *A. micrantha*—it is in fact readily distinguishable. The presence of hairy appendages in the throat of the corolla and deeply inserted anthers within the corolla tube immediately set it apart from all other species. It is therefore surprising that Lawalrée (1950), in his revision of the Belgian collections, misidentified several specimens.

In Europe, *Amsinckia lycopsoides* is perhaps most notably recorded from the British Isles, specifically the Farne Islands, where it was first documented over a century ago. Its continued presence

has been consistently verified, most recently by an [iNaturalist](#) observation in 2024. These populations may represent the only truly naturalised occurrences of the species in Europe. According to Randall (2017), *A. lycopsoides* is considered the most weedy species of the genus globally, based on literature reports. However, caution is warranted, as many of these records may stem from misidentifications.



Figure 9: *Amsinckia lycopsoides* in Wasmes-Audemez-Briffueil, 6 May 2018. Hairy appendages are visible in the corolla, a unique feature within the genus.



Figure 10: *Amsinckia lycopsoides* in Wasmes-Audemez-Briffueil, 6 May 2018. The corolla tube is constricted in its lower half.



Figure 11: *Amsinckia lycopoides* in Wasmès-Audemèze-Briffœil, 6 May 2018. Close-up of the orangish-yellow corollas.



Figure 12: *Amsinckia lycopoides* in Wasmès-Audemèze-Briffœil, 6 May 2018. Inflorescence.

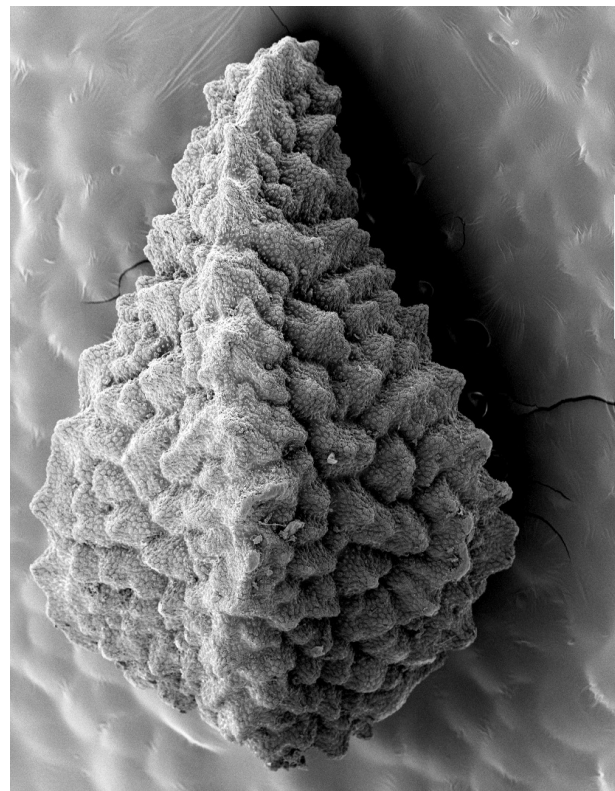


Figure 13: SEM image of a nutlet of *Amsinckia lycopoides* collected in Ensival in 1920 by M. Halin (herb. LG). The nutlet shows a pronounced relief of more or less flattened, conical to pyramidal protrusions that often merge into spine-like structures, particularly along the dorsal tangents.

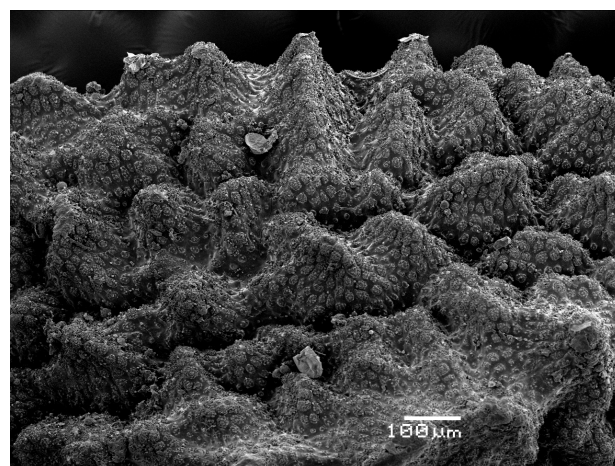


Figure 14: SEM image of the seed coat of a nutlet of *Amsinckia lycopoides* from the M. Halin collection.

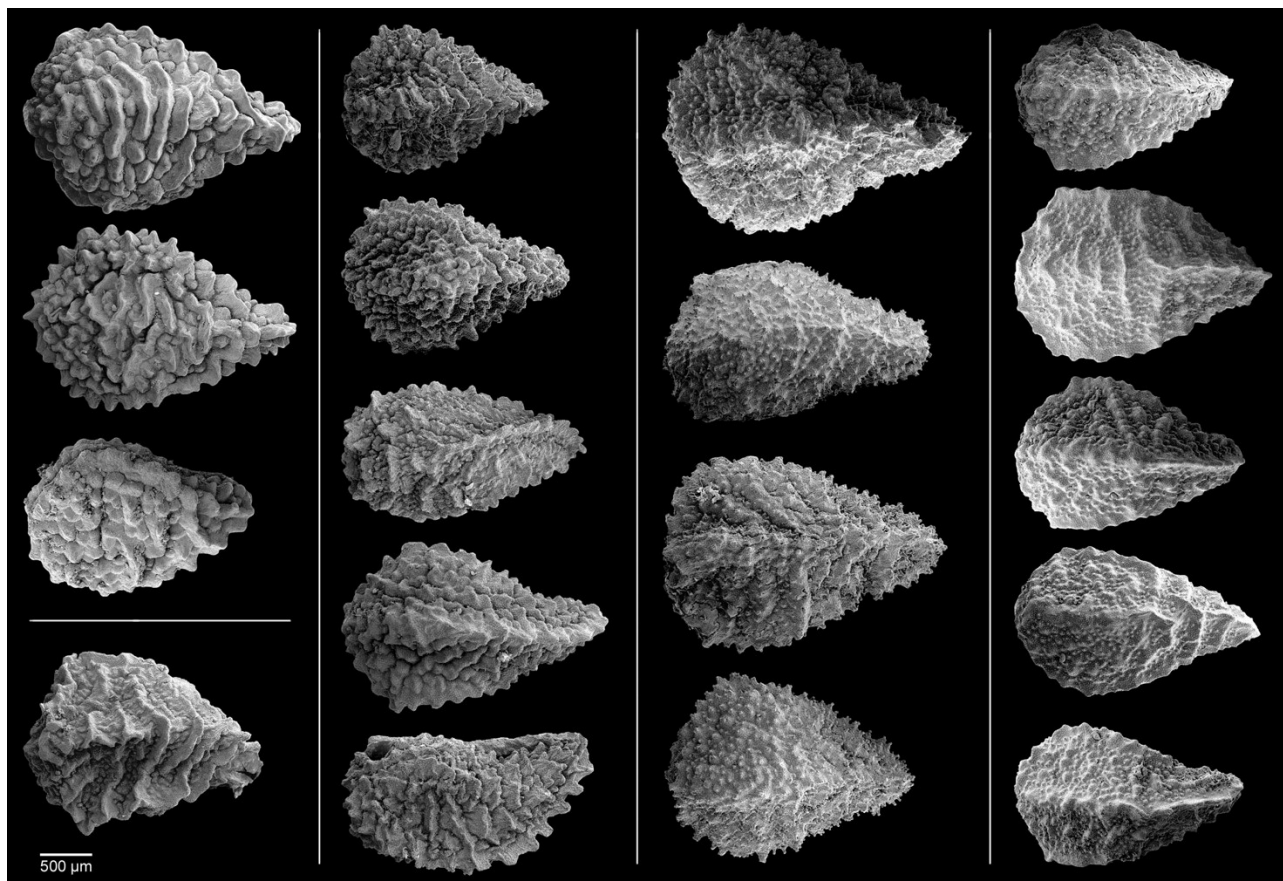


Figure 15: Schematic overview of nutlet morphology in *Amsinckia* in Belgium (from left to right): *A. eastwoodiae* (top), *A. tessellata* (bottom), *A. lycopsoides*, *A. retrorsa*, and *A. micrantha*. *Amsinckia intermedia* is not included due to the absence of mature nutlets at the time of preparation.

4. *Amsinckia micrantha* Suksd., Deutsche Bot. Monatsschr. 18: 134 (1900)

Syn.: *Amsinckia menziesii* auct. non (Lehm.) A. Nelson & J.F. Macbr., Bot. Gaz. 61: 36 (1916) (Fig. 16-20)

Native range. Various regions of the United States, Mexico, and Canada, including Alberta, Arizona, British Columbia, California, Connecticut, Idaho, Khabarovsk, Maine, Manitoba, Massachusetts, the Mexican Pacific Islands, northeastern and northwestern Mexico, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Oregon, Pennsylvania, Saskatchewan, South Carolina, Texas, Utah, Virginia, Washington, Wyoming, and Yukon.

Diagnostic characteristics. In its typical form, *Amsinckia micrantha* can be identified with relative ease. The corollas are generally small (the corolla tube scarcely, if at all, exceeding the sepals), uniformly yellow (lacking any orange hue), and without darker markings in the throat. The stamens are inserted at a consistent height near the apex of the corolla tube. Below the inflorescence, the stem bears spreading, long bristles, while smaller, appressed hairs are absent. Occasionally, specimens exhibit darker or faintly spotted corollas, though such cases are extremely rare. Likewise, some individuals display a layer of short, appressed hairs beneath the inflorescence in addition to the long, patent bristles, which can lead to confusion with *A. retrorsa* (see there).

Nutlet morphology. The nutlets are triangular-oval with a slightly pointed apex. The surface is irregularly rough, characterised by bluntly conical projections ranging from approximately 25 to 200 µm in size. These projections are densely covered with more or less circular fields of stiff, conical mamillae, each with (sometimes multiple) papillary tips. Conical bulges merge into

faint, inconspicuous transverse wrinkles. The average nutlet length is 1.9–2.6 mm.

Occurrence in Belgium. *Amsinckia micrantha* was first recorded in Belgium as a weed in the Meise Botanical Garden in 1979. Observations increased rapidly throughout the 1980s, peaking in 1987. Within the first decade following its initial discovery, the species was observed across all phytogeographical units of the Flemish and Brussels regions. In contrast, it has yet to be confirmed from the Walloon Region. Remarkably, nearly as many specimens were collected in 30 years as for *A. lycopsoides* over more than 75 years. The majority of observations have been concentrated in the sandy regions of Flanders and the Kempen, with records in the Brabant Loam region remaining exceptional. Herbarium collections have declined over the past two decades, potentially reflecting reduced collection effort rather than lower prevalence.

The online platform *waarnemingen.be* (<https://waarnemingen.be/species/6414/>; accessed 12 March 2024) lists 541 records, confirming the distribution pattern observed in herbaria. *A. micrantha* is primarily found in sandy areas of Flanders, particularly around Bruges and Ghent, as well as in the Kempen, especially the Mol-Dessel–Lommel region, and remains absent from Wallonia.

The first Belgian record from Meise in 1979 likely represented an ephemeral occurrence, as the species was not recorded there subsequently (Hoste 2011). In 1982, *A. micrantha* was recorded in Merksplas (Kempen), where it became more or less established. Recent *waarnemingen.be* data show that it has not been observed in Merksplas itself but occurs in neighbouring villages such as Ravels and Rijkevorsel. In 1984, the species was first recorded near Ghent, in Lovendegem (Bierstal), but recent observations are lacking, suggesting a casual occurrence. In 1987, *A. micrantha* was

recorded simultaneously in several locations across Flanders and the Brussels region, including Zeebrugge, Ghent, Oostakker, Audeghem, Arendonk, Retie, and Heusden. Many of these sites continue to host the species nearly 40 years later, particularly along the Kennedylaan in the Ghent port area near the Eurosilos grain storage (Verloove & Vandenberghe 1993), and in Zeebrugge, initially at the Borlim grain mill and later at Prins Filipdok. Its presence has also been confirmed in Retie and other parts of the Kempen, though links to the original 1980s records remain uncertain. Overall, *A. micrantha* is clearly naturalised in northern Belgium.

Amsinckia micrantha occurs in a wide range of habitats, including cereal unloading quays, railway yards, towpaths, chicken coops, rubble, roadsides, dry stream banks, bare sandy soil, construction debris, rough ground, wastelands, field edges, pine forests, lawns, and gardens. Most records are associated with cereals, particularly near grain mills, while garden records likely reflect commercial birdseed mixtures.

Specimens examined (per district).

MAR — Zeebrugge, port, Boudewijnkanaal, IFBL B2.41.23, mooring site of Bormil grain silos, dozens of specimens, 19 July 1987, L. Vanhecke 8405 (BR). – Zeebrugge, port, Boudewijnkanaal, same site as 1987 material, IFBL B2.41.23, 19 May 1990, L. Vanhecke s.n. (BR0000024393607).

VL — Lovendegem, Bierstal, IFBL C3.51.33, 26 June 1984, J. Van den Haute 1476 (BR0000024393713). – Oostakker, Kennedylaan, IFBL C3.53.32, 25 August 1987, J. Van den Haute 1607 (BR0000024393720). – Ghent, harbour, Kennedylaan, Moervaartbrug, IFBL C3.43.44, roadside verge with many annuals (pioneer vegetation after herbicide treatment), several specimens, 8 September 1987, E. Robbrecht 3531 (BR0000024393638). – Ghent, ruderal site behind cemetery near Ghent University Hospital, temporary soil depot, IFBL D3.22, 27 May 1991, W. Van Landuyt 619 (BR0000024393706) (see also Van Landuyt 1992). – Kortemark, IFBL D1.26.42, railway gravel site, established since three years, 19 May 1992, F. Verloove (BR). – Ghent, harbour, Rodenhuisdok, road parallel to Kennedylaan, IFBL C3.43.42, bare sandy verge near Ghent Grain Terminal, frequent under guardrail, very numerous seedlings, 22 November 1992, F. Verloove 813 (BR0000024393737). – Waregem-Zulte, De Piste-De Boksen district, IFBL E2.15.22, bank of intermittently dry brook merging into garden, sandy soil, 29 May 1994, J. Packet (BR0000024393768); apparently present for about three years, possibly introduced with old birdseed or flax waste (J. Packet, pers. comm.). – Ghent, Harbour of Ghent, Sifferdock, IFBL D3.13, sandy verge near EUROSILO granary, numerous specimens, 19 May 1996, F. Verloove 1955 (BR0000024393652). – Maldegem, S side of canal, between Rapenbrug and poplar plantation to the west, IFBL C2.26.11, rough, occasionally grazed ruderal vegetation with raised soil, very abundant, 29 April 1998 (disappeared by 18 August 1998), I. Hoste (private herb.). – Lembeke-Kaprijke, vicinity of Antwerp-Knokke expressway, IFBL C3.21.31, large soil heap, 4 August 1998, W. White (private herb.). – Bruges, harbour, Klein Handelsdok, E side, IFBL C2.22.11, loading quay, numerous, 23 May 1999, F. Verloove 3607 (BR0000011331827). – Lembeke (Nieuwland), just S of expressway, IFBL C3.21.31, soil depot, abundant and widespread, 25 June 1999, I. Hoste (private herb.). – Lichtervelde, IFBL D1.28, railway towpath, 17 August 1999, H. Ruysseveldt 2347 (BR0000024393645). – Ghent, harbour, Kennedylaan exit near Singel, IFBL D3.13.13, ruderal roadside, 7 November 1999, F. Verloove 4028 (BR0000011565536). – Eeklo, Balgerhoeke, near new N49 access, IFBL C2.27.31, recent roadside verge, few specimens, 27 June 2001, F. Verloove 4841 (BR0000011727156).

– Ghent, Evergem, near Ringvaart, IFBL C3.52.41, debris along railway track, several specimens, 26 October 2002, F. Verloove 5270 (BR0000012167210). – Doornkerke, IFBL D2.14, fine gravel near newly built parking, June 2004, H. Ruysseveldt 3615 (GENT). – Ghent (Evergem), corner of R4 and Ringvaart, temporary storage area for building materials, since several years, 15 June 2015, F. Verloove 5987 (BR0000012291298). – Eeklo, OLV-Ten Doorn college, IFBL C2.37.42, contamination in press-potting soil of lettuce seedlings, January 2006, further cultivated in private greenhouse and herbarium specimen taken 10 April 2006, W. White (private herb.). – Lotenhulle (Aalter), S of Malsembossen, IFBL D2.16.44, pasture edge with open vegetation on trampled dry patch, few specimens, 29 April 2007, I. Hoste (BR0000024393621). – Harbour of Ghent, S side of Sifferdock, IFBL D3.13.11, ruderal zone near grain storage, scattered specimens, 5 July 2007, F. Verloove 6699 (BR0000012458837). – Harbour of Ghent, Sprendonk (S-Moervaart), IFBL C3.43.44, sewage plant, 9 September 2012, F. Verloove 9700 (BR0000014439568). – Bruges, Blauwe Toren, Groendienst storage site, IFBL C2.11.23, sandy ruderal terrain, several hundred specimens, 27 April 2014, F. Verloove 10670 (BR0000014439551).

KEMP — Merksplas, Steenweg op Weelde, IFBL B5.27.33, sandy roadside verge, 23 October 1982, A. Vermeijen 82/29 (BR0000024393676; BR0000011565567). – Retie, Obroek farm track, IFBL B6.52.41, field margin, 8 specimens, 14 June 1987, A. Vermeijen 87/5 (BR0000024393669; dupl. GENT). – Arendonk, Huiskens, IFBL B6.52.21, roadside, 5 specimens, 19 June 1987, A. Vermeijen 87/9 (GENT). – Arendonk, Huiskens, IFBL B6.52.23, roadside and E3 bridge, 22 specimens, 19 June 1987, A. Vermeijen 87/8 (BR0000024393683; dupl. GENT). – Heusden, IFBL D6.26.31, soil heaps next to house under construction, mass occurrence (disappeared by 14 January 1988), 12 July 1987, B. Berten s.n. (BR0000024393539). – Retie, farm road near Zwarte Nete, IFBL C6.12.22, maize field margin, 1 specimen, 24 m, 11 July 1988, A. Vermeijen (private herb.). – Kasterlee, gravel road near Kluis, IFBL C5.18.24, sand heap, 1 specimen, 19 m, 22 May 1993, A. Vermeijen 93/3 (BR0000024393546). – Retie, forest road near Beverdonkse Heide, IFBL C6.11.42, pine forest edge, 45 specimens, 21 m, 14 June 1994, A. Vermeijen 94/6 (BR0000024393553). – Retie, gravel road near Sint-Martinusstraat, IFBL C6.12.21, wheat field, locally abundant, 24 m, 15 July 1994, A. Vermeijen 94/9 (BR0000024393560). – Kasterlee, Kluis, IFBL C5.18.22, roadside verge, 1 specimen, 19 m, 19 June 1995, A. Vermeijen 95/3 (BR0000024393577). – Retie, farm road, Kleine Duinberg, IFBL C6.11.24, oat field, 5 specimens, 22 m, 20 June 1995, A. Vermeijen 95/4 (BR0000024393584). – Oud-Turnhout, ruin near Geleeg, IFBL B5.38.32, disturbed clay, 11 specimens, 29 m, 9 July 1995, A. Vermeijen 95/6 (BR0000024393591). – Schoten, Albert Canal, IFBL C4.17.44, waste ground near Beyers grain mill, abundant, 1 June 2000, F. Verloove 4318 (BR0000011711056).

BRA — Meise, National Botanic Garden, near hexagonal building between Plant Palace and Victoria greenhouse, IFBL D4.55.31, heavily shaded lawn, 27 May 1979, E. Robbrecht 1369 (BR0000024393690) (corolla yellow with orange spots between lobes). – Audeghem, IFBL E4.47.11, garden, adventive from birdseed, July 1987, Geerinck-Coutrez 4150 (BR0000024393751).

Nomenclatural notes. The species under consideration was long recognised as *Amsinckia menziesii* (Lehm.) A. Nelson & J.F. Macbr. Lassen (1988) examined the type of its basionym, *Echium menziesii* Lehm., in the MEL herbarium. Lehmann (1830) provided no specimen or locality in the protologue. The MEL specimen (collection 1010643) lacks a date and was designated by Lassen as the lectotype. Its corolla throat features hairy appendages, a character ex-

clusive to *A. lycopsoides*. The phrase in the protologue, “Filamenta brevissima, subaequalis, versus basin tubi inserta,” also aligns more closely with *A. lycopsoides*. This suggests the original material of *A. menziesii* actually pertains to *A. lycopsoides*, though mislabelling prior to mounting may also be possible (Chater 1975).

Nonetheless, Lassen sought the next valid nomenclatural name, which was *A. micrantha*, published by Suksdorf in 1900. Since then, this name has been adopted by nearly all European authors (e.g., Vermeulen 1997, Verloove 2006, Arianoutsou *et al.* 2010, Duistermaat *et al.* 2021, *etc.*; see, however, Kurtto *et al.* 2019, Wilhelm *et al.* 2020, Hassler & Muer 2022). However, because Lassen's publication appeared in a journal with limited circulation and was written in Swedish, his work went largely unnoticed outside Europe, particularly in North America. As a result, in the New World, the species is still referred to as *A. menziesii*, with *A. micrantha* considered one of its heterotypic synonyms (e.g., Welsh *et al.* 2017, [Amsinckiinae Working Group](#); also POWO 2024). Given that the species is predominantly known by the name *A. menziesii* in its native range, it may have been more appropriate to conserve the name *A. menziesii* with a new type.

Taxonomic notes. *Amsinckia micrantha* is morphologically very similar to *A. calycina* (Moris) Chater, the only South American species in the genus. Early observations of *Amsinckia* in Belgium were attributed to *A. angustifolia*, a synonym of *A. calycina*. Reports of *A. calycina* as casual or naturalised occur in Spain (starting with Giráldez 1986), Italy (Galasso *et al.* 2018), and France (Tison & de Foucault 2014), as well as from Germany (Junghans 2014), Poland (Jackowiak *et al.* 2017), Slovakia (Medvecká *et al.* 2012), and Ukraine (Mosyakin & Fedoronchuk 1999). Interestingly, it is typically either *A. calycina* or *A. micrantha* that is cited, rarely both (e.g., Urbisz 2011 for Poland, where *A. micrantha* was only mentioned in an unverifiable record; Hassler & Muer 2022). In other regions of Europe, similar-looking (possibly identical) plants are attributed to *A. micrantha*, with *A. calycina* absent. It remains unclear whether this discrepancy reflects the true distribution or if it is indicative of ongoing confusion between these two species. The reason for assigning these plants to *Amsinckia calycina* (rather than *A. micrantha*) may lie in the treatment of the genus in *Flora Europaea* (Chater 1972). There, the nutlets of *A. calycina* and *A. menziesii* are described as ‘glabrous’ and ‘setulose’, respectively. It is unclear what Chater based this distinction on, but to our knowledge, nutlets in none of the *Amsinckia* species are actually setulose. As a result, this type of plant invariably keys out as *A. calycina*, possibly — if not always — incorrectly.

Lassen (1988) also noted that *A. calycina* is a problematic species. According to him, forms potentially attributable to *A. calycina* are common on wool waste in Great Britain. However, contemporary British floras (e.g., Stace 2019) do not recognise it, and Clement & Foster (1994) stated that it is “greatly over-recorded among its congeners” and that the “true identity of these records remains unresolved”. Still according to Lassen, there was no compelling evidence for its occurrence in the Nordic countries, and a substantial portion of the European material had been misidentified as *A. angustifolia* or *A. hispida*, both now recognised as heterotypic synonyms of *A. calycina*.

Morphologically, *A. micrantha* and *A. calycina* overlap in all key characters given by the [Amsinckiinae Working Group](#): corolla length (3–7 mm in *A. calycina* vs. 4–7 mm in *A. micrantha*) and nutlet length (2–2.8 mm in *A. calycina* vs. 2–3.5 mm in *A. micrantha*). Other distinguishing features mentioned in the literature, such as the presence or absence of bracts in the inflorescence

(Chater 1975), appear to have little diagnostic value. Australian floras describe the nutlets of *A. calycina* as lacking, or exhibiting only weak, transverse wrinkling and possessing less pronounced tubercles ([PlantNet 2025](#); [VicFlora 2025](#)). However, in Chilean specimens housed at BR (e.g., [BR0000027981337](#)), the nutlets display more prominent tubercles along the keel than is typically observed in *A. micrantha*, and the extent of transverse wrinkling also appears to be variable.

The two species are geographically separated, with *A. calycina* native to South America and *A. micrantha* to North America. Despite their close morphological similarity, recent molecular studies have shown that they are genetically distinct (Guilliams 2015).

To verify the identity of the species naturalised in Belgium, a representative specimen of *A. micrantha* from Brugge (collection Verloove F. 10670; [BR0000014439551](#)) was genetically analysed. The *trnL-F* marker clearly clustered the Belgian sample with North American accessions (whether identified as *A. menziesii* or not), rather than with a South American sequence of *A. calycina* from Peru (sequence GQ285246, based on specimen M. Weigend & Ch. Schwarzer 8031 from BSB). The *rps16* marker (sequence KC542699 from the same collection) did not distinguish *A. calycina* from related North American taxa. Interestingly, the ITS marker revealed that a Spanish sample of alleged *A. calycina* (KF849140, based on specimen *Bariego* PB1516 from MA) grouped in a large clade that included both North American taxa and the aforementioned *A. calycina* sample from Peru (sequence KU927645), underscoring the need for multiple markers to resolve species identities.

In conclusion, the species naturalised in Belgium is a North American taxon, most likely *A. micrantha*, rather than the South American *A. calycina*. Further *trnL-F* analyses may clarify the identity of other European populations currently assigned to *A. calycina*.



Figure 16: *Amsinckia micrantha* in the Ghent port area, 1 May 2013. The stem below the inflorescence typically bears only stiff, patent bristles.



Figure 17: *Amsinckia micrantha* in the Ghent port area, 1 May 2013. Compared with *A. intermedia*, which occurs in the same area, the corolla is slightly smaller (with the tube scarcely, if at all, exceeding the sepals), somewhat paler yellow, and lacks distinct red patches. Hairy appendages in the throat—present in *A. lycopsoides*—are absent.

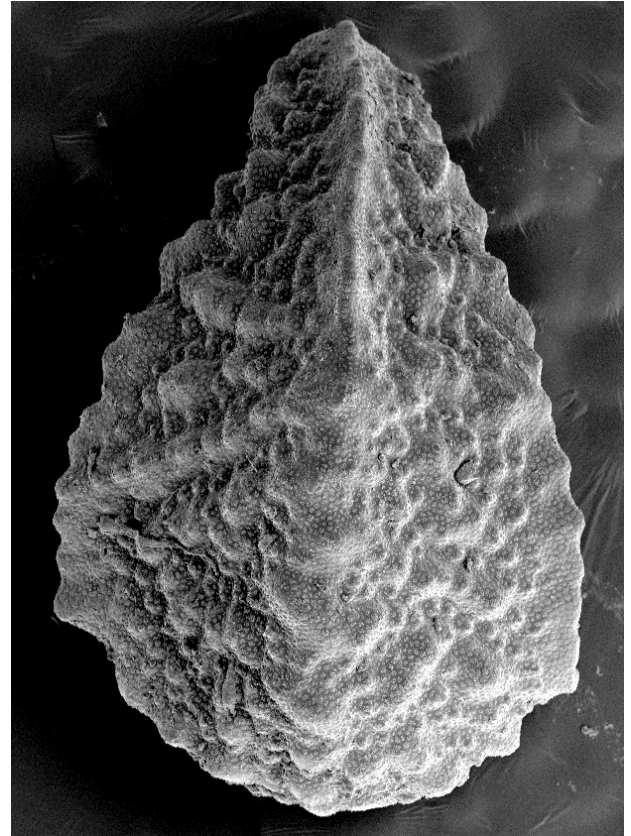


Figure 19: SEM image of a nutlet of *Amsinckia micrantha*, collected by F. Verloove in Evergem in 2005 (BR0000012291298). The surface is irregularly rough, characterised by bluntly conical projections.



Figure 18: *Amsinckia micrantha* in the Ghent port area, 30 April 2017. In this locality, where the species has been known since 1987, it still occurs with thousands of individuals each spring.

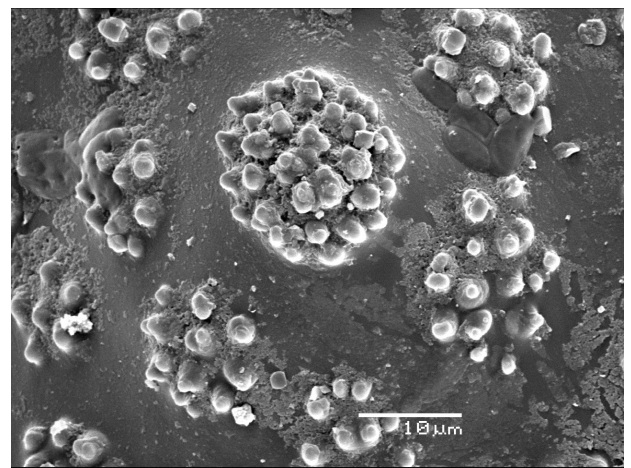


Figure 20: SEM image of the seed coat (detail) of a nutlet of *Amsinckia micrantha* from the Verloove collection. The projections are densely covered with more or less circular fields of stiff, conical mamillae, each bearing one or sometimes multiple papillary tips.

5. *Amsinckia retrorsa* Suksd., Deutsche Bot. Monatsschr. 18: 134 (1900) (Fig. 21-24)

Native range. Western United States (Washington, Oregon, California, Nevada, Idaho, Utah) and southern Canada (British Columbia).

Diagnostic characteristics. *Amsinckia retrorsa* is closely related and morphologically very similar to *A. micrantha*. Some authors have suggested it might better be treated as a variety or synonym of that species (Ray & Chisaki 1957; Cronquist *et al.* 1984). In addition to the long, spreading, stiff bristles characteristic of all species in the genus, the stems of *A. retrorsa* bear numerous short, appressed, usually retrorse hairs, which are most abundant in the

upper portions of the stem, including the inflorescence. The stamens are typically inserted at distinctly unequal levels within the corolla tube. Corollas are very small, only 5–6 mm long and with a limb ca. 1.5 mm wide.

Nutlet morphology. Nutlets are triangular-ovoid with apices less acutely pointed than those of *A. micrantha*. The conical protuberances are more sharply pointed and higher than in *A. micrantha*, and the smaller cones appear brush-like due to aggregated mamillae at the apex. This combination produces a considerably rougher surface texture than that of *A. micrantha*. Wrinkling (rugulosity) is weakly developed, as the protuberances are arranged in a transverse line relative to the fruit's longitudinal axis—less

distinctly so than in *A. micrantha*. Nutlets are slightly larger on average, measuring 2.5–3.5 mm in length.

Occurrence in Belgium. Between 1882 and 1937, *A. retrorsa* was recorded in nearly all phytogeographical districts of Belgium, except the Ardennes and the Lorraine district. The majority of records (over 75%) originated from the Brabant district and the limestone region, predominantly during 1882–1897 and 1920–1926. Repeated findings in different years were documented in Leuven (1882, 1891, 1908, 1916, 1920, 1922), although these may not represent continuous populations. Notably, no specimens of morphologically typical *A. retrorsa* have been collected in Belgium since 1937. A similar temporal decline has been observed in the Netherlands and Scandinavia, with the most recent records dating from the 1930s and 1940s (Lassen 1988; Vermeulen 1997). In contrast, Grøstad & Often (1998) reported more or less persistent populations in southern Norway.

The habitats of *A. retrorsa* are comparable to those of other *Amsinckia* species, such as *A. lycopsoides* and *A. tessellata*, and include fallow fields, wastelands, roadsides and embankments, pastures with haystacks, railway stations, and gravelly riverbanks. Interestingly, herbarium labels make no explicit reference to flour mills—a known vector for related species—although Baguet (1883) noted a collection near a grain mill in Leuven.

Specimens examined (per district).

MAR — Between Furnes and Avecapelle, IFBL Do.18, 2 June 1897, L. Berendonck in herb. C. Francotte ([BR0000009396371](#)). – Oostduinkerke, IFBL Co.58, terre-plein du village, 20 Aug 1926, A. Maréchal (LG).

VL — *Gand, IFBL D3.12, terrain inculte au Petit Dock, 4 May 1922, De Breyne in herb. L. Magnel ([BR00000024393485](#)).

KEMP — Hasselt, IFBL D6.57, prairie, subsontaneous, July 1888, M. Goetsbloets ([BR00000024393454](#)).

BRA — Louvain, IFBL E5.23, Boulevard de Louvain (between Namur and Tervuren roads), May 1882, E. Pâques ([BR00000024393461](#)). – Louvain, IFBL E5.13, uncultivated land, August 1882, C. Baguet (in herb. Lemoine) ([BR00000012547494](#)). – Papignies, IFBL F3.24, mixed with *Lithospermum arvense*, more numerous, 26 May 1884, G. Fontaine ([BR00000024393515](#)). – Schaerbeek, IFBL E4.26, embankment, 22 May 1885, L. Guelton ([BR00000012214877](#)). – Neder-over-Heembeek, IFBL E4.16, rubble, July 1891, P. Troch ([BR00000024393478](#)). – *Louvain, Heverlee, Arenberg Castle estate, IFBL E5.23.14, near haystack site, 1916, P.F. Devyver ([BR00000024393409](#)). – *Louvain, IFBL E5.13, near haystack along road, 1 September 1920, V.N.J. Lambert (LG). – Louvain, ruins, IFBL E5.13, 1920, Mlle J. Terby (in herb. L. Magnel) ([BR00000024393393](#)). – Louvain, Tervuren Boulevard, IFBL E5.13, 1 July 1922, J. Lebrun ([BR00000024393423](#)). – Heverlee, IFBL E5.23, cultivated area, 15 August 1924, J. Lebrun ([BR00000024393386](#)). – Eegenhoven (Leuven), IFBL E5.23, 7 June 1908, E. Michel ([BR00000024393362](#)).

MOSAN — Huy, North Station, IFBL G6.15.32, 5 June 1889, P. Clerbois (in herb. A. Mansion) ([BR00000024393447](#)). – Huy, IFBL G6.15, rubble, June 1889, P.-G. Cluysenaar (in herb. G. Lochenies) ([BR00000024393492](#)). – Huy, IFBL G6.15, rubble, June 1889, P.-G. Cluysenaar (in herb. J.-L. Wathelet) ([BR00000024393522](#)). – Huy, North Station, IFBL G6.15.32, July 1889, A. Mansion (in herb. A. Charlet) (LG). – Bois-Godin, Gerbaut, Vesdre gravel, IFBL F7.57, waste ground, 24 July 1894, P. Halin (LG). – Huy, South Station embankment, IFBL G6.25.12, 18 July 1913, C. Charlet (in herb. H. Henin) (LG). – Nismes, IFBL J5.41, roadside, 19 June 1937, H. Henin (LG).

Taxonomic notes. Specimens exhibiting the characteristic heterogeneous indumentum and stamens inserted at unequal levels within the corolla tube were recorded up to 1937. This species was among the most frequently misidentified in Belgium, and long-term research led to the revision of certain collections. Some collections that were difficult to assign with confidence are marked with an asterisk in the list above. In some cases, stamens were inserted at the same level despite the presence of short retrorse hairs on the stem.

A similar ambiguity is illustrated in recently observed populations of *Amsinckia intermedia* in the port of Ghent. These plants show stem hairiness reminiscent of *A. retrorsa*, but based on corolla size and colour, the uniform insertion height of the stamens, and genetic data (see under *A. intermedia*), these specimens correspond more closely to *A. intermedia*.

All naturalised *Amsinckia* populations in South Africa have been attributed to *A. retrorsa* (Retief & van Wyk 2001). Specimens housed in BR from South Africa display the diagnostic features of the species, including the combination of long, spreading, stiff bristles and short retrorse stem hairs, as well as stamens inserted at slightly different levels within the corolla tube.

Nevertheless, it remains an open question whether *Amsinckia retrorsa* is morphologically distinct enough from *A. micrantha* to warrant recognition at the species level.

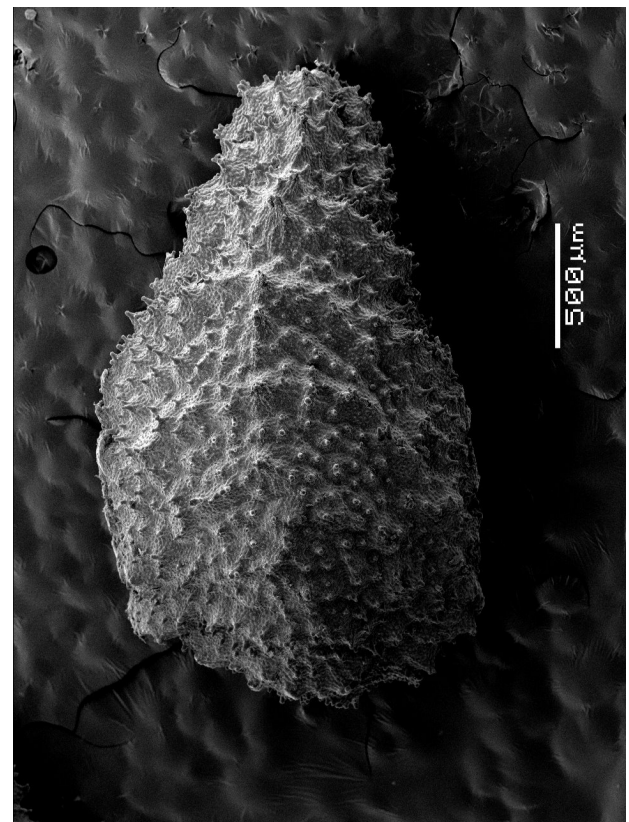


Figure 21: SEM image of a nutlet of *Amsinckia retrorsa*, collected by A. Mansion in Huy in 1885 (herb. LG).

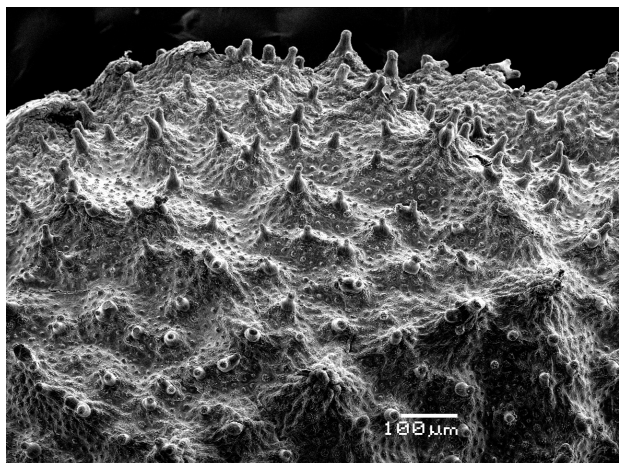


Figure 22: SEM image of the seed coat of a nutlet of *Amsinckia retrorsa* from the A. Mansion collection. The conical protuberances are more sharply pointed and taller than in *A. micrantha*.

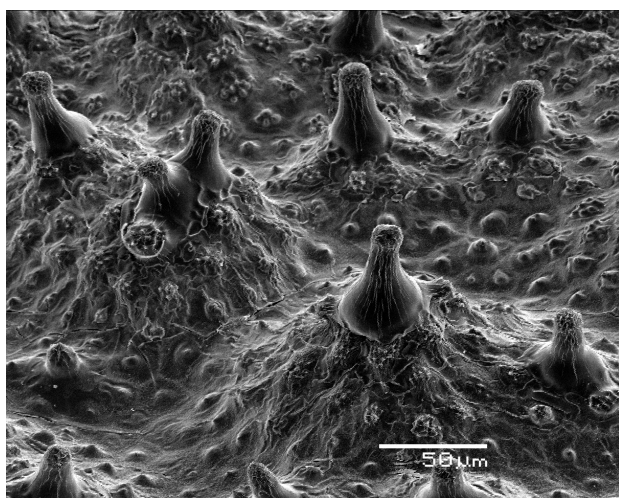


Figure 23: SEM image of the seed coat (detail) of a nutlet of *Amsinckia retrorsa* of the A. Mansion collection. Close-up of the conical protuberances.



Figure 24: Stem indumentum of *Amsinckia retrorsa*, collected in 1889 by Cluytensenaar in Huy. Indumentum with ca. equal numbers of long, stiff, patent bristles and short, appressed, retrorse hairs.

6. *Amsinckia tessellata* A.Gray, Proc. Amer. Acad. Arts 10: 54 (1875) (Fig. 25-26)

Native range. *Amsinckia tessellata* is native to the western and southern United States and northwestern Mexico, with a disjunct, introduced distribution extending to Central Chile and western Argentina.

Diagnostic characteristics. *A. tessellata* is distinguished by its unequal calyx lobes, which are reduced to 2 or 4 due to fusion below the middle and often notched at the tip. The corolla tube typically has 20 veins near the base, in contrast to the 10-veined corollas seen in all other Belgian *Amsinckia* species. The nutlets of *A. tessellata* are generally smoother than those of other species in the genus.

Nutlet morphology. The nutlets of *A. tessellata* are perhaps the most distinctive among the six *Amsinckia* species recorded in Belgium. The specific epithet refers to the “tessellate” pattern of the ornamentation, resembling a mosaic or a cobblestone check-board. The surface consists of blunt, elongated ridges approximately as wide as they are high in cross-section, running across the nutlet. Large, cone-shaped bulges are present but relatively scarce. Micro-ornamentation, as in other species of the genus, consists of densely packed papillary mammillae arranged in clusters.

Occurrence in Belgium. *Amsinckia tessellata* has been recorded only seven or eight times in Belgium, with observations spanning from 1877 to 1953. The species was collected twice in Brussels between 1903 and 1905 (in Schaerbeek and Ixelles), and twice in the Fagne region (in Philippeville and Roly), although nearly 75 years separate these latter records. It was also observed once in the Vesder Valley, a region known for its wool alien flora (Visé 1942, 1958; Verloove *et al.* 2026), though grain aliens have occasionally been recorded there as well (van Ooststroom & Reichgelt 1961b).

Specimens examined.

BRA — Ixelles, IFBL E4.35, in cultivated land, June 1903, *Maj. De Bosschere* ([BR0000024393317](#)). – Schaerbeek, IFBL E4.26, in uncultivated terrain, July 1905, *De Bosschere* (in herb. L. Magnel) ([BR0000024393416](#)).

MOSAN — Philippeville, IFBL J4.18.22, pile of iron slag near the station, 13 Sept. 1877, *G. Polchet* ([BR0000024393355](#)). – Bois-Godin, Gerbaut, gravel from the Vesdre river, IFBL F7.57, uncultivated terrain, 24 July 1894, *P. Halin* (LG). – Roly, IFBL J5.21, rubble, 21 July 1953, *J. Lebeau* s.n. ([BR0000024393331](#)); same collection in herb. *J. Bailly* ([BR0000024393348](#)). – Jamioulx, IFBL H4.16, sown in a garden from seeds collected in Roly in 195? (probably 1953), August 1956, *J. Lebeau* s.n. ([BR0000024393324](#)).

Taxonomic notes.

Amsinckia tessellata is readily distinguished from other *Amsinckia* species found in Europe by a combination of floral and fruit morphological traits. The markedly unequal calyx lobes—typically reduced to two or four by fusion below the midpoint and often notched at the apex—represent a unique character among Belgian *Amsinckia*. Another diagnostic feature is the corolla tube, generally bearing 20 veins near the base, whereas all other regional species display 10-veined corollas.

Nutlet morphology further reinforces its distinctiveness. The tessellate ornamentation of the nutlets, referenced in the species epithet, is characterised by blunt, elongated ridges arranged in a mosaic-like pattern. This surface sculpture is unique among Belgian *Amsinckia* and facilitates reliable identification when mature fruits are available. Unlike the densely muricate nutlets of other *Muricatae* members, *A. tessellata*’s nutlets are comparatively smooth, with large cone-shaped tubercles occurring only sparsely. As in other species of the genus, micro-ornamentation consists of papillary mammillae grouped in dense clusters.



Figure 25: Herbarium specimen of *Amsinckia tessellata*, collected by De Bosschere in Schaarbeek in 1905 and preserved in the herbarium of Meise Botanic Garden (BR0000024393416). As is often the case, the herbarium sheet bears several different names, reflecting the taxonomic difficulties historically encountered in this genus in Belgium.

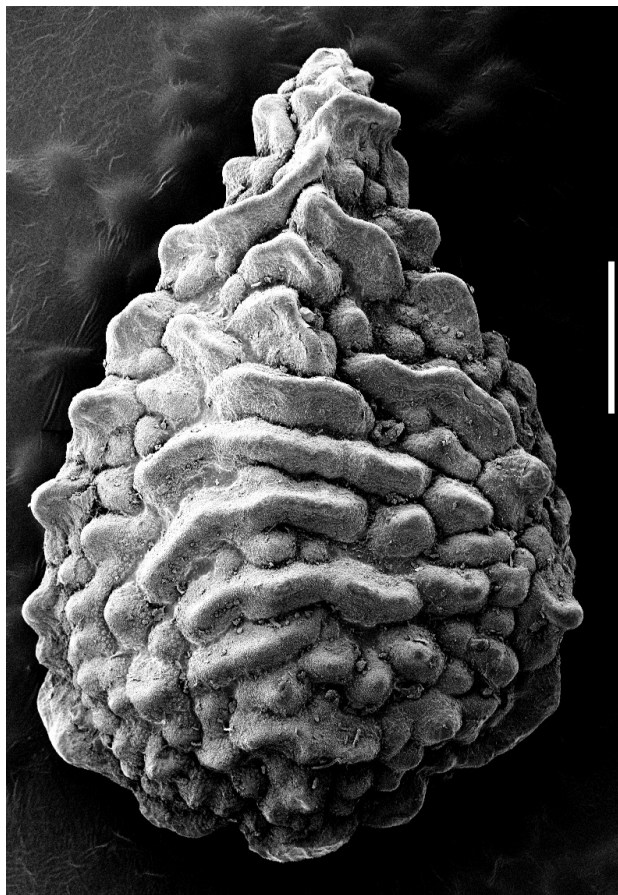


Figure 26: SEM image of a nutlet of *Amsinckia tessellata*, collected by P. Halin in Gerbaut in 1894 (herb. LG). The surface consists of blunt, elongated ridges approximately as wide as they are high in cross-section, running across the nutlet, resembling a mosaic or a cobblestone checkerboard.

Key for the identification of *Amsinckia* in Belgium

1. Calyx lobes unequal in width, (2-)4 from fusion below middle, often notched at the apex. Corolla tube generally 20-veined near base 6. *Amsinckia tessellata*
- 1' Calyx lobes more or less equal in width, 5, not fused above base, not notched. Corolla tube 10-veined near base 2
2. Corolla throat with five hairy appendages, tube constricted in lower ½. Stamens attached below middle of corolla tube, style included. 3. *A. lycopsoides*
- 2' Corolla throat glabrous, without appendages, tube not constricted. Stamens generally attached above middle of corolla tube (if below, then style more or less exserted). 3
3. Corolla 10–20 mm long, limb 8–14 mm wide. Style generally more or less exserted; anthers not appressed to and generally below stigma 1. *A. eastwoodiae*
- 3' Corolla 4–11 mm long, limb 1–10 mm wide. Style not exserted; anthers generally appressed to stigma 4
4. Stem more or less grey, with a mixture of dense and short appressed to reflexed hairs and long patent bristles. Stamens usually attached at markedly different levels in the corolla tube. Corolla small 5. *A. retrorsa*
- 4' Stem green to brown, appressed to reflexed hairs scattered or absent (if present, then corolla large), hairs predominantly long and patent. Stamens attached at the same level in the corolla tube. 5
5. Corolla large, 7–11 mm long, limb 4–10 mm wide, orange-yellow 2. *A. intermedia*

5' Corolla small, 4–7 mm long, limb 1–3 mm wide, yellow.

..... 4. *A. micrantha*

DISCUSSION

As a result of our revision of Belgian herbarium collections, six *Amsinckia* species have been identified: *A. eastwoodiae*, *A. intermedia*, *A. lycopsoides*, *A. micrantha*, *A. retrorsa*, and *A. tessellata*. Of these, *A. eastwoodiae*, *A. retrorsa*, and *A. tessellata* are known only from historical collections, with no records after 1953. *A. intermedia* and *A. lycopsoides*, although primarily recorded in the past, have also been observed more recently, though very rarely. The most recently introduced species is *A. micrantha*, first recorded in 1979. It is the only species that has successfully established itself permanently and can be considered naturalised in Belgium. While some authors have suggested that European plants may belong to the morphologically similar South American *A. calycina*, preliminary genetic analyses support their placement within the North American lineage.

Overall, the identification of the vast majority of specimens proceeded without major difficulty using current taxonomic criteria; only a few collections were challenging to assign. This indicates that, after a long history of taxonomic complexity and controversy, the genus appears to have reached a relative state of stability. Nevertheless, taxonomic challenges persist, particularly within the 'A. menziesii group', which includes *A. intermedia*, *A. micrantha*, and *A. retrorsa*. These species are characterised by small flowers and homostyly, with styles and stamens positioned at roughly the same height, which facilitates self-pollination (autogamy). Such reproductive traits may contribute to blurred species boundaries, both through limited reproductive isolation and through overlapping morphology and genetic homogeneity among species. Consequently, this group is perhaps best regarded as a species complex, accompanied by the usual taxonomic ambiguities.

One area where these difficulties become apparent is in the evaluation of stem hair characteristics. While historical specimens from this complex could usually be identified with relative confidence, more recent collections have proven significantly more difficult to place. The presence of numerous short, retrorse hairs—a feature typically associated with *A. retrorsa*—is sometimes also observed (albeit less prominently) in plants that otherwise resemble *A. intermedia* or even *A. micrantha*. This character thus appears less diagnostic than suggested in some recent treatments (e.g., [Amsinckiinae Working Group](#)). Notably, this nuance had already been acknowledged in the identification key proposed by Cronquist *et al.* (1984). Furthermore, hair type varies markedly depending on which part of the stem is examined. Within a single stem segment (e.g., in the inflorescence), successive zones of antrorse and retrorse pubescence, as well as felt-like hair patterns, may occur in combination with long, patent bristles. Typically, short, more or less appressed hairs are more abundant higher on the stem than at its base. Published treatments differ in which stem region is emphasised: some focus on the section just below the inflorescence (Cronquist *et al.* 1984; Vermeulen 1997; Welsh *et al.* 2017), while others explicitly reference the lower stem (e.g., [Amsinckiinae Working Group](#)).

Nutlet morphology has played a variable role in delimiting *Amsinckia* taxa. In earlier monographic treatments, particularly by American authors (e.g., Macbride 1917), nutlet characters were considered decisive for species identification. More recent floras and keys have emphasised the substantial variation in nutlet sculpture within single species, as noted by Ray & Chisaki (1957).

Nevertheless, nutlets still provide useful taxonomic information (Cronquist *et al.* 1984). In this study, SEM images were taken for all treated species across 20 collections, and subtle but discernible differences are described wherever possible, although these differences are often challenging to define precisely.

Amsinckia species are often perceived as undesirable weeds, both in introduced ranges and within their native North American range. They can compete aggressively with crops, potentially causing yield losses, and in some regions may impact the biodiversity of natural vegetation. This is particularly evident in parts of Australia, where several species are considered invasive, especially in cereal crops (numerous online references). Randall (2017) lists multiple *Amsinckia* species as “weeds,” although in some cases nomenclature remains unclear. Globally, *A. lycopsoides* has been assigned the highest risk score, followed by *A. intermedia*.

In Belgium, however, no *Amsinckia* species have been recorded in arable fields or in natural or semi-natural habitats, such as dunes or heathlands, that might otherwise be suitable. Instead, these species occur exclusively in human-influenced environments, such as wastelands, gardens, and port areas. Consequently, they appear to pose no significant threat to native biodiversity.

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