The seventh edition of the *Nouvelle Flore de la Belgique*: chorological adjustments

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Illustrations: map (Fig. 1) by Wesley Tack and Sven Bellanger.

Abstract. – During the past decade, numerous chorological data on the flora of vascular plants in Belgium and the neighboring areas have been gathered and published. This contribution gives an overview of altered distribution data in the seventh as compared with the sixth edition of the *Nouvelle Flore de la Belgique* which was published in 2012.

Résumé. – La septième édition de la *Nouvelle Flore de la Belgique* : changements chorologiques. Au cours de la dernière décennie, de nombreuses données chorologiques sur la flore vasculaire de la Belgique et celle des régions voisines ont été obtenues et publiées. Cette contribution donne un aperçu des changements de distribution dans la septième par rapport à la sixième édition de la *Nouvelle Flore de la Belgique*, parue en 2012.

Samenvatting. – De zevende editie van de *Nouvelle Flore de la Belgique*: chorologische wijzigingen. In het recente verleden werden veel nieuwe chorologische gegevens met betrekking tot de vaatplantenflora van België en de aangrenzende gebieden verzameld en gepubliceerd. Deze bijdrage biedt een overzicht van de gewijzigde verspreidingsgegevens in de zevende ten opzichte van de zesde editie van de *Nouvelle Flore de la Belgique*, die dateert van 2012.

Introduction

As with the publication of previous editions of the *Nouvelle Flore* (e.g. Delvosalle *et al.* 1988; Lambinon *et al.* 1994; Lambinon 1998; Lambinon 2005; Verloove & Lambinon 2014), an overview is presented of the chorological updates that have been carried out in the seventh edition of the *Nouvelle Flore* (Verloove & Van Rossum 2023a) as compared with the sixth (Lambinon & Verloove 2012). The same updates are also integrated in the fourth edition of the Dutch edition of the Belgian Flora (Verloove & Van Rossum 2023b), which is published a few months before and is identical with the *Nouvelle Flore*.

Since the publication of the sixth edition quite a lot has changed. The main author of the latest editions, Jacques Lambinon, passed away on 14 November 2015 (Fabri & Demoulin 2016, Verloove 2016a). He was the last surviving author of the original team (De Langhe *et al.* 1967). In the course of the preparation of the seventh edition an unprecedented amount of relevant new chorological data became available: several new national and regional Floras, atlases and checklists were published, important scientific (local) databases became publicly accessible and new online observation platforms arose (for details see below). As a result, the regional distribution of numerous taxa could be critically reassessed. For many taxa the distribution data presented in the latest edition of the *Nouvelle Flore* (Lambinon & Verloove 2012) had not or hardly changed as compared with those of the first edition and thus had become seriously outdated.

Materials and methods

During the preparation of the seventh edition, an extraordinary amount of new data became available, all of which were thoroughly checked in order to detect a potential impact on the distribution of taxa in the *Nouvelle Flore*.

Several important new Floras were published whose coverage coincides at least in part with the territory covered by the *Nouvelle Flore*. Table 1 gives a chronological overview of the most relevant publications and indicates their impact on the distribution of taxa.

The following journals were checked for the period 2010-2020 (or, in part, 2021):
- *Adoxa.*
- *Les Barbouillons.*
- *Bulletin de la Société des naturalistes luxembourgeois.*
- *Bulletin de la Société d'Histoire Naturelle de la Moselle.*
- *Bulletin de la Société d'Histoire naturelle des Ardennes.*
- *Bulletin de la Société linnéenne Nord-Picardie.*
- *Bulletin des Naturalistes de Charleroi.*
- *Dumortiera.*

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Table 1. Chronological overview of Floras with at least some territorial coverage that proved relevant for updating the chorological information for certain districts in NF7.

Publication	Bibliographic reference	Main districts impacted
Atlas de la Flore Lorraine	FLORAINE (2013)	Lorr.
Flora Gallica	Tison & de Foucault (2014)	Mar., Boul., Pic., Brab. occ., Lorr., Champ., Ard., Mosan occ., Tert. Par.
Flora der Region Trier	Hand *et al.* (2016)	Eifel centr., Ard. or.
Flora Zeelandica	Meininger (2018)	Mar.
Heukels' Flora van Nederland (24th edition)	Duistermaat (2020)	Mar., Camp., Brab. or., Fluv.
Flora Lotharingia	Vernier (2020)	Lorr.

• *Gorteria.*
• *Le Jouet du Vent.*
• *Natura Mosana.*
• *Les Naturalistes Belges.*
• *Les Nouvelles Archives de la Flore jurassienne et du nord-est de la France*.

At present, several online resources are available that have greatly improved the knowledge on the distribution of taxa. Florabank, a grid-based database on vascular plant distribution in the northern part of Belgium (Flanders and the Brussels Capital region), is now available online through GBIF (https://www.gbif.org/dataset/271c444f-f8d8-4986-b748-e7367755c0c1). Online platforms for the registration of observations such as waarnemingen.be (Belgium) or waarneming.nl (the Netherlands) are mostly based on citizen science and thus subject to errors. However, if critically approached (e.g. only approved records, documented by photographs) these databases are a very valuable additional data source.

The following abbreviations are frequently used throughout the text:
• NF6: the sixth edition of the *Nouvelle Flore* (Lambinon & Verloove 2012).
• AFV: *Atlas van de Flora van Vlaanderen en het Brussels gewest* (Van Landuyt *et al.* 2006).
• AFW: *Atlas de la Flore de Wallonie* (http://biodiversite.wallonie.be/fr/atlas-en-ligne.html?IDD=6056&IDC=807).
• APB: *Manual of the Alien Plants of Belgium* (https://alienplantsbelgium.myspecies.info/).
• H24: the 24th edition of *Heukels' Flora van Nederland* (Duistermaat 2020).
• FG: *Flora Gallica* (Tison & de Foucault 2014).
• FT: *Flora der Region Trier* (Hand *et al.* 2016).
• AFL: *Atlas Flore Lorraine* (FLORAINE 2013; the online version was also checked but no longer available from mid-2021 onwards).
• FZ: *Flora Zeelandica* (Meininger 2018).
• wn.be: waarnemingen.be (https://waarnemingen.be).
• wn.nl: waarneming.nl (https://waarneming.nl).
• Digitale2: database Conservatoire botanique national de Bailleul (https://digitale.cbnbl.org/digitale-rft/site/Authentification.do).
• database CBN Paris: database Conservatoire botanique national du Bassin Parisien (https://cbnbp.mnhn.fr/cbnbp/).
• SI-Flore: database that merges data from the several different 'Conservatoire botanique national', thus presenting distribution maps for the entire French territory (temporarily unavailable online from mid-2021 onwards).
• MNHN-Lux: database Musée National d'Histoire Naturelle Luxembourg (https://mdata.mnhn.lu/).
• Atlas-NL: NDFF Verspreidingsatlas, Nederland (https://www.verspreidingsatlas.nl/vaatplanten)

Frequency:
• CC: très commun (very common).
• C: commun (common).
• AC: assez commun (rather common).
• AR: assez rare (rather rare).
• R: rare (rare).
• RR: très rare (very rare).

Phytogeographical districts (Fig. 1):
• Ard., district ardennais: Ardennes district.
• Boul., district boulonnais: Boulonnais district.
• Brab., district brabançon: Brabant district.
• Camp., district campinien: Campine district.
• Champ., district champenois: Champagne district.
• Eifel centr., district de l'Eifel central: central Eifel district.
• Fl., district flandrien: Flemish district.
• Fluv., sous-district fluviatile: Fluviatile district.
• Lorr., district lorrain: Lorraine district.
• Mar., district maritime: Maritime district.
• Mosan, district mosan: Mosan district.
• Pic., district picard: Picardy district.
• Tert. Par., district du nord-est de l'Ile-de-France: Paris Basin district.

The delimitation of the territory covered by the *Nouvelle Flore* and the boundaries of districts

The territory covered by the *Nouvelle Flore* is shown in Figure 1. In addition to Belgium and the Grand Duchy of Luxembourg it also covers adjacent parts of neighboring countries. In the north, in the Netherlands, the area reaches the (southern border of the) Maas river and is thus relatively straightforward. In the south, river Somme (in southern Picardy, France) is the natural border of the

Territoire de la Flore et districts phytogéographiques

Figure 1. *Delimitation of the territory covered by the* Nouvelle Flore/Flora van België *and the boundaries of the phytogeographical districts.* **Aa***: Aachen;* **An***: Antwerp;* **Br***: Breda;* **Bo***: Boulogne-sur-Mer;* **Bx***: Brussels;* **Ca***: Calais;* **Ch***: Charleroi;* **Du***: Dunkerque;* **Ei***: Eindhoven;* **Ge***: Ghent;* **Ha***: Hasselt;* **Ko***: Kortrijk;* **Li***: Liège;* **Lu***: Luxembourg;* **Ma***: Maastricht;* **Me***: Metz;* **Na***: Nancy;* **Pé***: Péronne;* **Re***: Reims;* **So***: Soissons;* **SQ***: Saint-Quentin;* **Tr***: Troyes;* **Vo***: Vouziers.*

Flora area. However, upstream of Amiens the river turns north whereas the territory covered by the *Nouvelle Flore* extends in a southeastern direction. From there onwards, the southwestern (in Tert. par.) and southern limits (in Champ. and Lorr.) are very unclear, which seriously complicates things (species and/or localities to be added or not). Based on Figure 1, the extreme southern limits of the Flora area are near Troyes in Champ. and Charmes in Lorr. The same difficulties are encountered with the eastern boundaries of the territory. In Lorr. (in France) Lunéville, Château-Salins, etc. are supposed to be at the extreme eastern border. Further north, especially in the (small) German part of the territory, the Eifel centr. is part of the Flora area but in the course of time the interpretation of this district by the successive authors of the *Nouvelle Flore* has changed, leading to species being included that only occur further east, in Osteifel, and thus beyond the territory. As currently understood, the Westeifel corresponds with the eastern part of the Ardennes district (incl. parts of Haute Ardenne, the Schneifel in Germany). Ideally, this northeastern part of Ardennes coincides with the limits of the igneous bedrocks. Further north, in North Eifel, limestone depressions prevail, characterized by a quite different flora. The Eifel centr. of the *Nouvelle Flore*

corresponds with the Prümer Kalkmulde which is in fact the westernmost part of the Osteifel. This Kalkmulde is rather clearly characterized by Devonian limestones surrounded by igneous rocks. Consequently, taxa mentioned for Eifel centr. usually are exclusively calciphilous. As a result of these 'open' eastern borders, species have been included in the *Nouvelle Flore* in the past that only occur beyond its limits, e.g. *Cuscuta gronovii* Willd. ex Schult. in the valley of river Moselle in Germany.

Already from the very beginning (De Langhe *et al.* 1967) the distribution and frequency of taxa in the *Nouvelle Flore* have been presented according to phytogeographical districts. See e.g. Tanghe (1975) for specifications on the Belgian districts and Delvosalle (2011) for the entire territory and even beyond. These have hardly changed in the course of time and are doubtlessly in need of adjustment. In the atlas of the flora of Flanders (AFV) ecoregions were applied rather than phytogeographical districts. Regardless of the fact whether these or ecoregions are used, the limits of some of these clearly need to be reassessed. For instance, in the *Nouvelle Flore* the Maritime district includes both genuine coastal regions (with e.g. sea dunes, slikke, schorre) and the polders, both with a quite characteristic flora. In the Netherlands (Duistermaat 2020) the former constitutes a separate district (Renodunaal), probably correctly so. The Flemish district (Fl.) consists of a very heterogeneous assemblage and in fact seems to be some kind of bin that covers regions that are not easily accommodated in neighboring districts like Mar., Brab. or Camp. For instance, it includes, between Bruges and Ghent, an area with a quite characteristic flora that in fact roughly corresponds with that found in Camp. Also, Van Landuyt *et al.* (2011) already convincingly demonstrated that the Brabant district south of river IJzer has always been incorrectly defined. (The authors of the new edition of the *Nouvelle Flore* were not aware of this publication and therefore it is not taken into account.) Because of the unclear boundaries of Eifel centr., some (calcifuge) species have been mentioned from that district that probably do not belong there. Also, as a result of the dense human population in some parts of the Flora area, the natural vegetation locally has almost completely disappeared and was replaced by a fairly characteristic 'urban' flora, for which purpose a new 'urban district' was suggested by Denters (1999), a district that was applied in contemporary Dutch Floras (Duistermaat 2020). This also appeared from the analysis of Van Landuyt *et al.* l.c.

Results: chorological comments

The species are discussed in the order as they are treated in the Flora; the numbering of the families follows the Flora. The first entry of the name of a genus is in ***bold***.

1. Lycopodiaceae

• ***Huperzia*** *selago* (L.) Bernh. ex Schrank et C.F.P. Mart.: for quite a long time this species was considered to be extinct in Camp. However, since 1999 it has been known again from the Dutch part of that district (wn.nl) and it was reportedly increasing there recently (H24). Subsequently, this species was also rediscovered in the Belgian part of Camp. in 2000 (at the Zilvermeer in Mol). Since 2014 it is also known from a second locality, in Geel-Bel (wn.be). In Lorr. sept., on the contrary, the species seems to have disappeared (wn.be, FG, SI-Flore).

• ***Lycopodiella*** *inundata* (L.) Holub: this species is known since 2006 from several localities in the Dutch part of Mar. (FZ). It was historically known from several localities in Eifel centr. but has completely disappeared there (FT). It is much decreasing everywhere; in Tert. par., for instance, there is only a single extant locality, in the Laonnois area (Digitale2, database CBN Paris).

• ***Lycopodium*** *clavatum* L.: at present, this species is only R in Ard. and Eifel centr., everywhere else it has become RR or even extinct (wn.be, AFW, FT). It has disappeared from Pic. (Digitale2). The situation in Lorr. is unclear: it is certainly still present in Lorr. sept. (e.g. Châtilon, 2017; wn.be). In Lorr. occ. (Argonne) it was reported from two localities by Parent (2002) but a distribution map for France (SI-Flore) does not indicate any localities in Lorr. (idem for FLORAINE 2013). Finally, this species occurs in a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse, near the estuary of river Canche) (SI-Flore) along with, among others, *Rhynchospora alba*, *R. fusca*, *Trichophorum cespitosum*, *Drosera rotundifolia*, *Erica tetralix*, etc. (comm. B. Toussaint, 06.2021).

• *L. annotinum* L.: in Lorr. sept., there is only a single extant locality in the Grand Duchy of Luxembourg (Krippel & Massard 2019). Since 2004, this species is also known from Grandpré in Lorr. occ. (database CBN Paris).

• *L. tristachyum* Pursh: this species was rediscovered in Ard. (Hautes Ard.) in Ovifat in 2015 and its presence there was regularly confirmed subsequently (wn.be).

2. Isoetaceae

• ***Isoetes*** *echinospora* Durieu: this species is only surviving, albeit extremely rare (H24), in Camp. in the Netherlands. It was no longer seen in its unique Belgian site in Diepenbeek after 1995 (Florabank).

3. Selaginellaceae

• ***Selaginella*** *kraussiana* (Kunze) A. Braun: this species is no longer a mere ephemeral escape but tends to naturalize locally, especially in urban areas (e.g. Antwerp, Ghent) (wn.be).

4. Equisetaceae

• ***Equisetum*** *pratense* Ehrh.: previous claims from Lorr. (Grand Duchy of Luxembourg) and Eifel centr. are indeed not confirmed in recent Floras and checklists covering these areas (respectively Colling 2005 and FT). According to MNHN-Lux it was last seen in Luxembourg in 1961.

• *E.* ×*trachyodon* A. Braun (*E. hyemale* L. × *variegatum* Schleich.): a single Dutch locality (in Fluv.) probably still

exists (H24; most recently observed in 2010 according to wn.nl) but is located beyond the limits of the Flora area and thus not relevant. However, this hybrid is also know from the Belgian part of Lorr. (Étalle) where it grows together with the following hybrid (Pétrement *et al.* 2012).

• *E.* ×*moorei* Newman (*E. hyemale* L. × *ramosissimum* Desf.): the possible presence of this hybrid in Lorr. (Étalle) was already referred to in NF6, despite the absence of the second parent species in the area. However, its identity in this locality as well as in several others was subsequently confirmed by morpho-anatomical and cytological studies (Pétrement *et al.* 2012). This hybrid has also been found in several locations in Zeeland (Mar.) in the Netherlands (FZ, H24) and may have been overlooked elsewhere. According to de Winter & Lubienski (2012), *E.* ×*moorei* is in the northwestern part of the Netherlands even more frequent than *E. hyemale*.

• *E. ramosissimum* Desf.: this species is known since 2015 from the Braakman in Zeeland (Mar.), the Netherlands (FZ). It also occurs in several places in Fluv. but only beyond the limits of the Flora area (south of Nijmegen, Sliedrecht).

• *E. variegatum* Schleich. ex F. Weber et D. Mohr: a stable population with 500-1000 individuals was discovered in 2015 in Raimbeaucourt in northwestern France (Duhamel & Delaporte 2017), in Brab. occ., a district from where it was believed to have disappeared. These authors also provide an up-to-date overview of all extant populations in northwestern France. In northeastern France a new population was discovered in an abandoned quarry in Forêt de Morley in Lorr. occ. (Millarakis 2013, FLORAINE 2013).

5. Ophioglossaceae

• ***Ophioglossum*** *vulgatum* L.: this species was considered to be absent or doubtful from Ard.; there are, however, several recent verifiable records, for instance from the wide area south of Barvaux, near Bastogne, etc. (wn.be). From the French part of this district, it was also reported from Thilay by Bizot *et al.* (2016).

• ***Botrychium*** *matricariifolium* (A. Braun ex Döll) Koch: this species is long extinct in Belgium but still present in northeastern France (FG), just outside the Flora area. There are several recent localities in Saint-Avold and between Ham-sous-Varsberg and Haguenau (departments Moselle and Bas-Rhin) (SI-Flore, FLORAINE 2013).

6. Osmundaceae

• ***Osmunda*** *regalis* L.: this species was recorded again in Mosan (e.g. in Comblain-la-Pont: sablière de Larbois) and is still present in Lorr. as well (AFW, wn.be). In the latter district its presence was indeed no longer confirmed in Argonne (Millarakis 2013) but it is still present in several other places in Lorr. (AFL).

7. Hymenophyllaceae

• ***Hymenophyllum*** *tunbrigense* (L.) Smith: in Lorr. nord-or., this very rare species has also been known for decades from Bollendorf in the German part of Gutland, near Echternach but on the other side of the border (FT, Nieschalk & Nieschalk 1964).

• ***Vandenboschia*** *speciosa* (Willd.) Kunkel: this species (exclusively occurring as gametophyte in the Flora area) is not only known from the Grand Duchy of Luxembourg in Lorr. nord-or., but also from adjacent territories in Germany (FT). In Luxembourg, by the end of 2017, it was known from not less than 150 localities (Krippel *et al.* 2018). Also in Ard. it was recently found in new localities. In Belgium, it is at present known from two areas, near Houffalize (valley of river Ourthe) and near Bouillon (valley of river Semois) (AFW, wn.be), whereas in France it is still relatively widespread between Charleville-Mézières and Chooz (valley of river Meuse) (SI-Flore, database CBN Paris). The northernmost localities (near Chooz) are in fact located in Mosan mér. This species is very inconspicuous and may have been overlooked in the past.

8. Salviniaceae

• ***Salvinia*** *auriculata* Aubl.: in addition to Brab., this species was recently also recorded in Mar. (Zeeland), Fl. and Camp. (the Netherlands) (wn.be, wn.nl., FZ). Recent claims of *S. natans* (L.) All. from the Netherlands probably also refer to this species (H24).

• ***Azolla*** *filiculoides* Lam.: in Fl., this species is no longer restricted to the alluvial plain of river Scheldt. It was recently also observed in Butgenbach in Ard. (wn.be), a district from where the species was not previously reported. In the Luxembourg part of this district, it was detected in several lakes in Bourscheid (Krippel & Colling 2010). Since a few years, it is also found in rather numerous localities in the valley of river Marne, in Champ. and Tert. par. (database CBN Paris). In Pic. mér., the species is confined to the valley of river Somme, where it is widespread (SI-Flore). Finally, in French Lorr. this species is no longer restricted to the Metz area but has extended to large parts of the Moselle valley (FLORAINE 2013).

9. Marsileaceae

• ***Pilularia*** *globulifera* L.: contrary to NF6, this species has not disappeared from Brab., Mosan and Ard. (AFW, wn.be). In many of the districts mentioned, however, it has doubtlessly become very rare. In Lorr., for instance, there are almost no records from the past decades (e.g. FLORAINE 2013, wn.be, MNHN-Lux), except for Montcheutin in Argonne, where it was last seen in 2001 (database CBN Paris).

10. Pteridaceae

• ***Adiantum*** *capillus-veneris* L.: in NF6, this exotic fern was only mentioned from Antwerp. In the past years it was discovered in a few other cities as well, especially in Fl. (e.g. in Bruges; wn.be).

12. Cystopteridaceae

• ***Cystopteris*** *fragilis* (L.) Bernh.: in Lorr., this species is

not AC but R and it is not less rare in the western part of the district (FLORAINE 2013).

• ***Gymnocarpium*** *robertianum* (Hoffmann) Newman: the localities in Ostend (Mar.) and Sint-Niklaas (Fl.) are on non-natural substrates (old walls) but just as well 'wild', not 'introduced'. Otherwise, other native ferns found on walls, like *Asplenium ruta-muraria* L., should also be considered as introduced in parts of Flanders where natural rocks are lacking.

13. Aspleniaceae

• ***Asplenium*** ×*murbeckii* Dörfler [*A. ruta-muraria* L. × *septentrionale* (L.) Hoffmann]: this hybrid has also been found in Heid-des-Gattes in Aywaille since 2011 (Mosan or.; wn.be).

• *A. ceterach* L.: this species is apparently slightly expanding. Outside the Mosan and Lorr. districts, it is now considered to be R-RR rather than RR (wn.be).

• *A. scolopendrium* L.: this species has much expanded lately and its distribution and rarity were updated accordingly. It is now considered to be AC-AR in Mar., Boul., Fl., Camp., Pic., Brab., Mosan and Tert. par. (wn.be, SI-Flore, etc.).

• *A. septentrionale* (L.) Hoffmann: a well-known population in Bornem (Fl.), discovered in 1988 already (De Kesel 1991) was apparently overlooked in NF6. A small population consisting of 10-15 individuals persists well on an old wall and its presence there is regularly confirmed (wn.be). The species is also indicated from a single locality in Camp. in the Netherlands (Atlas-NL) from where it doubtlessly has disappeared again, the species being ephemeral in the Netherlands (Denters 2020).

• *A. ruta-muraria* L.: this species has much expanded lately. In Camp. and Ard., it is perhaps indeed slightly less common (as indicated in NF6) but then AC-AR rather than AR-R. The same applies to Champ., where it was considered to be RR in NF6 (wn.be, SI-Flore).

• *A. adiantum-nigrum* L.: also this species is slightly expanding lately. At present, it is not much rarer in many parts of Fl., Brab., etc. than in e.g. Mosan, thus R-RR rather than RR (wn.be).

• *A. trichomanes* L.: like the preceding species, it is expanding lately and is at most AC-AR in most districts. Its subsp. *pachyrachis* (Christ) Lovis et Reichst. has also been reliably recorded from multiple localities in Mar. and Fl. (wn.be), in Camp. (a large population known since 2016 in Rijen, the Netherlands; wn.nl), in Gerolstein in Eifel centr. (FT) and in Côtes de Moselle in French Lorr. (Vernier 2020). In Lorr., subsp. *trichomanes* is not limited to the northeastern part of this district: there are widely scattered localities in the French part of this district as well (FLORAINE 2013, Vernier 2020).

• *A. fontanum* (L.) Bernh.: according to Vernier (2014), this species is a war adventive ("plante obsidionale") in the Flora area that naturally occurs only to the south of it. In all of Lorr., there is only a single extant population, at the Fort du Vieux Canton in Villey-Saint-Etienne (FLORAINE 2013, SI-Flore). The species has disappeared apparently from a locality between Metz and Briey that was mentioned in NF6. In the 19th century it was found in Saint-Denis-lez-Mons (Brab.), along with *A. foreziense* Legrand (Verloove *et al.* 2020c).

• *A. foreziense* Legrand: this species is still present on the quay wall of a canal in Eindhoven but barely survives (Hendrix 2017).

• *A. obovatum* Viv. subsp. *billotii* (F.W. Schultz) O. Bolòs, Vigo, Masalles et Ninot: in Lorr. sept., this taxon also occurred on the German side of the border, in Bollendorf. Its presence there was still confirmed in 1993 but it now perhaps also disappeared there (FT). A historical claim from the French Ardennes (between Aiglemont and Nouzon), as referred to in NF6, is not upheld in contemporary databases covering the area (e.g. database CBN Paris).

17. Thelypteridaceae

• ***Oreopteris*** *limbosperma* (Bellardi ex All.) Holub: in Lorr., this species is not restricted to the northern part of the district: it is also known from the central part of Argonne in Lorr. occ. (Saint-Val 2015; see also FLORAINE 2013).

• ***Thelypteris*** *palustris* Schott: this species is known from a few localities in Champ. (SI-Flore), a district from where the species was not mentioned in NF6.

18. Dryopteridaceae

• ***Polystichum*** *lonchitis* (L.) Roth: this species has been known from a quarry in 't Rooth in Zuid-Limburg (the Netherlands) since 1998 (wn.nl), in Brab. or., a district from where it was not yet mentioned in NF6. The species may recently have disappeared from all its Walloon localities (Jacobs 2019).

• *P. aculeatum* (L.) Roth: this species is expanding lately in the Flora area, especially in areas where it was formerly very rare or even absent, for instance in Fl. It is increasingly often seen in recently planted woodlands, although slightly less regularly so than *P. setiferum* and *Dryopteris affinis* (Lowe) Fraser-Jenkins s.l. In recent years it was discovered in four districts from where it was not yet reported in NF6: Mar., Fl., Camp. and Champ. (wn.be, SI-Flore). The origin of these populations is uncertain: they could be resulting from a recent natural expansion and/or referring to plants escaped from cultivation.

• The same applies to *P. setiferum* (Forssk.) T. Moore ex Woynar. This species was newly recorded in Camp. (wn.be). In many districts, it has become R-RR rather than RR.

• ***Cyrtomium*** C. Presl: two species are more or less established now, *C. fortunei* J. Smith being the predominant species. In addition to the districts already mentioned in NF6, it is also known now from Camp. Whereas early records exclusively referred to urban habitats, the species is recently also increasingly seen in recently planted wood-

lands, along with other rare ferns such as *Dryopteris affinis* s.l., *Polystichum aculeatum* and *P. setiferum*.

• ***Dryopteris*** *affinis* (Lowe) Fraser-Jenkins: this species is expanding recently in the Flora area, especially in areas where it was formerly very rare or even absent, for instance in Fl. It is increasingly often seen in recently planted woodlands, often along with *Polystichum aculeatum* and *P. setiferum*. In recent years it was discovered in two districts from where it was not yet reported in NF6: Mar. and Champ. (wn.be, SI-Flore). The origin of these populations is uncertain: they could result from a recent natural expansion and/or refer to plants escaped from cultivation. In many districts it has become AR-R rather than R. The distribution of the subspecies of *D. affinis* in the Flora area remains to be critically assessed. As a rule, subsp. *borreri* (Newman) Fraser-Jenkins appears to be the least rare but in some regions, for instance in parts of northwestern France, subsp. *affinis* is more frequent (Stien 2019). Subsp. *pseudodisjuncta* (Tavel ex Fraser-Jenkins) Fraser-Jenkins was recently reported from Ard. in the Grand Duchy of Luxembourg (Krippel *et al.* 2018).

• *D. filix-mas* (L.) Schott: in NF6, this species was said to be AR-RR in Mar. and Champ. It is perhaps slightly less common than in the rest of the Flora area but yet at most AC (wn.be, SI-Flore). For comparison, in Zeeland in the Netherlands (Mar.) it is said to be common (FZ).

• *D. carthusiana* (Vill.) H.P. Fuchs: this species is only slightly less common in Champ. In Pic. and Mar. it is not rarer than in the other districts (wn.be, SI-Flore, FZ).

19. Polypodiaceae

• ***Polypodium*** *interjectum* Shivas: this species is not AR but completely absent from Eifel centr. (FT).

20. Ginkgoaceae

• ***Ginkgo*** *biloba* L.: this ornamental tree is also very rarely recorded as an escape from cultivation (a few records; wn.be).

22. Pinaceae

• ***Pinus*** *sylvestris* L.: in NF6, this species was said to be probably native in at least part of the Grand Duchy of Luxembourg. This is based on Diederich & Schweninger (1990). FT doubts this, especially because of the complete lack of historical observations in an otherwise well-studied region.

• Several ornamental species from the Pinaceae family that were exclusively known in cultivation in the Flora area were recently observed to reproduce sexually: *Pinus wallichiana* A.B. Jackson (scattered records since 2012), *Picea omorika* (Pančič) Purkyně (regularly observed since 2013) and *Abies nordmanniana* (Steven) Spach (regularly observed since 2009) (all from wn.be).

24. Cupressaceae

• ***Juniperus*** *communis* L.: in addition to populations found in the wild in the Flora area, this species is also sometimes recorded as an escape from or relic of former cultivation (wn.be). In Camp., it is not confined to or less rare in the eastern part of this district than in the rest of it, it is more or less evenly spread in the entire district, both in Belgium and in the Netherlands (wn.be, wn.nl). Some of these populations may, however, refer to deliberate introductions as the species is sometimes planted by the Agency for Nature and Forests.

25. Taxaceae

• ***Taxus*** *baccata* L.: this species is not 'sometimes' but 'commonly' planted as an ornamental. As a result, this species is now much more common as an escaped or naturalized exotic than as a native species.

26. Cabombaceae

• ***Cabomba*** *caroliniana* A. Gray: in NF6, this American aquatic weed was said to be sometimes introduced in Brab. centr. and Fluv. (exclusively in the Netherlands). By now it has naturalized in several additional localities, not only in the aforementioned districts, but also in Fl. and Camp. (wn.be, wn.nl). It is considered to be an invasive species (Scheers *et al.* 2016, 2019).

27. Nymphaeaceae

• ***Nymphaea*** *alba* L. subsp. *occidentalis* (Ostenf.) Hyl.: in NF6, this subspecies was mentioned from the French districts Pic., Lorr. and Tert. par. However, contemporary Floras and databases covering these areas do no longer refer to it (e.g. Filoche *et al.* 2010, FLORAINE 2013, SI-Flore, Digitale2), its presence – at least in Pic. – is therefore considered to be doubtful or erroneous. The question, above all, is whether or not this subspecies can be reliably distinguished from subsp. *alba*.

28. Saururaceae

• ***Saururus*** *cernuus* L.: is no longer 'rarely' but increasingly seen as an escape from cultivation. In addition to the districts already mentioned in NF6, it is now also known from Camp. and Mosan (wn.be, wn.nl).

33. Acoraceae

• ***Acorus*** *calamus* L. was said to be indigenous in NF6; it is, however, merely naturalized in the Flora area.

34. Araceae

• ***Arum*** *maculatum* L.: in Mar., Fl. and Camp. this species has increased lately (although perhaps at least part of these new populations refer to escapes from cultivation): it is now AR-R rather than RR (wn.be).

• *A. italicum* Mill.: the increase of this alien is even more spectacular, it has become less rare in all districts. It is least rare now in Mar., Fl., Boul., Pic. and Brab. (AR) and R-RR in Camp., Mosan, Ard., Lorr., Champ. and Tert. par. (wn.be, wn.nl, SI-Flore).

• ***Wolffia*** *columbiana* H. Karst.: this American species of *Wolffia* Hork. ex Schleid. has been recorded recently in

Camp. and Brab. (Hendrickx & Verloove 2019, Lecron *et al.* 2021). It is locally naturalized, fast spreading (especially in the Dutch part of the Flora area) and probably often overlooked, owing to the confusion with the native species *W. arrhiza* (L.) Hork. ex Wimm.

• ***Lemna*** *turionifera* Landolt: there are various reliable records from Fluv. (Lanaken, Stokkem, Uikhoven, Kessenich; wn.be) and the species was recently also recorded in several localities in the Aisne valley in Champ. (Le Gloanec *et al.* 2019), two districts from where the species was not yet reported in NF6.

• *L. minuta* Kunth: this alien species is much expanding lately in the Flora area. In Mar., Fl., Camp. and Brab., it is now AC-AR (instead of AR), whereas in northern France it is also known from several localities in Champ. and Tert. par. (SI-Flore), two districts from where it was not yet known.

• ***Spirodela*** *polyrhiza* (L.) Schleid.: this species too is on the rise and much less rare than indicated in Ard. (see e.g. Krippel & Colling 2012 for the Grand Duchy of Luxembourg), AR-R rather than R-RR.

35. Alismataceae

• ***Sagittaria*** *latifolia* Willd.: this American ornamental is steadily increasing in the Flora area. It is now also known from Camp. and Brab. (wn.be) and is R-RR rather than RR throughout our territory. In Lorr., it does not only occur in the extreme south of the district but also further north, for example in Woëvre (Vernier 2020).

• ***Luronium*** *natans* (L.) Rafin.: this very rare species was recently discovered near Marche-en-Famenne in Mosan mér. and near the Luchy lakes in Ard., two districts from where it was not yet known. In all of Lorr., the species is currently only known from Belgium and the Grand Duchy of Luxembourg and possibly nearly extinct there as well (last seen in Luxembourg in 2002) (Saintenoy-Simon 2012, FLORAINE 2013, Vernier 2020, wn.be, AFW, MNHN-Lux). In Champ., this species persists in a few localities near Épernay (SI-Flore).

• ***Baldellia*** *repens* (Lam.) Ooststr. ex Lawalrée subsp. *cavanillesii* (Molina Abril, Galán de Mera, Pizarro et Sardinero) Talavera: claims from Mar. mér. are considered to be doubtful or erroneous (SI-Flore, Digitale2), whereas in Lorr. (in Belgium, the Grand Duchy of Luxembourg and France) this rare taxon has completely disappeared a long time ago already (wn.be, AFW, FLORAINE 2013, Vernier 2020, MNHN-Lux, SI-Flore). In 2018, it was discovered in Beernem in Fl. (Gevaerts nature reserve, presence confirmed in 2020; wn.be). It is also known from at least one extant locality in Tert. Par. (Mesnil-sur-Oger), from where it was already reported at the end of the 19th century (database CBN Paris).

37. Hydrocharitaceae

• ***Egeria*** *densa* Planch.: this exotic aquatic weed is not only found as a casual escape from cultivation: more or less naturalized populations are currently known from scattered localities in the Flora area, especially in Fl. and Camp. (wn.be). The species has also been recorded elsewhere, for instance in the Marne valley near Châlons-en-Champagne in Champ. (SI-Flore) and in Montagne de Reims (Tert. par.) (database CBN Paris).

• ***Hydrocharis*** *morsus-ranae* L.: although the natural populations of this species are clearly declining, it is frequently cultivated nowadays and easily escapes, which can make it difficult to correctly estimate the natural distribution of the species.

• ***Elodea*** *callitrichoides* (L.C.M. Rich.) Caspary: although the genuine presence of this North American species in the Flora area was formally rejected by Vanderpoorten *et al.* (2000), it was recently reported again from Lorr. by FLORAINE (2013) for the Moselle river between Metz and Nancy (contrary to Vernier 2020). According to FG, the species has only been confirmed in northeastern France from Alsace.

• *E. canadensis* Michaux: this North American weed has become much rarer than *E. nuttallii* (Planch.) St John (wn.be, SI-Flore, etc.), which was not apparent from the description of their distribution in NF6. *E. canadensis*, previously said to be AC-AR in most of the Flora area, is now considered to be AR in Mar., Boul., Fl., Camp., Pic., Brab., Fluv., Lorr., Champ., Tert. par. and RR or absent elsewhere.

• *E. nuttallii* (Planch.) St John: this species was said to be absent in Eifel centr.; however, it is reported from there in FT.

• ***Lagarosiphon*** *major* (Ridley) Moss: this African aquatic weed was recently also recorded in several localities in Champ. and Tert. par. (Le Gloanec *et al.* 2019, SI-Flore), two districts from where it was not yet reported in NF6.

• ***Stratiotes*** *aloides* L.: this species is often introduced on purpose, which may make it difficult to correctly estimate the natural distribution of the species in the future. In Belgium, most occurrences outsides the Scheldt alluvium are introductions and even within the historical range (re-)introductions are common (comm. W. Van Landuyt 11.2022).

• ***Vallisneria*** *spiralis* L.: this species is also known from Camp. (scattered populations, especially in the Mol area in Belgium and a few localities in the Netherlands as well; wn.be, wn.nl), a district from where it was not yet reported in NF6. The same applies to Champ. where it has become widespread in the valley of river Marne (database CBN Paris), doubtlessly as an expansion of the species' known distribution in this river valley in the adjacent Tert. par. district. Still in Champ., it is also known from the Aisne valley. In some of the districts enumerated in NF6 the species doubtlessly has disappeared. This certainly applies to Brab. occ. (Douai) where the species was last observed in 1952 according to SI-Flore. In areas where the species is increasing exotic lookalikes may be involved, especially *V. australis* S.W.L. Jacobs et Les (Mesterházy *et al.* 2021).

• ***Najas*** *marina* L.: this species is expanding lately and is now also known from a locality in Fl. (Vloetemveld in Zedelgem, since 2017; wn.be). In Fluv., it is no longer restricted to the northern (Dutch) part of this district: the species currently occurs more or less throughout the district, also in its Belgian part (wn.be).

• *N. minor* All.: in NF6, this species was reported from Lorr. or. However, in this district it was recently also found in Lorr. occ. (Argonne: Châtrices) (Saint-Val 2018). FLORAINE (2013) and SI-Flore even lists several locations spread across the district. The species is also still present in Tert. par. (SI-Flore), a district from where it was thought to have disappeared. In Camp., on the contrary, where it was known since 1992 from the Eindhovensch canal (the Netherlands), it may have disappeared recently (last seen there, in very small numbers, in 2017; comm. J. Bruinsma, 08.2021).

38. Scheuchzeriaceae

• ***Scheuchzeria*** *palustris* L.: this species was said to be RR in Camp. but this only applies to the Dutch part of this district where it is still known from a single locality in Noord-Brabant (Atlas-NL, H24; wn.nl, on the contrary, does not provide any records from that province, perhaps it has disappeared there as well lately). In the Belgian part of Camp., however, it was last seen in 1974 and is thus long extinct (Willems *et al.* 1975, AFV).

39. Aponogetonaceae

• ***Aponogeton*** *distachyos* L. f.: this African aquatic ornamental was mentioned in NF6 from a single locality in Ard. occ. (Couvin), where it was moreover introduced on purpose, and from Camp. Since then this species was recorded in several additional localities, also in Brab. (wn.be). In some localities, for instance in the valley of Zwarte Beek in Camp., it has persisted at least since 2012 (wn.be).

40. Juncaginaceae

• ***Triglochin*** *palustris* L.: this species was not mentioned in NF6 from Fl. In fact, since 1972, it has been recorded in at least 15 km² squares, recently for instance from Oostkamp (Leiemeersen nature reserve), Gent (Bourgoyen-Ossemeersen nature reserve) and Wachtebeke (Florabank, wn.be). In general, however, this species is declining: in Tert. par., it only survives in the Laonnois and it may have completely disappeared from Champ. (Digitale2, database CBN Paris).

• *T. maritima* L.: this species from saline soils is sometimes observed as an introduction, e.g. in Camp. (Eindhout) and Brab. (Avelgem) (wn.be).

41. Zosteraceae

• ***Zostera*** *marina* L.: this species is indeed known from the Scheldt estuary (Mar.) but only from its Dutch part. The species is occasionally observed along the Belgian coast as well, washed up on the beach (especially between Blankenberge and Knokke; wn.be), but this exclusively refers to detached plant fragments. In the estuary of river Somme in France, the species seems to have disappeared a long time ago already (SI-Flore, Digitale2).

• *Z. noltei* Hornem.: this species is indeed known from the Scheldt estuary (Mar.) but only from its Dutch part (FZ).

42. Potamogetonaceae

• ***Groenlandia*** *densa* (L.) Fourr.: in NF6, this species was said to be AR-R in Fluv. However, this only applies to the Dutch part of this district (there is not a single record in its Belgian part) and even in the Netherlands there are hardly any records (wn.be, wn.nl.).

• ***Potamogeton*** *compressus* L.: is decreasing, also in Fluv. in the Netherlands, where it has become R rather than AR (H24).

• *P. friesii* Rupr.: this species is much decreasing lately and seems to have completely disappeared in Mar., Fl. and Brab. (wn.be, FZ). The species is still present in northwestern France (SI-Flore), in scattered locations in Camp. and a few in Fluv. (wn.be, H24, Atlas-NL) from where it was not yet mentioned in NF6.

• *P. obtusifolius* Mert. et Koch: there are only a few localities left in Fl. (wn.be), only a fraction of the number of localities in Camp. Thus, in Fl. this species has become RR instead of R.

• *P. pusillus* L.: the species' distribution and frequency is comparable in Mar., Fl. and Camp. (AC-AR), it is not rarer in the latter two as indicated in NF6 (wn.be).

• *P. berchtoldii* Fieb.: this species was not mentioned from Fl. in NF6 although it is present in several localities around Bruges and Antwerp (wn.be).

• *P. perfoliatus* L.: this species is by far least rare in Camp. and Fluv., rather than in the valleys of the bigger rivers as stated in NF6 (wn.be, wn.nl).

• *P. alpinus* Balb.: this species has become RR everywhere, including in Ard. and Lorr. (SI-Flore, wn.be, MNHN-Lux). In Lorr., however, it is not restricted to the northern part of this district: there is a locality northwest of Toul (FLORAINE 2013). Similarly, in Brab., this species is no longer limited to the French part of this district since, for several years now, there is a confirmed population in Vorsdonkbos in Betekom (wn.be).

• *P. praelongus* Wulfen: this species has also disappeared from Fluv. in the Netherlands (H24, wn.nl) and only persists near Breda (Camp.) in the Dutch part of the Flora area.

• *P. lucens* L.: in the Flora area, this species is least rare in Fluv. However, this only applies to the Dutch part of this district; in the Belgian part there are only two recent records (wn.be).

• *P. gramineus* L.: this species was mentioned from Mar. mér. in NF6. It is indeed absent from the Belgian part of this district but has been known for several decades from Schouwen-Duiveland in the Netherlands (Mar. sept.;

FZ). In Fluv., it exclusively (not predominantly) occurs in the Dutch part of this district. There are also scattered records from Champ. (e.g. from Loisy-en-Brie; database CBN Paris), a district left unmentioned in NF6. In NF6, for Tert. par., this species was said to be RR/have disappeared. In reality, it is still present there, at least in the Laonnois (Digitale2).

• *P.* ×*angustifolius* J. Presl: in the entire Flora area there is only one extant location, in the 's Hertogenbosch area in the Netherlands (wn.nl); it is extinct from Belgium (Overmere) for decades already. At (or rather just beyond?) the Flora limits, in Champ. mér., it is still known from several localities at Lac d'Auzon-Temple (Parc Naturel de la Forêt d'Orient; database CBN Paris).

• *P. natans* L.: this species is not RR in Mar. In Belgium, the species is fairly widespread along the coast and also in Zeeland in the Netherlands it is not rare and even increasing (FZ). The same probably applies to Eifel. centr. where it is definitely less rare than indicated in NF6; in the entire Trier area, incl. Eifel centr., it is by far the most widespread *Potamogeton* species (FT).

• *P. coloratus* Hornem.: this species was thought to be extinct in Camp. but it is still present there. There are, for instance, several recent localities in the Lille area (wn.be).

• *P. nodosus* Poiret: this species was discovered in 2009 (and subsequently regularly confirmed) in Bachte-Maria-Leerne (Deinze) in Fl. In Camp., it is not restricted to the Dutch part of this district: there are several localities in the Belgian Noorderkempen (wn.be). In Champ., it is also known from river Marne, not only from river Aisne (database CBN Paris).

• ***Stuckenia*** *pectinata* (L.) Börner: this species is less rare than indicated in Fl., Camp. and Brab. (AC-AR, rather than AR) (wn.be).

• ***Zannichellia*** *palustris* L. subsp. *major* (Hartm.) v. Ooststr. et Reichg.: in NF6, a historical claim from Zeeland was said to be doubtful. However, there are apparently no doubts about this record but it was last observed in 1933 (H24, FZ).

43. Ruppiaceae

• ***Ruppia*** *maritima* L. and *R. cirrhosa* (Petagna) Grande: after having regressed sharply and even supposed to be probably extinct in the Flora area, these two species were recently found again in Mar., between Calais and Dunkerque (France), in Knokke (Zwin, Dievegatkreek; Belgium) and in several places in Zeeland (the Netherlands) as well (SI-Flore, Digitale2, FZ, wn.be).

45. Dioscoreaceae

• ***Tamus*** *communis* L.: in NF6, this species was said to be absent in Brab. east of river Dyle. There are, however, at least two localities in the Sint-Pietersberg area, in Brab. or. (AFW, wn.be). In addition to the districts enumerated, the species is very rarely seen elsewhere, e.g. in Ard. (Our; AFW).

49. Liliaceae

• ***Erythronium*** *dens-canis* L.: this species, merely cited as a cultivated ornamental in NF6, was recently also observed as an escape (Melle, 2019; wn.be).

• ***Tulipa*** *sylvestris* L.: near Antwerp, all populations, including the most northerly which is located in the Rivierenhof in Deurne (IFBL C4.27) (wn.be), are in Fl. and not in Mar. This species has possibly disappeared in Souastre in Pic. (last seen there in 1993 according to SI-Flore, no reports in Digitale2). There were several other localities in Pic. but the species was not confirmed there recently either. According to SI-Flore, the species also occurs in Brab. occ., near Saint-Omer, and here and there in Champ. (e.g. known since 1884 from L'Épine; database CBN Paris, see also Thévenin *et al.* 2008). The status and distribution of this species in the Flora area are complicated: current-day records are a mixture of (rather few) historical, naturalized populations and an increasing number of escapes or relics of cultivation.

• ***Fritillaria*** *meleagris* L.: this species was rediscovered in the wild in Belgium in 2021. A single plant was found in Warneton (wn.be), just opposite the well-known population of Frelinghien in France. Although almost extinct in the wild in Belgium, this species is sometimes introduced voluntarily (including in nature reserves) and could naturalize locally. As a result, it is not always easy to correctly assess the status (introduced vs. potentially wild) of newly discovered populations. A small population discovered in 2010 in the Kalkense Meersen, in a hay meadow in the valley of river Scheldt, might as well refer to a natural occurrence. The same may apply to recently detected populations in the Damvallei in Destelbergen (wn.be). However, even populations from unimproved floodplain meadows are considered doubtfully native, at least in the British Isles (Walker 2021).

• *F. imperialis* L.: this species, cited as a merely cultivated ornamental in NF6, is also regularly observed as an escape, at least since 1995 (wn.be).

• ***Gagea*** *pratensis* (Pers.) Dum.: this species is known from the Belgian part of Brab. (Zoutleeuw) since 1998. In the same district, it was also recorded in Zuid-Limburg in the Netherlands, in 2008 and 2009 (H24, wn.nl), but it is unknown whether or not it is still present there.

• *G. villosa* (Bieb.) Sweet: in NF6, this species was said to have disappeared from the Belgian part of Brab. There are, however, several localities east of Brussels (wn.be). The species probably disappeared from Champ. The only recent record in the wide area is located in Montagne de Reims (SI-Flore) and thus in Tert. par. Near Châlons-en-Champagne it was last seen in 1925 (database CBN Paris).

• ***Lilium*** *martagon* L.: in Pic. mér., near Amiens, the species was apparently last seen in 1998 and thus may have disappeared from that district (SI-Flore).

50. Orchidaceae

• The intergeneric hybrid *Dactylorhiza fuchsii* (Druce)

Soó × *Gymnadenia conopsea* (L.) R. Brown [×*Dactylodenia st-quintinii* (Godf.) J. Duvigneaud] has recently also been recorded in two locations in the vicinity of the Sint-Pietersberg (Brab. or.), one in the Netherlands (Voerendaal), the other in Wallonia (Thier à la Tombe). These records were extensively documented by Baeten *et al.* (2011) and Meijrink & Engels (2009). In addition, this hybrid is also known for several years from the Torfbroek nature reserve in Nederokkerzeel in Brab. centr. (wn.be).

• ***Cypripedium*** *calceolus* L.: in Lorr., this species survives in a single locality in the southern part of the district, near Toul (FLORAINE 2013, Dirwimmer *et al.* 2016).

• ***Cephalanthera*** *rubra* (L.) L.C.M. Rich.: this species has completely disappeared in Eifel centr. (FT) and is also strongly declining in Tert. par. According to SI-Flore, there are no records in the last 20 years from the latter district and its actual presence there requires confirmation.

• *C. damasonium* (Mill.) Druce: this species is also known from a single locality in Fl. (Moerzeke, since 2014; wn.be). In Brab., it is not restricted to the eastern part of the district (Brab. or.): the species occurs in abandoned quarries in several places in the Mons area (Brab. occ.) and in Brab. centr. it is known for at least 20 years from Hoegaarden (e.g. Rosdel) (wn.be). In Mar., this species is no longer limited to the southern part of the district: Kreutz (2019) reports two localities in Zeeuws-Vlaanderen in the Netherlands and one on the Belgian coast.

• *C. longifolia* (L.) Fritsch: this species is also known from a single locality in Fl., in Tielrode, from where it has been known at least since the 1990s (wn.be; see also Kreutz 2019). Likewise, it also occurs in Champ. (e.g. Grandville; database CBN Paris), another district not yet mentioned in NF6. The species may have disappeared, on the contrary, from the northwestern portion of Fluv., from where it has no longer been recorded since 2000 (Kreutz 2019).

• ***Epipactis*** *dunensis* (T. and T.A. Steph.) Godf.: a reference in NF6 to this very narrow British endemic, that was formerly erroneously reported from the Flora area, was removed.

• *E. palustris* (L.) Crantz: in damp meadows in dunes in Mar., this species is currently not rare at all (hundreds of thousands of individuals; present in 30 km² squares on the Belgian coast alone; comm. M. Leten, 10.2022). It has become at most AR, rather than R (also compare with H24).

• *E. atrorubens* (Hoffmann) Besser: this species was discovered in Hoboken in Fl. in 2003 (Kreutz 2019, AFV).

• *E. microphylla* (Ehrh.) Swartz: this species is also known from the Épernay area in Champ. (Avenay-Val-d'Or; SI-Flore, database CBN Paris). According to Kreutz (2019) it is much declining lately. In Belgium there is probably only a single extant population (in Lavaux-Sainte-Anne) whereas it may have completely disappeared from the Grand Duchy of Luxembourg. Kreutz l.c. (distribution map) also indicated a record from Belgian Camp. But this likely was an error (not mentioned in the accompanying text).

• *E. helleborine* (L.) Crantz subsp. *helleborine*: in Mar., this subspecies is rather R than AC-AR (comm. M. Leten, 10.2022).

• *E. helleborine* (L.) Crantz subsp. *neerlandica* (Verm.) Buttler: in NF6, this subspecies was said to occur in fixed coastal dunes. In fact, its preferred habitat is precisely in dynamic dunes, in or near the latest phase of development of thickets of *Salix repens*. The decrease in the dynamics in coastal dunes is a major threat for this taxon (comm. M. Leten, 10.2022).

• *E. purpurata* Smith: this species was already known from Brab. occ. It is interesting, however, that it has also been known for several years from at least three locations in the Flemish Ardennes (surroundings of Oudenaarde, Ronse and Geraardsbergen), from where it has been known since 1997 (Kreutz 2019). Previously, this species was completely absent from Flanders (AFV). In Mar. mér., is has disappeared a long time ago already, the latest record dating back to 1960 (Digitale2, SI-Flore).

• *E. muelleri* Godf.: in Brab. or., this species only occurs in the Netherlands (H24, Kreutz 2019). Kreutz l.c. also indicated a few records of this species from Haute Ard. but these are non-substantiated records from wn.be that require confirmation. There are a few records from Champ. (e.g. Sompuis; database CBN Paris), a district not yet mentioned in NF6.

• *E. leptochila* (Godf.) Godf.: this species has completely disappeared in Eifel centr. (it is still present in Osteifel on Devonian limestone but beyond the limits of the Flora area; FT). It is perhaps overlooked elsewhere: it has been known for some years from the southern cuesta of the Boulonnais, the Forêt de Guînes (Pic. occ.) and the Avesnois (Mosan occ.) (Digitale2). In Mosan. mér. the species occurs in two regions: the Viroin and the wider Rochefort area (wn.be). It is by far least rare now in the central Calestienne area in Mosan (Mariamé & Delforge 2013).

• *E. leptochila* subsp. *leptochila* var. *cleistogama* (C. Thomas) D.P. Young: this variety is not only known from the Grand Duchy of Luxembourg but also from Mosan occ. (Virelles) (Kreutz 2019).

• ***Epipogium*** *aphyllum* Swartz: there were uncertainties about the distribution of this species in Lorr. in NF6. It is still present in the Grand Duchy of Luxembourg (Colling 2005, Kreutz 2019), although it is not seen in some years (Krippel & Colling 2010), whereas it has disappeared from the French part of this district (FLORAINE 2013, Dirwimmer *et al.* 2016). In northeastern France it is present only to the south of Épinal, beyond the boundaries of the Flora area.

• ***Spiranthes*** *aestivalis* (Poiret) L.C.M. Rich.: this very rare species has completely disappeared from the Flora area, the most recent growing sites, in Mar. mér., dating

back to 1985 (SI-Flore). The nearest extant populations are in Normandie in France (Kreutz 2019).

• *S. spiralis* (L.) Chevall.: in 2015, this species was discovered in Sexey-aux-Forges, south of Nancy, in Lorr. mér. (Dirwimmer *et al.* 2016), a district from where it was assumed to have disappeared. Although this species is RR throughout the Flora area and much decreasing, it sometimes occurs in genuinely massive stands, e.g. at least 100,000 flowering individuals on the Hompelvoet island in Mar. sept. (comm. M. Leten, 10.2022).

• ***Limodorum*** *abortivum* (L.) Swartz: this species is not extinct in its unique locality in Mosan (Viroinval: Les Rivelottes; http://biodiversite.wallonie.be/), although the species is not seen every year (Delforge *et al.* 2011, Kreutz 2019).

• ***Neottia*** *nidus-avis* (L.) L.C.M. Rich.: this species is RR or even absent outside the enumerated districts. This applies, for example, to Fl. where the species was observed in 2019 in Sint-Niklaas (wn.be) and since 2016 it is also known from an abandoned coal mining site in Camp. or. (Eisden). Kreutz (2019) indicated a record from Oostduinkerke in Mar. This refers to a not-substantiated record from wn.be. The latest reliable record from Belgian Mar. dates back to 1913 (Kreutz l.c.).

• *N. cordata* (L.) L.C.M. Rich.: the potential presence of this species in the Flora area has been suggested for quite a long time. The most northerly localities in northeastern France are east of Epinal, just outside the Flora area (Dirwimmer *et al.* 2016).

• ***Goodyera*** *repens* (L.) R. Brown: this species does not mainly occur in the northeastern part of the Lorr. district, on the contrary. According to FLORAINE (2013) and Dirwimmer *et al.* (2016) it is mainly found at Côtes de Moselle and Meuse and the limestone plateaus between Nancy and Toul. This species may have disappeared in Ard., at least in its Belgian part, from where it has not been recorded after 1999 (Kreutz 2019). As mentioned in NF6, this species is much declining since the 1980s, probably because it is more likely to be found in secondary habitats in the Flora area. Older pine woods (i.e. over 60 years old) are less suitable for this species: the layer of pine needle litter becomes probably too thick and contact with groundwater or run-off rainwater is prevented (comm. W. Van den Bussche 10.2022).

• ***Hammarbya*** *paludosa* (L.) O. Kuntze: in Ard., this species is now restricted to a single locality, in Libin (Belgium) (Kreutz 2019). It has completely disappeared from the French and Belgian part of Lorr. (FLORAINE 2013, Dirwimmer *et al.* 2016, Kreutz 2019, Vernier 2020).

• ***Liparis*** *loeselii* (L.) L.C.M. Rich.: in Mar., this species also occurs in the Netherlands (FZ) and in the Belgian part of this district: since 2007, it is known from the Waasland harbor area in Verrebroek (wn.be). It recently also reappeared, in very small numbers, in the Berg nature reserve (Brab.) from where it was thought to have disappeared since the 1940s (comm. M. Leten, 10.2022).

• ***Corallorrhiza*** *trifida* Chatel.: this very rare species currently still occurs in two districts, in Ard. in the valley of the Wamme river (according to Kreutz 2019 the only extant Belgian population) and in Lorr. sept. in Bande (since 2010; in this district is was not confirmed recently in Stockem) (wn.be). In NF6, it was also said to have been recorded in the Metz area. However, according to SI-Flore it only occurs further south in northeastern France, beyond the Flora limits, and Dirwimmer *et al.* (2016) did not report the species either from that area.

• ***Herminium*** *monorchis* (L.) R. Brown: this species has completely disappeared from Zeeland (FZ) and is actually almost limited to a small area on the Belgian west coast and the adjacent dune belt in northern France. However, in that part of Mar. it is actually R rather than RR: in recent years, the species was observed in at least 15 km² squares between Bray-Dunes and Nieuwpoort with at least 20,000 flowering individuals (counts W. Van den Bussche 2022; comm. M. Leten, 10.2022). It is extinct, since the 1960s already, in Zuid-Limburg in the Netherlands (Brab. or.) (H24, Atlas-NL, Kreutz 2019). There is, on the contrary, at least one locality in Champ. (Allibaudières; database CBN Paris), a district not mentioned in NF6.

• ***Pseudorchis*** *albida* (L.) Á. et D. Löve: this species is still present in Schneifel in Germany (Haute Ard.) but has completely disappeared from Eifel centr. (FT).

• ***Gymnadenia*** *×intermedia* Peterm.: hybrids between *G. odoratissima* and *G. conopsea* s.l. were known from Tert. par. in France but also occur in a single locality in Belgium, at the Tienne Pelé in Dourbes (Mosan occ.). In this locality, the second parent is *G. densiflora* (Kreutz 2019).

• *G. conopsea* (L.) R. Brown (s.str.): in Mar., this species is actually R rather than RR. It is present in various dune areas (Zuydcoote, Bray-Dunes, Westhoek, Bredene, ...) and is relatively frequent in the hinterland in the vicinity of Dunkerque in France (wasteland, roadsides, ...; data B. Bollengier, comm. M. Leten, 10.2022).

• *G. densiflora* (Wahlenb.) A. Dietr.: the distribution of this species, a segregate of *G. conopsea* (L.) R. Brown, was completely revised, solely based on confirmed data. In addition to the districts mentioned in NF6, it is also known from Brab. centr., where it is historically known (since the 19th century) from the Torfbroek nature reserve. In the 1980s, *G. conopsea* s.str. was also introduced there (on purpose) and apparently some genetic mixing between these two species has subsequently occurred (comm. M. Leten). In the same area, the species (or rather such intermediate plants?) has also been confirmed from Nederokkerzeel (Silsombos) (wn.be). Its presence was furthermore confirmed in Belgium from the Viroin (Mosan occ.). In neighboring territories, *G. densiflora* has only been confirmed so far from Boul. (so far only known from Desvres; Duluc 2019), Mosan (mostly Calestienne: Kreutz 2019), Lorr. (FLORAINE 2013, Dirwimmer *et al.* 2016, Kreutz 2019), Tert. par. (SI-Flore), Eifel centr. (FT;

Möseler & Patzke 1987) and Brab. or. (H24). It is probably R-RR everywhere.

• *G. odoratissima* (L.) L.C.M. Rich.: its frequency in Tert. par. was mentioned twice in NF6 (both R and RR). In reality, this species has become RR everywhere ("en forte régression en plaine" according to FG). Its presence in Lorr. (mér.) was recently confirmed in two localities in the Neufchâteau area (Dirwimmer *et al.* 2016). According to Kreutz (2019) it is only extant in Mosan occ. in the entire Benelux area.

• ***Ophrys*** *aranifera* Huds.: according to Digitale2, the species from the *O. sphegodes* aggregate in Boul. is *O. virescens* M. Philippe, not *O. aranifera*. In Brab. or., *O. aranifera* no longer occurs in the wild: a record in Zuid-Limburg in the Netherlands refers to a deliberate introduction (H24, Kreutz 2019) whereas in the Flemish part the species already disappeared in the 19th century (AFV). On the other hand, the species was recently discovered near Mons and in Moen (Zwevegem) in Brab. occ. and it also reappeared in coastal dunes in Oostduinkerke (Mar.) (wn.be). The species was still mentioned for the Mar. district in NF6 although the species had disappeared from the dunes since 1926 (AFV). Finally, Kreutz (2019) also reported at least two recent localities in Mosan, although the species probably disappeared again soon after its discovery.

• *O. virescens* M. Philippe: the genuine distribution of this species in the Flora area needs to be assessed. In NF6, it was said to be present in Boul., Pic., Lorr. and Tert. par. However, based on databases such as Digitale2 and SI-Flore, it is only known from Boul., Champ. and Tert. par.

• In addition, the latter two species are flowering earlier than was indicated in NF6, respectively until May and April (instead of June and May) (comm. W. Van den Bussche 10.2022).

• *O. apifera* Huds.: in Mar. (both the Belgian and French-Flemish parts and certainly also in the Netherlands, cf. FZ), this species actually has become at most AR instead of R-RR (and is still strongly increasing), both in the coastal dunes and in the polders nearest to the coast and especially in urban/industrial environments. On the Belgian coast, it is now present in at least 140 km² squares (data from 2005 to 2022) and in northern France it is perhaps even more common. In fact, it locally has become some kind of weed in this district (comm. M. Leten, 10.2022).

• ***Himantoglossum*** *hircinum* (L.) Spreng.: this species is definitely increasing in all districts and has recently also been observed in districts from where it was not yet mentioned in NF6. In Fl., it has been recorded e.g. in Tielt (since 2016), Sint-Amands, etc. and it also appeared in a few places in Camp. (e.g. Houthalen) and also in Ard. (e.g. Stoumont) (wn.be, Kreutz 2019). It was said to have disappeared from Eifel centr. in NF6 but it is still present in scattered localities there (FT). In Mar. (especially west of Wenduine), the species has become at most AR (almost as frequent as *Ophrys apifera*) and the same applies to neighboring parts of this district in France where it locally can be considered as a weed. East of Wenduine and in the polders it is indeed still R, but the species is expanding strongly everywhere! It is often found in somewhat messy, often humanly influenced habitats (comm. M. Leten, 10.2022). It is clearly a species that benefits from global warming.

• *H. robertianum* (Loisel.) P. Delforge: this species, with a mainly Mediterranean distribution and ecologically rather indifferent, is expanding towards the north but is usually fairly ephemeral north of the middle Rhône basin in France (FG). Since 2005, it has been known from a few localities around Paris (outside the Flora area). However, in 2013 the species was detected for the first time in the Flora area: a small population was discovered in a quarry (on chalk) near Visé in Brab. or. (at present a dozen of individuals) and since 2019 the species has also been observed in Stella-Plage, Amiens and near Dunkerque (Mardyck) in northwestern France (Mar. and Pic.). In 2020 this species was even reported in the Netherlands (north of the Flora territory), a few hundred kilometers further north (sources: wn.be, wn.nl, Delforge *et al.* 2016, Kreutz 2019, Bollengier & Baldeck 2020). The origin of all these populations is unknown; given the large gaps between the more or less contiguous distribution area and the populations recently found in the Flora territory, is it uncertain whether this refers to a natural range expansion, in consequence of climate warming, (see also discussion in Delforge *et al.* l.c. and Kreutz l.c.).

• ***Neotinea*** *ustulata* (L.) R.M. Bateman, Pridgeon et M.W. Chase: since there are no recent observations in Boul. and Pic., the species may have disappeared from these two districts (Digitale2, SI-Flore). In the Benelux area, it is only extant in Mosan (Kreutz 2019). It has dramatically declined in the entire Flora area in recent times.

• The hybrid ***Orchis*** *anthropophora* (L.) All. × *militaris* L. (*O.* ×*spuria* Reichenb. f.) has reliably been recorded in Mosan, both in the Viroin area and the region around Rochefort (wn.be).

• *O. militaris* × *purpurea* Huds. (*O.* ×*hybrida* Boenningh. ex Reichenb.): this hybrid is RR or absent outside of Lorr., Champ. and Tert. par. It is reportedly known from Zuid-Limburg in the Netherlands (H24).

• *O.* ×*beyrichii* A. Kerner (*O. militaris* × *simia* Lam.) and *O.* ×*angusticruris* Franch. ex Humnicki (*O. purpurea* × *simia*) are also known from Valkenburg in the Netherlands, in Brab. or. (Kreutz 2019).

• *O. anthropophora* (L.) All.: although still mentioned from Mar. in NF6, this species had actually disappeared on the Belgian coast (AFV). However, it was found again in Oostduinkerke in 2016 (wn.be). In the same district, the species has also recently been found in a few places in Zeeland (FZ). In the French Mar. district, it is only extant in the southernmost part (Digitale2). There are several recent records of this species in the surroundings of Mons in Brab. occ. (Kreutz 2019; also wn.be).

• *O. purpurea* Huds.: this species was observed in 2020 in Wetteren in Fl. (wn.be). It had not been recorded from that district before. According to Kreutz (2019), it is also known from a few localities in Ard., both in Belgium and the Grand Duchy of Luxembourg.

• *O. simia* Lam.: this species is extinct in Mar. mér. where it was last seen in 1960 (SI-Flore). Also elsewhere in northwestern France it has deteriorated sharply; e.g., it was recently no longer seen in Artois and Boulonnais (Digitale2). In Lorr., it has disappeared from the Belgian and Luxembourg part of this district (Kreutz 2019) but probably is still present in France, albeit RR (Vernier 2020).

• *O. militaris* L.: this species was recently discovered in Mar., both in Belgium and the Netherlands, respectively in Oudenburg (since 2010; wn.be) and Terneuzen (since 2014; FZ). It has also been known from three additional districts: it was recorded in Fl. (Burchtse Weel, since 2017) and Camp. (Brecht: Groot Schietveld, since 2016; see also Kreutz 2019) and it also occurs on the southern cuesta of the Boulonnais in France (Digitale2). In Lorr., it is less rare than indicated (AR rather than R), according to FLORAINE (2013) even AC. In Ard., on the contrary, at least in its Belgian part, it is apparently completely lacking (Kreutz 2019).

• ***Anacamptis*** *pyramidalis* (L.) L.C.M. Rich.: this species is much expanding lately and now occurs in all districts, including four districts from which the species was not yet mentioned in NF6: Boul. (Digitale2), Fl. (numerous observations), Camp. (mainly in Camp. or.) and Ard. (various observations) (wn.be). In Mar., it has become R rather than RR, although its occurrences are often rather ephemeral (comm. M. Leten, 10.2022). It is clearly a species that benefits from global warming.

• *A. coriophora* (L.) R.M. Bateman, Pridgeon et M.W. Chase: this species is on the verge of extinction in the entire Flora area. It was probably last seen in Champ., near Épernay, in 2006 (SI-Flore). It has certainly disappeared from Lorr. (FLORAINE 2013, Dirwimmer *et al.* 2016) and from the Benelux countries (Kreutz 2019).

• *A. morio* (L.) R.M. Bateman, Pridgeon et M.W. Chase: from the districts where this species was considered to be RR, extinct or absent, its actual presence was confirmed in Mar.; however, there are notable regional differences within this district. In Belgium it was temporarily present in Oostduinkerke (Florabank) from 2015-2016 but has now again disappeared. It has also possibly recently disappeared in French Mar. (Digitale2). In the Netherlands it is obviously less rare: according to FZ it even used to be common and at present it still occurs with many tens of thousands of plants at various sites in the Delta area, all in Mar. sept. (Dijkwater, Zouten en Zoeten Haard, Brouwersdam, Hompelvoet, …). It is not RR there and neither strongly decreasing (comm. M. Leten, 10.2022). The species is also present in a few localities east of Leuven, near the borders of the Brab. and Camp. districts (wn.be) and it is also known from Zuid-Limburg in the Netherlands (Brab. or.) (H24).

• *A. laxiflora* (Lam.) R.M. Bateman, Pridgeon et M.W. Chase: the only more or less recent claim in the Flora area dates back to 1980 and probably refers to a plantation in Zeeuws-Vlaanderen (FZ, H24, Kreutz 2019). Elsewhere, it had already disappeared a long time ago (Digitale2, SI-Flore). However, this species actually occurs near Bar-le-Duc, in the southwestern part of Lorr., although the origin of this population is uncertain (Dirwimmer *et al.* 2016).

• *A. palustris* (Jacq.) R.M. Bateman, Pridgeon et M.W. Chase: according to SI-Flore, this species was recently only observed near Reims in Champ. and it is also still present in Mar. mér. (Merlimont-Cucq marshes; Digitale2). Its actual presence in Pic. and Tert. par. requires confirmation; it may have disappeared from these two districts. It formerly also occurred in Lorr. in the Grand Duchy of Luxembourg (Kreutz 2019).

• ***Dactylorhiza*** *sambucina* (L.) Soó: this species was reported from two locations in Gutland in Germany, west of Trier. However, these probably refer to deliberate introductions (FT) and they are moreover located just outside the Flora area. In Lorr. mér., in Autigny-la-Tour, at the southernmost border of the Flora area, a small population persists since 1998 (FLORAINE 2013, Dirwimmer *et al.* 2016). In NF6, historical claims from Lorr. were either said to be erroneous or located beyond the limits of the Flora area. However, according to Kreutz (2019) this species was formerly also present in two localities in the Grand Duchy of Luxembourg.

• Massive hybrid populations of *Dactylorhiza* are increasingly recorded, not only of *D.* ×*grandis* (as already mentioned in NF6) but also of e.g. *D.* ×*godferyana*, *D.* ×*wintoni* en *D.* ×*kerneriorum*. This is especially the case in the Flemish coastal area. It is, however, uncertain whether such hybridogenous populations will survive in the long term (comm. M. Leten, 10.2022).

• *D. incarnata* (L.) Soó var. *serotina* Hausskn.: this poorly known taxon was mentioned from Mar. mér. and Brab. occ. (France) in NF6. Its presence there was indeed confirmed, respectively from Dannes and Watten (Digitale2).

• *D. traunsteineri* (Sauter) Soó: in NF6, this species was only mentioned from Lorr. mér., more precisely from the Haute-Marne department, at the southern limits of the Flora area. Delforge (2011) thoroughly discussed these plants and their localities. All are located well beyond the limits of the territory covered by the NF (see also FLORAINE 2013, where none are mentioned from our territory). Similar-looking plants were also reported from Mar. mér. and Tert. par. but the identity of these populations should be critically re-assessed. A targeted search in the Dannes area (Mar. mér.) could not confirm the presence of *D. traunsteineri* there, only various hybrids of *D. incarnata* (Delforge & Mast de Maeght 2003). In Tert. par., on the contrary, typical plants of *D. traunsteineri* were recently observed in the Branges marsh in Arcy-Ste.-Res-

titue (Aisne) by J.-C. Hauguel and R. Coulombel (comm. B. Toussaint, 03.2021). In this locality the species was previously cited, in 2002, by N. Devos and D. Tyteca and it is close to the historical locality of Villeneuve-sur-Fère (Riomet & Bournérias 1952-1961).

• *D. praetermissa* (Druce) Soó: this species was surprisingly not mentioned from Fl. in NF6. However, it occurs in quite a few places, for example in the wider area of Bruges and Ghent (wn.be; see also map in Kreutz 2019). Also from Ard., it is known from several localities (Kreutz l.c.) and in Mar. it is slightly less rare than indicated in NF6, AR-R rather than R (comm. M. Leten, 10.2022). In Eifel centr., on the contrary, where it was said to be present (albeit RR), it is absent (FT).

• *D. praetermissa* (Druce) Soó subsp. *integrata* (E.G. Camus ex Fourcy) Soó: according to Kreutz (2019), this subspecies also occurs in Mosan and Lorr. (Grand Duchy of Luxembourg; see also Krippel & Colling 2014).

• *D. elata* (Poiret) Soó subsp. *sesquipedalis* (Willd.) Soó: in its unique locality in the Flora area, in Zeeland in the Netherlands, this subspecies was no longer seen since 2002 (or even earlier; it was "eradicated" according to H24). Most likely it was formerly deliberately planted there (see FZ, although Kreutz 2019 did not entirely rule out a natural range extension), a plausible explanation for its occurrence far beyond the taxon's natural distribution area.

• *D. majalis* (Reichenb.) P.F. Hunt et Summerh.: in Mar. (sept.), the majority of the populations designated as *D. majalis* rather belong to the hybrid swarm *D.* ×*godferyana* (*D. majalis* × *praetermissa*). In this district, there are still 'pure' populations of *D. majalis* but these are RR rather than AR-R (comm. M. Leten, 10.2022).

• *D. fuchsii* (Druce) Soó: this species is said to be RR in all districts that are not specifically listed. This also applies to Eifel centr. However, *D. maculata* (L.) Soó (incl. *D. fuchsii*) is "relativ haufig" there and at least as common as *D. majalis* (Reichenb.) P.F. Hunt et Summerh., which is AR-R according to NF6. Thus, *D. maculata* s.l. is therefore at most AR in Eifel centr., but the exact identity of many populations is unclear (either *D. maculata* s.str. or *D. fuchsii*). Given the ecology of these two species, most records in Eifel centr. normally will rather belong to the latter species. In Mar., it is slightly less rare than indicated in NF6, AR-R rather than R (comm. M. Leten, 10.2022).

• *D. maculata* (L.) Soó subsp. *elodes* (Griseb.) Soó: according to Devillers-Terschueren *et al.* (2017), this taxon only occurs in Camp. (Buitengoor, Ronde Put) in Belgium, and even then there is some uncertainty about this identity. The distribution and identity of plants named as such in the Flora area (reportedly also known from Ard., Brab. occ. and Lorr. sept.) should thus be reexamined. Kreutz (2019) confirms its presence in Camp. and refers to its possible presence in Ard. Claims from northern France, on the contrary, are likely erroneous.

• *D. maculata* (L.) Soó subsp. *ericetorum* (E.F. Linton) P.F. Hunt et Summerh.: Kreutz (2019) identified this poorly known taxon from three places in Camp. (Turnhout, Mol), Brab. or. (the Netherlands: Brunssum) and one location in Ard.

• *D. maculata* (L.) Soó subsp. *arduennensis* (Zadoks) Tournay: the presence of this taxon – in fact a mere ecotype – in the Flora area was confirmed by Kreutz (2019) from Ard. and Lorr.

• *D. viridis* (L.) R.M. Bateman, Pridgeon et M.W. Chase: this species is also known (RR) from Boul. (Digitale2: « dans une pelouse marnicole du Boulonnais »). In Brab. or., this species is known since 2000 from one location in Haspengouw, in Gors-Opleeuw, where it grows on loam (thus, in Brab. or. it is not exclusively occurring on chalk stone) (Kreutz 2019). It is also still present in Ard. occ., from where it is historically known: Gernelle and Issancourt-et-Rumel (database CBN Paris).

51. Iridaceae

• ***Gladiolus*** *italicus* Mill.: this southern species had been recorded before in the Flora area, near Verdun in Lorr. (NF6, Vernier 2020). In 2012-2013 it was also seen in a roadside in Brussels (wn.be).

• ***Iris*** *pumila* L.: the only known naturalized populations in the entire Flora area are indeed located in the valley of river Meuse, more precisely in Waulsort (wn.be).

• *I. germanica* L.: in addition to the districts already mentioned in NF6, this ornamental is also more or less widely naturalized in Camp. (wn.be).

• *I. foetidissima* L.: in Mar., this species is no longer restricted to the southernmost part of this district: since 2008 it has also been known from a few localities in the Belgian and Dutch part of Mar. (Leten 2013, FZ). In Lorr., it is no longer limited to the southwestern part of this district: it is also known from the Metz area (FLORAINE 2013). Also in other parts of the Flora area this species is increasingly recorded recently (in Belgium especially in Fl. and Brab., to a lesser extent also in Camp., Mosan, etc.) (wn.be) and is doubtlessly naturalizing locally. In northern France, the species is at present also known from rather numerous localities in Pic. and Champ. (SI-Flore, database CBN Paris) but the status of these populations is hard to assess although a natural range extension seems likely there. The recent expansion of this species in the Flora area is difficult to interpret: a natural range extension, escaped individuals (the species is sometimes grown as an ornamental in gardens and its fleshy seeds are eaten and dispersed by birds) or a combination of both (see also Leten l.c.)?

• ***Sisyrinchium*** *montanum* E. Greene: most known populations of this American species in Belgium are located in Ard., especially in the northeastern part of this district; it is R rather than RR there. The species is also known from Fl. (wn.be). There is not a single established population in the Belgian and Dutch Mar. (FZ, wn.be); in that district the species only occurs in France (SI-Flore).

52. Asphodelaceae

• ***Hemerocallis*** *lilioasphodelus* L. and *H. fulva* (L.) L.: in NF6, these two ornamentals were both said to be 'sometimes' escaping. However, the latter is by far the commoner of the two (13 vs. 195 records respectively on wn.be on 11 March 2020). In fact, *H. lilioasphodelus* is only rarely observed as an escape of cultivation in the Flora area.

53. Amaryllidaceae

• ***Allium*** *sphaerocephalon* L.: this species has indeed disappeared from Eifel centr., a long time ago already (FT).

• *A. oleraceum* L.: in Mar., this species is not restricted to the northern (Dutch) part of the district, there are several records from the Belgian part as well (wn.be).

• *A. carinatum* L.: this species was thought to have disappeared from the Flora area, where it was formerly naturalized. In recent years, however, it was rediscovered in several localities in Mosan occ. (Viroin; wn.be). In addition, the species is also known from a few localities in Lorr. and Tert. par. (Montagne de Reims) (FLORAINE 2013, database CBN Paris). In these two districts, the species is believed to be native. There are also scattered records from the Dutch part of the Flora area (Camp., Fluv.; wn.nl) but these probably refer to deliberate introductions or escapes from cultivation.

• *A. scorodoprasum* L.: this species is also known from Pic. (west of Péronne) and Tert. par. (west of Laon) (SI-Flore).

• *A. angulosum* L.: in addition to the well-known populations in the valley of river Marne in Champ. mér. (the only hitherto known in the Flora area), this species is also present in a single locality in Lorr. occ., in the valley of river Aisne, where it was first observed in 1997 already (Challerange; database CBN Paris).

• *A. ursinum* L.: this species was said to be present in Mar. in the northern (Dutch) and southern (French) parts of the district. In reality, there are numerous records from the Belgian part as well (wn.be). This species has much expanded lately but many recent records refer to plants that escaped from cultivation.

• *A. paradoxum* (Bieb.) G. Don: this alien species is slightly expanding and has locally shown some invasive tendencies (Graulich 2017). In Belgium, it is still limited to Brab. but there are also scattered records from the Dutch part of Camp. (wn.nl).

• ***Galanthus*** *nivalis* L. var. *scharlockii* Caspary: there are several locations for this variety in Brab., even more than in Camp. and Fl. (wn.be).

54. Asparagaceae

• ***Yucca*** L.: escaped individuals from this genus are not only observed in Mar. but also increasingly on sand in Camp.

• ***Convallaria*** *majalis* L.: this species has expanded lately but nearly all new records refer to plants that escaped from cultivation. In Fl., for instance, it is now AC-AR rather than RR (wn.be). Identifying the species' natural and introduced ranges has become increasingly difficult.

• ***Polygonatum*** *verticillatum* (L.) All.: this species is not rare at all in Eifel centr., where it is at most AC-AR (FT). Its distribution and frequency there are in fact similar to *P. multiflorum* (L.) All., which is considered to be AC in NF6. In Lorr., this species does not mostly but exclusively occur in the northern part of this district, it is completely missing in French Lorr. (SI-Flore, FLORAINE 2013). In addition to the districts mentioned (where it occurs naturally), this species is occasionally observed elsewhere as an escape from cultivation, for instance in Loppem (Fl.) in 2016 (wn.be).

• *P. odoratum* (Mill.) Druce: this species has apparently not disappeared from Pic. mér.: there is at least one recent locality, immediately southeast of Amiens (SI-Flore).

• *P. multiflorum* (L.) All.: this species is slightly more common than indicated although at least part of the new localities may refer to plants that escaped from cultivation. It is considered to be AC everywhere, except in Fl., Camp., Champ. (AC-AR) and Mar., Haute Ard. (R).

• ***Ornithogalum*** *umbellatum* L. (s.str.): in NF6, Lorr. was not mentioned, suggesting that the species is RR there. In reality, however, it is at most AR-R in this district (FLORAINE 2013). This species is also present, albeit RR, in Eifel centr. (FT).

• *O. divergens* Boreau: the possible indigenousness of this species is evidently most likely in the southern part of the Flora area, where it is known from Mar. mér., Pic. and Tert. par. (SI-Flore). Even there, however, this species was most likely (formerly) introduced (FG).

• ***Loncomelos*** *pyrenaicum* (L.) Holub: in NF6, this species was mentioned from Ranst, where it was believed to be introduced. This locality is in Fl. and the species was discovered in similar circumstances in Boortmeerbeek, in Brab., in 2011 (wn.be). In both localities this species is apparently fully established.

• *L. brevistylus* (Wolfner) Dostál: in NF6 (as *Ornithogalum pyramidale* L.), this ornamental was said to escape occasionally. In one such locality, in Yvoir, this species persists very well since 2012 (wn.be).

• ***Scilla*** *bifolia* L.: this species was not mentioned from Eifel centr. in NF6, suggesting that it is at most occasionally escaped or naturalized there. However, it naturally occurs in Eifel centr., which is confirmed by historical data (FT).

• ***Hyacinthoides*** ×*massartiana* Geerinck and *H. hispanica* (Mill.) Rothm.: these two ornamentals are often confused. The former is by far the commoner of the two. In fact, more or less 'pure' populations of the latter are only exceptionally recorded, for instance in the Westhoek nature reserve in De Panne (https://waarnemingen.be/observation/214159961/). In this area, where native *H. non-scripta* (L.) Chouard ex Rothm. also occurs (although

the genuine indigenousness of coastal populations of this species is uncertain), introgression has been observed (comm. M. Leten, 05.2021).

• ***Muscari*** *comosum* (L.) Mill.: this species is much rarer in Lorr. than indicated in NF6. In all of French Lorr., for instance, there are only two locations left (FLORAINE 2013). It is thus RR rather than AR-R.

• *M. neglectum* Guss. ex Ten.: this species is very much declining in the Flora area. There is not a single reliable record in the wild in Belgium on wn.be and only a few more or less recent claims from Wallonia in AFW (ID not verifiable). Hauteclair & Lambinon (2012) reported the species from a new locality in bois d'Oppagne near Barvaux-sur-Ourthe (Mosan; Famenne Centrale). In addition to the districts mentioned in NF6, the species has also been recorded in Pic. but may have disappeared there (last seen in 2000) (SI-Flore).

• *M. botryoides* (L.) Mill.: this species is also known from Champ., a district not mentioned in NF6. In the valley of river Marne, in the surroundings of Châlons-en-Champagne, there are several populations, including historical ones that date back to the 19th century (database CBN Paris). *M. botryoides* is likely native in that area.

• *M. armeniacum* Leichtlin ex Baker: this is by far the most common representative of *Muscari* nowadays and it is naturalized in many places (and probably in all districts), not only in Mosan mér. as indicated in NF6.

• ***Anthericum*** *liliago* L.: this species is admittedly RR in Lorr. but not restricted to the Moselle valley near Nancy. It is currently known from at least five locations, of which only one near Nancy (FLORAINE 2013).

• *A. ramosum* L.: in NF6, this species was said to have disappeared from Mosan, where it was considered moreover to be doubtfully native. However, in this district the species still occurs near Givet (SI-Flore) where it is likely native.

56. Pontederiaceae

• ***Pontederia*** *cordata* L.: this aquatic ornamental is locally naturalizing and has meanwhile been observed in several districts, but predominantly in Camp. and Brab. centr. (wn.be, wn.nl, SI-Flore).

58. Typhaceae

• ***Sparganium*** *erectum* L. subsp. *oocarpum* (Čelak.) Domin: this poorly known subspecies, hitherto unknown in the Flora area, probably has been overlooked. Its presence was recently noticed, in 2020, in the Champ./Lorr. bordering area in France (Vanault-les-Dames, Vivier-au-Court; database CBN Paris).

• *S. natans* L.: this species is also known from scattered localities in Champ., a district from where it was not mentioned in NF6 (SI-Flore, database CBN Paris).

• *S. angustifolium* Michaux: this very rare species is known from Charmes (Lorr. mér.) in the Moselle valley (FLORAINE 2013, SI-Flore), at the extreme southern border of the Flora area.

• ***Typha*** ×*glauca* Godr.: this hybrid is probably more widespread than previously thought; it is also found in other districts (e.g. in Fl., Mar.) and potentially can occur everywhere where both parent species grow together.

• *T. minima* Funck: this ornamental species was re-discovered in Belgium: there are at least four records since 2016: Boortmeerbeek, Lontzen, Oostkamp and Waregem (wn.be). In NF6, it was suggested that this species was in the process of naturalization in Brab. or. in the Netherlands and in the Grand Duchy of Luxembourg but this requires confirmation. In both countries the species is probably merely ephemeral. There are no recent records from the Dutch part of the Flora area and the species was only seen once recently (in 2005) in Luxembourg (wn.nl, Atlas-NL, MNHN-Lux).

• *T. laxmannii* Lepechin: this escaped ornamental is currently naturalized in Mar., Fl., Camp. and Brab. (R-RR) (wn.be, wn.nl, SI-Flore).

59. Juncaceae

• ***Luzula*** *pilosa* (L.) Willd.: this species is rather AR-R instead of AC in Eifel centr. (FT) where the soil is predominantly calcareous while the species is more likely to occur on slightly acidic soils.

• *L. forsteri* (Smith) DC.: this species is also known from Ard. in France (e.g. Haulmé, Saint-Laurent) (database CBN Paris). It is sometimes found as an introduction, as already mentioned in NF6. In addition to its well-known population, as a stinzenplant, in the domain of Meise Botanic Garden, the species has also been recorded in Honsem (Brab.) where it is claimed to have germinated from the exposed seed bank (wn.be).

• *L. luzuloides* (Lam.) Dandy et Wilmott: this species occurs all over Lorr. (not predominantly in the western and northern parts of the district); the species in fact seems even more frequent in the eastern part of it (FLORAINE 2013).

• *L. sylvatica* (Huds.) Gaudin: this species is increasing in Fl. and Camp. (doubtlessly predominantly as an escape from cultivation), especially in Camp. where it has become relatively widespread. In these districts it is R-RR rather than RR.

• *L. pallescens* Swartz: this species was formerly reported from the Netherlands but this claim was considered to be very unlikely in NF6. The record is from Tegelen in Fluv. and dates back to 1943. It is referred to in H24 and thus likely to be reliable although no longer relevant anymore since the species was not confirmed recently in this locality. It does not occur in France either (FG).

• *L. congesta* (Thuill.) Lej.: this taxon is now accepted as a species distinct from *L. multiflora*. Its distribution in the Flora area remains uncertain, however. It seems to be most frequent in Camp. (see also H24 and map wn.be, insofar as reliable) and mainly occurs on the more acidic sandy soils, which corresponds with the species' ecology.

• ***Juncus*** *squarrosus* L.: in Lorr., this species is not mostly but exclusively occurring in the northern part of this district (FLORAINE 2013, wn.be). In the Flora area, this species is only absent from Champ. and this was added.

• *J. tenuis* Willd. subsp. *tenuis*: this subspecies is increasing and more common in some districts than was indicated in NF6, e.g. in Fl. and the entire Lorr. district (rather AC than AR-R). In Mar., it is certainly not RR or absent, rather AR-R (according to FZ even AC) (FLORAINE 2013, wn.be).

• *J. tenuis* subsp. *dudleyi* (Wiegand) P. Fourn.: this subspecies was discovered in an additional locality in the Flora area in 2018, in Houthulst (Fl.) (wn.be, BR!). In NF6, this subspecies was said to be naturalized in Europe in Scotland. By now, it has become more widely naturalized in Europe (e.g. in the Netherlands; see also E+M Plantbase).

• *J. tenuis* subsp. *anthelatus* (Wiegand) Verloove et Lambinon: in addition to Camp. this subspecies was also discovered in Brab. centr. and Ard. (wn.be).

• *J. tenuis* subsp. *dichotomus* (Elliott) Verloove et Lambinon: this newly added subspecies was recently observed in Fl., Camp., Brab., Mosan and Ard. (Hoste & Verloove 2016). It is RR but probably often overlooked, although its separation from the other subspecies is rarely straightforward.

• *J. compressus* Jacq.: this species seems to be on the rise in Fl., especially around the bigger cities (Antwerp, Ghent, etc.); it is no longer RR, rather R, there.

• *J. gerardi* Loisel.: in Mar., this species is much less rare than indicated in NF6 (it is even considered to be CC in Zeeland; FZ): AC-AR rather than AR. As a roadside halophyte in the interior, it is mostly found in Fl., Camp. and Brab.

• *J. ranarius* Song. et Perr.: this poorly known species is less rare than indicated in NF6, especially in Mar. where it is AC-AR, rather than AR-R (it is even said to be C in Zeeland in FZ; see also H24). Also in Fluv., it is rather R than RR (wn.be, H24). This species closely resembles *J. bufonius* L. and may have been misunderstood. There are also several claims from Camp. and Brab. occ., especially from industrial areas, but these require confirmation.

• *J. foliosus* Desf.: there are at least two confirmed finds in Mar. (De Haan, Zeeland: wn.be, wn.nl) and the species was also found at the Kranepoel in Aalter and in Wintam (both in Fl.) in 2014 and 2012 respectively. In Camp., it is no longer limited to the eastern part of this district but now also occurs in the Netherlands. This species resembles *J. bufonius* and is perhaps underestimated.

• *J. tenageia* Ehrh. ex L. f.: it is unclear whether or not this species is still present in Argonne (Lorr. occ.). FLORAINE (2013) does not report the species from French Lorr., while Vernier (2020) does (from Woëvre).

• *J. inflexus* L.: this species is less rare than indicated in NF6, especially in Fl. (AC-AR rather than AR). In Camp. (AR-R) and Ard. (R-RR), it is indeed rarer than in the other districts.

• *J. conglomeratus* L.: this species was said to be R-RR in Mar. in NF6 but it is hardly less common in Mar. than in other districts (rather AC-AR). For comparison, in Zeeland it is considered to be C (FZ).

• *J. filiformis* L.: this rare species was considered to be extinct in Fl. There are some recent observations from that district but these require confirmation (no photos or material seen; wn.be).

• *J. balticus* Willd.: this very rare species persists well in its unique Belgian population that was discovered in 2000 (wn.be; Leten & Fasseaux 2008).

• *J. maritimus* Lam.: this species is slightly less rare than indicated in NF6, rather AR-R than R. For comparison, in Zeeland it is considered to be AR (FZ).

• *J. capitatus* Weigel: this species has become particularly rare (RR instead of R). There is only one extant location in Belgium (in Molenstede-Dassenaarde) and one in the Netherlands (near Weert) (wn.be, wn.nl).

• *J. pygmaeus* L.C.M. Rich.: the survival of this species in Camp. in the Netherlands (from where the only populations in the entire Flora area are known) was questioned in NF6. The species is still present there in North Brabant province, though RR (H24, wn.nl).

• *J. subnodulosus* Schrank: there is a very remarkable cluster of observations of this species (several dozen locations) east of Brussels, where it is not rarer than in e.g. Mar. (AR). It occurs in valleys in the loamy area between Brussels and Liège; it is locally more numerous than *J. acutiflorus* Ehrh. ex Hoffmann because of the presence of calcareous groundwater (comm. R. Guelinckx, 12.2020). In Eifel centr., this species has completely disappeared (FT) and in Lorr. it is RR instead of AR (FLORAINE 2013).

• *J. acutiflorus* Ehrh. ex Hoffmann: this species does occur, although very rarely, in Champ., e.g. around Châlons-en-Champagne (SI-Flore).

• *J. anceps* Laharpe: the history of this rare species in Belgium is complicated. It was formerly incorrectly reported for the area between Oostduinkerke and Nieuwpoort because of the misleading title of the article by De Raeve *et al.* (1983); its unique population was in Knokke (Leten in prep.) where it was last observed in the 1920s. After a reappearance in another locality in Knokke in 1983, from where it probably disappeared, the species has been found again since 2008 in several localities, first in Oostduinkerke, then also in Zeebrugge, Koksijde and again in Knokke. It is also present in Zeeland where it is less rare (R rather than RR; FZ). An old record in the interior was located along the Willebroekse Vaart at Marly, thus in Brab., not in Fl. as incorrectly indicated in NF6 (comm. M. Leten). This very rare species was recently also discovered in Tert. par. (Everly, Jaulnes), just outside the Flora area (database CBN Paris).

• *J. canadensis* J. Gay ex Laharpe: in Wingene (Fl.), this American species turned out to be merely casual, not naturalized as indicated in NF6. It was only seen in 1996-1997. The species is only naturalized (and expanding) in Camp.

• *J. bulbosus* L.: the distribution of this species in some districts is very uneven. However, in some parts of e.g. Fl., Brab. and Mosan, it is at most AR, not RR. In Lorr., this species is not restricted to the northern part of this district: there are at least four localities further south (FLORAINE 2013). The species also occurs in some parts of Pic., for instance near Amiens (SI-Flore), a district from where it was not mentioned in NF6.

• *J. ensifolius* Wikstr.: this alien species is increasing and locally naturalized in Mar., both in France and the Netherlands (Dunkerque, Zeeland; FG, FZ) and from multiple locations in Fl. and Camp. (wn.be; see also Verloove *et al.* 2017). SI-Flore further indicates a record from the Lille agglomeration in northwestern France (Brab. occ.). Records from French Lorr. (Antoine *et al.* 2019) are located outside the Flora area.

60. Cyperaceae

• ***Eriophorum*** *angustifolium* Honck.: in the districts where this species is considered to be either RR, extinct or absent, it was recently observed, among others, in Fl. (Leiemeersen in Oostkamp, Gulke Putten in Wingene, Berlare, etc.), Brab. occ. (Stambruges), Mar. (Zeeland), etc. (wn.be, FZ).

• *E. latifolium* Hoppe: a single individual of this species was (re-) discovered in 2019 in the Leiemeersen in Oostkamp (Fl.). Its presence there was confirmed in 2020 (comm. I. Jacobs, 12.2020). This species is also known from Ard., at least in France (Parc Naturel Régional des Ardennes): there are rather numerous historical records and it was recently confirmed from Thilay (database CBN Paris).

• *E. gracile* Koch ex Roth: this very rare species is much declining in the Flora area. It has definitely disappeared from Mar. mér. (Digitale2), very likely also from Tert. par. (most recently observed there in 1977 according to SI-Flore, database CBN Paris, Digitale2).

• ***Eleocharis*** *acicularis* (L.) Roem. et Schult.: this species is at most AR, not R, in Mar. mér., Camp. and Fluv. (the Netherlands) (see also H24).

• *E. ovata* (Roth) Roem. et Schult.: this species is also known from Champ. (e.g. south of Épernay) (database CBN Paris).

• *E. obtusa* (Willd.) Schult.: this American species was recently discovered in Luzancy (Tert. par.) (Larregle *et al.* 2014), south of Bruges (Fl.) and at several places in Ard. where it is no longer restricted to the eastern part of the district (wn.be). Meanwhile this species is also found in Camp. in the Netherlands (Simons *et al.* 2020).

• *E. engelmannii* Steud.: this newly added North American alien has been recorded in Fl., Camp. (Neth.), Brab. and Ard. (Verloove 2015, Simons *et al.* 2020; wn.be, wn.nl). It is still RR but probably slightly increasing.

• *E. multicaulis* (Smith) Desv.: this species possibly also occurs in Ard. (or.), to be confirmed (wn.be). It was recently (re-)discovered in Mar. mér., in Quend (Coulombel 2019). Although the species had been known from that area (in Rue, up to 1974), this district was not mentioned in NF6.

• *E. palustris* (L.) Roem. et Schult.: this species is at most slightly less common in Fl. (AR, not R).

• ***Blysmus*** *compressus* (L.) Panzer ex Link: this species is also known from the Torfbroek nature reserve in Berg (Brab.) and it also exists in Tert. par. (Laonnois) (SI-Flore), two districts from where it was not mentioned in NF6. In Mar. in Belgium, there is only a single extant population (in Hannecartbos); in Zeeland, it is slightly less rare (FZ). Overall, this species is much declining in the Flora area, especially in its inland localities.

• *B. rufus* (Huds.) Link: this species was reported in NF6 from Goeree in Zeeland (the Netherlands). This claim was highly unlikely and eventually indeed turned out to be incorrect (FZ).

• ***Isolepis*** *setacea* (L.) R. Brown: the species' rarity in Mar., Camp., Mosan and Ard. was probably exaggerated (AC-AR, rather than AR). It is probably slightly increasing or is otherwise often overlooked. It nowadays even locally occurs on heavy clay in the central part of West-Flanders. In 'suitable circumstances' it can be AC (see also H24, FZ).

• *I. cernua* (Vahl) Roem. et Schult.: a recent update on this species' local distribution and rarity was presented by Duhamel & Delaporte (2017). The species is still found in three locations in the Flora area, all in Mar. mér.: Anse Bidart + dunes of Marqueterre and Cambron marshes (all in the Somme valley near its estuary) and the Cucq-Villiers marshes, further north.

• ***Trichophorum*** *cespitosum* (L.) Hartm.: this species has been known from a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse, near the estuary of river Canche) since quite a long time (SI-Flore) along with, among others, *Rhynchospora alba*, *R. fusca*, *Hypericum elodes*, *Drosera rotundifolia*, *Erica tetralix*, etc. (comm. B. Toussaint, 06.2021). It is very surprising that these data had been overlooked until now in NF.

• *T. alpinum* (L.) Pers.: this species was reported in NF6 from Mar. mér. (France), though considered to be suspect. Its presence there is indeed very unlikely and not mentioned in local databases and Floras.

• ***Bolboschoenus*** (Aschers.) Palla: this genus now includes four distinct species in the Flora area, each with a different distribution pattern. *B. maritimus* (L.) Palla s.str. is the widespread species in Mar. (it is much rarer in Fl. and in Lorr. in saline habitats and occasionally observed elsewhere), whereas *B. laticarpus* Marhold, Hroudová, Zákravský et Ducháček is the widespread species in the

interior, especially on riversides [it is AR-R in Fl., Camp., Brab., Fluv. (especially in the Netherlands); R-RR in Mosan and very occasionally elsewhere, e.g. in Châtrices in Argonne, Lorr. occ.; Bizot & Labroche 2018]. The two other species are only very locally found. *B. yagara* (Ohwi) Yung C. Yang et M. Zhan is confined to Camp. (Vijvergebied Midden-Limburg, where it was first seen in 2015; wn.be), Champ. and French Lorr. from where several localities have been detected since 1999 (database CBN Paris, AFL, Bizot & Labroche 2018, Labroche 2020). *B. planiculmis* (F. Schmidt) T. Egorova is known from Fluv. (valley of Maas river, since 2017; Simons & Gonggrijp 2019) and since 2018 from two localities in the boardering area of Champ. and Lorr. (Chapelle-Felcourt, Vanault-les-Dames) (database CBN Paris).

• ***Scirpus*** *sylvaticus* L.: this species is less rare in Fl. than indicated in NF6 (AR rather than R), although at least part of the populations refer to escapes from or relics of cultivation (the species is often used nowadays in projects of nature development).

• *S. georgianus* R.M. Harper: in addition to the known locations in Mosan mér. and Tert. par., this American species was found in Nivelles in 2016 (Brab.; wn.be) and in Eindhoven (Camp.) in the Netherlands, also in 2016 (Bruinsma *et al.* 2021). Herbarium material from both localities was seen.

• *S. hattorianus* Makino: this American species was recently also discovered in several localities in Argonne (Lorr.; AFL).

• *S. cyperinus* (L.) Kunth: this newly added North American alien was recently discovered in Camp., both in Belgium and the Netherlands (Spronk 2016, wn.be).

• ***Scirpoides*** *holoschoenus* (L.) Soják: in Mar., this species is now also present in Koksijde (Fluithoekduinen nature reserve) and in Brab. occ. it is also known from two locations east of Tournai (wn.be, AFW, Anrys & Saintenoy-Simon 2013). In Lorr., this species is no longer confined to the Moselle valley: Krippel & Colling (2010) reported several localities from other parts of this district. The species was also observed in a locality in Pic. or., southeast of Saint-Quentin (SI-Flore, François *et al.* 2015, François *et al.* 2017). The least rare taxon in the Flora area is subsp. *holoschoenus*. However, a plant found in 2014 in Mechelen belongs to subsp. *australis* (L.) Soják (wn.be).

• ***Schoenoplectus*** ×*kuekenthalianus* (P. Junge) D.H. Kent [*S. tabernaemontani* (C.C. Gmel.) Palla × *triqueter* (L.) Palla]: this hybrid was said to occur in the absence of the second parent in Fl. However, *S. triqueter* still occurs in Fl., along river Scheldt between Antwerp and Ghent (Florabank).

• *S. mucronatus* (L.) Palla: this southern species was formerly indicated for Lorr. according to NF6. However, the only record of this species in northeastern France is from near Vesoul, (far) outside the Flora area (SI-Flore). A claim from northwestern France (Brab. occ.) was incorrect according to Digitale2. Surprisingly, this species was recently observed in two locations in Camp. in the Netherlands, at first in Reusel (1999) and since 2015 near Tilburg. At least in this last locality the species looks more or less established (wn.nl).

• *S. pungens* (Vahl) Palla: this species is also recorded in Fluv. in the Netherlands, e.g. 200 indviduals in Stevensweert in 2007-2008 (wn.nl; also H24). In Mar., it is also known since 2017 from Zeeland (FZ). There are several claims from the Champ.-Lorr. boardering area as well (database CBN Paris), but these require confirmation.

• *S. triqueter* (L.) Palla: this species is not exclusively found upstream of Antwerp along river Scheldt. It was recently also observed downstream of Antwerp, in Kallo (wn.be). In the French part of the Flora area, it is also known from Champ. (Marne) (database CBN Paris, FG).

• *S. lacustris* (L.) Palla: this species is not absent from but RR in Eifel centr., where it is moreover considered to be non-native (FT).

• ***Cyperus*** *fuscus* L.: this species was said to be declining in NF6 but this is no longer true, on the contrary: in some areas it tends to increase slightly. This applies to parts of Fl. (especially around Antwerp), Camp. or. (Zonhoven and its surroundings) and Fluv. (the entire valley of river Maas) where it is R and no longer RR. For comparison: the species is said to be R in Fluv. in H24. In all these regions the species is even much less rare than in Brab. (in the latter district it was considered to be merely R).

• *C. flavescens* L.: this species is not RR but extinct in Champ. where it was last seen around 1900 (SI-Flore).

• *C. esculentus* L.: this weed is nowadays at least as common in Fl. (especially between Ghent and Bruges) as in Camp. (in the latter district it is widely dispersed now and no longer confined to the eastern part of the district). It is also known from several localities in Brab. (R-RR) and is also present in Mar., both in Belgium and the Netherlands (wn.be, Atlas-NL). In 2012, this species was discovered in Nouvion-sur-Meuse and its surroundings in French Lorr., where the species was subsequently noticed to expand strongly (Bizot 2012b, Bizot *et al.* 2016, Labroche 2020). It is also known in Tert. par. from the area west of Compiègne (SI-Flore).

• *C. longus* L.: this southern species is increasing and now also known from Camp. and Mosan. In Lorr., it is not limited to the northeastern part of the district (e.g. Bizot & Bouillard 2011). This species is at most R in many districts. For an overview of recent records in northwestern France, see Duhamel & Delaporte (2017).

• *C. eragrostis* Lam.: this New World weed is much increasing, especially in Mar., Fl., Camp. and Brab. In these districts, it has become at most AR now. More recently, it was also found in various other districts (Pic., Champ., Tert. par. where it is R and Ard. and Lorr. where it is RR) (FLORAINE 2013, Digitale2, FZ, wn.be, etc.; see also Bonassi *et al.* 2017).

• ***Rhynchospora*** *alba* (L.) Vahl and *R. fusca* (L.) Ait.: these two species have both been known from a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse, near the estuary of river Canche) since quite a long time (SI-Flore) along with, among others, *Trichophorum cespitosum*, *Hypericum elodes*, *Drosera rotundifolia*, *Erica tetralix*, etc. (comm. B. Toussaint, 06.2021). It is very surprising that these data had been overlooked until now in NF.

• ***Cladium*** *mariscus* (L.) Pohl: in Camp., where it was considered to be RR in NF6, this species is clearly less rare (R-RR) than in the other districts. The species also occurs in Sint-Gillis-Waas (since 1940!), located in Fl., a district from where the species was thought to be absent.

• ***Schoenus*** *nigricans* L.: this species is still known in Camp.; it was discovered in the Buitengoor nature reserve in 2014.

• ***Carex*** ×*timmiana* P. Junge [*C. nigra* (L.) Reichard × *trinervis* Degl.]: the presence of this hybrid was confirmed from several localities in Mar. in Belgium since 2012. It is in fact much more common there than *C. nigra*. A few years ago, it was also found in northwestern France in this district (Pré Communale d'Ambleteuse) and it apparently also occurs south of Boulogne (Mar. mér.). In a single locality in the Belgian dunes this hybrid grows together with both parent species and covers several tens of m² (comm. M. Leten, 07.2020).

• *C. dioica* L.: there is only one extant population left in Camp. in Belgium and the Netherlands (Buitengoor nature reserve). The species may still be present in Hautes Fagnes (AFW). In Brab. (Berg), it was not seen since 1952 and it has also disappeared in Lorr. sept. (Colling 2005, AFL). This species is very much declining in the Flora area.

• *C. davalliana* Smith: this rare species is known in the Netherlands from two localities. The species was first found in 2006 in Zuid-Limburg (Brab. or.; Weeda *et al.* 2006). Subsequently, since 2012, it has also been known from one place near Breda (Camp.; wn.nl, H24). This species had never been reported before in the Netherlands. Yet, it is considered native and not adventitious, as it is a species found in almost all of Europe, with the exception of Scandinavia. It is characteristic of limestone marshes.

• *C. bohemica* Schreb.: in both Camp. and Tert. par., this very rare species was recently rediscovered: in Camp. in Bokrijk in 2010 (as already mentioned in NF6; its presence was regularly confirmed subsequently but the species was apparently no longer observed after 2019; wn.be) and since 2009 it has repeatedly been observed in Festigny (database CBN Paris).

• *C. pulicaris* L.: in Lorr., this species is only known from the northern part of the district, with only a single locality, near Toul, in the French part of the district (FLORAINE 2013, wn.be).

• *C. divisa* Huds.: this rare species was rediscovered at the Belgian coast in 1999 (AFV). In the meantime at least four locations are known (comm. M. Leten, 07.2020 and 01.2021): three in coastal dunes between Koksijde and Nieuwpoort (Doolaeghe, Oostvoorduinen and Groenendijk) and one in the polders in Middelkerke. There are also several locations in Zeeland (FZ). It is now equally rare in the entire Mar. district and hardly less rare in Mar. mér. In NF6, *C. divisa* was still indicated as being extinct in Belgium, erroneously so.

• *C. arenaria* L.: this species is less rare than indicated in NF6 in Brab., where it is R rather than RR (wn.be).

• *C. colchica* J. Gay: in the Flora area, this species only occurs in the Netherlands. In addition to Fluv., it has also been known from Camp. (H24).

• *C. pseudobrizoides* Clavaud: according to FG, the presence of this species in Somme (France) is erroneous. Delay *et al.* (2016), however, have recently confirmed its presence there (in Crécy-en-Ponthieu; Pic. occ.) based on morphological and anatomical studies. Lecron & Duluc (2019) and Duluc (2019) moreover demonstrated that in fact both *C. pseudobrizoides* and *C. brizoides* L. are present there.

• *C. brizoides* L.: this species is slightly expanding (or has been long overlooked?), especially in Camp. and Mosan where it is rather R than RR (see also H24). Lecron & Duluc (2019) recently also confirmed its presence in Pic. occ., from where it was not yet mentioned in NF6. Some authors still question the indigeneous of this species in Belgium (e.g. Vernier 2014).

• *C. praecox* Schreb. subsp. *curvata* (Knaf) Vollm.: in its unique Belgian locality near Dinant, this taxon was last seen in 1991. Despite a targeted search at the site, it was no longer seen in 2017. Judging from its 'habitat' (the concrete border of river Meuse) it was undoubtedly introduced there (comm. J. Koopman, 05.2017).

• *C. vulpinoidea* Michaux: this North American alien was discovered in several additional districts in Belgium and the Netherlands: Mar., Camp. and Fluv. (Koopman 2015, Verloove 2016b).

• *C. spicata* Huds.: this species was said to be RR in Fl. and Mar. in NF6, which is exaggerated. It is found in the dunes, inner dunes and polders of the coast (often commonly so, for example in the Zwin nature reserve in Knokke). At least on the Belgian and Dutch coast, it is at most AR-R (comm. M. Leten, 01.2021). For comparison, according to FZ it is even C in Zeeland. The same applies to most parts of Fl. (wn.be). In Eifel centr., on the contrary, this species is indeed RR (FT).

• *C. muricata* L.: this poorly known species also occurs in the northeastern corner of Lorr. in Germany (Gutland; FT) and may have been overlooked just across the border in the Grand Duchy of Luxembourg. It has also been known from Lorr. mér. and Tert. par. (Montagne de Reims) (database CBN Paris).

• *C. pairae* F.W. Schultz: this species is not AR in Eifel centr. as stated in NF6; in reality, it is completely absent

from that area (FT), although it occurs further east, in the Osteifel.

• *C. diandra* Schrank: this rare species is also present at several locations in Brab.: Torfbroek, Vorsdonkbroek, Malendriesbeekvallei and Vaarttaluds Moen (verified data from wn.be). There are also several localities in the valley of river Somme west of Amiens in Pic. mér. (SI-Flore, Digitale2, see also Coulombel *et al.* 2016). In Tert. par., its actual presence needs to be confirmed: it seems to have disappeared from most (or all?) of its former localities (Digitale2, database CBN Paris).

• *C. appropinquata* C.F. Schumach.: this very rare species is also known from Fluv. in the Netherlands (H24, Atlas-NL).

• *C. leporina* L.: in Brab., this species is equally rare in the central and eastern part of the district; in the western part, on the other hand, it is almost missing (wn.be).

• *C. crawfordii* Fernald: this North American alien is expanding and is now also known from ten localities in Camp. in the Netherlands (Koopman 2015) and in 2008 it was discovered in Argonne (Cornay) in Lorr. occ. (Lecron 2014, Labroche 2020). It was also observed in two locations in Belgian Mar. (Koksijde) in 2010 but apparently disappeared soon afterwards (Verloove 2016b).

• *C. canescens* L.: this species also occurs in Mar. in the Netherlands where it is known from Schotsman in Zeeland (FZ). In Fl., Brab., Lorr., Tert. par. and Eifel centr., it is perhaps slighly less rare, R-RR rather than RR. In Lorr., it is moreover also known from scattered localities in the French part of this district (FLORAINE 2013), the species not being limited to the northern (Belgian) part of this district.

• *C. echinata* Murray: this species is known from a single locality in Mar. (Doolaeghe nature reserve in Koksijde), where a few plants grow in a damp meadow (best interpreted as Rhinantho-Orchietum morionis). In this locality this species persists well; it is certainly the only known population on the Flemish coast (comm. M. Leten, 01.2021).

• *C. elongata* L.: in Eifel centr., this species is neither absent, nor extinct; there are in fact a few recent localities according to FT.

• *C. depauperata* Curt. ex With.: this species is extinct in both Belgium and the Grand Duchy of Luxembourg (Colling 2005, AFW, wn.be, etc.). The same applies to northwestern France (Digitale2) and northeastern France (FLORAINE 2013). However, the species was recently rediscovered in Gutland in Germany (Lorr. nord-or.; Reichert 2014, FT) and it is also still present in some parts of Tert. par. (Laonnois and west of Soissons; SI-Flore).

• *C. strigosa* Huds.: in Brab., this species is noticeably rarer in the eastern and equally distributed in the western and central part of the district. In Fl., there are several recent localities (e.g. in the wide area of Bruges), but most of these populations are likely non-native (e.g. deviating ecology; the species is nowadays also planted as an ornamental). However, it is sometimes also found in natural habitats, e.g. in Drongengoed in Ursel, where its recent occurrence is less easily explained. This species also naturally occurs in several localities in Champ. (Labroche 2020).

• *C. sylvatica* Huds.: this species is increasing but, like for the preceding species, its origin is partly unclear. In some of the districts where it was considered to be RR in NF6 it is at most R. This applies to Fl. and also to parts of Mar. For comparsion, it is said to be merely R in Zeeland (FZ).

• *C. pseudocyperus* L.: in Camp. and Brab., this species is not noticeably more common in the western than in the other parts of these districts (wn.be).

• *C. laevigata* Smith: there are four locations in Zuid-Limburg in the Netherlands (Brab. or.; H24, Atlas-NL) where it occurs naturally. Claims from Brab. and Camp. in Belgium (wn.be) require confirmation. The species is also known, rather isolated from the other sites, from Lac de Bairon in Lorr. (Labroche 2020). In Tert. par., on the contrary, it is completely absent (it only occurs northwest of Paris, outside the Flora area) (SI-Flore).

• *C. distans* L.: in Mar., this species is less rare than indicated in NF6, AC-AR rather than AR-R (wn.be). In the Dutch part, it is even said to be C (FZ, H24) and it is hardly any rarer in its Belgian part. In Pic., it is not limited to the western part of this district: it also occurs in the southeastern part, in the valley of river Somme (François *et al.* 2017).

• *C. punctata* Gaudin: this species was first seen in Belgium in 1993 (two localities in Mar.). There are several locations between Zelzate and Antwerp now. These are located on the border of the Mar. and Fl. districts but at least some definitely in the latter, e.g. those in the Stropersbos and along the E34 motorway (on sand; IFBL squares C3.34, C4.11, C3.27). The species is usually found in slightly acidic grasslands in this area. In coastal Mar., it is also known since 2009 from Koksijde. In 2020, *C. punctata* was also found in Muno in Ard. (La Roche à l'Appel), in a very different, deviating habitat (wn.be). The status of this latter locality is difficult to assess. [Erratum: this population was reidentified as *C. laevigata* by Indra Jacobs in July 2023. Unfortunately, this correction could not be included in the Dutch edition of the Flora.]

• *C. mairei* Coss. et Germ.: this species was thought to be possibly extinct in Tert. par. However, its presence there has been confirmed lately in Laonnois (Digitale2, SI-Flore; see also Messean *et al.* 2015).

• *C. flava* L.: except for a single location in French Lorr., this species is restricted to the Belgian (northern) part of Lorr. (FLORAINE 2013, wn.be). Its presence in Pic. (valley of river Somme) was recently confirmed (Watterlot & Coulombel 2018). Previous claims from that area have often been considered false or questionable (Duluc 2019).

• *C. lepidocarpa* Tausch: this species is certainly present in Camp., for instance in the Buitengoor nature reserve in

Mol and near Neerpelt and Lommel (ID confirmed by J. Koopman). The species is also known from several locations on the Ardennes plateau in France where it may have been introduced (Labroche 2020). In Lorr., where it was said to be AR in NF6, its frequency probably needs to be revised: according to FLORAINE (2013) it is RR in the French part of this district.

• *C. demissa* Hornem.: this species also occurs here and there in Mar. (wn.be, FZ, H24), although the separation from *C. viridula* Michaux is not always straightforward.

• *C. rostrata* Stokes: in Mar., this species is not restricted to Mar. mér. In Belgium a stable population is present in the Hannecart nature reserve (in a very wet peat bog) (comm. M. Leten, 01.2021) and the species has also been recorded in Zeeland in the Netherlands (FZ), although it is rather ephemeral there.

• *C. riparia* Curt.: this species has completely disappeared in Eifel centr. (FT), where the species has always been RR.

• *C. acuta* L.: this species is hardly found in Eifel centr. and is thus R-RR, rather than AC-AR (FT).

• *C. umbrosa* Host: this species also occurs in Eifel centr., where it is known from at least one locality, in Oberbettingen (Kalkeifel; FT). There are also several localities in Champ. mér., northeast of Troyes (database CBN Paris).

• *C. tomentosa* L.: this species has been known since 2001 from one location in Zuid-Limburg in the Netherlands (Brab. or.) where the species may once have been introduced; it is, however, expanding lately (H24).

• *C. humilis* Leyss.: this species is much rarer than indicated in NF6 (AR) in Lorr. (even RR according to FLORAINE 2013) and moreover almost limited to the southwestern part of the district, roughly in the area Verdun-Toul-Neufchâteau.

• *C. ornithopoda* Willd.: this species is also known from the Givet area in Mosan (database CBN Paris).

• *C. pendula* Huds.: this species naturally occurs in Champ., although RR (Labroche 2020). It is much expanding lately, especially as an escape from cultivation. At least part of these escaped plants belong to subsp. *agastachys* (L. f.) Ljungstrand, although the separation of this subspecies is rarely straightforward in the Flora area. As a consequence, its distribution remains obscure and requires further study.

• *C. pilosa* Scop.: this species is known for at least 20 years from Overloon in Fluv. in the Netherlands where it is considered to be a naturalized alien (H24). In Lorr., although RR, this species occurs at several locations throughout the district (FLORAINE 2013), it is not restricted to the southern and northeastern parts of the district as stated in NF6.

• *C. flacca* Schreb.: in parts of Fl., this species is not RR, rather R-RR (wn.be).

• *C. halleriana* Asso: in NF6, this species was said to reach its northern limit in French Lorr. Indeed, according to AFL the species' most northerly locality was in Saulny, north of Metz. In 2016, however, this southern species was discovered even further north, in Tagnon in Champagne, possibly as a result of global warming and it is thus expected to occur elsewhere in the region in suitable locations, for instance on Pre-Ardennes ridges or at Pointe de Givet (Labroche 2020).

• *C. pallescens* L.: there is a reliable record from Belgian Mar. (Doolaeghe nature reserve in Koksijde) (comm. M. Leten, 01.2021). The species was found once in a somewhat drier, decalcified zone.

• *C. limosa* L.: this rare species is much declining in the Flora area and may have disappeared from some of the districts mentioned in NF6. This applies, among others, to Tert. par. (Laonnois) where its actual presence requires confirmation (it was most recently observed in 1972 according to SI-Flore).

61. Poaceae

• With respect to alien species not treated in detail: *Cortaderia selloana* (Schult. et Schult. f.) Aschers. et Graebn.: this ornamental is no longer rarely but increasingly escaping, especially in Mar., Fl., Camp. and Brab. (e.g. Lemoine 2017, wn.be).

• The intergeneric hybrid *Festuca rubra* L. × *Vulpia myuros* C.C. Gmel. (×*Festulpia* Melderis ex Stace et Cotton) is not restricted to Brab. occ. (France) and Mar. sept. It has also been found several times in Belgium and can potentially be formed wherever both parent species occur (i.e., in all districts; wn.be).

• ***Panicum*** *miliaceum* L. subsp. *agricola* H. Scholz et Mikoláš: this taxon has also been recorded on several occasions in Fl. (wn.be).

• *P. hillmanii* Chase: a habitat type was added ("ballast des voies ferrées"). More or less established populations of this species, particularly those in the port of Antwerp, are located in or near railway infrastructure (wn.be).

• *P. schinzii* Hack.: this South African alien is now also strongly increasing and established in large parts of Brab. and it was recently also reported from maize fields in various parts of Mosan (Wastiaux 2019).

• *P. dichotomiflorum* Michaux var. *dichotomiflorum*: this weed is not exclusively naturalized in Fl.; it has also become established in Camp. where it is as widespread now as in Fl. (wn.be). It is also, at least locally, established in Brab., Mar., Ard. and Lorr. (Bizot 2012c, Bonassi *et al.* 2017), etc.

• ***Echinochloa*** *crus-galli* (L.) Beauv.: this species is lacking in Eifel centr. (FT).

• *E. muricata* (Beauv.) Fernald: this American weed has much increased lately in Fl., Camp. and Brab. (wn.be). In the first two districts it has become rather AC, in Brab. rather AR, although there are important local differences (e.g. it is much rarer in the central part of the province of West-Flanders). In Brab., it is also established

in the wider area of Kortrijk (Brab. occ.) and Brussels (Brab. centr.) and no longer predominantly so in Brab. or. In Mar., it is clearly less rare (AR-R) than in the rest of the remaining districts. Elsewhere, this species is occasionally recorded as an alien, recently for instance for the first time in Lorr. near Metz (Bonassi *et al.* 2017). Its var. *wiegandii* (Fassett) Mohlenbr. is now separated but it is still poorly known and its distribution uncertain. According to verifiable data from wn.be it has been confirmed from at least Fl., Brab. occ. and or. and Mosan or.

• ***Setaria*** *parviflora* (Poiret) Kerguélen: this alien is more or less established in two places. It was known in the port of Ghent between 1975-85 (Robbrecht & Jongepier 1986). This location was lost, but since 2001 the species has been growing permanently on the other side of the canal. Since 2017, it is also known from a canal bank in Genk (Camp. or.) where it grows together with two other 'southern' exotic grasses, *Paspalum dilatatum* and *Sporobolus indicus* (wn.be).

• *S. pumila* (Poiret) Roem. et Schult.: this species has much increased lately, especially (but not exclusively) in maize fields, and it is less rare than indicated in NF6 (wn.be).

• *S. verticillata* (L.) Beauv. var. *verticillata*: this taxon is lacking in Eifel centr. (FT).

• *S. verticillata* (L.) Beauv. var. *ambigua* (Guss.) Parl.: this variety is much rarer than var. *verticillata* and is locally (!) naturalized only in Fl. and Camp. and still at least AR (wn.be). It was also found a few times in Mar. This variety is not as rapidly expanding as indicated in NF6.

• *S. viridis* (L.) Beauv.: this species is lacking in Eifel centr. (FT).

• *S. faberi* R.A.W. Herrmann: this Asian weed is expanding and no longer restricted to Fl. It is now also present in Mar., Camp., Brab. and Mosan (surroundings of Rochefort). Northeast of Rochefort, *S. faberi* occurs in several places in and along fields since 2018 (wn.be); it was not previously recorded in Wallonia.

• ***Digitaria*** *sanguinalis* (L.) Scop.: this species has become AC in Lorr., instead of AR-R (FLORAINE 2013).

• *D. ischaemum* (Schreb.) Muhlenb.: in Mar., this species is not RR at all, rather AC-AR (wn.be). In Zeeland, it is even C (FZ) and also north of Antwerp it is very widespread (wn.be). It is evidently much rarer in the polders in this district.

• *D. aequiglumis* (Hack. et Arechav.) Parodi: this South American weed has further expanded and is no longer restricted to the area north and east of Ghent. It now roughly occurs in an area from Ruiselede to Overmere and from Eeklo to Deinze (wn.be).

• ***Bothriochloa*** *ischaemum* (L.) Keng: this species has not been observed in Belgium for over a century (Verloove 2006a). The species' distribution in the remainder of the Flora area was clarified: it only occurs in Tert. par. and very locally in the southernmost part of Lorr. (Jaillon, since 2014; Bonassi *et al.* 2017) (Digitale 2, AFL, SI-Flore). In Tert. par., this species is localized on the warmest limestone grasslands in the Soisson area (just beyond the Flora limits also in the Vallée de l'Automne and in Valois). Although relatively isolated, these populations could result from a changing climate and therefore considered as a natural range extension.

• ***Sorghum*** *bicolor* (L.) Moench: this species is now locally cultivated on a large scale as fodder in the southeastern part of the Flora area (Lorr.) and as an experimental crop elsewhere.

• *S. halepense* (L.) Pers.: this thermophilous weed is naturalized around Antwerp, Brussels, Ghent, the southern part of West Flanders and along several motorways (i.e., rather in and near the larger cities and no longer restricted to the Ghent area) (wn.be). It is much rarer elsewhere and, surprisingly, almost absent from the southern flora districts in northern France (SI-Flore, Digitale2, AFL). As already indicated in NF6, it indeed hardly seems to expand: the distribution map for Flanders from 2006 (AFV) hardly differs from the current one (wn.be).

• ***Cynodon*** *dactylon* (L.) Pers.: this thermophilous species is expanding and slightly less rare than indicated in the districts listed in NF6. In Fluv., it is restricted to the Netherlands and completely missing in Belgium. It is not RR in Camp. or. (at most R), particularly in the mining region. In Lorr., on the contrary, it is apparently much rarer than indicated (RR instead of R), both in Belgium and France (wn.be, FLORAINE 2013).

• ***Eleusine*** *tristachya* (Lam.) Lam.: this South American weed is sometimes temporarily persisting (e.g. railway yard Melle near Ghent, 2005-2013; wn.be) but probably not really established anywhere.

• ***Spartina*** *maritima* (Curt.) Fernald: this species is still present in Zeeland in the Netherlands where it was formerly AC, now RR. There are two extant populations at the Volkerakmeer (Hellegatsplaten) (FZ, H24). In contrast to FG, this species never occurred along the French North Sea coast (Digitale2).

• ***Sporobolus*** *indicus* (L.) R. Brown: this pantropical species was not yet keyed-out in NF6 but is much expanding lately. It has been known since the 19th century in the Flora area, especially as a wool alien. In the past decades it gradually extended from southern Europe to the north and the current northern limit of its more or less contiguous area is set around the Paris Basin. However, the plant is clearly expanding and is now increasingly observed north of this limit, including in the Flora area. The species is already present there in apparently stable populations, especially in Mar., Fl., Camp., Brab. and Tert. par. (wn.be, Digitale2, SI-Flore; for an overview of populations in northwestern coastal France, see Facon 2017).

• ***Eragrostis*** *minor* Host: this species is much more frequent than indicated (rather AC; wn.be), especially in urban agglomerations (H24: AC, FZ: C). In the extreme southwestern part of the territory it is, indeed, largely missing (Digitale2), as indicated in NF6.

• *E. cilianensis* (All.) Vign.-Lut. ex Janchen: this is a very rare and ephemeral alien, it is not naturalizing anywhere (wn.be).

• *E. curvula* (Schrad.) Nees: the species' actual distribution was added. It is established locally in the port of Antwerp since the 1990s and is also more or less consistently occurring to the south of Ghent. In addition, it was recently also detected here and there along the E17 motorway between Ghent and Antwerp, in Koksijde (dunes), in Camp. (south of Breda in the Netherlands and near Genk in Belgium) and near Trier (Germany) (wn.be, wn.nl, FT). At least some of the new growing sites refer to escaped (the species is also grown as an ornamental grass) rather than adventive individuals.

• *E. multicaulis* Steud.: the species' distribution was updated. It is AC in Mar., Fl., Camp. and Brab., especially in urban agglomerations. It is also increasing (but still R-RR) in Mosan (especially valleys), as well as around Paris (outside the Flora area; FG). The species is almost absent beyond these districts, e.g. recorded a few times in Lorr. (Virton, Lagarde) and Ard. (AFL, Digitale2, wn.be, FT).

• *E. mexicana* (Hornem.) Link: this alien is much rarer than indicated in NF6, it is at least as rare as *E. virescens* J. Presl (i.e., RR) (wn.be).

• *E. virescens* J. Presl: this remains a very rare and ephemeral alien that is not naturalizing anywhere. Subsp. *verloovei* Portal has never been recorded again since 2009 when it was found in Gierle (Camp.). It is also long gone in Ghent, from where it was formerly described (wn.be).

• ***Tragus*** *racemosus* (L.) All.: a population with more than 100 individuals on a railway site in Melle near Ghent (Fl.) was destroyed after the redevelopment of the site (2011-2013; wn.be). Thus, this species is probably only established in northern France, especially in Tert. par. (e.g. north of Soissons) (Digitale2) and near Metz (FLORAINE 2013).

• ***Leersia*** *oryzoides* (L.) Swartz: in Fluv., this species is indeed remarkably less common downstream of Roermond (wn.be, wn.nl) as indicated in NF6. In the Flora area it is clearly least rare in Camp. and the Belgian part of Fluv., where it is AR-R rather than R-RR. The species seems on the rise and may also have been overlooked (see also Dijkhuis 2020).

• ***Phragmites*** *australis* (Cav.) Trin. ex Steud.: in Brab., this species is not or hardly less common than in Fl., Camp., etc. (C rather than AC) (wn.be).

• ***Danthonia*** *decumbens* (L.) DC.: Champ. was not listed in NF6; the species occurs there, although it is RR (SI-Flore).

• ***Nardus*** *stricta* L.: this species is in parts of Brab. certainly not RR. It is scattered east of Brussels (roughly from Leuven to Tongeren) and also occurs east of Ypres and around Brussels itself. Its distribution in Brab. actually is comparable to that in Fl.: there too the species is R on the sandy soils and completely absent elsewhere in the district (wn.be).

• ***Milium*** *vernale* Bieb. subsp. *scabrum* (L.C.M. Rich.) K. Richt.: this taxon only occurs from South Holland (Voorne) further north, i.e. outside the Flora area, and therefore not really relevant for the Flora area.

• ***Phalaris*** *canariensis* L.: this alien is less rare than indicated, AC-AR rather than AR-R (compare with H24: "vaak", FG: "fréquent").

• ***Anthoxanthum*** *aristatum* Boiss.: the first Belgian record of this long-naturalized alien species dates back to 1840, not 1881 (Verloove 2006a).

• ***Hierochloe*** *odorata* (L.) Beauv.: in Mar. in the Netherlands, the southernmost localities are in Voorne, i.e. outside the Flora area (wn.nl, FZ). Other localities in the southern part of the Netherlands are located in Camp. and Fluv. In its unique Belgian growing site, near Sint-Niklaas (Verloove & Opstaele 2004), the species is still present (wn.be).

• ***Koeleria*** *macrantha* (Ledeb.) Schult.: in Eifel centr., this species is less rare than *K. pyramidata*, at most AR instead of RR (FT). In parts of the Flora area, it is locally much increasing since ca. 2010, including on roadsides of motorways (A19, E17, E34, etc.), for instance in the southern part of the province of West-Flanders, etc., often in populations with 1000s of individuals (wn.be). The species is now present in grass seed mixtures and may have been partly sown at some point.

• ***Rostraria*** *cristata* (L.) Tzvelev: this thermophilous species was not yet keyed-out in NF6 but is much expanding lately. It is now naturalized locally, especially in Mar. and Boul., and in urban agglomerations (Fl., Brab., etc.) (wn.be, SI-Flore, Digitale2; see also Saintenoy-Simon 2016, Verloove *et al.* 2020a).

• ***Holcus*** ×*hybridus* K. Wein: in NF6, this hybrid was said to be possibly overlooked. According to FG it can indeed be found throughout France.

• ***Gaudinia*** *fragilis* (L.) Beauv.: in Belgium, this species has only been known since 2001 (Saintenoy-Simon 2004). It was first found in Houyet (Mosan), then, in 2020, in Oudenaarde (Brab.) and Esneux (Mosan) (wn.be). All of these localities appear "natural" (hay meadows) and it is not known whether the species has been neglected before or if it is actually expanding. Since 2012, it has also been known from the Biesbosch (Fluv.) in the Netherlands, just north of the Flora area (H24). Finally, it is also present in Champ., for instance near Châlons-en-Champagne (database CBN Paris), a district not yet mentioned in NF6.

• ***Ventenata*** *dubia* (Leers) Coss.: this rare species has indeed disappeared from Mosan and Eifel centr. and is, as a native species, extinct now in the entire Flora area (AFW, FT). However, the species was collected in June 2002 by David Mercier on a coal mining slag heap (terril 116-117) in Dourges (dep. Hauts-de-France; France). In 2010 its presence there could no longer be confirmed (comm. B. Toussaînt, 01.2021).

• ***Arrhenatherum*** *elatius* (L.) Beauv. ex J. et C. Presl subsp. *bulbosum* (Willd.) Schübl. et Martens: in Belgium, this subspecies is apparently least rare in the wider area of Bruges. It perhaps also occurs here and there in Mar., in Belgium as well as in the Netherlands (wn.be, wn.nl; to be confirmed, however). In France, this taxon is also known from Champ., for instance near Vaudesincourt (database CBN Paris).

• ***Helictochloa*** *pratensis* (L.) Romero Zarco: in addition to natural occurrences, this species is rarely introduced, e.g. in the Wateringen nature reserve in Lommel (Camp.; wn.be), where it may have been sown a long time ago (just like *Campanula rhomboidalis* and a few other Central European species).

• ***Avena*** *barbata* Pott ex Link: this southern species used to be a very rare and ephemeral alien but a large population has persisted since 2017 on the edge of an abandoned railway yard in Wondelgem (Ghent; Fl.) (wn.be). The species is abundantly naturalized on and near railway yards and -tracks in the port of Dunkerque in France where it was already common around 2010 (Stien 2018, pers. obs. author). In identical circumstances, it also occurs in the port of Antwerp (pers. obs. author). In these two areas, both located in Mar., *A. barbata* is clearly naturalized and has probably been overlooked for some time. It is occasionally seen in other districts as well, e.g. at some drive-outs of the A1 motorway near Lille in France (Brab.; pers. obs. author).

• *A. fatua* L. subsp. *septentrionalis* (Malzev) Malzev: the presence of this subspecies in the Flora area is confirmed. There are recent, reliable records from Mar. and Brab. (wn.be).

• *A. strigosa* Schreb.: this species was formerly cultivated for livestock feed but now increasingly as green manure.

• ***Deschampsia*** *cespitosa* (L.) Beauv.: this species is in much of Fl. much less common than indicated in NF6 (AC-AR, rather than C-AC). In some regions (e.g. the central part of West Flanders), it is even almost absent. The widespread taxon, at least in the northern part of the Flora area, is probably subsp. *cespitosa*. Two further subspecies, subsp. *parviflora* (Thuill.) Dum. and subsp. *subtriflora* (Lag.) Ehr. Bayer et G. López, are poorly known and possibly overlooked. In France, the former is present at least in Brab. occ., Ard., Lorr., Champ. and Tert. par. (Digitale2, database CBN Paris). In French Lorr., subsp. *parviflora* is not rare at all (AFL), even more common than subsp. *cespitosa*. It could be inferred from FG that the latter is not *a priori* the most widespread subspecies in France. Subsp. *subtriflora* is much rarer and probably limited to Champ. mér. and Lorr. mér. Duluc (2019) checked claims of it from Avesnois (Baives, Trélon; Mosan occ.) and these could not be confirmed as subsp. *subtriflora*.

• ***Avenella*** *flexuosa* (L.) Drejer: this species is not absent but RR in Mar. and Champ. It occurs in decalcified dunes in Zeeland (FZ) and is also present in Champ. (SI-Flore).

• ***Aristavena*** *setacea* (Huds.) F. Albers et Butzin: this rare species is still present at several locations in Camp., both in Belgium and the Netherlands (wn.be, wn.nl). In Tert. par., it is still known from two locations south of Épernay in Brie: Oger and le Mesnil-sur-Oger (comm. B. Toussaint; also: https://inpn.mnhn.fr/docs/ZNIEFF/znieffpdf/210000723.pdf).

• ***Aira*** *caryophyllea* L. (subsp. *caryophyllea*): the distribution of this species is similar to that of *A. praecox*. In Fl. and Mar., it is hardly, if at all, rarer than in Camp. (wn.be; see also FZ). In Lorr. sept. and occ., this species was said to be AR in NF6. However, this only applies to the Belgian (northern) part of this district; in French Lorr. this species is RR and even completely absent in the western part of the district, contrary to NF6 (FLORAINE 2013).

• *A. multiculmis* (Dum.) Bonnier et Layens: the exact residence status of this poorly known species is difficult to determine with certainty, but there are certainly arguments to consider this as an indigenous (or at least archaeophytic) species. There are several historical records (much more than current ones) and these were not treated as 'adventive' (Durand 1899). Moreover, the species was originally described by Dumortier in his Florula Belgica, supposedly on the basis of Belgian material (see also Eichhorn & Brinkkemper 2018). It occurs at least in Lorr. and historically also in Brab. or. in the Netherlands (Zuid-Limburg). However, in the French part of the Flora area it is apparently missing (SI-Flore).

• ***Parapholis*** *incurva* (L.) C.E. Hubbard: the genuine presence of this species was recently confirmed in several places between Calais and Dunkerque (comm. B. Toussaint, 01.2021; pers. obs. author) and also further south, south of the estuary of the Somme river (beyond the limits of the Flora area). In our territory it is thus naturally occurring in France whereas in Belgium it is only adventitious: the species was discovered in Rekem (Camp. or.) in 2009 and has persisted well ever since (along with *Polygonum arenarium*) (wn.be). It was introduced there with talk (a soft inert mineral powder) from Egypt or Pakistan (comm. R. Barendse, 09.2020).

• ***Elytrigia*** Desv. hybrids: *E. acuta* (DC.) Tzvelev × *juncea* (L.) Nevski subsp. *boreoatlantica* (Simonet et Guinochet) Hyl. is R according to FG on the North Sea coast, whereas according to H24 it is C in the foredunes. The situation on the Belgian coast is unclear. *E. juncea* subsp. *boreoatlantica* × *repens* (L.) Desv. ex Nevski is very common along river Scheldt north of Antwerp (comm. D. De Beer, 10.2019).

• *E. acuta* (DC.) Tzvelev: the distribution and frequency of this species is similar in Camp. and Fl. (introduced in both districts). It occurs naturally only in Mar. (compare with H24, FG).

• *E. campestris* (Godr. et Gren.) Kerguélen ex Carreras (subsp. *campestris*): the genuine presence of this taxon and its distribution in the Flora area remain quite controversial. According to SI-Flore and Digitale2, this species is absent from Tert. par. in the Flora area (although the

database of CBN Paris presents several records from both Champ. and Tert. par.!). In northwestern France its most northerly locality appears to be in Fécamp, north of the Seine estuary (i.e., far beyond the limits of the Flora area). The whole issue requires further study.

• ***Lolium*** *temulentum* L.: in recent decades, this weed was only observed as an adventive in port areas (wn.be). It may be extinct in the wild in the Flora area, just like *L. remotum* Schrank. See also FG and H24.

• ***Hordeum*** *murinum* L. subsp. *murinum*: this taxon is indeed a little less common in Camp. than in e.g. Fl. but at most AC. It is much commoner there than in e.g. Mosan (wn.be).

• *H. murinum* L. subsp. *leporinum* (Link) Arcang.: this southern subspecies is increasing lately and in the process of local naturalization, especially in Mar., Fl. and Brab. (Verloove & Vercruysse 2020).

• *H. marinum* Huds.: in the whole Flora area, this species only occurs naturally in the Netherlands, both to the north and south of the Scheldt estuary (FZ). It is extinct in Belgium for decades and also disappeared in northwestern France (Digitale2, SI-Flore), except as an introduction (pers. obs. author: Lille, 2021). The northernmost natural locality there is just south of the mouth of the Somme river, at Cap Hornu (Duhamel & Delaporte 2017), i.e. beyond the limits of the Flora area.

• *H. secalinum* Schreb.: this species is omnipresent in Fl. in meadows in the Scheldt and Leie valleys (surprisingly not yet indicated in NF6). Outside of the Mar. district, these appear to be the main distribution centers of the species in Belgium (wn.be).

• *H. jubatum* L.: this alien species is certainly not more common in Mar. sept. than in the rest of Mar., rather on the contrary: at present, the species only occurs as an ephemeral alien in Zeeland (FZ). It is globally least rare in Mar. and Camp. (especially on slag heaps) and indeed is established there, albeit R rather than AR (wn.be). Elsewhere it may be mostly ephemeral.

• ×***Calammophila*** *baltica* (Flügge ex Schrad.) Brand: this intergeneric hybrid is R north of the Scheldt estuary (FZ). Elsewhere in this district, it is RR throughout and it has even completely disappeared in northwestern France (wn.be, Digitale2). It is certainly not in expansion as suggested in NF6, on the contrary.

• ***Alopecurus*** *rendlei* Eig: this species was recently (re-) discovered in Pic. (Malzy; Watterlot *et al.* 2009). According to Digitale2, populations in Boul. probably are not natural: « Les populations du Boulonnais constituent un noyau isolé de leur aire générale de répartition (d'indigénat [sic] serait peut-être à confirmer). Presque strictement inféodé à des habitats agropastroraux, il est extrêmement dépendant des méthodes d'exploitation agricole ».

• *A. pratensis* L.: in Mar., this species is at most AC, certainly not AR (compare with FZ: CC; the heatmap of wn.be shows that the species is just as common there as in Fl., Camp., etc.).

• *A. bulbosus* Gouan: in Mar., at present, this species exclusively occurs in Mar. sept. (the Netherlands: Walcheren and Schouwen). The most important current locality is in Yerseke (FZ). It is extinct elsewhere in Mar. (wn.be).

• ×***Agropogon*** *lutosus* (Poir.) P. Fourn. (*Agrostis stolonifera* × *Polypogon monspeliensis*): this intergeneric hybrid was formerly recorded in Mar. in northwestern France by Bouly de Lesdain (http://herbariaunited.org/specimen/319611/). There are two recent locations in the same district in Belgium, from where it is known since 2015, in Kallo (Fort Sint Marie) and Doel (Arenbergpolder) (wn.be). For convenience, a morphological description of this hybrid was added.

• ***Polypogon*** *monspeliensis* (L.) Desf.: this alien is also locally established in Brab. and Camp. and in overall expansion in the Flora area (wn.be).

• *P. maritimus* Willd.: this recent newcomer has been established for some time in the Antwerp port area (Verloove & al. 2008) and seems to be increasing lately elsewhere in the Flora area: at present it is known from Mar., Fl., Camp. and Brab. (wn.be).

• *P. viridis* (Gouan) Breistr.: this southern weed is much increasing in urban areas where it has become locally AC (FZ, H24; e.g. in Bruges, Ghent, etc.); it has become much less rare than indicated in NF6 and now also occurs in Camp. (wn.be).

• ***Lagurus*** *ovatus* L.: this thermophilous species is less common northward in Mar.: it is much more frequent on the Westcoast in Belgium (this is very obvious from the heatmap of wn.be) and becomes much rarer (and often ephemeral) in Zeeland (FZ). FG also indicates that the species is progressively expanding north in France. Outside of the Mar. district, it is sometimes recorded as an escape from cultivation, rather than as a genuine alien. Moreover, in inland districts (Pic. or. and Tert. par., as mentioned in NF6), it is a mere ephemeral, not a naturalized species (database CBN Paris, Digitale2).

• ***Phleum*** *arenarium* L.: in NF6, this species was claimed to be merely R in Tert. par. However, it has completely disappeared from this district (it was formerly present in the Laon area; Digitale2, database CBN Paris). In addition, current inland populations probably always refer to introductions, the species being native only in Mar.

• *P. phleoides* (L.) Karst.: this species appears to have strongly declined in Belgium (Mosan occ.). There are still many records on wn.be, but from only a few locations. Similarly, in Lorr. it is much rarer than indicated in NF6, RR rather than AR (FLORAINE 2013), although it is slightly less rare in some areas, e.g. in the Meuse department (Millarakis 2013).

• ***Crypsis*** *alopecuroides* (Pill. et Mitterp.) Schrad.: this rare species has reappeared in the Flora area where it was considered to be extinct. It is still known from Lac du

Der-Chantecoq in French Lorraine and in the same district it was also found in Réchicourt-le-Château east of Nancy (Pax 2018a), the latter locality just beyond the limits of the Flora area. Near (or rather just beyond) the Flora limits it is also known from Champ. mér. (Forêt d'Orient) and Tert. par. (e.g. from Pont-sur-Seine) (database CBN Paris). This species is flowering later than indicated in NF6 (from June to September). According to FG, it flowers from July onwards but further north it only starts flowering from August onwards (see also Pax 2018a).

• ***Calamagrostis*** *arundinacea* (L.) Roth: in Eifel centr., this species is slightly less rare than indicated in NF6, R-RR rather than RR (FT). It is also sometimes introduced in the Flora area. There are some recent reports of escaped individuals in urban areas in Fl. (Ghent, Boom; wn.be). The species is sometimes offered for sale in the horticultural trade as *C. brachytricha* Steud., a heterotypic synonym.

• *C. canescens* (Weber) Roth: in NF6, this species is explicitly mentioned from Fluv. as being least rare there (AR). However, this does not appear at all from the actual distribution map, rather on the contrary. H24 also does not mention the species specifically for Fluv. and there are hardly any observations from there (wn.nl).

• *C. epigejos* (L.) Roth: this species is said to be C in Mar. (especially in coastal dunes) in NF6. Strangely enough, this is not apparent from the map of wn.be (heatmap). The species is actually more common in Camp. and even in Brab. centr.; in Mar., it is more common north of Antwerp than on the coast. However, H24 also indicates the species to be most common in coastal dunes.

• *C. pseudophragmites* (Haller f.) Koeler: this rare species formerly occurred in Fluv. in the Netherlands but it is extinct for more than a century now. However, H24 reports that the species "may still be present" but not recognized. The southernmost growing place was in Gorinchem, at the northern border of the Flora area (or rather just outside of it).

• ***Agrostis*** *scabra* Willd.: this American weed was observed in 2015 at a railway yard in Haren (Brussels; Brab.) (wn.be), but it is unclear whether the species is naturalized there. Since 2014, the species is also known from a railway site in Nuth in Zuid-Limburg in the Netherlands (wn.nl; BR!).

• *A. vinealis* Schreb. (subsp. *vinealis*): this (sub-) species occurs in Mar at least since the 1980s, especially north of the estuary of the Scheldt river (FZ). In this district it is also known in Belgium, at least from the Hannecartbos (comm. M. Leten) and perhaps also in D'Heye in Bredene (decalcified dunes). In France it is apparently missing in Mar. (Digitale2).

• *A. vinealis* Schreb. subsp. *ericetorum* (Préaubert et Bouvet) Valdés et H. Scholz: the distribution of this subspecies in the Flora area was not given in NF6, mostly because it is poorly known. It is certainly present in France, more precisely in the districts Brab. occ. (e.g. around St.-Omer and Valenciennes) and Ard. (Vouziers, Sedan) (SI-Flore, FG, Digitale2). According to Portal (2009) it is certainly also present in Belgium (without further details). Two collections in the herbarium of Meise Botanic Garden (BR) were annotated by him as "proche de [FV: close to] la sous-espèce ericetorum": Gelrode, 08.07.1938, *E. Michiels* s.n. (BR 1144825) and Aarschot, 's Hertogenheide, 14.06.1937, *E. Michiels* s.n. (BR 1144889).

• *A. ×fouilladeana* Lambinon et Verloove: this hybrid appears to be much rarer than initially thought (RR rather than R). There are hardly any recent observations of it and most of them are from Camp. from which district the hybrid was not yet reported in NF6. It is also possible that the plant is overlooked.

• The presence of *A. castellana* Boiss. et Reuter, one of the parents of the aforementioned hybrid, is likely. According to Portal (2009), it also occurs in Belgium. A collection from a railway site in Kortemark (FV 5665; BR!) from 22.06.2004 "semble correspondre à Agrostis castellana" according to R. Portal.

• ***Apera*** *spica-venti* (L.) Beauv.: this species is in Mar. and Lorr. clearly less rare than in e.g. Mosan, AC-AR rather than AR-R (wn.be).

• *A. interrupta* (L.) Beauv.: the distribution of this alien was specified (no distribution details were given in NF6). It is primarily found in Mar., Fl., Camp., Brab. occ., Mosan and Lorr. (R-RR). Outside these districts it is RR or missing (wn.be, H24, FG).

• ***Sesleria*** *caerulea* (L.) Ard.: in Brab. or., this species is at present restricted to Belgium, it apparently disappeared from Zuid-Limburg (the Netherlands) in 1986 (H24). The species is also increasingly planted in public green and was found as an escape from such plots in Mechelen and Mol since 2015 (wn.be).

• ***Melica*** *ciliata* L.: this species is nowadays often planted as an ornamental in public green and very easily escapes in urban areas (Ghent, Brussels, Antwerp, etc.; wn.be). It is possible, however, that escaped plants belong to non-native infrataxa. In Lorr., this species is much rarer than indicated in NF6 (RR instead of AR-R; FLORAINE 2013).

• *M. uniflora* Retz.: this species does occur as a stinzenplant (e.g. FZ; also in arboreta, parks, etc.). Yet, there may also be populations beyond its known native distribution range (e.g. in Camp.) that could as well be native, e.g. in the Pulderbos in Zandhoven (wn.be), where the species is found in conditions identical with those found in its native area.

• ***Brachypodium*** *pinnatum* (L.) Beauv.: this species is sometimes found as an introduction. In Camp., there are several localities and in at least some places the species even seems well established (e.g. in Lommel; wn.be).

• *B. sylvaticum* (Huds.) Beauv.: this species appears to be slightly expanding lately and is in parts of e.g. Fl., Camp. and even Ard. slightly less rare than indicated, AR-RR rather than R-RR (wn.be).

• *B. phoenicoides* (L.) Roem. et Schult.: this thermophilous grass species was discovered on a slag heap in Genk in 2016 and is well naturalized there (Verloove & Barendse 2019). Subsequently, the species was also observed in a mesophilic calcareous grassland in Warnant-Dreye in Hesbaye (Brab. or.) (comm. Jean-Yves Baugnée, 06.2018). The presence of this alien species in a natural habitat is very surprising. In 2021, it was also observed in a disturbed chalk grassland in La Veuve in Champ. (database CBN Paris; comm. P. Amblard, 01.2022); its status (naturalized?, ephemeral?) in the latter locality requires additional observations.

• ***Cynosurus*** *cristatus* L.: the distribution as given in NF6 largely contradicts the current distribution map (wn.be). In Mar. (polders) it is not at all rarer than elsewhere, according to FZ it is even CC. Also in Brab. occ., it is not rarer than elsewhere in Brab. (the species is C-AC throughout the district). In the main part of Camp., it is much rarer than in other districts, far from C-AC (see also H24: R). In reality, the distribution is very uneven. In Fl., for instance, it is locally quite common (e.g. around Ghent) but completely absent elsewhere. Thus, it is C-AC in Mar., Brab. and AR-R in Camp. (wn.be).

• ***Sclerochloa*** *dura* (L.) Beauv.: this species naturally occurred only in the Grand Duchy of Luxembourg where it is indeed extinct (Colling 2005). In northern France, it is completely absent from the Flora area, the most northerly current locality is in the Seine valley (in La Cerlangue; Digitale2, AFL), far beyond the Flora limits.

• ***Dactylis*** *glomerata* L. subsp. *oceanica* G. Guignard: this taxon was already known from coastal halophilous habitats in northwestern France [as var. *abbreviata* (Link) Lange in NF6]. It has also been confirmed from Zeeland in the Netherlands (H24, wn.nl). This record was not yet included in FZ because the determination only took place after publication, although the find dates back to 2009 already.

• ***Briza*** *maxima* L.: these days, this species is rather an escape from cultivation than a genuine adventive.

• *B. minor* L.: this species was said to be RR in Tert. par. However, it has completely disappeared from the French part of the Flora area (SI-Flore). The last remaining location is in Verneusses, south of the Seine river (Digitale2) and thus far beyond the Flora limits.

• ***Poa*** *infirma* Kunth: this thermophilous species was only recently detected in the Flora area where it probably passed unnoticed for some time. It was first found in camp sites (Verloove & al. 2020a), subsequently also in other suitable habitats, especially in Mar. and Fl. where it is at most R (wn.be, wn.nl; FZ).

• *P. palustris* L.: this species is by far least rare in Camp. and hardly rarer in large parts of Brab. (not only in occ.) and Fluv. (both in Belgium and the Netherlands). In Fl., it is certainly not rarer than in e.g. Mosan and Ard., especially between Ghent and Antwerp but also e.g. around Bruges (wn.be). In Fl., it is more often found in disturbed places, including railway yards (see also H24), than elsewhere in the Flora area.

• *P. trivialis* L. subsp. *sylvicola* (Guss.) Lindb. f.: this taxon was reported in NF6 as probably occurring in Mar. This was surprising, given the subspecies' main distribution in the Mediterranean area. R. Portal has seen the corresponding herbarium material and it rather belongs to an intermediate form, perhaps even to subsp. *trivialis* (Portal 2005). The original record from Belgium was published by Duvigneaud & Lambinon (1963).

• *P. nemoralis* L.: this species is found throughout Camp. and is hardly rarer in much of Fl.; in both districts it is AC-AR rather than AR (wn.be). It is indeed much less common in Mar. but RR is exaggerated; it is at most R there (e.g. AR according to FZ).

• *P. pratensis* L. subsp *angustifolia* (L.) Gaudin: this subspecies is widely distributed in Camp. (wn.be), where it may have previously been overlooked.

• *P. pratensis* L. subsp. *irrigata* (Lindm.) Lindb. f.: in Camp., this subspecies is not rare at all (wn.be) although, just like for subsp. *angustifolia*, some observer bias may be involved (a local botanist, R. Barendse, is familiar with these two taxa).

• *P. chaixii* Vill.: this species is still reported for Zuid-Limburg in H24, but it may have disappeared there (absence of recent observations; wn.nl). The species did occur there historically and, most likely, naturally (contrary to the assumption in NF6). Jansen (1951) only reported finds from "country estates" further north in the Netherlands as probably introduced.

• *P. compressa* L.: this species is often much more frequent in urban environments than in the surrounding countryside, also in districts where it is otherwise R-RR. In Fl., for instance, it is rather common in Antwerp and Ghent. In Camp. it is at most AR everywhere, even outside urban areas. In Mar., on the contrary, its frequency may have been overestimated in NF6, even in the polders (wn.be).

• ***Bromus*** *arvensis* L.: according to H24, this species is naturalized in Brab. or. (Zuid-Limburg) and Fluv. in the Netherlands.

• *B. racemosus* L.: this species is said to be AR-R in most districts in NF6 but this could be a gross overestimation since the species appears to have declined a lot lately (wn.be). It is often difficult to distinguish from *B. commutatus* Schrad. and, as a result, the genuine distribution and frequency of these two species in the Flora area are badly understood.

• *B. commutatus* Schrad.: this species was formerly found in Eifel centr. but it has disappeared from that area (FT). It is certainly present in Ard. occ., where at least subsp. *decipiens* (Bomble et H. Scholz) H. Scholz occurs (wn.be). The overall distribution of the latter subspecies is unknown. It is sometimes seen as a casual alien in port areas but also occurs as a weed in cereal fields, especially in

Lorr. sept. and Ard. occ. (numerous records by I. Jacobs, ID confirmed by U. Amarell; see also FT).

• *B. secalinus* L.: in NF6, this species was said to be absent or gone from Champ.; however, it is still present there, albeit R-RR (SI-Flore, database CBN Paris). The current distribution maps, especially those of wn.be, actually give a very distorted picture. The species is not rare at all in Flanders (the region, not the district), but all these records refer to casual occurrences in ports and other disturbed areas (roadsides, rough ground, etc.). Only in Lorraine the species still seems to occur quite often in fallow fields, at least in the Belgian part (to a lesser extent also here and there in Mosan). Thus, the sharp decline of the species, as indicated in NF6, relates to its occurrence in fields; as an alien, the species is increasingly being found.

• *B. grossus* Desf. ex DC.: according to wn.be and AFW, this rare species is still present in Belgian Lorraine, Mosan, Ard. and Brab. or. (only in Belgium, in Eben-Emael; it has disappeared in Zuid-Limburg in the Netherlands for almost a century, H24). The species has also disappeared in all of northern France (SI-Flore, Digitale2), including in Boulonnais. Formerly, it was also known from Eifel centr. (FT).

• *B. bromoideus* (Lej.) Crépin: this Belgian semi-endemic species was in 1883 also found in Gulpen in Zuid-Limburg in the Netherlands (H24). The record is considered to be part of the natural distribution area (Atlas-NL). Jansen (1951), on the other hand, referred to the endemic nature of the species in Belgium (occurring in a small region southwest of Liège), implicitly indicating that the Dutch record was not part of it (introduced?).

• *B. lepidus* Holmberg: the native area of this species remains uncertain. In NF6, it was said to be from southwestern Europe whereas FG says it is from northwestern Europe.

• *B. hordeaceus* L. subsp. *thominei* (Hardouin) Br.-Bl.: this subspecies is slightly less common than indicated in NF6, AC-AR rather than AC. It is considered to be R in northwestern France (Digitale2) and the same applies to Zeeland (FZ). Also on the Belgian coast there are areas where it is lacking (wn.be). In the interior, as an adventive, it is very exceptional; recently (2020) it was observed, for instance, in a sandy lawn in Ghent (wn.be). According to FG, this taxon mainly occurs from Caen southwards, which implies that more northern populations, including those in the Flora area, are relatively isolated and their nativity uncertain.

• *B. pseudothominei* P.M. Smith: this poorly known species is also known from Brab. (wn.be), a district not mentioned in NF6. In fact, most of the records are from this district, mainly from the wider area around Kortrijk, although there is undoubtedly an observer bias (a local botanist, D. Derdeyn, being familiar with this species). Its genuine distribution in the Flora area remains unknown.

• ***Bromopsis*** *ramosa* (Huds.) Holub: this species is much less common than indicated in NF6 in Eifel centr., AR rather than AC. It is in fact more rare than *B. benekenii* (Lange) Holub in the Trier area (FT). It is also sometimes introduced, including in Mar. (Hannecartbos) and Camp. (multiple locations) (wn.be). However, in most of such cases it is unclear whether *B. ramosa* s.str. or *B. benekenii* is involved. To be checked.

• *B. benekenii* (Lange) Holub: in Eifel. centr., this species is slightly less rare than *B. ramosa*, at most AR instead of RR (FT). Its presence or absence in Tert. par. in the Flora area remains uncertain: it is absent judging from the map provided by SI-Flore, whereas according to FG it is present in the Paris Basin. The CBN Paris database also confirms its present in this district, e.g. in Montagne de Reims.

• *B. inermis* (Leyss.) Holub: in Brab., this species was said to be restricted to the central and western part of the district. However, there are hardly any fewer locations in Brab. or., mostly between Tongeren and Maastricht (wn.be). This species is also present in Boul., where it is known from at least two localities (SI-Flore).

• ***Anisantha*** *tectorum* (L.) Nevski: in NF6, this species was said to be R in Camp. but it is at most AR there and thus falls within the first rarity category (AC-AR). The species occurs in a large part of the district with dense distribution centers around Mol and Genk (heatmap wn.be). In Pic., Ard. and Eifel centr. it is indeed remarkably rarer (R) (wn.be, FT, Digitale2).

• *A. diandra* (Roth) Tutin ex Tzvelev: in NF6, this species was said to be merely R in Champ. In reality, it is almost absent there and thus much rarer. In fact, in inland parts of northern France, it is much less rare in Tert. par. than in Champ. (database CBN Paris).

• *A. rigida* (Roth) Hyl.: this species and *A. diandra* (Roth) Tutin ex Tzvelev are very poorly known in the Flora territory. It seems that only *A. diandra* is naturalized there, while *A. rigida* is much rarer and probably merely ephemeral. The issue requires further study.

• *A. madritensis* (L.) Nevski: this southern species is now locally naturalized in the Flora area where it is known from at least four districts. In Mar., it was recently found in several locations around Ostend and between Zeebrugge and Knokke-Heist (wn.be) and in Dunkerque (France; Stien 2018) and it is also found in Zeeland (the Netherlands) although it is probably not yet fully established there (FZ). In the port of Ghent it occurs since about 20 years by railway tracks. In Brussels (Brab.) it is locally common on gravel of the tramway, especially in Jette (wn.be). The species also occurs in Fluv. in the Netherlands (H24, wn.nl).

• ***Ceratochloa*** *cathartica* (Vahl) Herter: this American weed is indeed locally naturalizing in the Flora area, especially in Fl. and Brab. (wn.be).

• *C. sitchensis* (Trin.) Cope et Ryves: this species is more widely distributed in the Flora area than indicated in NF6. It is naturalized now in Fl., Camp. and Brab. (wn.be). It is also established in Tert. par. but only outside the Flora area (SI-Flore). It is sometimes observed as a casual alien

elsewhere, for instance in Mosan and Mar. (France) (wn.be, Digitale2).

• ***Catabrosa*** *aquatica* (L.) Beauv.: this species is clearly the least rare in Brab. and Lorr. sept., and only somewhat rarer in Mosan. Yet, it is also relatively widespread in Fl. where it is R-RR rather than RR (wn.be). In Lorr., it is much less rare in the northern (Belgian) part of the district than further south in France where it is RR (FLORAINE 2013).

• ***Catapodium*** *rigidum* (L.) C.E. Hubbard: in addition to the districts mentioned in NF6, this species is sometimes found elsewhere as an introduction (either ephemeral or locally naturalized), e.g. in Fl. (port area north of Ghent) and Camp. (former coal mining area) (wn.be). In Brab., it is native in the eastern part (on chalk), whereas in the central part (Brussels) it is established in several places along tramway tracks (wn.be).

• *C. marinum* (L.) C.E. Hubbard: in NF6, this species was said to be sometimes found as an introduction outside of Mar. However, there are hardly any indications for this whatsoever. The species was found along tracks in the port of Antwerp, but this area also belongs to Mar.

• ***Micropyrum*** *tenellum* (L.) Link: there is a clear distinction between a series of records in Camp. in the Netherlands (railway yard in Weert, 1983-89; wn.nl, Bruinsma 1989), from where it was not confirmed in the past 30 years, and the populations in the former coal mining region in northwestern France where this species is widely distributed and established. In the Flora area, this species is perhaps only naturally occurring in the Moselle valley in Lorr., at present solely between Épinal and Nancy, so in the extreme southeastern part of the Flora area (comm. S. Antoine & M. Voirin, 02.2021). In its historical localities in Lorr. (Fliche & Le Monnier 1883, synthesizing previous data of Berher, Mougeot, etc., Petitmengin 1907 and Duvigneaud & Mullenders 1965), the species has not been recorded for quite a long time. Finally, there is also a record from northwest of Soissons in Tert. par. (ephemeral?) (Digitale2).

• ***Glyceria*** *notata* Chevall.: this species was said to be RR in Fl. in NF6 which is certainly not correct (except perhaps on sand) (wn.be). In comparable regions in the Netherlands it is considered to be AC (H24). However, this species and *G. declinata* Bréb. are still very often confused and their genuine distribution in the Flora area should be reviewed.

• *G. canadensis* (Michaux) Trin.: in 2008, this North American species would have been discovered in a second location in Ard., near Bra (AFW). To be confirmed. In Waimes, from where it was first reported in Belgium, it was recently reported to be expanding (Wastiaux & Gérardy 2019).

• *G. striata* (Lam.) A.S. Hitchc.: this North American invasive species is much expanding lately, especially in northern France. In addition to the districts from where it was already known, it is also naturalized in Pic. (west of Arras) and Champ. It is known since quite a long time from the Paris area (Tert. par., including the territory covered by the Flora; also in Montagne de Reims) (Digitale2, database CBN Paris) although this district was apparently left out in NF6. In 2017, it was also recorded for the first time in Belgium: several populations are known now in the Rochefort area in Mosan (Weyembergh 2017). Vernier (2015) and Bonassi *et al.* (2017) provide an overview of records in French Lorraine (see also FLORAINE 2013 and Saint-Val 2018). The species is thought to have been introduced in the Flora area by American troops during World War I (Vernier 2014).

• ***Puccinellia*** *capillaris* (Liljebl.) Jansen: this species was said in NF6 to be restricted to Mar. sept., i.e. north of river Scheldt in the Netherlands. However, there are also records south of the Scheldt estuary in the Netherlands, although the species has become much rarer in recent years in the whole of Zeeland (FZ). Moreover, the species is also found in Belgium (AFV; comm. M. Leten 02.2021), at present for instance in the Zwin nature reserve, Baai van Heist, Uitkerkse Polders, Lissewege, etc. The first records date back to 1977 already (D'hose & De Langhe 1977). In France, *P. capillaris* is missing (FG). Compared with *P. distans* (Jacq.) Parl., it is more often found on sand (FZ).

• *P. fasciculata* (Torr.) E.P. Bicknell: this species has decreased lately in the Netherlands (Zeeland) and now has become R rather than AR (FZ, H24). The species apparently has also completely disappeared in northwestern France (SI-Flore, Digitale2). In Belgium, it mainly occurs on the East coast (comm. M. Leten 02.2021), adjacent to the populations in Zeeland; it is slightly less rare there than elsewhere in Mar. (wn.be).

• ***Pseudosclerochloa*** *rupestris* (With.) Tzvelev: as a native, this species is extinct now in the entire Flora area. It was last seen in Zeeland in 1954 (FZ) and is also long gone in northwestern France (FG, SI-Flore, Digitale2), where it was last recorded in 1965. In recent years, it was only observed a single time, in the Antwerp port area, doubtlessly as an alien.

• ***Vulpia*** *fasciculata* (Forssk.) Fritsch: this species is considerably rarer in Zeeland in Mar. than in Belgium and France, R (FZ) or even RR (H24). In Belgium, it is also clearly more common on the West coast than further north (wn.be).

• *V. membranacea* (L.) Dum.: this is still rarer than the previous species in Zeeland (RR). In Pic., it is apparently completely missing at present (SI-Flore, Digitale2); previous claims (as mentioned in NF6) perhaps referred to ephemeral records there.

• *V. bromoides* (L.) S.F. Gray: in Eifel centr., this species probably has disappeared, it was no longer seen after 1980 (FT).

• *V. myuros* (L.) C.C. Gmel.: this species was said to be AC-AR in the entire Flora area in NF6. However, it is almost completely lacking in Eifel centr. (RR; FT).

• *V. ciliata* Dum. subsp. *ciliata*: in Mar., this taxon is no longer restricted to France: there are also confirmed finds on the West coast in Belgium (De Panne, Nieuwpoort; wn.be) and even in Zeeland, although most of the claims are poorly documented there (FZ). This subspecies has been present in the Ghent port area (Fl.) for many years, sometimes with thousands of plants (wn.be). It is probably largely overlooked elsewhere and seemingly in recent expansion.

• *V. unilateralis* (L.) Stace: in NF6, 'Champ.' occurred twice in the enumeration of districts (as R and RR). According to SI-Flore, there has been a sharp decline, only a few locations are left there (rather RR thus). In Brab. occ., this species is no longer restricted to France: it has been known since 2005 from several quarries between Tournai and Mons as well (AFW, wn.be).

• ***Festuca*** *heterophylla* Lam.: this species has apparently disappeared completely in Eifel centr. (FT). It has also been reported from other districts (Pic., Champ., Brab. or.) (SI-Flore, H24) but it is unclear whether these claims are reliable. In these regions, the species occurs on lime, while the species is usually rather confined to (slightly) acidic soils.

• The potential presence of *F. microphylla* (St-Yves) Patzke in the Flora area was indicated in NF6 (as *F. rubra* L. subsp. *microphylla* St-Yves). This is rather unlikely on the basis of current insights (SI-Flore, Digitale2, FG, etc.). According to FG, this species doubtfully occurs in France outside of the Massif Central and the Pyrenees.

• *F. trichophylla* (Ducros ex Gaudin) K. Richt.: this species from the *F. rubra* group was recently discovered in the southeastern part of the Flora area, where it may have been overlooked before. It is found in hygrophilous grasslands and its presence was confirmed from Champ. (Sompuis) and Tert. par. (Cormicy, le Mesnil-sur-Oger) (database CBN Paris; comm. P. Amblard & R. Boeuf 12.2021).

• *F. ovina* L. subsp. *guestfalica* (Boenningh. ex Reichenb.) K. Richt.: in Belgium and adjacent territories in the Netherlands and Germany, this taxon is confined to zinciferous soils in Mosan or. These populations belong to a particular race ("subsp. *calaminaria*") that is a mere ecotype and thus of no taxonomic value. In fact, subsp. *guestfalica* occurs on various types of soils, although probably predominantly on calcareous substrates (like in the type locality). In northern France it has been documented from various areas (Mosan, Ard., Champ.; SI-Flore) and populations of subsp. *hirtula* (Hack. ex Travis) M.J. Wilkinson, a taxon typically found on acidic soils, from Boul. (as mentioned in NF6) possibly also rather belong to subsp. *guestfalica*. According to Jauzein & Nawrot (2011) populations of *F. heteropachys* (St-Yves) Patzke ex Auquier in Île de France (beyond the limits of the Flora area) in part also belong to *F. ovina* subsp. *guestfalica*.

• *F. ovina* L. subsp. *hirtula* (Hack. ex Travis) M.J. Wilkinson: this taxon from acidic substrates was mentioned from Boul. in NF6. This claim requires confirmation. However, this subspecies occurs in quantity in decalcified dunes near Ostend in Belgium (nature reserve D'Heye), at least since the 1980s (comm. M. Leten 06.2017, ID confirmed by R. Haveman). The locality harbored a horse racing track in the 1930s and, on that occasion, this taxon may have been sown as a lawn grass. However, the abundance of this grass in an otherwise very natural habitat (with e.g. *Danthonia decumbens*, *Calluna vulgaris*, *Jasione montana*, ...) and the former presence of the very same taxon in other relict dune grasslands in De Haan (Verboven 1980), suggest that it may as well be a remnant of a historic and therefore possibly indigenous population.

• *F. ovina* L. subsp. *ovina*: according to Ronse & Arndt (2014) some of the Belgian herbarium specimens of *F. valesiaca* Schleich. ex Gaudin from zinciferous soils (collected in 1912 and 1936 in Pepinster and Plombières) belong to this taxon.

• *F. heteropachys* (St-Yves) Patzke ex Auquier: this species is recorded in an area northeast of Paris (Tert. par., but only outside the Flora area; SI-Flore). It is unclear whether these populations indeed belong to this species or rather to *F. ovina* subsp. *guestfalica* (as suggested by Jauzein & Nawrot 2011).

• *F. lemanii* Bast.: this species is is indeed sometimes found outside the districts mentioned in NF6, for instance in Fluv. in the Netherlands (Haveman 2005b).

• *F. valesiaca* Schleich. ex Gaudin: in addition to the confirmed historical presence of this Central European species on zinciferous soils in Mosan or. (before 1830), a naturalized population was recently also reported from the domain of Meise Botanic Garden (Ronse & Arndt 2014). It was hypothesized that this species has probably been introduced as wood lawn neophyte during the 19th century.

• *F. pallens* Host: this species formerly also occurred in Brab. or. in the Netherlands (Haveman 2005a).

• *F. marginata* (Hack.) K. Richt.: according to the map of SI-Flore, this species is not rare just north of Paris but evidently outside the Flora area.

• *F. patzkei* Markgr.-Dann.: in Lorr., this species is RR instead of AR-R. FLORAINE (2013) only indicates two nuclei, one north of Thionville, the second south of Nancy. In the Grand Duchy of Luxembourg the species is considered to be 'endangered' (Colling 2005).

• *F. polesica* Zapał: in NF6, this species was said to reach it southwestern limits in Belgium and the Netherlands. However, it never occurred in the Netherlands (Haveman 2005a).

• ***Schedonorus*** *arundinaceus* (Schreb.) Dum.: this species is in Fl. and Camp. hardly rarer than in e.g. Brab., at most AC-AR (wn.be).

• *S. pratensis* (Huds.) P. Beauv.: this species is a little less rare in Fl. than stated in NF6, AC-AR rather than AR (wn.be).

62. Ceratophyllaceae

• ***Ceratophyllum*** *submersum* L.: in Brab., this species is not restricted to the western part of this district: there is at least one confirmed record from Sint-Truiden (wn.be) and it is also known from Hollogne-sur-Geer (Wastiaux 2019). In Lorr., where it was thought to be limited to the eastern portion of the district, the species was recently also reported from the Grand Duchy of Luxembourg, thus in Lorr. sept. (Krippel & Colling 2016, Krippel *et al.* 2020).

63. Papaveraceae

• ***Meconopsis*** *cambrica* (L.) Vig.: this ornamental is increasingly escaping and will probably naturalize in the near future. In addition to the districts already mentioned in NF6, it was recently also observed in Mar., Camp. and Ard. (wn.be).

• ***Corydalis*** *cava* (L.) Schweigg. et Körte: this species has completely disappeared from Eifel centr. (FT). In Mosan, it was already known from Entre Sambre et Meuse and Aix-la-Chapelle; there are, in addition, also several localities near Esneux (wn.be). This species is also known from several localities in Zuid-Limburg (Brab. or.) in the Netherlands (wn.nl) where it is even considered to be possibly native (H24).

• ***Ceratocapnos*** *claviculata* (L.) Lidén: this species is slightly expanding and has also been recorded in Lorr. (both in Belgium and the Grand Duchy of Luxembourg; Krippel & Colling 2012) and Ard. (wn.be), two districts from where it was not yet reported in NF6.

• ***Pseudofumaria*** *lutea* (L.) Borkh.: in Fl., this species is AC-AR rather than R-RR (wn.be).

• *P. alba* (Mill.) Lidén: this species has also been recorded in Camp. (wn.be) and Champ. (SI-Flore, database CBN Paris).

• ***Fumaria*** *capreolata* L.: this species is slightly expanding in some parts of the Flora area, for instance in Mar. and Fl. where it has become AR-R, rather than RR (wn.be).

• *F. muralis* Sond. ex Koch: the same applies to this species that is least rare in Mar., Fl. and Camp. (AR) (wn.be). It has also been recorded in Ard. and Champ., two districts from where it was not yet known (database CBN Paris). In Lorr., it is restricted to the northern (Belgian) part of this district (FLORAINE 2013).

• *F. officinalis* L. subsp. *wirtgenii* (Koch) Arcang.: the distribution of this subspecies in the Flora area, as far as distinguishable, remains unknown. It was recently reported from Ard. and Eifel centr. in FT.

65. Berberidaceae

• ***Berberis*** *aquifolium* Pursh: this invasive ornamental shrub is by far least rare in Mar., Fl. and Camp. (AC-AR) (wn.be).

66. Ranunculaceae

• ***Caltha*** *palustris* L. var. *araneosa* v. Steenis: this variety, as far as distinguishable, also occurs in Mar. sept., in the Netherlands (FZ). The species itself (var. *palustris*) is R rather than RR in Mar. (wn.be, FZ).

• ***Helleborus*** *foetidus* L.: this species also occurs in Fl., Camp. and Ard., districts from where it was not mentioned in NF6, although it is doubtfully native there (wn.be).

• *H. viridis* L. subsp. *occidentalis* (Reut.) Schiffn.: this taxon is not RR but completely missing in Belgian and French Lorr. (FLORAINE 2013, Vernier 2020, wn.be) and has also disappeared from Lorr. in the Grand Duchy of Luxembourg (comm. G. Colling May 2021).

• ***Eranthis*** *hyemalis* (L.) Salisb.: this species is also more or less naturalized in Mar. and Fl. (wn.be, FZ) and in Lorr. it is not restricted to the northern part of this district (FLORAINE 2013, Antoine 2020a). It recently gained in popularity again as an ornamental and doubtlessly also occurs in other districts (e.g. in Athis in Champ.; database CBN Paris).

• ***Nigella*** *arvensis* L.: in NF6, this very rare and much declining species was said to be RR in Lorr., Champ. and Tert. par. However, the most recent records in northern France date back to the 1980s an 1990s according to SI-Flore (see also Digitale2, database CBN Paris). Yet, in Lorr., Vernier (2020) still mentioned the species for Côte de Moselle and FLORAINE (2013) for the region around Toul. It may have disappeared almost completely from the Flora area.

• ***Aquilegia*** *vulgaris* L.: in addition to the districts where this species naturally occurs, it is frequently observed as an escape elsewhere (including cultivars) (wn.be).

• ***Aconitum*** *lycoctonum* L.: in addition to the districts where this species naturally occurs, it is occasionally observed as an escape or introduction elsewhere. A more or less established population is known for instance from Forêt de Soignes in Uccle (Brab.) since 2008 (wn.be).

• *A. napellus* L. subsp. *lusitanicum* Rouy: in Lorr., this subspecies is not only known from the northern part of the district: it also occurs in Gondrecourt in Lorr. mér. (FLORAINE 2013).

• ***Anemone*** *ranunculoides* L.: in addition to the districts where this species naturally occurs, it is occasionally observed as an escape or introduction elsewhere (wn.be).

• *A. apennina* L.: this ornamental is historically known from Beaumont in Mosan occ. where it is naturalized for many decades. It has gained in popularity again and is now increasingly observed in other parts of the Flora area as well, as a casual or locally naturalizing escape (wn.be).

• *A. hepatica* L.: a small naturalized population of this species was discovered in Ganshoren (Brab.) in 2013 (wn.be). Antoine & Dardaine (2016) presented an overview of its actual presence and foliar variation in Lorr.

• *A. pulsatilla* L.: in addition to the districts where this species naturally occurs, it is occasionally observed as an escape or introduction elsewhere (wn.be).

• ***Clematis*** *tangutica* (Maxim.) Korsh.: in NF6, this ornamental was already reported from the banks of river

Scheldt north of Antwerp. It has occasionally been observed elsewhere (wn.be) but appears to be strictly ephemeral in the Flora area.

• *C. recta* L.: it is uncertain whether or not this species still occurs in the Flora area. In NF6, it was mentioned from three localities (Fraipont, valley of river Moselle and Mailly-le-Camp in France). In Belgium, it seems to have not been observed in the past decades, not even in Fraipont (wn.be, AFW). According to SI-Flore and the CBN Paris database, there are no reports from northern France either and the species was last seen in the Grand Duchy of Luxembourg in 1899 (MNHN-Lux). Vernier (2020) still mentioned the species from Côte de la Moselle but it is unknown if this also refers to recent records (the species was not mentioned in FLORAINE 2013).

• *C. vitalba* L.: this species is increasing lately, at least in parts of the Flora area where it was considered to be rare in the past, for instance in Camp. where it is AC-AR rather than RR (wn.be). In Mar., it is not more frequent in the southern part of the district (R vs. RR): in Zeeland, for instance, it is even considered to be AC (FZ).

• *C. viticella* L.: this ornamental is rarely naturalized in the Flora area, especially in river valleys (although it may have disappeared from some of them). In addition to those already mentioned in NF6, the species is also naturalized along river Moselle in Wincheringen (Lorr.) in Germany (FT). It is occasionally seen elsewhere as an escape and might naturalize locally, for instance along river Leie where it was recently observed in two nearby localities (Marke and Wevelgem; wn.be) and near Maastricht in the Dutch part of Fluv. (H24, wn.nl).

• ***Myosurus*** *minimus* L.: this species is less rare in some districts than indicated in NF6: in Mar. and Camp. it is R rather than RR (wn.be). In Zeeland, for instance, it is even considered to be AC (FZ).

• ***Adonis*** *flammea* Jacq.: according to SI-Flore, this species was only observed more or less recently in Lorr., whereas it has disappeared elsewhere in northern France (see also Digitale2).

• *A. aestivalis* L.: according to SI-Flore, this species was only observed more or less recently in Lorr., whereas it has disappeared everywhere else in northern France (see also Digitale2).

• *A. annua* L.: according to SI-Flore there are only historical records for this species in Tert. par., its actual presence there requires confirmation.

• ***Ranunculus*** *lingua* L.: in addition to the districts where this species naturally occurs, it is occasionally observed as an escape or introduction elsewhere (wn.be).

• *R. ophioglossifolius* Vill.: in addition to the very rare occurrences in northwestern France, this species is also known since the 1990s from exposed pond margins southwest of the village of Villeret, at the limit of Hampigny (Lorr. sud-occ.), quite disjunct from its main area of distribution (database CBN Paris). In the same site, *Trifolium michelianum* Savi occurs (https://inpn.mnhn.fr/docs/ZNIEFF/znieffpdf/210000165.pdf), an equally unexpected record.

• *R. sceleratus* L.: this species is least rare in Mar., Fl., Camp. and Brab. where it is C-AC. In Camp., where it was considered to be AR-R in NF6, it is only less common on the poorest soils (wn.be). In Eifel centr., where it was thought to have disappeared, there is at least one extant locality, in Oberbettingen (FT).

• *R. parviflorus* L.: in the Flora area, this species historically occurs in Tert. par., the only district where it is possibly native. In addition, it is well-established at several campsites, especially in Mar. (Verloove *et al.* 2020a). In this district, it is also known since at least the 1950s from lawns in a cemetery in De Panne and it is also established as a lawn weed since 2008 in the Botanic Garden in Meise (Ronse 2011). In the past years, it has increasingly been recorded in newly detected localities, mostly in turf, where it seems to have naturalized recently, e.g. in Bruges (Assebroek), Obourg, Schaffen, Châlons-en-Champagne, etc. (wn.be, database CBN Paris; also comm. P. Dupriez 05.2021).

• *R. acris* L. subsp. *friesianus* (Jord.) Syme: assessing the genuine distribution of this subspecies in the Flora area remains problematic. According to FG, it is at most naturalized, except perhaps in northeastern France. However, according to SI-Flore, it is not rare at all in parts of Ard., Mosan, Tert. par., Champ. and, to a lesser extent, Pic. Vernier (2020) reported it from the whole of Lorr. where it is relatively common. There are a few recent claims from Belgium as well (Berchem, Peer; wn.be).

• *R. hederaceus* L.: in Mar., this species is not restricted to the southern part of the district. There are several records from the polders near Bruges (wn.be). It was also known from Zeeland in the Netherlands although it may have disappeared there (FZ). The species has also disappeared from Tert. par. (Digitale2, database CBN Paris).

• *R. ololeucos* Lloyd: this species still occurs in several places in northeastern Brab. in the Netherlands (H24, Atlas-NL), in the subcentreuroop (sub-)district.

• *R. peltatus* Schrank: this species is R rather than RR in Mar. (see e.g. FZ). In Lorr., on the contrary, where it was said to be AC-R in NF6, it is RR (FLORAINE 2013).

• *R. rionii* Lagger: in Lorr., this species is also found in several locations between Saint-Dizier and Vitry-le-François (Le Gloanec *et al.* 2019). According to FLORAINE (2013), it also occurs southeast of Verdun.

• *R. penicillatus* (Dum.) Bab.: the distribution of this species is indeed poorly known in the Flora area, as stated in NF6. In addition to the districts already mentioned, it has also reliably been recorded in Champ. and Tert. par. (database CBN Paris).

• ***Ficaria*** *verna* Huds. subsp. *fertilis* (A.R. Clapham ex Laegaard) Stace: this subspecies is poorly known but probably absent in Belgium, at least in the wild (possibly

as an escape from cultivation) (Veldkamp 2014-2015). Zonneveld (2014-2015) considered it to be rare in Belgium and the Netherlands but it is unclear on what this is based; no Belgian or Dutch accessions were included in his study. In northwestern France, Toussaint *et al.* (2008) referred to localities between Guînes and Aire-sur-la-Lys; however, according to Digitale2, this subspecies now also occurs much nearer to the Belgian frontier, around Ghyvelde. It thus should be sought in neighboring areas in Belgium.

• ***Thalictrum*** *minus* L.: this species is also/still present in Camp. and Brab. or. in the Netherlands (wn.nl, H24) but it is unknown which subspecies is involved (and whether these records refer to wild occurrences).

67. Platanaceae

• ***Platanus*** ×*hispanica* Mill. ex Muenchh.: the naturalization of this tree is mostly observed along watercourses.

68. Buxaceae

• ***Buxus*** *sempervirens* L.: accidentally introduced into Europe via plants imported from Asia in 2007, *Cydalima perspectalis* Walker, a moth native to the Far East, quickly became invasive (e.g. Kenis *et al.* 2013). Its caterpillars feed almost exclusively on boxwood leaves and the invasion of the species causes heavy damage in European populations of boxwood, both ornamental and wild. The species is present in the native area of *Buxus sempervirens* in the Flora area and natural buxus woodlands are already affected, for instance in the Solière valley near Huy (comm. E. Branquart, E. Fabrice and S. Krickx, 10.2020; see also: Bizot & Coppa 2018).

72. Grossulariaceae

• ***Ribes*** *alpinum* L.: this species is slightly less rare as an escape than indicated, R-RR rather than RR. In some parts of Fl. and Camp., for instance, there is an increasing number of observations (wn.be).

• *R. rubrum* L.: in NF6, this species was said to be R in Fl. and Camp. In reality, it has become almost omnipresent and is at most AC-R (wn.be). Most, if not all, records evidently refer to plants escaped from cultivation, the berries easily being dispersed by birds.

• *R. spicatum* E. Robson: it is very unclear whether or not this northern species occurs in the Flora area. There is a recent claim from Champ. (Cernon; database CBN Paris) but this is very unlikely, especially because according to FG French records of this species are erroneous. Putatively native occurrences are known from the Biesbosch in the Netherlands (H24), just north of the Flora area.

• *R. aureum* Pursh: this North American ornamental shrub recently managed to naturalize locally in the Flora area. It is mostly found in Mar. (coastal dunes), Fl. and Camp. and is R-RR (wn.be).

• *R. sanguineum* Pursh: this North American ornamental shrub recently managed to naturalize locally in the Flora area. It is mostly found in coastal shrub- and young woodland in Mar., Fl., Camp. and Brab. and is AR-R (wn.be).

73. Saxifragaceae

• The ornamental ***Tolmiea*** *menziesii* (Pursh) Torr. et A. Gray was already known as an (exceptional) escape. In Camp., however, it tends to naturalize locally in woodlands in the area between Schilde and Lier (Zoerselbos, Kloosterheide), where it was first seen in 2015 (wn.be).

• ***Saxifraga*** *tridactylites* L.: this species has much expanded lately, at least in parts of the Flora area. This applies for instance to Fl. and Camp. where it is at most AR, no longer R (wn.be).

• ***Tellima*** *grandiflora* (Pursh) Dougl. ex Lindl.: this North American ornamental is now completely naturalized and rather expansive in some parts of the Flora area, especially in Fl., Camp. and Brab. (wn.be).

74. Crassulaceae

• ***Umbilicus*** *rupestris* (Salisb.) Dandy: this is a recent newcomer in the Flora area that was initially known from a single locality in Brab. centr. In the past years it was recorded in several additional localities in Fl. and Brab. (wn.be).

• ***Crassula*** *tillaea* Lester-Garland: this very rare native species (known in Belgium from a single extant locality in Stambruges) was detected as an introduction in several districts from where it was not known: Mar. (Belgium and the Netherlands, previously only known from the southern, French part), Fl., Camp. (wn.be) and Fluv. (particularly common between Maaseik and Roermond; wn.nl, H24). It is found on gravel or sand, especially (but not exclusively) in campsites where it can produce extraordinary stands (Verloove *et al.* 2020a). It starts flowering much earlier than indicated in NF6, in April rather than in June (see also H24, FG).

• *C. helmsii* (T. Kirk) Cock.: this invasive weed is least rare in Mar., Fl., Camp. and Brab. where it is at present at most AR (rather than R) (wn.be). It has also been reported from several localities in Pic. (Digitale2).

• ***Sedum*** *rubens* L.: this very rare species is also known from a single locality in Boul. (Desvres, railway station, July 2012, *F. Verloove* 9591 in BR, LG) and at least one in Champ. (Oiry; database CBN Paris). In Brab., it has not disappeared: there are several confirmed relatively recent records (AFW).

• *S. cepaea* L.: in NF6, this species was mentioned from a single extant locality, in Pic. (Tortefontaine). It was last seen there in 1999 according to SI-Flore (which is in fact when it was first observed there; Dupont in Toussaint 2001) and thus its actual presence requires confirmation. It has indeed (also) disappeared from the other districts where it was known in the past (Brab. or., Mosan and Tert. par.; AFW, H24, wn.be). The species was recently observed near Meaux in Tert. par. (SI-Flore), close to but beyond the Flora limits.

• *S. dasyphyllum* L.: this ornamental was very rarely naturalized in the Flora area but probably has disappeared almost everywhere. It is now occasionally observed as an (ephemeral) escape from cultivation, especially in cemeteries (wn.be, H24).

• *S. hispanicum* L.: this species, a recent newcomer in the Flora area, is slightly expanding and was recently reported also from Lorr. (de Faÿ & Weiss 2016). It is increasingly cultivated and easily escapes.

• *S. sarmentosum* Bunge: this ornamental is now fully naturalized, especially in Mar. and Fl., where it is most often seen on river and canal banks (Dender, Scheldt, etc.; wn.be).

• ***Hylotelephium*** *maximum* (L.) Holub: according to NF6, this species naturally occurs just outside the Flora area, along river Waal in the Netherlands. There are several localities in Pic. and Tert. par. as well, roughly in an area between Saint-Quentin, Soissons and Vervins (SI-Flore). It is unknown whether or not these populations refer to wild populations. Moreover, Digitale2 nor the CBN of Paris database refer to populations of this species in that area. According to FG, it also occurs in northeastern France but possibly beyond the area covered by the Flora. It is obvious that the species is poorly understood and that this issue requires further study.

75. Haloragaceae

• ***Myriophyllum*** *alterniflorum* DC.: this species is not rarer in Camp. than in Ard., it is R in both districts (wn.be). In Mar., it is restricted to the area south of Boulogne, i.e. to Mar. mér. (wn.be, FZ, Digitale2, SI-Flore). The species also occurs east of Soissons in Tert. par. (SI-Flore).

• *M. heterophyllum* Michaux: this North American aquatic weed is a recent newcomer in the Flora area. In few years' time it has much expanded and was recently also observed in Pic., Lorr. sud-occ. and Champ. In some water courses, e.g. Aisne and Somme, it is now considered to be an invasive species (Blottière 2018, Le Gloanec *et al.* 2019, Gross *et al.* 2020).

• *M. aquaticum* (Velloso) Verdc.: this aquatic South American ornamental is expanding in the Flora area and has become less rare: AR in Fl., Camp. and Brab. and R-RR in the other districts (wn.be, SI-Flore).

76. Vitaceae

• ***Vitis*** *vinifera* L. subsp. *vinifera*: the area where grapes are grown has considerably extended lately, the regions mentioned in NF6 are at most the more important ones. Grapes are also grown again around Montmédy and in the Meuse valley in Belgium. The species also regularly germinates from discarded seeds and is also dispersed by birds.

• ***Parthenocissus*** *quinquefolia* (L.) Planch.: in Lorr., according to FLORAINE (2013), the distribution and rarity of this species are comparable to that of *P. inserta* (A. Kerner) Fritsch, and it is even considered to be invasive there. But is this correct? According to FG, this species is "à rechercher hors culture".

78. Fabaceae

• ***Glycine*** *max* L.: this species is locally grown as a forage crop in southern Lorraine in France, as stated in NF6. In recent years, it is also grown further north in the Flora area, since 2017 also in Belgium (several online sources).

• ***Caragana*** *arborescens* Lam.: this ornamental shrub is rarely escaping from cultivation in French Lorr. (Pays-Haut, Côte de Moselle; FLORAINE 2013, Vernier 2020).

• ***Cytisophyllum*** *sessilifolium* (L.) O.F. Lang: this ornamental shrub is locally very well-established in the Tert. par./Champ. border area, northwest of Troyes (database CBN Paris), on the verge or just outside the Flora area. It may as well further expand and enter our area.

• A note was added regarding the American ornamental shrub ***Amorpha*** *fruticosa* L. (with small dark purple flowers, with a single petal and imparipinnate leaves, provided on the underside with red glands with an annular rim). It is in the process of local naturalization on road and railway embankments and in wasteland, especially in Fl., Camp. and Brab. (wn.be). More worrying is its presence in riparian habitats: since 2016 it has been known from a few localities in the Meuse valley in Limburg (Fluv.; wn.be) and the species has also been recorded in the Moselle valley in Pont-à-Mousson (French Lorr.; FLORAINE 2013, Vernier 2020); in such habitats this species is considered to be invasive in southern Europe.

• ***Cytisus*** *striatus* (Hill) Rothm.: there is a remarkable concentration of observations in Camp. or., from where this species was not yet reported. Part of these records moreover refer to nature reserves such as Park Hoge Kempen, Kikbeekbron and Schotsven-Bergerven. Apparently, this species was deliberately and inconsiderately introduced in these moors and heathlands (actions for nature management), where it subsequently spread. Occasionally, it is also observed in other districts than those where it is naturalized, e.g. in Fl. and Brab. At least in Zwartberg (Genk) the species also occurs on slag heaps (wn.be).

• *C. hirsutus* L.: this shrub is only known from natural habitats in France in the Flora area. As an introduction, in Belgium, it was only known in the 19th century, when it was last seen in 1888 (Verloove 2006a). The genuine distribution of this species is uncertain and requires further study since it has been confused up to the present with *C. lotoides* Pourr. in the Flora area. As a rule, *C. hirsutus* s.str. seems to be restricted to northeastern France where its presence has been confirmed from several localities in Côte de Meuse (Lorr.), mostly south of Verdun (Coulot & Rabaute 2016). In the same district, in Côte de Moselle, its actual presence needs to be confirmed. This species is usually found in thermophilous heathlands and forest margins, often on marly or even slightly acidic substrates. *C. lotoides*, in turn, occurs further to the west and has

been confirmed from several localities between Soissons and Reims (Champ., Tert. par.). It is found in xero-thermophilous forest margins, generally on stony, calcicolous substrates, and often in more hilly areas. In the Marne and Aube departments both species may occur but this requires confirmation.

• ***Genista*** *tinctoria* L.: this species also occurs on slag heaps and in roadsides, e.g. near Mons but also in Pic. (pers. obs.). It is occasionally planted and naturalized in the Flora area, outside the districts indicated in NF6 (see also FZ).

• *G. anglica* L.: this species occurs in a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse, near the estuary of river Canche) (SI-Flore) along with, among others, *Rhynchospora alba*, *R. fusca*, *Trichophorum cespitosum*, *Drosera rotundifolia*, *Erica tetralix*, etc. (comm. B. Toussaint, 06.2021). It was formerly also known from Prüm in Eifel centr. where it is extinct now (FT).

• *G. germanica* L.: in Belgium, this species had only been observed since 1940 in a single locality in the Lorraine district from where it disappeared a long time ago already. In 2021, however, a small population was rediscovered in Etalle (Lorr. sept.), in an old spruce plantation that was cut for nature development, on sandy limestone of Orval (wn.be). This species has also been known since the 19th century from a loam quarry in Groesbeek south of Nijmegen in Fluv. in the Netherlands (Garjeanne 1958, H24), where it is considered to be native.

• ***Spartium*** *junceum* L.: in NF6, this species was explicitly mentioned from the Liège area where it is locally naturalized on motorway embankments. By now, this species has been observed in rather numerous localities throughout the Flora area (wn.be).

• ***Ulex*** *minor* Roth: this species is perhaps under-recorded in the Flora area. It is naturalized in at least two localities. In one of them, in Oudenburg (Mar.), it was recognized only in 2017, although it should have been present there for several decades already. The species is also known since 2014 (probably longer) from Lommel in Camp. or. (wn.be).

• ***Galega*** *officinalis* L.: this species is increasing lately. At least in Fl., Camp. and Mosan it is no longer RR, at most R, and this may also apply to other districts, e.g. Mar. (R in Zeeland according to FZ). In Brab., it is not more frequent in occ. than in the other parts of this district (wn.be).

• ***Colutea*** *arborescens* L.: the possible indigenousness of this species in the Flora area has always been a point of discussion. However, even in the southernmost parts of our territory, this species is most likely at most a naturalized escape from cultivation: our populations are usually ascribed to subsp. *gallica* Browicz, which is now often treated as a separate species, *C. brevialata* Lange (FG), although plants with intermediate features sometimes occur. *C. brevialata* is *a fortiori* a southern taxon (confined to the French "Midi" according to FG), which renders a potential native status in the Flora area even more unlikely.

• *C.* ×*media* Willd.: this hybrid mostly but not exclusively occurs in Mar. and Lorr. (wn.be). One of its parents, *C. orientalis* Mill., with which it is often confused, may also occur in the Flora area although its presence requires confirmation.

• ***Astragalus*** *cicer* L.: this species is sometimes recorded as an introduction outside its native distribution range in the Flora area, recently for instance on a slag heap in Germignies (Brab. occ.) in northwestern France (Stien 2011).

• *A. glycyphyllos* L.: this species is on the rise: it is in parts of Mar., Fl. (especially in and near Antwerp and Ghent) and Camp. or. at most R-RR. In Brab., it occurs almost exclusively east of Brussels (wn.be).

• ***Vicia*** *pisiformis* L.: in Lorr., this species is not confined to the eastern and southern parts of the district. It occurs, along a north-south axis in the Moselle valley, from near to the Grand Duchy of Luxembourg to Nancy (Bonassi *et al.* 2017). In Champ., it has disappeared quite a long time ago already, most records date back to the second half of the 19th century (SI-Flore, database CBN Paris).

• *V. tenuifolia* Roth subsp. *dalmatica* (A. Kerner) Greuter: in 2016, this subspecies was also observed in Arcis-le-Ponsart in Tert. par. (database CBN Paris). It is unknown whether or not this refers to a naturalized population.

• *V. dumetorum* L.: this species is not mentioned by FLORAINE (2013) and Fournier (2020) from Lorr., not even as an adventive. According to SI-Flore, the northernmost populations in France, near Belfort, are located (far) beyond the limits of the Flora area. Claims from Mosan or., as mentioned in NF6, apparently refer to a few historical observations from the area around Verviers (Lawalrée 1963), from where it has not been confirmed lately (AFW, wn.be).

• *V. dasycarpa* Ten.: this species is expanding lately and is now also present in Fl., Camp., Mosan, Ard. and Lorr. (wn.be). In all districts it is R-RR.

• *V. sepium* L.: in NF6, this species was said to be C everywhere, except in Mar., Fl., Camp. and Champ. where it was considered to be R. In some of these districts, e.g. in Fl., it is locally not R, in others on the contrary even rarer than R (e.g. RR in Zeeland; FZ) (wn.be).

• *V. lathyroides* L.: in NF6, this species was classified as RR or absent in Fl. and Camp. It is, however, at most R in these two districts (it is particularly well-represented in and near Ghent for instance) (wn.be). It is also a regular introduction throughout the Flora area.

• *V. lutea* L.: this species is by far least rare in Brab. and Fl. in the Flora area (wn.be); from the latter district it was not mentioned in NF6.

• ***Ervum*** *tetraspermum* L.: in Fl., this species is AC-AR, rather than AR-R (wn.be).

• *E. gracile* (Loisel.) DC.: the distribution of this poorly known species is indeed uncertain, as stated in NF6. In addition to the cited districts and according to our current data, it does occur in northwestern France (Digitale2) but perhaps not at all in Belgium (wn.be). It is critically endangered in the Grand Duchy of Luxembourg (Colling 2005). In the Netherlands, it still occurs in Zeeland, possibly also in Zuid-Limburg (FZ, H24) although the most recent observations there date back to the early 2000s (wn.nl).

• ***Ervilia*** *hirsuta* (L.) Opiz: this species was said to be AR in Mar. However, it is not rarer in Mar. than in most other districts (C-AC) (wn.be). In Zeeland, for instance, it is even classified as CC (FZ).

• ***Lathyrus*** *japonicus* Willd. subsp. *maritimus* (L.) P.W. Ball: this taxon is not only known from the French and Belgian part of Mar., but has also been reported from Zeeland in the Netherlands (FZ). However, everywhere in the Flora area it is strictly ephemeral.

• *L. vernus* (L.) Bernh.: outside its native distribution area, this species is sometimes found as an introduction. For instance, since 2020 a small population is known along river Leie near Ghent (wn.be). SI-Flore also indicates a locality in Montagne de Reims (Tert. par.), without further details (correct?, native?; this record is not included in the CBN Paris database).

• *L. niger* (L.) Bernh.: this species has disappeared from its unique locality in Birresborn in Eifel centr. (FT).

• *L. pannonicus* (Jacq.) Garcke subsp. *asphodeloides* (Gouan) Bässler: according to NF6, this taxon is only known from a single extant locality in French Lorr., in Moussay (Verloove & Lambinon 2014; moreover, it is unclear where this village is located. The village Moussey exists in Lorr. but it is located well beyond the Flora limits, in Vosges). Recent local Floras and databases provide conflicting information about this species. In Lorr., it is still present in Lagarde (at least up to 2019; AFL) but this locality is beyond the limits of the Flora area. The same applies to the single record from SI-Flore, near Réchicourt-le-Château. FLORAINE (2013) and Vernier (2020) presented records that fall within the Flora limits, respectively from southeast of Verdun and from the northern Plateau Lorrain. It is unknown whether or not this taxon is still present in these areas and how many populations are involved.

• *L. linifolius* (Reichard) Bässler: in Lorr., this species was said to be present mostly in the western and northern part of the district. It is actually more or less evenly distributed throughout the district and even more frequent in the eastern than in the western part of it (FLORAINE 2013).

• *L. pratensis* L.: this species is in Camp. indeed a bit less common but its frequency is comparable with that in e.g. West Flanders. AR is exaggerated, especially when compared to a large part of Wallonia (wn.be).

• *L. tuberosus* L.: this species is certainly not RR in most parts of Fl., especially in the wider area of Ghent and Antwerp (wn.be). It is at most R in this district.

• *L. sylvestris* L.: in Fl., this species is significantly less rare than in e.g. Mar. or Camp. (R rather than RR) (wn.be).

• The distribution and frequency of *L. latifolius* were specified: it mostly occurs in Mar., Fl., Pic., Brab. and Mosan (wn.be, Digitale2).

• *L. hirsutus* L.: as an introduction, this species mainly occurs in Fl. and Brab. (wn.be). In the latter district (for instance in Zuid-Limburg in the Netherlands), it is locally at most R (H24). It seems to slightly expand lately.

• *L. nissolia* L.: in several districts (Mar., Fl., Pic., Brab., Lorr.) this species is no longer RR, rather AR-R. In Zeeland for instance it has become C according to FZ. It also occurs in Camp., a district from where it was not yet known, although it is RR there (wn.be).

• ***Pisum*** *sativum* L. var. *arvense* (L.) Poiret: in NF6, this taxon was said to be AC in Mar. sept., both as a cultivated and escaped plant. This, however, does not appear at all from FZ, where it is known only from "a few finds".

• ***Ononis*** *natrix* L.: in NF6, this species was said to be AC-R in Lorr. It has much declined there lately and is now considered to be even RR (FLORAINE 2013).

• *O. spinosa* L. subsp. *spinosa*: this subspecies is not R but entirely absent from Eifel centr. (FT).

• ***Trigonella*** *alba* (Med.) Coulot et Rabaute: this species is at least as common in Fl. and Brab. as in e.g. Camp. and thus AC rather than AR-R (wn.be).

• *T. altissima* (Thuill.) Coulot et Rabaute: in Fl. and Camp., this species is no longer RR, rather AR. It is clearly expanding lately (although it is still by far the rarest of the three native or archaeophytic melilots). In Zeeland, in the Netherlands, it is now considered to be even common (FZ).

• ***Medicago*** *littoralis* Rohde ex Loisel.: this species was reported from Mar. mér. in NF6. Meanwhile it also occurs elsewhere in Mar., in Belgium as well as in the Netherlands. Like in France, this species is confined to campsites (Verloove *et al.* 2020a, FZ).

• *M. lupulina* L. var. *willdenowiana* Koch: according to van Ooststroom & Reichgelt (1958), this variety is "quite often" occurring in Belgium and the Netherlands. However, there are very few observations, nearly all from the Belgian and Dutch valley of river Maas (wn.be, wn.nl).

• *M. sativa* L. subsp. *falcata* (L.) Arcang.: this subspecies was not mentioned at all from Fl. in NF6. In reality, it is not rarer in Fl. than in e.g. Brab. or Camp. (AR), especially in and near the bigger cities (Antwerp and Ghent) (wn.be).

• *M. arabica* (L.) Huds.: this species is not markedly rarer in the eastern portion of the Brab. district. It is fairly scattered, for example, in the wider area of Leuven (wn.be).

• *M. polymorpha* L.: this species is increasing and tends to naturalize locally, for instance on gravel banks of river Maas and in campsites, especially in Fluv. and Mar. respectively (Verloove *et al.* 2020a, H24).

• *M. minima* (L.) L.: this species also occurs on gravel banks of rivers, especially of river Maas (wn.be, Florabank).

• ***Trifolium*** *spadiceum* L.: in NF6, this species was mentioned, based on historical data, from Hautes Ard. and Eifel centr. However, there is only a single old record from the Eifel, from Stadtkyll, which is located in the Westeifel and thus corresponds with the Ard. district (FT).

• The casual alien *T. pannonicum* Jacq. is, in the Flora area, not only known from the Grand Duchy of Luxembourg. It was recorded in Brussels in 2006, without further details (herb. L. Delvosalle).

• Some of the casual alien species of *Trifolium* (especially *T. glomeratum* L., *T. nigrescens* Viv. and *T. tomentosum* L.) have recently been observed in campsites, especially in Mar., where they could naturalize locally (Verloove *et al.* 2020a). A further alien, *T. strictum* L., previously reported once from Ghent (Verloove & Heyneman 2012), was observed in 2012 in ruderalized dunes in Ghyvelde in French Mar. (Blondel 2013), rather remote from its natural area and thus probably as a mere ephemeral alien. Its persistence there was not confirmed lately (comm. B. Bollengier, 09.2020).

• *T. ornithopodioides* L.: this species was reported from Zeeland in NF6. In fact, the species had disappeared from Zeeland since 1981 already (FZ). However, it has recently reappeared in several campsites (wn.nl, Verloove *et al.* 2020a). The species was recently recorded for the first time in Belgium as well (reclaimed land in the Waasland port area; comm. G. Spanoghe), but its status is unclear there (introduced by migrating birds?). Its presence there could not be confirmed subsequently.

• *T. hybridum* L. var. *hybridum*: this variety is as common in Mar. and Fl. as in e.g. Camp. or Brab. (i.e., AC-AR, rather than AR-RR) (wn.be). In Zeeland, for example, it is even common (FZ). It is on the rise everywhere in the Flora area.

• *T. michelianum* Savi: this species was discovered in 1996 in Mar. mér. and, based on this single record, included in the key and a full account provided; it was no longer observed in this locality afterwards (Digitale2, SI-Flore). However, this species by now also occurs in several localities in the southeastern part of the Flora area, at the limits of Champ. and Lorr., between Saint-Dizier and Troyes (SI-Flore). It was already known from that region but further south, outside the Flora area (Didier 1998). In addition, it occurs, exceptionally, as an ephemeral (grain) alien elsewhere (pers. obs. author).

• *T. fragiferum* L.: this species is at most AR-R in Fl. (ubiquitous, for instance, in the Scheldt valley upstream from Ghent) and Brab. (wn.be, Florabank), rather than R-RR.

• *T. resupinatum* L.: this alien is locally in the process of naturalization, especially in campsites in coastal areas (Verloove *et al.* 2020a).

• *T. patens* Schreb.: this rare species was discovered in a second locality in French Lorr., in Juvelize, near Metz (Pax 2015), close to Moncourt from where the species had been recorded in the past. According to Coulot & Rabaute (2020), it is abundant in this locality and it is the only one recently observed in Lorraine. In northwestern France it actually only occurs south of the Seine river (Digitale2, SI-Flore), way beyond the Flora limits, and the nearest localities (from the Eure department) moreover turned out to be erroneous (Coulot & Rabaute 2014). It thus has disappeared apparently from Pic. and also from Tert. par. (SI-Flore, database CBN Paris). In Champ., there is a single extant locality in Vésigneul-sur-Marne, near Châlons-en-Champagne (SI-Flore).

• *T. campestre* Schreb.: this species is hardly any rarer in Camp. than in e.g. the province of West Flanders in Fl., AC-AR, rather than AR-R. It is indeed much less common in Ard., as correctly indicated in NF6 (wn.be).

• *T. micranthum* Viv.: in Brab., this species is much rarer in the central part of this district, certainly when compared to the cluster of records in its western part. In Mar., it is not more common in the northern part of this district (where it is considered to be R; FZ): it is also occurring in most of the Belgian part of Mar. This species is slightly increasing everywhere (or perhaps it is better known now?): in Mar., Fl., Camp. and Fluv. sept. it is R rather than RR at present (wn.be, wn.nl).

• *T. striatum* L.: the main distribution of this species is nowadays in Mar. (both in Belgium, France and the Netherlands) and in Mosan, where it is at most AR-R (wn.be, wn.nl, Digitale2). There are also some recent, reliable records from Camp. (Bocholt, Genk and others; wn.be), a district from where it had not been reported so far.

• *T scabrum* L.: this species occurs in and near Ghent (Fl.) in nutrient-poor lawns, often in cemeteries (along with e.g. *T. striatum* and *T. subterraneum* L.; wn.be). It may have been overlooked there before.

• *T. alpestre* L.: in Lorr., this species predominantly but not exclusively occurs in the southern and northeastern part of the district. There is at least one locality near Verdun, in the western part (SI-Flore).

• *T. rubens* L.: in the Eifel in Germany, this species only occurred in the Osteifel (i.e., beyond the Flora limits) and it is, moreover, long extinct there (FT). There are, on the contrary, some recent records from Champ. (near Vitry-le-François; database CBN Paris), a district not yet mentioned in NF6.

• *T. alexandrinum* L.: this alien species seems to be increasing lately, it is R rather than RR these days (wn.be).

• *T. subterraneum* L.: the main distribution of this species obviously is in Mar. (R) where the species is much less rare than elsewhere (RR) (wn.be; see also FZ: R).

In Brab. occ., this species is not limited to France: there are at least three recent records from near Kortrijk and it is also found elsewhere in this district. There are also several observations in Camp. (wn.be). It may have been overlooked before. In Tert. par., on the contrary, its current presence requires confirmation: according to SI-Flore there are only historical records.

• *T. suffocatum* L.: this species has been observed since the 1990s in Mar., at first in its southern part (Le Touquet-Paris-Plage), then also in a more northern locality in France (Calais). From 2015 onwards, it was also discovered in Belgium and Zeeland (the Netherands) but, given the importance of some populations, the species has probably been neglected for some time. It is confined to campsites and its presence there is clearly the result of an unintentional introduction by tourists (Verloove *et al.* 2020a).

• The alien species ***Lotus*** *hispidus* Desf. ex DC. has been known since the 1990s from Mar. mér. but its persistence there apparently has not been confirmed lately. A more or less stable population was discovered in Wondelgem (Ghent; Fl.) in 2019 (wn.be).

• *L. corniculatus* L.: this species is not or hardly any rarer in Camp. than in other districts (AC rather than AR), only on the poorest soils it is perhaps a little less common (wn.be).

• *L. tenuis* Waldst. et Kit. ex Willd.: this species is a component of wild flower seed mixtures and sometimes forms a monospecific vegetation in recently 'redeveloped' areas (reclaimed areas, slag heaps, etc.). As a perennial, after sowing, it persists very well and easily naturalizes. It is much less rare than indicated in some districts: in Mar., Fluv. nord-occ. (Pays-Bas) and Lorr. it is at most AC-AR (wn.be, wn.nl; for comparison, in Zeeland it is even CC; FZ), in Fl., Brab., Champ. and Tert. par. AR-R.

• *L. pedunculatus* Cav.: this species is indeed somewhat less common in Mar. but still AC-AR (according to FZ: AC). In Brab., it is not rarer than in e.g. Fl. or Camp. It is surprisingly rarer in Mosan, where it is AR and definitely not C-AC as indicated in NF6 (wn.be).

• *L. maritimus* L.: in Brab. or., this species only occurs in the Netherlands (Zuid-Limburg; wn.nl). It has also been reported from Eifel centr. but all localities are in fact located further east, in Osteifel (FT). The distribution of the varieties of this species is unclear. According to Fl. Iberica, var. *maritimus* is the widespread variety (in the species' general area), whereas according to FG, it is limited to the Midi in France.

• ***Anthyllis*** *vulneraria* L.: this species occurs in several places in Ard., from where it was not yet reported in NF6 (wn.be). These are apparently natural populations, there are no indications that they refer to adventive plants.

• ***Ornithopus*** *compressus* L.: this adventive species is, although still RR, probably locally naturalized and slightly increasing in the Dutch part of the Flora area, especially in the northeastern part of Camp. (H24, wn.nl).

• *O. perpusillus* L.: this species is evenly distributed in Camp., it is not more frequent in the western part of the district (heatmap wn.be). In Lorr., this species is RR in the entire district, except in its northern (Belgian) part (FLORAINE 2013).

• The possible naturalization of ***Coronilla*** *scorpioides* (L.) Koch in the southern districts of the Flora area has been anticipated for quite a long time (NF6). However, judging from recent maps (AFL, Digitale2, SI-Flore, database CBN Paris) this is not yet applying.

• *C. vaginalis* Lam.: in the entire Flora area, this species is only mentioned from Eifel centr. in NF6. However, all localities are located outside the Eifel centr., in Osteifel (FT). The species does not actually occur in the Flora area.

• ***Hippocrepis*** *emerus* (L.) Lassen: in addition to the areas in Lorr. or. already mentioned in NF6 (Luxembourg, valley of river Moselle between Nancy and Metz) this species is also known from a few further localities in this district (FLORAINE 2013).

• *H. comosa* L.: according to H24, this species was last seen in 1987 in Zuid-Limburg (Brab. or.), but that is not correct: the species is still present at several locations, especially south of Valkenburg (wn.nl).

• ***Onobrychis*** *viciifolia* Scop.: in the northern part of Lorr., this species is much rarer than indicated, R rather than C-AC (Champluvier & Saintenoy-Simon 2014).

79. Polygalaceae

• ***Polygala*** *vulgaris* L. subsp. *oxyptera* (Reichenb.) Schübl. et Martens: this subspecies, in so far distinguishable, is confined to the eastern part of the Flora area, as indicated in NF6. From Eifel centr., however, it has completely disappeared (FT) and claims from France are erroneous according to FG.

• *P. comosa* Schkuhr: there is a recent, reliable record from Brab. occ. (east of Mons; wn.be). This record falls within "ailleurs: RR" but is nonetheless worth mentioning, since quite disjunct.

• *P. calcarea* F.W. Schultz and *P. amarella* Crantz: there are several recent claims for both species from Mosan (wn.be), but their identity is difficult to assess correctly, solely based on photos. The presence of these two species in Mosan is possible but requires confirmation.

80. Rosaceae

• ***Aruncus*** *dioicus* (Walter) Fernald: this species was reported by FLORAINE (2013) from two localities in the northern half of Lorr. However, in this region it only occurs naturally in the Vosges (Vernier 2020, comm. S. Antoine 19.05.21) and thus only beyond the Flora limits. Records further north doubtlessly refer to escaped garden plants.

• ***Eriobotrya*** *japonica* (Thunb.) Lindl.: in NF6, some uncertainty was expressed about the status of this shrub in the Flora area: merely planted as a curiosity or adventive? In fact, spontaneous seedlings (or even several years

old shrubs) are regularly observed in urban environments. These doubtlessly refer to plants germinated from thrown away pits (comparable with e.g. figs and date palms; see e.g. Keil *et al.* 2003).

• ***Sorbaria*** *sorbifolia* (L.) A. Braun: in Mar., Fl. and Camp., this escaped ornamental is slightly less rare than indicated, R rather than RR (wn.be).

• ***Physocarpus*** *opulifolius* (L.) Raf.: there are several locations on sandy soils in Fl., e.g. in the surroundings of Beernem and Waasmunster (wn.be), from where it was not yet mentioned in NF6. However, the species is by far the least rare in Camp., where it is R rather than RR (wn.be).

• ***Spiraea*** *tomentosa* L.: this ornamental shrub was mentioned from Fl. in NF6. However, it is only naturalized in Camp. (in heaths), there are apparently no confirmed records from Fl. (wn.be).

• *S. douglasii* Hook.: this North American shrub is equally rare in Fl., Brab., Mosan and Lorr., it is not more frequent in Mosan (wn.be). It is very rarely recorded in other districts, for instance between Amiens and St.-Quentin in Pic. (SI-Flore).

• *S. chamaedryfolia* L. subsp. *ulmifolia* (Scop.) J. Duvigneaud: this taxon is in fact least rare in the Flora area in Camp. (wn.be), from where it was not yet mentioned in NF6. In Eifel centr., on the contrary, it is completely missing (FT).

• ***Rubus*** L.: see Devriese & van de Beek (2023).

• ***Geum*** *urbanum* L.: the distribution of this species was updated: it is at least as common in Fl. and Camp. as in e.g. Brab., Mosan, etc. (C-AC) (wn.be). Only in the polders (Mar.) and Ard. it is indeed possibly somewhat less common (wn.be), although the species is said to be CC in Zeeland (FZ).

• *G. rivale* L.: in Camp., this species also occurs in Belgium, not only in the Netherlands. It has been known from the Groot Schietveld military training area since at least 2014 (wn.be), although its residence status is uncertain there. It may have been unintentionally introduced. It is occasionally observed as an introduction in districts where it is not native, for instance in Fl. (Hanewee; wn.be).

• *G. macrophyllum* Willd.: this species is naturalized now and slightly expanding; it is AR-R in Fl., Camp. and Brab. (wn.be), RR or absent elsewhere. In France, for instance, it is completely lacking (FG, SI-Flore, Digitale2).

• ***Potentilla*** *sterilis* (L.) Garcke: in parts of Fl. and Camp., this species is R rather than RR (wn.be).

• *P. supina* L.: this species is known from many districts but RR throughout the Flora area and often merely ephemeral. Only in Fluv., it seems to be present more or less permanently (see also H24), perhaps also in Brab. occ. (in the surroundings of Mons) (wn.be).

• *P. argentea* L.: in Fluv., this species is much rarer than indicated in NF6, R rather than AC-AR (wn.be). According to H24, it is even RR in that district.

• *P. inclinata* Vill.: this rare alien species is very locally naturalized in the Flora area, mostly in Brab. occ. (Mons area) and Camp. (wn.be).

• *P. recta* L.: in Fl. and Brab., this species is certainly not rarer than in Ard. and Lorr. sept., thus R rather than RR (wn.be).

• *P. norvegica* L.: the distribution of this alien in the Flora area was specified: it is predominantly found in Fl., Camp. and Brab. (wn.be).

• *P. intermedia* L.: the distribution of this alien in the Flora area was specified: it is predominantly found in Fl., Camp., Brab. and Lorr. (wn.be, SI-Flore).

• *P. reptans* L.: in Camp., this species is indeed slightly less frequent but certainly not AR (rather AC-AR). In Brab., there are also some gaps in the distribution west of Brussels, but overall the species is C-AC in that district (wn.be).

• *P. incana* P. Gaertn., B. Mey. et Scherb.: in NF6, this species was said to be doubtfully present in Eifel centr. Its presence there has indeed never been confirmed and no corresponding 19th century specimens turned up so far. The site in the Prümer Kalkmulde, where it was said to be found, is well researched since 150 years. It would be a surprise, if this subcontinental taxon ever occurred in the rainy heart of the Eifel (comm. R. Hand, 09.2020).

• *P. leucopolitana* P.J. Muell.: in the entire Flora area, this species was only known from the Grand Duchy of Luxembourg, where it was considered to be RR. By now, however, it is extinct (Colling 2005). It was probably last seen in 1994 (MNHN-Lux).

• *P. indica* (Andrews) Th. Wolf: the distribution of this alien in the Flora area was specified: it is predominantly found in Fl., Camp. and Brab. where it is AC-AR. Elsewhere, it is AR-RR, although there are major regional differences: in some districts it is rather widespread (e.g. parts of Pic. and Tert. par.), while it is almost absent in others (wn.be, SI-Flore).

• ***Comarum*** *palustre* L.: at least part of the recent records in regions where the species previously did not occur (or was very rare) relates to deliberate introductions, e.g. in the center of West-Flanders (wn.be).

• ***Fragaria*** *viridis* Weston: this species has also been observed in a single locality in Brab. occ., near Tournai (Les Vignobles) (AFW; comm. S. Carbonnelle 09.2020). In Pic. mér., on the contrary, where it was said to occur in the valley of river Somme, the species either has disappeared or never occurred (SI-Flore, Digitale2).

• *F. vesca* L.: in Mar. and Camp., this species is indeed slightly less common but it is not RR at all (although at least part of the records probably refer to plants escaped from cultivation, but this also applies to areas where the species commonly occurs as a native species) (wn.be). In Zeeland, for instance, it is considered to be AC (FZ).

• *F. moschata* Weston: this species has disappeared from its only known locality in Birresborn in Eifel centr. (FT).

Likewise, it seems to have disappeared from many of its former localities: for instance in Pic., there are apparently only historical records and it is much declining elsewhere in the Flora area as well (SI-Flore).

• ***Filipendula*** *vulgaris* Moench: in addition to the districts already mentioned in NF6, this species has also been known from single localities in Mar. mér. (valley of river Canche, near to its estuary) and Pic. mér. (valley of river Somme, east of Amiens) (SI-Flore).

• *F. ulmaria* (L.) Maxim.: in NF6, this species was said to be common throughout the Flora area, except in Mar. where it was said to be rare. It is indeed less common in Mar. but at most AC-AR (wn.be). It is AC in Zeeland according to FZ.

• ***Agrimonia*** *procera* Wallr.: in parts of Fl., Camp. and Brab., this species is slightly less rare than indicated, R-RR rather than RR (wn.be).

• ***Alchemilla*** *acutiloba* Opiz var. *acutiloba*: in Eifel centr., this taxon is not R-RR but completely absent (FT).

• *Alchemilla acutiloba* Opiz var. *micans* (Buser) B. Bock: the native status of this variety in the Flora area has always been considered doubtful. However, at least in a few localities in Mosan and Ard. (e.g. surroundings of Aywaille and Trois-Ponts) it is found in perfectly natural conditions (wn.be).

• *A. mollis* (Buser) Rothm.: this ornamental is naturalized here and there (near houses, cemeteries, old walls, embankments), especially in Mar. (polders), Fl., Camp., Brab. and Mosan where it is AR-R; elsewhere it is RR (wn.be, SI-Flore).

• ***Aphanes*** *arvensis* L.: this species is not at all RR in Mar. and also in some other districts (Boul., Camp. and Ard. nord-or.) it is at most R (wn.be, FZ, SI-Flore).

• *A. australis* Rydb.: this species is not at all RR in Mar. (wn.be), according to FZ it is even AC there. Also according to H24, this species is common in the dunes. This species and the preceding are undoubtedly confused and poorly known.

• ***Rosa***[1] *majalis* J. Herrmann: this ornamental was mentioned in NF6 as an escape from cultivation (without further details). FLORAINE (2013) reported several records from near Toul in Lorr. mér. but these claims are probably erroneous (comm. S. Antoine, 11.2021). In the entire Flora area, this species has only been reliably reported (incl. historical records) from the Dutch part of Mar. but even there, recent records are lacking (FZ).

• *R. agrestis* Savi: this species is sometimes introduced on slag heaps, especially in northwestern France, and is locally naturalizing (Digitale2).

• *R.* ×*inodora* Fr. (*R. agrestis* × *elliptica*): the distribution of this hybrid (not yet mentioned in NF6) is poorly known in the Flora area because it is often confused with *R. elliptica*. Its presence has been confirmed at least from Mar. (the Netherlands), Brab. or. (idem) and Tert. par. (scattered occurrences between Soissons and Reims) (FZ, H24, Bakker *et al.* 2011, database CBN Paris).

• *R. arvensis* Huds.: this species is absent from Fl. and Camp. and RR in Mar. and Champ. (wn.be).

• *R.* ×*deseglisei* Boreau (*R. arvensis* × *corymbifera*): the distribution of this hybrid (not yet mentioned in NF6) is poorly known in the Flora area. It is known at least from Mar., Brab., Mosan and Tert. par. and R-RR throughout (Maes *et al.* 2021, wn.be, database CBN Paris, etc.). Although not mentioned in H24, it is known from the Netherlands as well (Maes *et al.* 2021).

• *R. caesia* Sm.: no distribution for this species was given in NF6. It is RR in Mar. and Fl. (wn.be, FZ, Zwaenepoel 2019) and has been recorded as an escape in Camp. (comm. B. Van Puyenbroeck).

• *R.* ×*margerisonii* (Wolley-Dod) Wolley-Dod (*R. caesia* × *spinosissima*): this rare hybrid (not yet mentioned in NF6) is only known from Mar. (Oostduinkerke) in the Flora area (Zwaenepoel 2019).

• *R.* ×*subcollina* (H. Christ) Vukot. (*R. caesia* × *corymbifera*): no distribution for this hybrid was given in NF6. It is RR in Mar., Fl. and Brab. (FZ, Bakker *et al.* 2011, Zwaenepoel 2019, wn.be; obs. A. Zwaenepoel).

• *R.* ×*dumetorum* Thuill. (*R. canina* × *tomentella*): this rare hybrid is only known from Mar. in the Flora area (Zwaenepoel 2019).

• *R.* ×*grovesii* (Baker) Maskew (*R. canina* × *spinosissima*): this very rare hybrid (not yet mentioned in NF6) is only known from Mar. in the Flora area (Zwaenepoel 2019).

• *R.* ×*nitidula* Besser (*R. canina* × *rubiginosa*): no distribution for this hybrid was given in NF6. It is RR in Mar. and Fl. (Zwaenepoel 2019; obs. A. Zwaenepoel). Although not mentioned in H24, it probably also occurs in the Netherlands.

• *R.* ×*subcanina* (H. Christ) Vukot. (*R. canina* × *vosagiaca*): this very rare hybrid (not yet mentioned in NF6) is known at least from Mar., Fl. and Lorr. (Tailly) in the Flora area (Zwaenepoel 2019, database CBN Paris, FZ; obs. A. Zwaenepoel).

• *R.* ×*insignis* Déségl. (*R. canina* × *squarrosa*): this is a rather common hybrid in most of Europe. In the Flora area it is AC in Mar., Fl., Pic., Brab., Mosan, Lorr., Ard., Champ. and R in Camp. (Maes *et al.* 2021; obs. A. Zwaenepoel).

• *R. corymbifera* Borkh.: no distribution for this species was given in NF6. It is C-AC in Mar., Boul., Fl., Pic., Brab., Mosan, Ard., Lorr., Champ., Tert. par. and RR in Camp. (database CBN Paris, Maes *et al.* 2021).

• *R.* ×*hibernica* Templeton (*R. corymbifera* × *spinosissima*): this very rare hybrid (not yet mentioned in NF6) is only known from Mar. in the Flora area (Zwaenepoel 2019).

[1] The genus *Rosa* was entirely revised by A. Zwaenepoel.and F. Verloove.

• *R. corymbifera* × *tomentella*: this poorly known hybrid is only known from Mar. where it is R (Zwaenepoel 2019). It should be looked for elsewhere and is presumably less rare than hitherto assumed, but easily overlooked as an intermediate form.

• *R. elliptica* Tausch: although RR throughout the Flora area, this species is more widely spread than indicated in NF6. In addition to Brab., Lorr. and Champ., it has also been recorded from Mar. and Tert. par. (Zwaenepoel 2019, database CBN Paris).

• *R. gallica* L.: this species is historically known from Lorr. or. according to NF6. These claims, however, require confirmation. It certainly exists in Alsace (i.e. beyond the Flora limits) although at least some of these plants may rather belong to *R.* ×*polliniana* Spreng., its hybrid with *R. arvensis* Huds. A population from Ommeray in Lorr. or. (but also just outside the Flora area) was recently identified as *R. marginata* Wallr. (comm. S. Antoine, 11.2021; Simon & Antoine 2021).

• *R. ferruginea* Vill.: this widely grown ornamental is increasingly observed as an escape and is locally naturalizing. It has been known at least from Mar., Fl., Camp., Brab., Mosan (wn.be) and should be looked for elsewhere.

• *R.* ×*gremlii* (Christ) Christ (*R. micrantha* × *rubiginosa*): although not yet mentioned in NF6, this hybrid is locally not quite rare in the Flora area. In Mar., it is rather common, at least in Belgium and France (Zwaenepoel 2019, Digitale2; less so in the Netherlands, see FZ) and R in Mosan, Lorr., Champ. and Tert. par. (database CBN Paris).

• *R.* ×*avrayensis* Rouy (*R. rubiginosa* × *tomentosa*): this very rare hybrid (not yet mentioned in NF6) is only known from Mar. (Oostduinkerke) in the Flora area (Zwaenepoel 2019).

• *R.* ×*biturigensis* Boreau (*R. rubiginosa* × *spinosissima*): this rather rare hybrid (not yet mentioned in NF6) is only known from Mar. (west of Nieuwpoort) in the Flora area (Zwaenepoel 2019). Although not mentioned in H24, it also occurs in the Netherlands (wn.nl).

• *R.* ×*timbalii* Crépin (*R. rubiginosa* × *tomentella*): this very rare hybrid (not yet mentioned in NF6) is only known from Mar. in the Flora area (Zwaenepoel 2019) but should be looked for elsewhere.

• *R. sherardii* Davies: as expected, this poorly known species is – although very rare throughout the Flora area – more widely spread. Its presence has been confirmed now from Mar. (not only in its southern part), Boul. and Lorr. (Zwaenepoel 2019); it possibly also occurs in Brab., although confusion with *R.* ×*suberectiformis* cannot be ruled out there (photos wn.be).

• *R.* ×*suberectiformis* Wolley-Dod (*R. sherardii* × *tomentosa*): this hybrid is poorly known and much confused with the previous species. As a result, its distribution in the Flora area needs to be reassessed. Its presence has been confirmed from Mar. and Tert. par. (Zwaenepoel 2019, database CBN Paris). Given the presence of both parental species in Lorr., it probably also occurs there. The same applies to Fl., Brab. occ. and Ard. or. (Oesling), as already mentioned in NF6.

• *R. spinosissima* L.: this species may have disappeared from some of its inland localities. For example, from Pic. mér. (valley of river Somme) there are no observations from the past decades (Digitale2).

• *R.* ×*andrzejowskii* Boreau (*R. spinosissima* × *tomentosa*): no distribution for this hybrid was given in NF6. It is RR in Mar. (Zwaenepoel 2019) and Mosan (Viroinval) (comm. B. Van Puyenbroeck).

• *R. spinosissima* × *vosagiaca*: this very rare hybrid (not yet mentioned in NF6) is only known from Mar. (Oostduinkerke) in the Flora area (Zwaenepoel 2019).

• *R. squarrosa* (Rau) Boreau: this poorly known species (not separated from *R. canina* in NF6) is known at least from Mar. (Zwin nature reserve) (Zwaenepoel 2019). It is likely more widespread and probably also present in France (Mosan, Ard., Lorr., Champ. and Tert. par.; database CBN Paris) and in Brab. or. (Zuid-Limburg) in the Netherlands (H24). It is probably overlooked because the diagnostic glands on the side veins of the lower leaf surface are usually not very noticeable.

• *R.* ×*dumalis* Bechst. (*R. squarrosa* × *vosagiaca*): this very rare but poorly known hybrid (not yet mentioned in NF6) is only known from Mar. (Oostduinkerke) in the Flora area (Zwaenepoel 2019). It should be looked for elsewhere.

• *R. squarrosa* × *stylosa*: this very rare hybrid (not yet mentioned in NF6) is only known from Mar. and Brab. in the Flora area (Zwaenepoel 2019; comm. B. Van Puyenbroeck).

• *R.* ×*andegavensis* Bastard (*R. stylosa* × *canina*): no distribution for this hybrid was given in NF6. It is RR in Mar., Boul., Lorr. and Tert. par. (Zwaenepoel 2019, Digitale2, database CBN Paris). It is, however, a very poorly known taxon and its genuine distribution certainly needs to be reassessed.

• *R. tomentosa* Smith: this species is also known from Tert. par. (database CBN Paris), a district not mentioned in NF6. In Mar., it is much less common in the Netherlands (Bakker *et al.* 2011).

• *R. tomentella* Léman: no distribution for this hybrid was given in NF6. It is AC in Mar. and Brab., R in Fl., Camp., Mosan and Lorr. (Bakker *et al.* 2011, Zwaenepoel 2019, wn.be; obs. A. Zwaenepoel) and should be looked for elsewhere.

• *R. villosa* L.: this rare native species is known from at least one locality in Champ. (database CBN Paris), a district not mentioned in NF6. In addition, it is occasionally grown as an ornamental in parks and gardens.

• *R. vosagiaca* N.H.F. Desp.: the distribution of this poorly known species is insufficiently known. Its presence has been confirmed from Mar. and Brab. or. (Zuid-Limburg) (Bakker *et al.* 2011, Zwaenepoel 2019, H24). It

is RR throughout the Flora area although perhaps slightly less rare in the French part of Mar. (Digitale2). There are several claims from Wallonia as well but it is uncertain whether these indeed refer to this species or to *R.* ×*dumalis* Bechst., its hybrid with *R. squarrosa*.

• ***Prunus*** *serotina* Ehrh.: this invasive exotic is not rarer in Brab. than in Fl. (AC-AR) (wn.be). Also in Mar. (especially in the coastal dunes), it is not very rare, according to FZ even AC.

• *P. padus* L.: this species is present in all districts (wn.be, SI-Flore). In some of them, it is (as a native species) indeed RR but it is rather frequently observed as an escape from cultivation (e.g. in Fl.), greatly blurring the line between native and introduced populations.

• *P. virginiana* L.: this ornamental shrub is not only known to escape in Mar.; according to H24 it also occurs in Zuid-Limburg in the Netherlands (Brab. or.).

• *P. armeniaca* L.: this tree is not only cultivated but was recently also observed as an escape from cultivation (especially in coastal dunes in Mar., probably germinating from discarded stones; wn.be).

• *P. spinosa* L.: in NF6, this species was said to be C-AC throughout the Flora area, except in Fl. and Camp. where it was said to be AR. It is, however, hardly any rarer in these two districts (wn.be), thus at most AC-AR.

• *P.* ×*fruticans* Weihe: this hybrid is poorly known but probably overlooked. Most present-day records are from Brab. occ. (wn.be), a district from where it was not mentioned in NF6 (doubtlessly because an observer who is familiar with this taxon, D. Derdeyn, botanizes in that region).

• *P. cerasifera* Ehrh.: as an escape from cultivation, this species is more common than indicated in NF6 where it was said to be rare throughout the Flora area. In fact, it is AC-AR, especially in Fl., Camp. and Brab. (wn.be, SI-Flore), but its genuine distribution remains poorly known.

• *P. mahaleb* L.: in Eifel centr., this species is not RR but completely missing. There is a locality in Osteifel, beyond the Flora limits, but it is considered to be subspontaneous there, not native (FT).

• *P. avium* (L.) L.: as a native species, this tree is indeed RR in e.g. Fl. but it is rather frequently observed as an escape from cultivation (wn.be), greatly blurring the line between native and introduced populations.

• *P. laurocerasus* L.: this ornamental shrub is increasingly naturalizing in woodlands in the Flora area. It is AR in Boul., Fl., Camp., Pic., Brab., Mosan and Tert. par. and RR elsewhere (wn.be, SI-Flore).

• ***Cotoneaster*** *integerrimus* Med.: in NF6, this native species was reported from Brab. or. (Zuid-Limburg), where it recently would have appeared. This is incorrect and at most refers to escaped plants or – much more likely – incorrect identifications (see also H24). There are no documented records from Zuid-Limburg (wn.nl).

• *C. horizontalis* Decaisne: this Chinese shrub, by far the most invasive representative of the genus in the Flora area, is not only naturalized in Mosan. It is also widely established in Mar., Boul., Fl., Pic. and Brab. (wn.be, SI-Flore).

• ***Pyrus*** *nivalis* Jacq.: this species was mentioned in NF6 from Lorr. (Moselle). However, contemporary Floras and databases covering that area (e.g. SI-Flore, FLORAINE 2013, Vernier 2020) do not refer to it. It either disappeared or was formerly erroneously reported from there.

• ***Amelanchier*** *ovalis* Med.: this rare native shrub has been found for decades on steep rocks along the Meuse near Givet in Mosan (Colcy & Graitson-Schmitt 2018, Graitson-Schmitt *et al.* 2019) and it is also known from at least a single locality in Tert. par. (Mesnil-sur-Oger) (database CBN Paris). It was not mentioned from these two districts in NF6.

• *A. lamarckii* F.G. Schroeder: the species' distribution was updated based on data from wn.be and SI-Flore. It is most common in Camp. (AC-AR) but also not rare in Mar., Brab. and Fl. (see also FZ: AC) (at most AR-R). It also occurs in most other districts (Mosan, Ard., Lorr., etc.) but is much rarer there.

• *A. spicata* (Lam.) K. Koch: this ornamental shrub was mentioned as an escape from cultivation in NF6. In NF7, it was added that this refers to a single clone that has been known in coastal shrubland in De Panne (Houtsaegherduinen nature reserve) in Mar. for several decades (wn.be, comm. M. Leten).

• ***Crataegus*** *rosiformis* Janka: this species is also known from Lorr. (FLORAINE 2013), form where it was not yet mentioned in NF6.

• ***Aronia*** *prunifolia* (Marshall) Rehd.: in addition to the two districts where this shrub is naturalized (Fl. and Camp.), this species is occasionally observed elsewhere as an escape form cultivation. There is at least one confirmed record from Mosan (Anhée, 2019; wn.be), but this may refer to a (one-off) escape, not a naturalized population.

• *A. arbutifolia* (L.) Pers.: in the entire Flora area, this species is only known with certainty from Mar. in the Netherlands, from where it was recently confirmed again (FZ).

• ***Sorbus*** *aucuparia* L. subsp. *glabrata* (Wimm. et Grab.) Hedl.: this taxon was said to possibly occur in the Flora area, especially in Ard. and Eifel centr. Based on the distribution map in Kurtto *et al.* (2018) this seems to be rather unlikely. The taxon is also not mentioned in FT.

• *S.* ×*thuringiaca* (Nyman) Fritsch: in NF6, this hybrid was mentioned from Ard. or. and Eifel centr. It also occurs in other districts (e.g. Fl., Camp., Brab., Champ.; wn.be, SI-Flore), without a clear pattern.

• *S. domestica* L.: in Lorr., this species is slightly less rare than indicated in NF6, R-RR rather than RR (FLORAINE 2013). Also elsewhere in northeastern and north-central

France, this species is more widespread than previously thought: there are several records from Champ. and Tert. par. (two districts not mentioned in NF6) and in Ard. it is not restricted to Oesling but also occurs in the French part of this district (database CBN Paris). Moreover, in at least some of these localities it is possibly native.

• *S. torminalis* (L.) Crantz: the indication AR-R for Eifel centr. is a gross overestimation. The species is rare and may have even disappeared (Salmwald) there (FT).

• *S. ×tomentella* Gandoger: this hybrid also occurs (and is apparently not rare) in the wide area around Reims (Champ. and Tert. par.) (SI-Flore).

• *S. latifolia* (Lam.) Pers.: according to NF6, the presence of this species in Pic. mér. required confirmation. It was recently indeed observed there but south of the Somme river and thus outside the Flora area (SI-Flore).

• *S. remensis* Cornier: this micro-endemic species was described from Champagne and initially thought to be confined to a small area south of Montagne de Reims, Merfy and the surroundings of Chalons-en-Champagne. More recently, it was also found south of Paris (FG, SI-Flore) and, in the Flora area, in Tert. par. (Pouillon, northwest of Reims) (database CBN Paris).

• *S. intermedia* (Ehrh.) Pers.: this ornamental tree has also been observed as an escape in Mar. and Camp., two districts from where it was not mentioned in NF6. In Eifel centr., on the contrary, where it was considered to be rare, it has completely disappeared from two known areas (FT).

81. Elaeagnaceae

• ***Elaeagnus*** *umbellata* Thunb.: this ornamental has naturalized locally in the Flora area, especially in Mar. (more precisely in the Antwerp port area). It is occasionally seen elsewhere as well (wn.be, SI-Flore).

• *E. angustifolia* L.: this ornamental has naturalized locally in the Flora area, especially in Mar. (in coastal areas as well as in the Antwerp port area). It is occasionally seen elsewhere (wn.be, SI-Flore).

82. Rhamnaceae

• ***Frangula*** *alnus* Mill.: in NF6, this species was said to be RR in Mar. In fact, it is not at all RR there but doubtfully indigenous. According to FZ it is AC in Zeeland.

83. Ulmaceae

• ***Zelkova*** *serrata* (Thunb.) Makino: this ornamental tree was already mentioned in NF6 as being cultivated; in recent years it has also repeatedly been observed as an escape from cultivation since 2015. Nearly all records are from the Antwerp area (wn.be).

• ***Ulmus*** *laevis* Pallas: like all other species of *Ulmus* L., this species is often cultivated for ornamental purposes in parks, more rarely also on canal banks and at the inner limit of coastal dunes. From such plantations it is rather regularly escaping or locally even naturalizing, severely obscuring the species' natural distribution.

• *U. minor* Mill.: this species is not RR but completely absent from Eifel centr. (FT).

84. Cannabaceae

• ***Celtis*** *australis* L.: this ornamental tree was already mentioned in NF6 as being cultivated; in recent years it has also occasionally been observed as an escape from cultivation (e.g. in Leuven and Bruges, since 2020; wn.be).

85. Moraceae

• ***Ficus*** *carica* L.: this species is not rarely but increasingly observed as an escape from cultivation, especially in urban habitats (wn.be).

• ***Morus*** *alba* L. and *M. nigra* L.: both these species are not only cultivated but have recently also been recorded as escapes (wn.be).

86. Urticaceae

• ***Parietaria*** *officinalis* L.: this species is slightly expanding in the Flora area (R-RR throughout, rather than RR). There are several records from coastal woodlands (wn.be, H24), a habitat not mentioned in NF6.

• *P. judaica* L.: like the preceding, this species is recently expanding (wn.be, SI-Flore). In Fl. and Brab. it is at most R now. Also in Fluv., it is not very rare, both in Belgium and the Netherlands (AR according to H24).

• ***Soleirolia*** *soleirolii* (Req.) Dandy: this escaped ornamental is now fully established, in urban areas even fairly commonly so, certainly in the Netherlands (H24, Denters 2020). In addition to the districts already cited in NF6, it now also occurs in Mar. (in Zeeland even AC; FZ), Camp. (at least in the Netherlands, e.g. in Breda, Tilburg, etc.; wn.nl) and in Tert. par. (e.g. northwest of Soissons; Digitale2).

88. Fagaceae

• ***Quercus*** *ilex* L.: this southern species seems to be in the process of local naturalization in coastal dunes (Mar.) and saplings are also increasingly observed elsewhere, especially in recently planted woodlands (Fl., Brab.) (wn.be).

• *Q. suber* L.: in NF6, this species was said to have been introduced in coastal dunes south of Boulogne-sur-Mer. In fact, a trial in the Forêt Domaniale d'Écault was unsuccessful, by 1984 the species had already completely disappeared (comm. D. Laille, Office Nationale des Fôrets, 06.2021).

• *Q. cerris* L.: in addition to the districts mentioned in NF6 (where it is said to be naturalized), this species is occasionally observed as an (ephemeral?) escape from cultivation. SI-Flore indicates localities in Mar. mér. and Pic. and the species has been observed rather regularly in various parts of Belgium as well (wn.be).

90. Juglandaceae

• ***Juglans*** *nigra* L.: this tree is increasingly escaping and possibly naturalizing locally, especially in riparian habi-

tats, not only in Belgium (Verloove 2011) but also e.g. in northeastern France, along river Moselle between Metz and Nancy (FLORAINE 2013).

• ***Pterocarya*** *fraxinifolia* (Poir.) Spach: this invasive tree is also known from river Marne in Champ., between Épernay and Vitry-le-François (database CBN Paris; see also Hendoux 2019).

91. Betulaceae

• Two frequently planted species of ***Corylus*** L., *C. colurna* L. and *C. maxima* Mill., are also increasingly found as escapes (wn.be).

• ***Alnus*** *cordata* (Loisel.) Duby: this ornamental tree is also known as an escape from Tert. par. (Montagne de Reims; database CBN Paris), a district not mentioned in NF6.

92. Cucurbitaceae

• ***Bryonia*** *dioica* Jacq.: in Eifel centr., this species is lacking, it only occurs in Osteifel (FT), beyond the Flora limits.

• ***Cucurbita*** *maxima* Duchesne: this species is not only cultivated, it very rarely also occurs as an adventive or escape, e.g. in Kieldrecht in 2017 (wn.be).

94. Celastraceae

• ***Euonymus*** *europaeus* L.: in addition to the areas where this species naturally occurs, it is frequently cultivated and increasingly observed as an escape, thus heavily obscuring its natural distribution (wn.be).

• *E. latifolius* (L.) Mill.: in NF6, this species was said to be least rare in Mosan (R, elsewhere RR). However, also in Mosan it is only known from a single locality (wn.be, AFW, SI-Flore, database CBN Paris). It is thus RR throughout the Flora area.

• ***Parnassia*** *palustris* L.: in Camp., this species is also present in the Belgian part of this district (wn.be). It is also known from Ard. (e.g. Libin, Vielsalm) from where it was not yet reported in NF6 (wn.be, AFW). From Eifel centr., on the contrary, it has disappeared (FT). In some of the localities where this species recently occurred, it is doubtfully native (lack of historical records), e.g. around Ieper and Kortrijk in West-Flanders.

95. Oxalidaceae

• ***Oxalis*** *debilis* Kunth: this weed is now naturalized and slightly increasing lately. It is still RR in most districts, except in Fl. and Camp. where it is merely AR-R (wn.be).

• *O. corniculata* L.: the geographical origin of this species was recently elucidated. It originates from eastern Asia (Groom *et al.* 2019), not the Mediterranean area as assumed in NF6.

• *O. dillenii* Jacq.: this recently naturalized North American species is increasingly recorded in the Flora area, although it remains very rare. It has been known from most districts by now: Mar., Fl., Camp., Pic., Brab., Lorr. and Tert. par. (wn.be, SI-Flore, Digitale2, FZ, H24, FLORAINE 2013; see also Watterlot 2010).

96. Hypericaceae

• ***Hypericum*** *androsaemum* L.: this is a very rare native species in some parts of the Flora area. However, it is frequently grown as an ornamental, is increasingly escaping from cultivation and has been able to naturalize in recently planted woodlands and urban habitats, especially in Fl., Brab. and Camp. where it is at most AR-R at present (wn.be).

• *H. elodes* L.: this species occurs in a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse, near the estuary of river Canche) (SI-Flore) along with, among others, *Rhynchospora alba*, *R. fusca*, *Trichophorum cespitosum*, *Drosera rotundifolia*, *Erica tetralix*, etc. (comm. B. Toussaint, 06.2021).

• *H. humifusum* L.: this species from slightly acidic soils hardly occurs in the calcareous Eifel centr.; it is RR there, not AC-AR (FT).

• *H. perforatum* L. subsp. *veronense* (Schrank) Cesati: narrow-leaved forms of *H. perforatum* were already referred to in NF6 but these were believed to be mere ecotypes from dry substrates. However, the genuine presence of this southern taxon in the Flora area was recently confirmed: a large population was detected in 2021 on an embankment along the Canal de la Deûle à l'Escaut in Roubaix (Brab. occ.), where it may be a mere introduction (pers. obs. author; ID confirmed by J.-M. Tison). However, the same subspecies is apparently also known from scattered localities in Champ. and Tert. par. (database CBN Paris) and should be looked for elsewhere, especially in the southern districts.

• *H. desetangsii* Lamotte: this species was not mentioned from Eifel centr. in NF6 although it is hardly any rarer than *H. maculatum* Crantz subsp. *obtusiusculum* (Tourlet) Hayek and much more common than *H. tetrapterum* (FT). It is at most R there.

• *H. maculatum* Crantz subsp. *maculatum*: this subspecies is much rarer than the next and, as for its ecology, much more demanding (trophy/pH: Nardaies, acidophilic clearings and wood margins) than subsp. *obtusiusculum* (mesotrophic meadows, roadsides, hems,...). In its typical habitat, it was discovered in Oostkamp (Fl.) in 2019 (wn.be; comm. I. Jacobs, 05.2022), a district from where it was not known.

• *H. maculatum* Crantz subsp. *obtusiusculum* (Tourlet) Hayek: in NF6, this taxon was said to be rarer towards the western part of the Flora area. This actually turns out not to be true at all. According to SI-Flore, this subspecies occurs throughout the entire northwestern part of France, while it is virtually absent in northeastern France. The distribution pattern in Belgium is fairly diffuse. It is obvious that in reality this taxon is poorly known and its genuine distribution therefore uncertain.

• *H. montanum* L.: in Eifel centr., this species is only

known from a single locality and thus RR instead of AR. It is occasionally observed outside its natural distribution range. In Averbode (Camp.), for instance, a small persisting population has been known since 2012 (wn.be) and the species was recently also observed in Brussels (Saintenoy-Simon 2013).

• *H. linariifolium* Vahl: recently, a new Belgian location for this very rare species was discovered, ca. 13 km away from the unique one known so far, in Viroinval (Clesse 2014).

• *H. pulchrum* L.: the indication AC in Eifel centr. is very unlikely for an acidiphilous species. In reality it is absent there (comm. R. Hand, 03.2021; FT).

97. Elatinaceae

• ***Elatine*** *alsinastrum* L.: the status of this very rare species in the Flora area remains uncertain. In (relatively) recent times it has only been recorded from Lorr. Vernier (2020) left this species unmentioned and the same applies to SI-Flore, while the AFL still indicates a single location. Indeed, the species is said to still be found in Forêt de la Reine et Caténa de Rangéval (https://www.terrestouloises.com/wp-content/uploads/2018/07/PLUi_Etat-initial-de-lenvironnement.pdf). There are indeed no records from Champ. and Tert. par. (database CBN Paris, Digitale2).

• *E. triandra* Schkuhr: in NF6, this very rare species was mentioned from the southeastern part of Lorr. The few present-day records in that part of Lorr. are all located well beyond the Flora limits, near Sarrebourg (SI-Flore). FLORAINE (2013) indicates a locality in the western part of the district.

98. Violaceae

• ***Viola*** *odorata* L.: in Eifel centr., this species is completely lacking instead of being AR (FT).

• *V. mirabilis* L.: this species is also known from Givet in Mosan mér. In Lorr., it is also known from other regions than those indicated in NF6, e.g. from Argonne in Lorr. occ. (La Neuville-aux-Bois) (SI-Flore, database CBN Paris).

• *V. alba* Besser: this species is also known from Givet in Mosan mér. and the region around Rethel in Lorr. occ. (SI-Flore, database CBN Paris).

• *V. rupestris* F.W. Schmidt: the occurrence of this species near Givet is considered to be doubtful in NF6, although its presence there is confirmed by the CBN Paris database. This species disappeared from Zeeland a long time ago already (FZ).

• *V. lactea* Smith: this very rare species was recently discovered in a new locality in Fl., in Drongengoed between Aalter and Maldegem (Hoste *et al.* 2021).

• *V. stagnina* Kit.: in NF6, this species was mentioned from Champ. However, the few growing places are located near the border of the Lorr. and Champ. districts, south of Vouziers (SI-Flore) and therefore still in Lorr., not in Champ. *V. stagnina* is found in exactly the same area as *V. pumila* Chaix, which is correctly indicated for Lorr. occ. in NF6.

• *V. pumila* Chaix: this rare species occurs in two areas in northeastern France. In addition to Lorr. occ. (as indicated in NF6), it also occurs in Champ. (near Châlons-en-Champagne). The populations in Lorr. occ. are located south of Vouziers and near Rethel (SI-Flore, database CBN Paris).

• *V. elatior* Fries: in addition to the known localities in Lorr. mér. (Antoine & Voirin 2015), this rare species also occurs in several places in Champ., especially in the valley of river Marne southeast of Reims (SI-Flore, database CBN Paris), from where it was not mentioned in NF6.

• *V. palustris* L.: according to SI-Flore, this species has completely disappeared in Tert. par. The CBN Paris database also only lists records outside the Flora area (Yvelines and further south).

• *V. tricolor* L. subsp. *saxatilis* (F.W. Schmidt) Arcang.: see Verloove (2023) for details.

100. Salicaceae

• ***Salix***[2] *×capreola* A. Kerner ex Anderss.: this very rare hybrid is also known from Pic. (SI-Flore).

• *S. ×straehleri* Seemen: this triple hybrid (*S. aurita* × *cinerea* subsp. *cinerea* × *repens* subsp. *repens*) was not mentioned in NF6. It is very rarely found in heaths in Fl. and Camp.

• *S. ×mollissima* Hoffm. ex Elwert: in addition to the (few) districts mentioned in NF6, this hybrid is also known from Mar., Pic. and Lorr. in France (SI-Flore, Digitale2).

101. Euphorbiaceae

• ***Mercurialis*** *annua* L.: in NF6, this species was said to be AR in Camp. It is, however, hardly any rarer there than in e.g. Fl., at most AC-AR (wn.be). In Eifel centr., where it was said to be R, it is RR (known from a single locality; FT).

• ***Euphorbia*** *amygdaloides* L.: this species is no longer RR in Eifel centr., it has completely disappeared there (FT).

• *E. exigua* L.: in Eifel centr., this species is limited to two localities (FT). It is RR there, not AC-AR as indicated in NF6.

• *E. seguieriana* Neck.: outside its native area, this species is occasionally observed as an introduction. In a single locality in Mar. (Middelkerke) a small naturalized population has been observed (Vercruysse *et al.* 2017).

• *E. palustris* L.: this is a very rare native species in the Flora area. However, in the past years it has increasingly been used in nature restauration projects and very easily escapes. It is increasingly naturalizing, especially in Fl. (as already indicated in NF6) but also in Brab. (wn.be). As a native species, it is also present in several localities in Champ., south of Épernay (SI-Flore).

[2] The genus *Salix* was entirely revised by A. Zwaenepoel.

• *E. dulcis* L. subsp. *incompta* (Cesati) Nyman: this taxon is known from at least one locality in Champ., in Sompuis, a district not mentioned in NF6 (database CBN Paris).

• *E. flavicoma* DC. subsp. *verrucosa* (Fiori) Pignatti: this taxon also occurs between Amiens and Péronne in Pic. mér. (SI-Flore).

• *E. stricta* L.: this species also occurs in a few localities in the valley of river Authie in Pic. mér. (SI-Flore, Digitale2), a district from where it was not mentioned in NF6. Outside its native distribution range, this species is sometimes observed as an introduction, for instance in Roeselare (Fl.) since 2019 (wn.be) or in Zuid-Limburg (Brab. or.) in the Netherlands (H24, wn.nl).

• *E. maculata* L.: this North American species is much expanding and now AR rather than R throughout, especially in the southern part of the Flora area (SI-Flore) and Flanders (wn.be).

102. Linaceae

• ***Radiola*** *linoides* Roth: this rare species is recently much declining in the Flora area. In Belgium, it is known from a few extant localities in Mosan and Camp. and from solitary growing places in Fl. and Mar. (it is less rare in Mar. mér. in France and Mar. sept. in the Netherlands; SI-Flore, FZ). It apparently has disappeared from Ard. (wn.be) and the same applies to Lorr., both from its Belgian, Luxembourg and French part (FLORAINE 2013, SI-Flore, wn.be, MNHN-Lux).

• ***Linum*** *hirsutum* L.: this species has not only been introduced in Champ. as stated in NF6; according to FG, it is even naturalized there in a single locality (Mourmelon), although the CBN Paris database surprisingly does not refer to it at all. It is easily recognizable by its pubescent leaves.

• *L. tenuifolium* L.: this species is not R-RR in Eifel centr., it is completely absent there (FT). Several localities are known from the valley of river Somme near Amiens in Pic. mér. (SI-Flore), a district that was not mentioned in NF6.

• *L. austriacum* L.: this ornamental is doubtlessly also present in other districts than those indicated in NF6 (cf. SI-Flore, wn.be), but usually ephemeral or only temporarily persisting.

• *L. bienne* Mill.: this very rare species is not only known from Tert. par. but also from adjacent parts of Champ., e.g. near Mourmelon (SI-Flore).

104. Geraniaceae

• General remark on the distribution of species of the genus ***Geranium*** L.: an increasing number of species are in recent expansion and this applies to both native and introduced taxa. Several native species with a rather limited natural distribution in the Flora area are increasingly often observed in regions where they were absent before (e.g. *G. columbinum* L., *G. lucidum* L., *G. pratense* L., *G. rotundifolium* L., *G. sanguineum* L. and *G. sylvaticum* L.). For these species, the nuclei of natural and secondary distribution are sometimes difficult to distinguish from one another these days.

• *G. pratense* L.: in areas where this species does not occur naturally, it is increasingly escaping, often not RR and clearly increasing (wn.be).

• *G. endressii* J. Gay: this is one of the most widely cultivated and escaped *Geranium* species (especially and incl. *G. ×oxonianum* Yeo). In many districts, it has become at most R now, no longer RR (wn.be).

• *G. nodosum* L.: in addition to the districts already mentioned in NF6, this species has also been recorded as an escape in Mar. mér. (SI-Flore), Fl., Camp. and Ard. (wn.be).

• *G. macrorrhizum* L.: this species is increasingly grown as an ornamental and easily escapes. In addition to the districts already mentioned in NF6, this species has also been recorded as an escape in Camp., Pic., Lorr. and Tert. par. and in Brab. it is not limited to the eastern part of the district (wn.be, SI-Flore, FLORAINE 2013).

• *G. columbinum* L.: this native species is increasingly observed outside the area where it naturally occurs. Outside the districts that are listed, it is now R-RR rather than RR. In NF6, Champ. was not mentioned, suggesting that it is RR there. In fact, it is as common as in e.g. Tert. par. or Lorr., thus C (database CBN Paris).

• *G. dissectum* L.: this species is commoner now than indicated in NF6. It is now almost everywhere AC (or even C), except on the nutrient-poor soils in Camp. (AR) and in Ard. (R) (wn.be).

• *G. rotundifolium* L.: this native species is in expansion lately, especially in Mar., Fl., Camp. and Fluv. (wn.be).

• *G. molle* L. var. *aequale* Bab.: despite the papers by Aedo *et al.* (1998), Lawalrée (2000) and Veldkamp (2008), who all reported this taxon from Belgium and adjacent territories, this variety remains largely unknown in the Flora area (wn.be, wn.nl, FG, H24).

• *G. lucidum* L.: this native species with a rather limited natural distribution in the Flora area is in recent expansion, especially in urban agglomerations (Fl., Camp., Brab.) (wn.be).

• *G. robertianum* L.: this species is not rarer in Camp. than in the other districts, C-AC throughout (heatmap wn.be).

• *G. purpureum* Vill.: no distribution was presented yet in NF6 for this fast spreading alien species. It is mostly found in Mar., Fl., Camp., Brab. and Mosan (wn.be).

• ***Erodium*** *moschatum* (L.) L'Hérit.: this thermophilous species is recently increasing. It is now also naturalized locally in Mar. in Belgium and the Netherlands and is also present in Fl. (wn.be). It typically occurs in dry "grasslands" on campsites (Verloove *et al.* 2020a). The species was indicated for Mar. mér. in NF6 but it is uncertain if

it still occurs there (there are no records according to SI-Flore and Digitale2).

• *E. lebelii* Jord.: this species was said to be AC throughout the Mar. district. However, it is less frequent for instance in Zeeland in the Netherlands where it is considered to be AR (FZ).

105. Lythraceae

• ***Lythrum*** *portula* (L.) D.A. Webb: the frequency of this species in Ard. is comparable with that in e.g. Fl., i.e. R instead of AR (wn.be).

• *L. junceum* Banks et Soland.: most recent records of this species are from exposed banks and dried-out ponds (wn.be), a habitat that was not yet mentioned in NF6.

• *L. hyssopifolia* L.: this species is also known from Fl. and Camp. (wn.be). The habitats in which it is found in these districts are, at least in part, as 'natural' as in the other districts. But, in general, this species is rather ephemeral in the Flora area.

• ***Trapa*** *natans* L.: the actual situation of this species in northeastern France is unclear. FLORAINE (2013) does not mention a single record while Vernier (2020) still refers to its presence in Champ. According to SI-Flore and the CBN Paris database, the species was recently seen east of Vouziers and around Épernay, in the Marne valley, whereas it apparently has disappeared from the Aisne valley in Champ. (from where it was recorded in NF6). In addition to these very rare occurrences in the wild, *T. natans* is also sometimes introduced as an aquatic ornamental, not only in the past (as stated in NF6) but also at present, for instance in Beloeil in 2019 (wn.be). It was also seen by De Langhe and Slembrouck in the early 1990s.

106. Onagraceae

• ***Ludwigia*** *palustris* (L.) S. Elliott: this species has completely disappeared from Lorr., both in Belgium, France and the Grand Duchy of Luxembourg, and the same applies to Pic. mér. and Tert. par. (FLORAINE 2013, wn.be, MNHN-Lux, SI-Flore, Digitale2).

• *L. grandiflora* (Michaux) Greuter et Burdet: this exotic aquatic ornamental is also known from Ard. (e.g. Marbehan; wn.be) and from several localities in Tert. par. (e.g. Oise; Digitale2).

• *L. peploides* (Kunth) P.H. Raven subsp. *montevidensis* (Spreng.) P.H. Raven: this aquatic weed is a relatively recent newcomer in the Flora area, probably first observed in 1995, but much expanding lately. In addition to the districts already mentioned in NF6, it now also occurs in Mar., Fl. and Camp. (wn.be) and in Brab. it is no longer confined to the canal Escaut-Deûle (SI-Flore, wn.be).

• ***Oenothera*** *laciniata* Hill: this species is more or less naturalized ("instable", according to FG) in Tert. par. (Courcelles-Sapicourt and Muizon, i.e. west of Reims), close to the border with Champ. From the latter district itself there are apparently no records. At least in the first locality it has been present since the 1980s (Worms 1985) and its persistence there was regularly confirmed up to the present (database CBN Paris). It is exceptionally seen as an alien elsewhere in the Flora area, e.g. in Drongen (Fl.) in 2020 (wn.be).

• *O. glazioviana* Micheli f. *rubricalyx* (R.R. Gates) Lambinon: this taxon was mentioned in NF6 from Mar. mér. (Étaples) where it is more or less naturalized in coastal dunes. It has recently also been observed in other areas (Rostański & Verloove 2015, Mahévas *et al.* 2015).

• *O. oehlkersii* Kappus ex Rostański: this species is more or less naturalized in parts of the Flora area, especially in Fl., Camp. and Brab. where it is R-RR (wn.be). It is occasionally observed elsewhere (e.g. SI-Flore, Mahévas *et al.* 2015). It was added to the key and a full account presented.

• *O. rubricaulis* Kleb.: this species is expanding recently and locally naturalized, especially in port areas of Antwerp and Ghent (Mar., Fl.) and in Camp. (wn.be). It is occasionally observed elsewhere. It was added to the key and a full account presented.

• ***Epilobium*** *montanum* L.: in Mar., Fl. and – particularly – Camp., this species is perhaps slightly less rare than indicated in NF6, AC-AR rather than AR (wn.be).

• *E. collinum* C.C. Gmel.: this species seems to be sharply declining in the Flora area. It is least rare in Ard. but even there R rather than AR (wn.be, AFW).

• *E. roseum* Schreb.: this species is not rarer in Fl. than in Camp. (wn.be), it was poorly known for quite a long time. Inversely, its assumed frequency in Lorr. (AC) is exaggerated, it is rather AR there (according to FLORAINE 2013 it is even R in Lorr.).

• *E. tetragonum* L. subsp. *lamyi* (F.W. Schultz) Nyman: in Fl. and Camp., this species is not rarer than in e.g. Brab., R rather than RR (wn.be).

• *E. angustifolium* L.: in NF6, this species was said to be AR-R in Fl. and Camp. This is no longer true, it is at most AC-AR in these two districts (wn.be). For comparison, in Zeeland (the Dutch part of Mar.) it is even considered to be CC (FZ).

• *E. dodonaei* Vill.: this recent newcomer in the Flora area is only known from Mosan and Lorr. It is expanding locally: a new locality was recently discovered in Marche-en-Famenne (Louviaux 2021). In Lorr., it was known from Belgium and the Grand Duchy of Luxembourg (Lorr. sept.); since 2011 it has also been present in the extreme southwestern corner of this district in France (Nully; database CBN Paris).

• *E. brachycarpum* C. Presl: this North American species was already briefly mentioned in NF6 from northwestern France (Brab. occ. and Mosan occ.). In the intervening years, it has much expanded and it is at present known from Mar. (ports of Antwerp and Dunkerque; wn.be and author's observations), Fl., Brab., Mosan (wn.be), Ard. (both in Germany, Westeifel: Steffeln, Lavagrube; FT and in the Grand Duchy of Luxembourg; Wolff & Krippel

2022), Lorr. (Remacle 2014a, 2014b), Champ. (Troyes; database CBN Paris) and Tert. par. (Soissons; Digitale2). In 2020, this species was also recorded for the first time in the Netherlands, in Broekhuizenvorst (Fluv.) (wn.nl).

• ***Circaea*** *lutetiana* L.: in NF6, this species was said to be R-RR in Fl. and Camp. which was highly exaggerated (wn.be).

• *C.* ×*intermedia* Ehrh.: the genuine presence of this hybrid in Tert. par. requires confirmation. SI-Flore nor Digitale2 indicate its presence there, not at present nor historically. The CBN Paris database only includes records from well beyond the southern border of the Flora area.

107. Staphyleaceae

• ***Staphylea*** *pinnata* L.: this ornamental tree has been recorded as an escape in several additional districts: Camp., Pic., Brab. and Tert. par. (wn.be, SI-Flore, H24). According to FG, it is native in eastern and northeastern France, but probably nowhere in the Flora area. In some regions, e.g. the Laonnois (Tert. par.) and to some extent also in Brab. occ., it is apparently not very rare (wn.be, SI-Flore, Digitale2).

109. Sapindaceae

• ***Koelreuteria*** *paniculata* Laxm.: this East Asian ornamental tree is not only cultivated in the Flora area. In fact, it rather easily reproduces from seed and is increasingly recorded in the wild. In riparian habitats (for instance on the banks of rivers Rupel and Scheldt) it could naturalize in a near future (wn.be).

• ***Acer*** *saccharinum* L.: this ornamental tree with leaves with a whitish-silvery lower side, is increasingly observed as an escape, even locally naturalized, in particular in riparian habitats (Verloove 2011). According to H24 it also occurs along river Maas, including in the territory covered by NF (see also wn.nl).

• *A. pseudoplatanus* L.: the genuine native distribution of this species is hard to assess. However, in areas where it is supposed to be not native (for instance in most of Flanders and further north) it is no longer AR-R (wn.be). The species is much expanding lately, probably exclusively as an escape from cultivation.

• *A. platanoides* L. and *A. campestre* L.: the genuine native distribution of these two species is hard to assess. However, in areas where they are supposedly not native (for instance in most of Flanders and further north) they are no longer R-RR (wn.be). These two species are much expanding lately, probably exclusively as escapes from cultivation.

• *A. rufinerve* Siebold et Zucc.: this species was introduced on an experimental basis in the forest of Bonsecours (Brab.) around 1950. It has shown an invasive potential there and is now the subject of an eradication project. It has occasionally been observed elsewhere (Forêt de Soignes) (wn.be).

• ***Aesculus*** *parviflora* Walter: this ornamental tree is not only cultivated, it has also been observed as an escape recently (scattered records since 2013; wn.be).

• *A. hippocastanum* L.: this ornamental tree was already known to escape from cultivation. However, in recent years it has shown some tendencies towards a local naturalization, for instance in riparian habitats (wn.be).

110. Rutaceae

• ***Skimmia*** *japonica* Thunb.: this ornamental shrub is not only cultivated, it is occasionally also observed as an escape from or relic of cultivation (wn.be).

112. Malvaceae

• ***Malva*** *sylvestris* L.: this species is widespread throughout Fl. and Camp., it is C-AC rather than AC-AR. Also in Ard., it is slightly less rare than indicated, R-RR instead of RR (wn.be). In Eifel centr., on the contrary, it is not RR but completely missing (and considered non-indigenous elsewhere in the Eifel; FT).

• *M. neglecta* Wallr.: in Camp., this species is hardly any rarer than in e.g. Fl., thus C-AC rather than AR (wn.be).

113. Thymelaeaceae

• ***Daphne*** *laureola* L.: this species has exceptionally been recorded in Camp. (wn.be), doubtlessly as an escape from cultivation. In Champ., also not mentioned in NF6, it may well be indigenous; it is known in this district from a few localities (e.g. in Écury-sur-Coole; database CBN Paris).

• *D. mezereum* L.: this native species is also grown as an ornamental and is increasingly observed in areas where it is not native, e.g. in Mar. (France), Fl. and Camp. (wn.be; comm. M. Leten 05.2021).

• ***Thymelaea*** *passerina* (L.) Coss. et Germ.: the distribution of this very rare species was updated. In Lorr., it is still present in Côtes de Meuse and Woëvre (Vernier 2020). In Tert. par., from where it was assumed to have possibly disappeared, it is still present (Messean 2010, SI-Flore, Digitale2). It was reported, for instance, from a military campsite in Sissonne (Messean *et al.* 2013). From Champ., however, it probably has indeed disappeared (database CBN Paris). In Belgium and the Grand Duchy of Luxembourg, on the contrary, it is extinct, the most recent records date back to 1951 (http://observatoire.biodiversite.wallonie.be) and 1899 (MNHN-Lux) respectively.

114. Cistaceae

• ***Tuberaria*** *guttata* (L.) Fourr.: it is questionable if this species, as a native, is still present in the Flora area. It was known from Montagne de Reims in Tert. par. but the most recent records there date back to 1925 according to SI-Flore. Recent records further southwest, near Creil (Digitale2), are located beyond the Flora limits. In 2017 a small population was discovered in Mar. sept. in the Netherlands (Brouwersdam: island Ossehoek) (H24, wn.nl). The species grows on an artificial island in the Grevelingen lake and its status is unclear (introduced?).

• ***Helianthemum*** *apenninum* (L.) Mill.: this species is only known from Mosan in the Flora area. However, it is occasionally observed elsewhere as an introduction. A population of a few hundred individuals was recently discovered in an old quarry in Lorry-Mardigny in the Moselle valley south of Metz. The plants have undoubtedly been introduced there and may belong to var. *virgatum* (Desf.) Font Quer. (Antoine & Aubry 2015).

• *H. nummularium* (L.) Mill.: the actual distribution of the two subspecies in parts of the Flora area is difficult to assess since they are not distinguished by all authors (e.g. FG). However, in Lorr. subsp. *obscurum* (Čelak.) Holub [as *H. grandiflorum* (L.) Mill.] is by far the least rare subspecies according to FLORAINE (2013), "peu commun" vs. "très rare" for subsp. *nummularia*. In NF6, the latter was said to be AC. The distribution and frequency of both subspecies in Eifel centr. is almost identical. Subsp. *obscurum* is therefore not RR at all, rather AC ("recht verbreitet in den Kalkgebieten von Gutland und Eifel") (FT).

117. Resedaceae

• ***Reseda*** *luteola* L.: in Fl. and Camp., this species is not R-RR. In fact, its frequency is comparable with that in Brab., i.e. AR (wn.be). In many localities in the Flora area this species is introduced rather than native.

• *R. lutea* L.: this species is hardly rarer in Fl., Camp. and Brab. than in the districts where it is considered to be AC, thus AC-AR rather than AR-R (wn.be).

119. Brassicaceae

• ***Sisymbrium*** *volgense* Bieb. ex E. Fourn.: this alien species, with tough creeping rhizomes producing dense colonies, is naturalized since the 1990s on a railway embankment in Ghent (Fl.) (wn.be).

• *S. austriacum* Jacq.: there are a few recent records of this species in Champ. (database CBN Paris) but it is unknown which of the three subspecies is involved. Anyhow, the species is a mere accidental introduction in this part of the Flora area.

• *S. altissimum* L.: among the districts where this alien species is least rare, Brab. was added (wn.be).

• *S. orientale* L.: no distribution was given for this alien species in NF6. It seems to be most frequent in Mar., Fl., Camp. and Brab., especially in urban habitats (including foot of walls) (wn.be).

• *S. irio* L.: this species has been in the process of local naturalization in urban areas since the 2000s, first in Antwerp (Fl.), then also in Brussels (Brab.) (wn.be). It has also been observed repeatedly in Nancy in Lorr. mér. since 2006 (Bonassi *et al.* 2017). In Châlons-en-Champagne (Champ.), it was already known at the end of the 19th century; it was rediscovered there in 2016 and its persistence was subsequently confirmed (database CBN Paris).

• ***Descurainia*** *sophia* (L.) Webb ex Prantl: in NF6, this species was said to be least rare in the northern part of Mar. (the Netherlands). It is, however, equally distributed throughout this district, in France, Belgium and the Netherlands (wn.be, SI-Flore). It was also explicitly mentioned from Fluv. (as AR). In reality, this species is much more rare there than in e.g. Fl. H24 does not mention this species from Fluv., only from Mar.

• ***Alliaria*** *petiolata* (Bieb.) Cavara et Grande: this species is not at all rarer in Camp. than in e.g. Fl., Brab., etc. (wn.be), i.e. C instead of AR.

• ***Isatis*** *tinctoria* L.: rather than as an adventive, this species is nowadays mostly seen as an escape. It is increasingly used for landscaping purposes, as a component of wild flower seed mixtures, and occasionally is running wild (wn.be).

• ***Erysimum*** *strictum* P. Gaertn., B. Mey. et Scherb.: this species is also known from at least one locality in Champ. (Cauroy) (database CBN Paris), a district not yet mentioned in NF6.

• *E. odoratum* Ehrh.: the actual presence of this species in Champ. and Tert. par. requires confirmation. According to SI-Flore and Digitale2, it has disappeared from all its localities, the northernmost extant populations being located south of river Seine, i.e. beyond the Flora limits. There is, however, a recent record east of Saint-Quentin (Pic.) (Digitale2), a district from where it had not been reported before. The species was found in Mont-d'Origny in 2018, on top of a chalky hillside (Falaise Bloucard), 20-25 individuals, apparently in a quite natural habitat (comm. J.-M. Lecron, 02.2022).

• ***Conringia*** *orientalis* (L.) Dum.: in NF6, this species was said to be R-RR in Lorr. In fact, it has disappeared there a long time ago already (see also FG), the most recent records dating back to before 1950 (SI-Flore). The species was no longer mentioned by FLORAINE (2013) and Vernier (2020). Elsewhere, this species is a very exceptional rather than an occasional alien in the Flora area.

• ***Hesperis*** *matronalis* L.: this species is expanding lately and is no longer RR in parts of Fl., Brab., Camp. and even Mar. (in Zeeland, for instance, AR; FZ). It is particularly well-represented in Fluv., especially between Maastricht and Roermond, where it is at most AR-R (wn.be, wn.nl).

• Some additional chorological information was added for the subspecies of ***Barbarea*** *vulgaris* R. Brown. Subsp. *rivularis* (Martrin-Donos) Sudre is probably R-RR throughout the Flora area, especially in Mosan, Ard. and Lorr. (wn.be, SI-Flore), whereas subsp. *arcuata* (Opiz ex J. et C. Presl) Hayek is probably also R-RR everywhere but seems to be expanding slightly (it is apparently also included in wild flower seed mixtures). Subsp. *vulgaris* is by far the most widespread subspecies (wn.be).

• *B. intermedia* Boreau: this species is clearly less rare in a triangle Ghent - Kortrijk - Brussels (Fl., Brab.) (wn.be), where it is R rather than R-RR.

• *B. stricta* Andrz.: the distribution of this species was updated. It is no longer RR in Mar. (see also: FZ), and in

Camp. and Brab., it is not more frequent in the northern parts than in the other parts of these districts (wn.be).

• *B. verna* (Mill.) Aschers.: this species was said to be possibly native in the northeastern part of Mosan. However, it is undoubtedly exclusively adventitious in the Flora area. Moreover, there are actually no records from that region (wn.be), the species must have been found there a number of times in the past, as an ephemeral alien. The species is increasingly observed throughout our territory and now is R-RR rather than RR (wn.be).

• ***Rorippa*** *×armoracioides* (Tausch) Fuss: this hybrid was mentioned in NF6 from the northern part of the Flora area, in the Netherlands. Since 2016, a stable population has also been known from Belgium, in Boom in Fl. (wn.be).

• *R. stylosa* (Pers.) Mansf. et Rothm.: the populations of this species in Oesling (Grand Duchy of Luxembourg) are quite isolated from other European populations. The species has become very rare there and is on the brink of extinction (Colling 2005).

• *R. palustris* (L.) Besser: this species is equally common in Mar., Fl., Brab. as in Camp. (i.e., AC-C, rather than AR-R) (wn.be; compare with Mar. in FZ: CC). In NF6, it was said to be absent or doubtfully recorded in Boul. and Eifel centr. However, in both districts the species is present, although probably RR (SI-Flore, FT).

• *R. austriaca* (Crantz) Besser: no distribution was given for this alien species in NF6. It seems to be most frequent in Fl., Camp. and Brab. and recently seems to be increasing slightly. Since 2010, it has also been known from the valley of river Marne, in Champ. (database CBN Paris).

• ***Nasturtium*** *officinale* R. Brown and *N. microphyllum* (Boenningh.) Reichenb.: the distribution of these two species in Eifel centr. was corrected, based on FT. The former is completely absent in Eifel centr. (instead of AR-R), while the latter is known from only one location, in Oberbettingen. In Lorr., this species is exclusively found in the Belgian part of this district (Lorr. sept.), it is completely absent from the French part (FLORAINE 2013).

• ***Cardamine*** *bulbifera* (L.) Crantz: outside the species' native distribution range in the Flora area, it is sometimes recorded as an escape from cultivation, occasionally even in naturalized populations, especially in Fl. and Camp. (wn.be). Populations in Zuid-Limburg in the Netherlands (H24) likely also refer to introductions.

• *C. amara* L.: this species was said to be absent in Mar. in NF6. There are several recent claims from this district (wn.be) but these are most likely erroneous (comm. M. Leten) and require confirmation. In Champ., it is not absent but RR (e.g. valley of river Marne near Châlons-en-Champagne; database CBN Paris).

• *C. dentata* Schult.: the distribution of this poorly known species remains uncertain but it appears to be the most widespread species of the *C. pratensis* group in coastal dunes, at least between De Panne and Oostduinkerke (comm. M. Leten, 05.2020). A confirmation of this ID, using modern techniques, is however desirable. The species is also known from Champ., in the valley of river Marne (database CBN Paris).

• *C. impatiens* L.: this species is on the rise, especially in Camp. where it is not much rarer than in Mosan (AR). Also in Fl. and Brab., the species is increasing and now at most R-RR (wn.be). It is uncertain whether this recent expansion refers to a natural range extension or to multiple, independent introduction events. As a doubtlessly native species, it also occurs in various parts of Tert. par. (Laonnois, near Soissons, Montagne de Reims, etc.) (SI-Flore), from where it was not mentioned in NF6.

• *C. flexuosa* With.: this species is expanding lately. At present, it is clearly most common in Brab. (entire district) and Camp. (AC) and in fact hardly any rarer in Fl. (wn.be). It is very scattered and covers almost the whole area in the Eifel. centr.; it is at most AR-R there, not RR (FT).

• *C. hirsuta* L.: in Mar., Fl., Camp. and Brab., this species has become more common throughout the Flora area (C, rather than AC, in Mar., Fl., Camp. and Brab.), whereas in Mosan it is slightly but definitely less common than in these districts (AC) (wn.be). In Mar., in Zeeland, it is even considered to be CC (FZ). In Lorr., it is no longer R-RR but actually AC (FLORAINE 2013).

• *C. corymbosa* Hook. f.: the distribution of this recently introduced New Zealand species was specified. It is much rarer than initially thought (R rather than AR) and mostly found in Mar., Fl., Camp. and Brab. It is occasionally seen elsewhere, for instance in Lorr. (Remacle 2020).

• *C. occulta* Hornem.: this East Asian species is much increasing, especially in Mar., Fl., Camp., Brab., Mosan and Lorr. where it is AC-AR (wn.be). In the wild, *C. occulta* has been known in the Flora territory since 2007 but it was collected there as a pot weed already in 1968 (herb. BR). It has become the most widespread species of the genus worldwide in a few decades time (Šlenker *et al.* 2018).

• ***Arabidopsis*** *arenosa* (L.) Lawalrée subsp. *arenosa*: this subspecies is well-represented in Lorr. and parts of the Ard. (nord-or. and mér.) where it is R rather than RR. In Mosan, this subspecies is not more frequent in the northeastern part of the district (rather on the contrary). On the other hand, this subspecies is much rarer in Camp. and Brab. than indicated in NF6, RR rather than R (wn.be).

• *A. halleri* (L.) O'Kane et Al- Shehbaz: the exact origin of the populations found in the Flora area could be determined on the basis of genetic research: they originate in the Harz region in Germany (Pauwels *et al.* 2005).

• ***Arabis*** *sagittata* (Bertol.) DC.: this poorly known species is also known from scattered localities in Champ. (database CBN Paris), a district not mentioned in NF6.

• *A. planisiliqua* (Pers.) Reichenb.: this poorly known species from southwestern Europe reaches its northern

limit at the Seine valley, i.e. outside the territory covered by the Flora (SI-Flore). A former claim from Lorr., as referred to in NF6, is therefore probably erroneous.

• ***Turritis*** *glabra* L.: this species appears to be expanding. Its current abundance in Camp. or., often in linear populations (especially along roadsides and slopes), is remarkable (wn.be). It is not known whether these refer to introduced plants or to a natural range extension (comm. R. Barendse, 10.2020).

• ***Fourraea*** *alpina* (L.) Greuter et Burdet: in NF6, this species was said to have disappeared from Eifel centr. In reality, it has never occurred there. In neighboring areas, it is found in Rheinland-Pfalz in the Our region close to the known localities in the northern part of Grand Duchy of Luxembourg. There are also very rare occurrences at the northern edge of the Eifel in Nordrhein-Westfalen, e.g. at Achenlochhöhle in the Urft valley on Devonian limestone (comm. R. Hand, 10.2020). In Tert. par., it has indeed disappeared (SI-Flore, Digitale2).

• ***Pseudoturritis*** *turrita* (L.) Al-Shehbaz: there is a large, apparently well-established population in Mannebach-Kümmern (Lorr. nord-or.), near the border with the Grand Duchy of Luxembourg (FT). In addition to the naturalized populations, this species is exceptionally observed as a casual alien in the Flora area, e.g. in Edegem (Fl.) in 2009 (wn.be). SI-Flore reports a record from Gondrecourt-le-Château in Lorr. mér. (2002); it is unclear whether or not this species is naturalized there. It was not cited at all by Vernier (2020) and only from a locality outside the Flora area by FLORAINE (2013).

• ***Lunaria*** *rediviva* L.: outside its native distribution range in the Flora area, this species is occasionally observed as an escape from cultivation (wn.be).

• *L. annua* L.: no distribution was provided in NF6. In the past decades this species has much expanded. It is most frequently observed in Mar., Fl., Camp. and Brab. where it is AC-AR (R-RR elsewhere in the Flora area) (wn.be).

• ***Alyssum*** *alyssoides* (L.) L.: this species has disappeared from Mar., where it was last seen in Belgium in the 1970s, and in the 1990s in the Netherlands (AFV, FZ). It is occasionally observed as an introduction, recently for instance in the old port area of Ghent (wn.be). Repeated records since 2006 from a quarry in the Dutch part of Sint-Pietersberg (Brab. or.) (H24, wn.nl) likely also refer to adventive plants. In Lorr., it is very rare at present but evenly distributed throughout the district (FLORAINE 2013, wn.be); it is not predominantly found in the northern part of the district as erroneously stated in NF6. Surprisingly, this species was not mentioned from Tert. par. in NF6, although it is by far least rare in this district and adjacent Champ. (roughly between Compiègne-Laon-Reims-Épernay; SI-Flore, Digitale2).

• *A. murale* Waldst. et Kit.: this ornamental has extended in the Huy area where it is not only naturalized on rocks downstream but also upstream of river Meuse (wn.be).

• ***Berteroa*** *incana* (L.) DC.: in Mar., there are rather numerous observations, even in dense concentrations, on the Middle and East coast in Belgium (wn.be). On the other hand, the species is considered to be R in Zeeland (FZ). Its rarity in this district was left unchanged but it may be slightly less rare than indicated in NF6 (R-RR). In Eifel centr., this species is not R-RR but completely lacking (FT).

• ***Draba*** *muralis* L.: in the entire Mar. district (i.e. France, Belgium and the Netherlands), this species is only known from Koksijde (SI-Flore, FZ, wn.be, wn.nl). This information was deemed useful to add. It also occurs naturally (not adventitious) at some locations in the Eifel centr. (FT). In addition to the enumerated districts (where it is supposed to occur naturally), this species is increasingly observed as an introduction and seems to have locally naturalized, e.g. on canal or river banks in Brab. (Menen) or Camp. (Breda) (wn.be, wn.nl).

• *D. aizoides* L.: this rare species is historically known from Yvoir. Recently, it has also been found elsewhere, on old walls or rocks, in Mosan (Huy) as well as in Ard. (La Roche, Bouillon) (wn.be). The status of these populations is uncertain but they most likely represent escaped plants.

• ***Cochlearia*** *danica* L.: this coastal species has further expanded to more southern, inland districts (Mosan, Ard., Lorr., Tert. par.; for Lorr. see also Remacle 2015, Bonassi *et al.* 2017 and Krippel *et al.* 2018) (wn.be, SI-Flore). In Camp., it is equally distributed throughout the district, it is no longer more frequent in its northern part (wn.be).

• *C. officinalis* L.: some details were added about the distribution of this species. It is confined to Mar. where it occurs in France (contrary to NF6, at present it occurs exclusively north of Cap Blanc Nez, it has disappeared from Mar. mér.; SI-Flore) and Mar. sept. (the Netherlands) but also north of Antwerp in Belgium (wn.be).

• *C. anglica* L.: this species was recently discovered in several additional localities along the coast in northwestern France. It was already known, since 1995, from the estuaries of rivers Somme and Slack (NF6) and now also occurs at the mouth of rivers Authie and Canche and between Calais and Dunkerque (Digitale2, Legris & Villejoubert 2015, Dumont 2016). From Zeeland in the Netherlands, it has already disappeared a very long time ago, in 1857 (FZ).

• ***Camelina*** *sativa* (L.) Crantz: in NF6, this species was said to be formerly cultivated as an oil crop. In recent years, it is cultivated again on a small scale by bio-farmers, for instance in Malonne (Romain 2020), as an oilseed crop.

• ***Neslia*** *paniculata* (L.) Desv.: as a weed of arable land, this species may have almost disappeared in the entire Flora area. SI-Flore reports not a single recent record. Perhaps it is only extant in some parts of Lorr.: FLORAINE (2013) indicated a record from Nancy and Vernier (2020) mentioned the species from the northern Plateau Lorraine. In Champ. and Tert. par., it may be lost (SI-Flore).

• ***Hornungia*** *petraea* (L.) Reichenb.: this rare species was recently discovered in two places around Commercy in Lorr. mér. where it is believed to have been previously overlooked, due to its early flowering (Bonassi *et al.* 2017). It is exceptionally recorded as a casual alien, for instance in Boom in 2020 (wn.be).

• ***Teesdalia*** *nudicaulis* (L.) R. Brown: in Mar., this species is certainly not RR, rather R. It has scattered occurrences all along the Belgian coast (wn.be). For comparison: in Zeeland, in the Netherlands, it is considered to be AR (FZ).

• ***Thlaspi*** *arvense* L.: this species is less rare than indicated in Lorr., AC according to FLORAINE (2013).

• *T. alliaceum* L.: this species indeed probably occurs as a native species in Lorr. (comm. S. Antoine, 02.2021; Antoine 2020b), as already assumed in NF6, but also in the Champ./Tert. par. bordering area (database CBN Paris; SI-Flore). In Belgium, it has persisted since its discovery in 2007 in the south of Entre-Sambre-et-Meuse (Mosan occ.). Since 2020, the species has also been known from the edge of a tree nursery near Diest (at the limit of Camp. and Brab. districts).

• ***Noccaea*** *montana* (L.) F.K. Mey.: in Lorr., this species occurs – albeit RR – throughout the district, it is not confined to the southern parts of it, the northernmost populations being located immediately southwest of Thionville (FLORAINE 2013).

• ***Iberis*** *amara* L.: in Lorr., this species is actually limited to the French part of this district (it has completely disappeared in the Belgian part; AFW, wn.be). In Belgium, there are only extant native populations in Mosan; the species is sometimes found elsewhere in the Flora area as an alien or escape (wn.be).

• *I. umbellata* L.: this escaped ornamental is also known from Camp. and Brab. (wn.be), districts from where it was not yet mentioned in NF6.

• ***Lepidium*** *campestre* (L.) R. Brown: this species is indeed scattered in Mar. but at least as much in Belgium as in the Netherlands (it is not more frequent in the Dutch part). The species is also rather common in Camp. (especially or.: AR-R) and also less rare than indicated in NF6 in Fl. (R, rather than RR) (wn.be). The same applies to Lorr. where it is even said to be C (FLORAINE 2013). The species seems to be expanding lately.

• *L. heterophyllum* Benth.: in NF6, this species was said to be present in the Dutch part of Fluv. but this claim is not substantiated by recent observations (wn.nl), nor is the species mentioned from this district in H24. There are some observations (wn.be) in the Belgian part of Fluv. (river Maas) but these are likely erroneous.

• *L. graminifolium* L.: no distribution details were provided in NF6. It is naturalized in a few localities in Brab. occ. and Pic. sept. in France (SI-Flore) and in a single locality in Zeeland in the Netherlands (FZ, wn.nl). It was also recently seen in Charleville-Mézières, at the border of Ard. and Lorr., an area from where it was already recorded at the end of the 19th century (database CBN Paris).

• *L. latifolium* L.: the notion R in Mar. in NF6 in fact only applies to France where this species is indeed known from the Dunkerque area (it is much expanding there locally and now has become at most AR) (Digitale2). Elsewhere in Mar., this species is only exceptionally seen: in Zeeland (the Netherlands) it is RR (FZ) and in Belgium it hardly occurs in Mar. (wn.be). Elsewhere in the Flora area, this species obviously is on the rise, incl. in Fl. (wn.be) from where it was not yet mentioned in NF6. The species' recent spread is at least in part favored by the use of de-icing salt.

• *L. ruderale* L.: the distribution of this species was updated. It has expanded greatly in some districts but is missing in others. It is least rare in Mar., Fl., Brab. (mostly occ. and centr.) and Mosan (valleys) where it is AC-AR (wn.be). Everywhere else it is R-RR (not only in Ard., also in e.g. Lorr.) and it is even completely absent in Eifel centr. (FT).

• *L. virginicum* L.: in Fl., Camp. and Brab., the districts where it is least rare, this species has much expanded and is now AC-AR, rather than AR (wn.be).

• *L. densiflorum* Schrad.: this species is also expanding but yet much rarer than the previous species with which it is often confused. It is usually naturalized in urban agglomerations, for instance in Antwerp and Ghent (Fl.) (wn.be).

• *L. coronopus* (L.) Al-Shehbaz: the distribution and frequency of this species in Fl. is comparable with that in Brab., i.e. AR instead of RR (wn.be).

• *L. didymum* L.: in Camp. and Brab., this species is not more frequent in the northern parts of these districts (wn.be).

• ***Subularia*** *aquatica* L.: this very rare species is long-extinct in the entire Flora area. It was reported from Camp. (Genk) but historically also occurred in the French part of Ard., in the Monthermé area (1860-1900; database CBN Paris).

• ***Diplotaxis*** *tenuifolia* (L.) DC.: this species is much expanding recently and is by now also known from several locations in Ard. from where it was thought to be absent (wn.be; see also Bizot & Bouillard 2011 and Bizot *et al.* 2016 for records from the Charleville-Mézières area in France). In Camp. and Mosan (Meuse valley), it is at most AR and no longer R-RR. In Eifel centr., on the contrary, it has disappeared from its unique locality (FT). This species is now increasingly cultivated as a leaf vegetable, as a substitute for cultivated arugula.

• *D. muralis* (L.) DC.: this species was said to be more frequent in the western part of the Camp. district in NF6 but, in reality, it appears to be even more common in the eastern part (wn.be).

• ***Brassica*** *oleracea* L.: this species was discovered in Zeeland in Dutch Mar. in 2002. It has apparently persisted well since then but has hardly extended (FZ).

• ***Sinapis*** *arvensis* L.: this species was said in NF6 to be C throughout, except in Fl. and Camp. where it is AR. In reality, it is at least as frequent there as in the other parts of the Flora area (wn.be). On the other hand, in Eifel centr. it is much rarer than indicated, AR rather than C (FT).

• ***Erucastrum*** *gallicum* (Willd.) O.E. Schulz: in NF6, this species was indicated as least rare in Fluv. (AR-R). However, there are no records from this district in Belgium and only two in the Netherlands, both from 1992. It does occur further north in Fluv., but outside the Flora area. In our territory it apparently is a very rare and ephemeral alien in this district (H24, wn.be, wn.nl). It is completely missing and was never recorded in the past in Eifel centr. (FT).

• *E. supinum* (L.) Al-Shehbaz et Warwick: this rare species was not mentioned from Tert. par. in NF6. It is known from several localities in this district, especially east of Laon. It is also known from the area north of Laon, in Pic. or. (Digitale2).

• *E. nasturtiifolium* (Poiret) O.E. Schulz: indicated as a mere alien in NF6, this species has naturalized in several localities in northern France. It is known since at least the 1980s from a slag heap near Lens (Pic. sept.) and was also reported from a few localities in French Lorr., where it was qualified as a war alien ("plante obsidionale") by Vernier (2014). FLORAINE (2013) indicated two records from the area between Metz and Verdun. SI-Flore also indicates scattered localities between Reims and Châlons-en-Champagne (Champ.).

• ***Coincya*** *monensis* (L.) Greuter et Burdet subsp. *cheiranthos* (Vill.) Aedo, Leadlay et Muñoz Garmendia: it is doubtful whether the distribution presented in NF6 is still correct. In Oesling, where it was considered to be least rare (AR), it is declared "vulnerable" (Colling 2005) and there are hardly any recent records from the other districts mentioned (Mosan and Lorr.). It is probably dramatically declining in its natural distribution range in the Flora area. In the Grand Duchy of Luxembourg, for instance, it was last seen in 2004-2005, the penultimate record being from 1988 (comm. Y. Krippel, 10.2020). The same applies to Eifel centr. from where the species has completely disappeared (FT). On the other hand, it is expanding elsewhere, as an alien, especially between Antwerp and Brussels, where it has become AC locally. The same applies to the northeastern part of Camp. and Fluv. in the Netherlands (H24, wn.nl).

• ***Rapistrum*** *rugosum* (L.) All.: this alien is expanding and at present most frequently observed in Fl. and Brab. occ. (wn.be).

• ***Calepina*** *irregularis* (Asso) Thell.: this species was rediscovered in agricultural fields in Belgium in 2018 (Jacobs 2019). It has also been known since the 1970s from Zuid-Limburg in the Netherlands (near Voerendaal; Brab. or.) (wn.nl, H24). Since 2010 it has been observed as a weed in tree nurseries north of Valenciennes (France; Brab. occ.) and near Diest (Camp. mér.) where it seems to be well naturalized (SI-Flore, wn.be).

• ***Raphanus*** *raphanistrum* L. subsp. *landra* (Moretti ex DC.) Bonnier et Layens: this subspecies has recently established itself in the Flora area, or perhaps it was overlooked for some time. It is R-RR in Mar. but also occurs in Fl., more precisely in the valley of river Scheldt downstream from Melle (wn.be; also comm. G. Rappé 10.2017 and M. Leten 01.2018).

• *R. raphanistrum* L. subsp. *raphanistrum*: this subspecies was said to be C-AR in the entire Flora area. In Eifel centr., however, it is completely lacking (FT).

120. Santalaceae

• ***Viscum*** *album* L.: this species is slightly expanding in the Flora area. It was mostly found south of a line Marquise-Saint-Pol-Amiens-Roye-Bohain-Le Quesnoy-Ath-Bruxelles-Louvain-Hasselt-Maaseik with only isolated localities further north. At present, however, it has become relatively widespread further north as well (wn.be).

• ***Thesium*** *pyrenaicum* Pourr.: according to NF6, this species occurs in Lorr. exclusively in the northern and eastern parts of the district. SI-Flore, on the contrary, only indicates localities in the southern part of it. In fact, the species is very rare but occurs throughout Lorr. (FLORAINE 2013, Vernier 2020).

• *T. linophyllon* L.: in the entire Flora area, this species was only known from Côte de Meuse in Lorr. mér., from where it was thought to have possibly disappeared (which seems to be confirmed by data from SI-Flore). However, according to Muller (2006) it is perhaps still present. Vernier (2020) also still mentioned it from Meuse (RRR). FLORAINE (2013), on the other hand, only presents records from beyond the Flora limits. Thus, it is quite unclear whether or not this species is still present in the Flora area.

• *T. humifusum* DC. subsp. *divaricatum* (Jan ex Mert. et Koch) Bonnier et Layens: in the entire Flora area, this taxon is only known from Tert. par., where it is considered to be RR. According to Digitale2 there are only some localities left in Laonnois but even there the most recent observations date back to 1996 (comm. B. Toussaint, 06.2021).

123. Plumbaginaceae

• ***Ceratostigma*** *plumbaginoides* Bunge: in NF6, this ornamental was said to occur as an escape in the extreme southwestern part of the Flora area (in France). By now, it has also been observed as an escape further north, also in Belgium and the Netherlands (wn.be, wn.nl).

• ***Limonium*** *humile* Mill.: the situation with respect to this recent newcomer in the Flora area is very unclear: according to H24 it is known from a single locality in Zeeland, whereas according to FZ its ID remains questionable. There are many new recent claims from the Netherlands, both from Zeeland and Friesland (wn.nl, Atlas-NL). These may refer to a (recent) natural range extension, a previously overlooked species and/or escapes from cultivation. Anyway, contrary to NF6, the species is not restricted to Mar. sept. but also occurs south of the

Scheldt estuary. Plants recently observed in Belgian Mar. (Zwin nature reserve), with morphological characteristics that were in line with *L. humile*, turned out to have a genome size that rather corresponds with *L. vulgare* (comm. I. Jacobs & L. Delgat, 10.2021). The whole issue obviously requires further study.

• *L. binervosum* (G.E. Smith) C.E. Salmon: this species is known from two localities in French Mar., a historical one from chalk cliffs in Cran aux Œufs (Cap Gris-Nez) and one, discovered in 2007, from Platier d'Oye near Gravelines. In the latter locality, it is very well established, with very substantial numbers observed each year, mainly in former hunting ponds with little vegetation and flooded during high tides and at the contact of salt meadows / dunes ("haute schorre"). This ecology considerably differs from that of the "historic" population of Cran aux Œufs (Cap Gris-Nez) but both are (sub) halophilic systems that are relatively cut off from the direct impact of marine submersion ("sheltered areas") by recent dune ridges which limit the marine influence to an area in the process of continentalization. However, the substrate in Platier d'Oye is sandy loam and not rocky or sandy (comm. B. Toussaint, 06.2021). Stace (2019) also indicated a double ecology for this species: "chalk cliffs / salt marshes".

• ***Armeria*** *arenaria* (Pers.) Schult.: this species was recently observed, as an introduction, on a slag heap in Germignies-nord (Stien 2011).

124. Polygonaceae

• ***Rumex*** *scutatus* L.: in NF6, this species was said to be AR-R in Champ. However, it has apparently much declined lately and seems to have completely disappeared from that district (database CBN Paris).

• *R.* ×*heterophyllus* C.F. Schultz: it is very doubtful whether this hybrid still exists in the Flora area. In Belgium there are no documented records from the past decades (wn.be, etc.). In France, it has disappeared 'depuis longtemps' (FG, which also makes the claim from the Seilles valley in Lorr., mentioned in NF6, questionable). It has long since disappeared in the Netherlands as well: it is no longer mentioned in H24, Atlas-NL, etc. Weeda *et al.* (1985) already indicated that this hybrid had disappeared from the Netherlands.

• *R. hydrolapathum* Huds.: in Fl., this species is clearly much more common along rivers and canals than in the rest of the district, AC vs. AR (wn.be).

• *R. triangulivalvis* (Danser) Rech. f.: this North American alien occurs more or less permanently along river Maas (Fluv.) (wn.nl, wn.be, H24), especially on the Dutch side, where it may be naturalized locally.

• *R. patientia* L.: this naturalized alien is by far least rare in Mar., Fl. and Brab. (especially Brab. occ.) (AR) (wn.be, SI-Flore); it is R-RR elsewhere in the Flora area.

• *R. sanguineus* L.: in NF6, this species was not mentioned from Mar. and Ard. although it is known in these districts from rather numerous localities. In Ard., it is particularly frequent in the French part of it (database CBN Paris), whereas in Mar., it is even considered to be AC in Zeeland, in the Netherlands (FZ).

• *R. conglomeratus* Murray: this species is not AR-R but completely absent from Eifel centr. (FT).

• *R. pulcher* L.: this species is native to neither Belgium nor the Grand Duchy of Luxembourg (Colling 2005).

• *R. obtusifolius* L. subsp. *transiens* (Simonk.) Rech. f.: in NF6, this subspecies was mentioned from, among other districts, Mosan where it occurs along river Meuse. There are several (permanent) populations along this river in Limburg (Fluv.) as well (wn.be).

• *R. maritimus* L.: the distribution of this expanding species was updated. It is certainly equally common in Fl. as in Mar. and Fluv. (AC-AR). Also in Camp. (especially around Hasselt and Genk, thus in Camp. or.) and Brab. (in the entire district, not just in occ.) it is less rare than indicated in NF6 (AR) (wn.be). It is also known from several localities in Champ., especially in the valley of river Marne (database CBN Paris). In Eifel centr., on the contrary, it is completely missing (FT).

• *R. palustris* Smith: in Fl. and Brab., this species is less rare than indicated in NF6, AR rather than RR (wn.be).

• ***Polygonum*** *arenarium* Waldst. et Kit. subsp. *pulchellum* (Loisel.) Thellung: this rare alien with petaloid tepals (markedly enlarged at the apex) has more or less established itself at the edge of a canal in Uikhoven (Fluv.), at least since 2009, where it was probably introduced with talc, most likely from Egypt or Pakistan (wn.be; comm. R. Barendse, 01.2021).

• *P. maritimum* L.: this species was found once in the Flora area, in 1962, in Zeeland. It is an ephemeral that has not been seen for more than half a century (FZ, H24) and probably will not reappear in the near future (it is even declining in France where it does not occur to the north of Bretagne) (FG, SI-Flore). It was therefore removed from the key and the account was deleted as well.

• An additional alien species of ***Persicaria*** Mill. was recently discovered, *P. filiformis* (Thunb.) Nakai (Genk, 2021; wn.be). A future naturalization of this Asian ornamental is not unlikely, especially in disturbed woodland (see also H24).

• *P. nepalensis* (Meissn.) H. Gross: this annual with ascending stems, subglobose heads that are subtended by one or two leafy bracts and auriculate leaves with winged petioles, seems in the process of naturalization since 2010, at least in Fl. and Camp. (respectively in Bruges and Averbode) (wn.be). The somewhat similar *P. capitata* (Buch.-Hamilt. ex D. Don) H. Gross, that according to NF6 was expected to be on the verge of naturalization in the Flora area, appears to remain rather ephemeral (wn.be).

• *P. mitis* (Schrank) Asenov: this species is not RR but completely lacking in Eifel centr. (FT).

• *P. minor* (Huds.) Opiz: in the entire Flora area this species is probably least rare in Camp. (AC, rather than AR-

R) (wn.be, wn.nl, SI-Flore). It is the only district where it is not rare.

• ***Bistorta*** *officinalis* Delarbre: in addition to the districts where this species naturally occurs, it is occasionally seen as an introduction (wn.be).

• ***Rubrivena*** *polystachya* (Wall. ex Meissner) M. Král: in the entire Flora area, this naturalized species is by far least rare in Camp. (wn.be). According to SI-Flore, it used to be relatively widespread in Pic. as well but it appears to have disappeared completely there (Digitale2). In northern France, at present, it appears to be least rare in Ard., in the valley of river Meuse (database CBN Paris).

• ***Fallopia*** *dumetorum* (L.) Holub: in Fl., this species is AR rather than RR (wn.be). In Eifel centr., on the contrary, it is not AR but completely missing (FT).

• ***Reynoutria*** *japonica* Houtt.: this Asian species has become one of the most invasive species in the Flora area, it is now C-AC almost everywhere (instead of AC-AR) (wn.be, SI-Flore). In Belgium, it is only lacking in some of the most pristine areas in Wallonia (AFW), perhaps also in parts of Pic. in France (SI-Flore).

• *R.* ×*bohemica* Chrtek et Chrtková: this hybrid is much more frequent than one of its parents, *R. sachalinensis* (F. Schmidt Petrop.) Nakai (see also Meerts & Tiébré 2007). It is AR rather than R and probably widely overlooked.

• ***Fagopyrum*** *esculentum* Moench: this is not an AR-R but rather AC-AR (albeit ephemeral) alien (wn.be).

125. Droseraceae

• ***Drosera*** *rotundifolia* L.: in Lorr., this species was indicated from the northern and eastern part of the district in NF6. It is, however, lacking in eastern Lorr. (FLORAINE 2013) (in the northern part it is confined to Belgium and absent from France; wn.be). In addition to the districts where this species is native, it is occasionally introduced, e.g. in Zeeland where it was originally introduced intentionally in the 1980s in the Braakman and now expanding greatly (thousands of individuals) (FZ).

• *D. intermedia* Hayne: this species naturally reappeared in 2011 in Mar. sept. (De Schotsman, Zeeland), after an absence of a century (FZ). It was recently also discovered in Kyllwald in Eifel centr. (FT). The species was not mentioned from these two districts in NF6.

• *D. anglica* Huds.: until the beginning of the 20th century, this species also occurred in a few places in Pic. (e.g. near Béthune, Péronne and Cambrai) (SI-Flore). In the entire Flora area, it seems to be known from a single extant locality, in Chenay (near Reims), in Tert. par., where it was still present in 2018 (database CBN Paris).

126. Caryophyllaceae

• ***Moehringia*** *trinervia* (L.) Clairv.: in the western part of Fl., this species is not C-AC, rather AR (wn.be).

• ***Minuartia*** *mediterranea* (Link) K. Malý: this species is very locally naturalized since 2004 in a single area in Ghent (Fl.) (Verloove 2006b). It closely resembles *M. hybrida* (Vill.) Schischkin but differs from it by its more condensed inflorescence, with pedicels that are usually shorter than the calyces.

• *M. hybrida* (Vill.) Schischkin: in Eifel centr., this species is only known from a single area (Büdesheim; FT); it thus is RR there instead of AR. In NF6, this species was said to be R in Mar. It is absent from the Belgian and Dutch part of this district (wn.be, wn.nl) and only occurs near Dunkerque in France (SI-Flore). Even there, it is confined to railway infrastructure and thus likely introduced (author's observations).

• ***Honckenya*** *peploides* (L.) Ehrh.: this species is slightly less rare than indicated. It occurs throughout Mar., also to the north of Antwerp. It is AC-AR, rather than AR (wn.be, wn.nl). For comparison, it is said to be AC in Zeeland (FZ).

• ***Stellaria*** *palustris* Retz.: in much of Fl., this species is not rarer than in Camp. (AR, rather than R) (wn.be). In Lorr., it is slightly less rare in the larger valleys (R, elsewhere RR; Champluvier & Saintenoy-Simon 2014).

• *S. graminea* L.: in Mar., this species is certainly less common but not really rare (AR-R, rather than R; wn.be). For comparison, in Zeeland it is considered to be AC (FZ).

• ***Myosoton*** *aquaticum* (L.) Moench: in Fl. and Camp., this species is not rarer than in Pic., Brab., Mosan, Lorr. or Tert. par. (C-AC, rather than AR) (wn.be).

• ***Holosteum*** *umbellatum* L.: in NF6, this species was said to occur particularly in the western part of Fl. This is no longer true: according to wn.be (heat map) it is more or less equally distributed in this district with some concentrations near Ghent. It was also said to be absent or have disappeared from Pic. and Ard. However, it is still present in a few places in Pic. (valley of river Somme and west of Lens; SI-Flore) and its actual presence was recently confirmed in Ard. as well, at least in the Grand Duchy of Luxembourg (near Wiltz, 2020; MNHN-Lux). Finally, in Lorr. it is R in the entire district, not less so in its northern part (FLORAINE 2013).

• ***Cerastium*** *fontanum* Baumg. subsp. *vulgare* (Hartm.) Greuter et Burdet var. *holosteoides* (Fries) Jalas: this variety was only mentioned from the Netherlands in NF6 (Mar. sept. and Fluv. occ.). In fact, it is poorly known and probably overlooked. In Mar., it is certainly also present in coastal dunes in the Belgian and French part of this district (comm. M. Leten, 08.2020). In Fluv., it is apparently rarer than indicated, R rather than AR (H24).

• *C. brachypetalum* Desp. ex Pers.: this species naturally occurs in Eifel centr. (albeit RR) (FT).

• *C. semidecandrum* L.: this species is recently expanding and has become less rare in certain districts, especially in Fl., Camp., Pic. and Brab. where it actually is AC-AR instead of AR (wn.be, SI-Flore).

• *C. pumilum* Curt. var. *pumilum*: this variety was known from one location (Wöllersberg) in Eifel centr. but has long since disappeared (FT).

• ***Moenchia*** *erecta* (L.) P. Gaertn., B. Mey. et Scherb.: this species was recently discovered in Chamagne, Bainville-aux-Miroirs and Virecourt in Lorr. mér. (Voirin 2017, Voirin 2019), a district from where it was not mentioned in NF6. In Tert. par., on the contrary, it has completely disappeared (Digitale2, database CBN Paris).

• ***Sagina*** *alexandrae* Iamonico [syn.: *S. subulata* (Swartz) C. Presl]: in NF6, this species was said to rarely escape from cultivation (more precisely, a cultivar named 'Hortensis'). In addition, wild forms of this species have recently also been observed, as an adventive, for instance on charcoal in the Ghent port area in 2014 (wn.be).

• *S. nodosa* (L.) Fenzl: this species has not disappeared from Pic. mér., it was recently confirmed from at least two locations, in Long and Forest-Montiers (Coulombel 2018).

• *S. apetala* Ard. subsp. *apetala*: this subspecies is locally much less rare than indicated in NF6, especially in urban areas (see also H24) and campsites (Verloove *et al.* 2020a). There are also, at least a few, records from Tert. par. and in Ard. it is not confined to the eastern part of this district (database CBN Paris).

• *S. apetala* Ard. subsp. *erecta* F. Hermann: in NF6, this subspecies was said to be AC-R throughout the Flora area. However, in Eifel centr. it is completely absent (FT).

• ***Scleranthus*** *annuus* L. subsp. *polycarpos* (L.) Bonnier et Layens: in addition to natural occurrences, this subspecies is occasionally found as an introduction, for instance in campsites (Verloove *et al.* 2020a).

• *S. perennis* L.: in NF6, this species was said to be least rare (R) in Fluv. in the Netherlands. In fact, it has completely disappeared from that district (Atlas-NL, H24). In Eifel centr., where it was said to be RR, it is absent (FT). This species seems to be declining in the entire Flora area and it may have disappeared from some of the districts mentioned, for instance in Brab. and Camp. (wn.be, wn.nl).

• ***Herniaria*** *hirsuta* L.: in NF6, this species was said to be RR throughout the Flora area. It is, in fact, slightly increasing and has become less rare in some districts, e.g. in Fl., Camp. and Brab. (R-RR) (wn.be, wn.nl, SI-Flore).

• ***Illecebrum*** *verticillatum* L.: in Lorr., this species is not predominant in the eastern part of this district (as stated in NF6). In fact, it only occurs in its northern (Belgian) part (wn.be, MNHN-Lux, SI-Flore). In France, it is restricted to the Vosges (Vernier 2020, FLORAINE 2013), thus far beyond the Flora limits. In Tert. par., it may never have occurred within the boundaries of the Flora area, the northernmost known locality being that from 1913 in Saint-Gratien in Val d'Oise (SI-Flore, CBN Paris database).

• ***Polycarpon*** *tetraphyllum* (L.) L.: this thermophilous species is much expanding in urban habitats. At present, it is locally naturalized in Mar., Fl., Camp. (district added, known from a few localities, mainly cemeteries and campsites; wn.be, Verloove *et al.* 2020a) and Brab., where it has become R rather than RR. It has been reported from other districts as well, e.g. Mosan (city of Liège; Paelinck *et al.* 2021) and Champ. (near Châlons-en-Champagne; SI-Flore) but it is unknown whether or not the species is genuinely naturalized in these districts.

• ***Spergula*** *arvensis* L.: in Mar., this species is certainly not R, rather AC, except perhaps in the polders (wn.be). For comparison, in Zeeland it is considered to be AC (FZ).

• *S. morisonii* Boreau: there are two recent (2013-2014), reliable records from the Lagland military camp in Saint-Léger in Lorr. sept. (wn.be), a district from where this species was not reported in NF6.

• *S. pentandra* L.: the actual presence of this very rare species in Lorr. was recently confirmed (Voirin 2017). Historically, in addition to the districts already mentioned in NF6, this species also occurred in Pic. and Tert. par. (SI-Flore).

• ***Spergularia*** *rubra* (L.) J. et C. Presl: this species was considered to be R-RR in Mar. in NF6. It is in fact at most AR there (wn.be). According to FZ, it is even AC in Zeeland.

• *S. media* (L.) C. Presl subsp. *angustata* (Clavaud) Kerguélen et Lambinon: this coastal plant is increasingly recorded in the interior part of the Flora area, especially in Fl., Camp., Brab. and Mosan (wn.be).

• *S. segetalis* (L.) G. Don f.: this species is indeed extinct in Belgium, the Netherlands (H24) and the Grand Duchy of Luxembourg (MNHN-Lux). In France, there is a relatively recent record, from 2001, northeast of Troyes (Champ.) (SI-Flore), at the extreme southern border of the Flora area.

• ***Viscaria*** *vulgaris* Bernh.: in Lorr., this species only occurs in the northern part of this district, other records from northeastern France being located (far) beyond the Flora limits (FLORAINE 2013, SI-Flore). This species was believed to have disappeared from Tert. par., however there is at least a recent record (from 2009) from near Soissons (SI-Flore; but reliable? not included in Digitale2).

• ***Silene*** *italica* (L.) Pers.: this southern species is known since 1995 from Metz in Lorr. It seems, however, that its presence there has not been confirmed lately: FLORAINE (2013) only reported a record from elsewhere in this district, near Thionville, whereas Vernier (2020) mentioned this species from the northern Lorraine plateau, without further details. Elsewhere in northeastern France it is occasionally observed, for instance in Val-de-Vesle (Champ.) in 2020 (database CBN Paris). It is worth noting that this species is still present, in quantity, in the Ghent port area, from where it was already reported in 2007 (Verloove 2008) (wn.be).

• *S. dioica* (L.) Clairv.: this species has expanded in Mar., Fl., Camp., Pic. (occ.) and Tert. par. and is no longer AR in these districts, rather AC-AR. For comparison, in Zeeland (Dutch Mar.) it is considered to be even CC (FZ).

In this district, it is however clearly less common in the polders (wn.be).

• *S. noctiflora* L.: in NF6, this species was said to be least rare in Tert. par. (Laonnois: R). However, it seems to have completely disappeared from that area (SI-Flore, Digitale2). At present, in Tert. par., it is nearly confined to Montagne de Reims (SI-Flore) and thus, as elsewhere in the Flora area, RR. There are also some records from Pic., for instance from southeast of Amiens (SI-Flore). It is not always easy to distinguish between native (or archaeophytic) and adventive occurrences (this species is a rather regular, usually ephemeral grain alien in the Flora area). As a consequence, in several (most?) of the districts mentioned in NF6 it now only occurs as an alien rather than as a native species (see also H24).

• *S. vulgaris* (Moench) Garcke subsp. *glareosa* (Jord.) Marsden-Jones et Turrill: this subspecies was mentioned in NF6 from Pic. sud-or. (valleys of rivers Oise and Noirrieux), rather disjunct from its distribution area in eastern France. FG did not report this taxon from that area and Duluc (2019) studied the problem in more detail. Such plants were known for instance from Tupigny. However, at present only subsp. *vulgaris* was found there and plants of alleged subsp. *glareosa*, transplanted to Bailleul in 1992, now also clearly belong to subsp. *vulgaris*. It therefore seems that plants of *S. vulgaris* from scree merely looked like subsp. *glareosa* but were not identical with it.

• *S. otitis* L.: although mentioned from Lorr. in NF6, this species does not appear to occur in that district, nor in its Belgian, Luxembourg, German and French parts (Vernier 2020, FLORAINE 2013, SI-Flore, wn.be, MNHN-Lux, FloraWeb).

• *S. baccifera* (L.) Durande: this species has apparently completely disappeared from Tert. par., at least from the part of this district that falls within the Flora limits. The northernmost extant localities are in the Paris area (SI-Flore, Digitale2), i.e. well beyond the Flora area.

• *S. coronaria* (L.) Clairv.: this escaped ornamental is increasingly found as a naturalizing alien, especially in Fl., Camp. and Brab. (wn.be, wn.nl, SI-Flore). It is mostly found near houses, on wasteland, in ruderalized woods and in roadsides.

• ***Gypsophila*** *muralis* L.: as a native species, this is very much declining everywhere and its actual presence in some districts requires confirmation.

• ***Saponaria*** *ocymoides* L.: this ornamental is not only known as an escape, it seems to be in the process of local naturalization, for instance on slag heaps (wn.be).

• ***Petrorhagia*** *prolifera* (L.) P.W. Ball et Heywood: nowadays, this species has its largest densities in Fl. and Camp. (especially in port and industrial areas and in the former coal mining area; wn.be), it is certainly not R-RR there, rather AR-R. In Mar., it is only less rare between Dunkerque and the Belgian border, i.e. in France; elsewhere in this district it is RR (see e.g. FZ). In Brab. occ., it is not at all rare in the coal mining basin, both in France and Belgium (wn.be, Digitale2).

• *P. saxifraga* (L.) Link: this is an escaped ornamental rather than a genuine adventive.

• ***Dianthus*** *caryophyllus* L.: this escaped ornamental was best known in the Flora area from the ramparts of Saint-Valéry-sur-Somme, where it was long-established and once quite common on old walls of castles and abbeys in the region. However, according to SI-Flore it was last observed there in 1978. In the past decades it has declined sharply, particularly as a result of restoration work on these old buildings. The few remaining localities (Les Andelys, Tosny, Conches-en-Ouche) are of historical heritage value (Digitale2) but all located well beyond the Flora area.

• *D. superbus* L.: in Lorr., this species occurs only in the extreme southeastern (not eastern) part of the district, from Lunéville southwards (FLORAINE 2013, SI-Flore). Its actual presence in Tert. par. requires confirmation, it may have disappeared from all its localities there (Digitale2). In the area east of Paris it only survives between Épernay and Troyes, in Champ. (and/or on the verge with Tert. par.) (SI-Flore).

• *D. carthusianorum* L.: in NF6, this species was said to be R but locally AC in Eifel centr. In fact, it has completely disappeared from that district (FT).

127. Amaranthaceae

• ***Amaranthus*** *retroflexus* L.: this species is not completely missing in Ard., there is e.g. a verifiable record from 2015 from La Roche-en-Ardenne (wn.be).

• *A. hybridus* subsp. *bouchonii* (Thell.) O. Bolós et Vigo: in Brab., this species is more or less as widespread in the eastern as in the western part of this district. It is much rarer in the central part (wn.be).

• *A. blitum* L.: the distribution of this species was updated as it has increased considerably, especially in Mar. (where it is not more frequent in its northern part), Fl., Camp., Brab. and Tert. par. The species is ubiquitous along the Maas river now; therefore it seemed appropriate to mention Fluv. separately (wn.be, wn.nl, SI-Flore). In these districts it has become AC-AR, rather than AR-R. Nowadays the species is often seen on exposed river and pond banks. This habitat was added (see also FG).

• *A. deflexus* L.: in Brab., this species is not only naturalized in the western part of this district (although it is much less rare there, for instance in the Lille agglomeration in France where it has become relatively common; pers. obs. author). It has been known from a locality in Brussels (Laken) since 2015 and in Mosan it is not only naturalized in the Charleroi area but also in Namur (wn.be). *A. deflexus* seems to be expanding lately and will doubtlessly naturalize in other districts as well. For instance, it has been known since 2016 from the city of Eindhoven (Camp., the Netherlands) (wn.nl).

• ***Salicornia*** *europaea* L. subsp. *disarticulata* (Moss) Lambinon et Vanderpoorten: although now present throughout Mar., this subspecies is much less rare in the southern part of this district, although it seems to have disappeared from many localities (SI-Flore, wn.be, wn.nl). In Belgium, it was thought to be extinct (since 1936), but it was rediscovered in the Zwin nature reserve in 2012, on both sides of the border, and it has persisted there ever since. It may have been overlooked there before (wn.be, also FZ, de Zwart 2013).

• ***Polycnemum*** *majus* A. Braun: apart from Rochefort (Mosan), this species was recently only recorded from the region south of Laon in Tert. par. (SI-Flore; but reliable? record not upheld in Digitale2). Elsewhere in the Flora area (Champ., Lorr.), it seems to have completely disappeared (e.g. FLORAINE 2013). A recent record in French Lorr., in Morsbach (Weicherding 2011), is located outside the Flora area. This species was considered extinct in Belgium for a long time. However, in 2018, a population was rediscovered near Rochefort (Jacobs 2019, Jacobs & Jacobs 2019) and its presence there was repeatedly confirmed ever since (wn.be).

• ***Suaeda*** *vera* Forssk. ex J.F. Gmel.: this species was formerly introduced in the Slack estuary in Mar. mér., from where it has disappeared. It was apparently last seen there in 1996 (SI-Flore, Digitale2).

• ***Chenopodium*** *vulvaria* L.: this species is much declining in the entire Flora area (Groom 2015). It was recently confirmed in Mar. sept. (a single historical locality in 's Gravenpolder; FZ), Brab., Lorr. (not only in its eastern part), Champ. and Tert. par. (wn.be, SI-Flore). From the latter district it was not mentioned in NF6; in fact, the species appears to be least rare in that area, e.g. in Montagne de Reims (SI-Flore).

• *C. ficifolium* Smith: this species is not rarer in Camp. than in e.g. Fl. or Brab. (wn.be). The species is AC-AR, rather than R-RR, in these districts, it has apparently increased over the last decades.

• *C. betaceum* Andrz. (syn.: *C. strictum* Roth): the distribution of this poorly known species in the Flora area remains uncertain, although it is probably R-RR throughout. It is known e.g. in Lorr. or. from several locations, at the extreme eastern border of the Flora area (FLORAINE 2013).

• ***Dysphania*** *ambrosioides* (L.) Mosyakin et Clemants: this alien is naturalized since at least 2006 and over a considerable distance along river Marne in Champ., between Épernay and Vitry-le-François (database CBN Paris).

• *D. botrys* (L.) Mosyakin et Clemants: in Brab., this species is practically limited to the coal mining region in northwestern France, where it is naturalized since several decades. Elsewhere in the same district (Anderlues, Clabecq, Meise; wn.be) it is probably merely ephemeral or only temporarily established.

• *D. pumilio* (R. Brown) Mosyakin et Clemants: in NF6, this species was said to be equally rare as the preceding (both RR). In fact, *D. pumilio* is less rare (rather R-RR) and locally naturalized in urban habitats (railway infrastructure, sidewalks, between cobble stones, etc.), sometimes also on exposed river banks, mostly in Fl., Camp., Brab., Fluv. and Mosan (wn.be).

• ***Lipandra*** *polysperma* (L.) S. Fuentes, Uotila & et Borsch: in Camp., this species is not rarer than in e.g. Fl., i.e. AC-AR, rather than AR-R (wn.be).

• ***Chenopodiastrum*** *hybridum* (L.) S. Fuentes, Uotila et Borsch: there are quite a few records of this species in Mar., both on the Belgian coast and north of Antwerp. In this district it is R rather than RR. For comparison, it is considered to be R also in Zeeland (FZ).

• ***Oxybasis*** *glauca* (L.) S. Fuentes, Uotila et Borsch: this species has increased in recent decades. In Mar., Fl., Pic., Brab., Lorr. and Tert. par. it has become AC-AR, rather than AR. In Zeeland (Mar.), for example, it is even considered to be CC (FZ). It is also all but RR in Camp. and Mosan, at most AR-R (wn.be).

• *O. rubra* (L.) S. Fuentes, Uotila et Borsch: contrary to NF6, this species does occur in Ard. (there are reliable records from e.g. Bevercé, Bihain and Bastogne; wn.be). It has also strongly increased elsewhere. In Zeeland (Mar.), for instance, it is now considered to be even CC (FZ). On the other hand, the species has disappeared in Eifel centr. (FT).

• *O. chenopodioides* (L.) S. Fuentes, Uotila et Borsch: this species is historically known from Lorr. or. (Château-Salins). However, according to FLORAINE (2013), the populations are actually located further south, between Nancy and Lunéville.

• ***Atriplex*** *micrantha* Ledeb.: this Asian species has further expanded in the Flora area and now also occurs in Camp. and Ard. (wn.be). Most records are from the central reservation of motorways and other major roads but the species is also regularly recorded on rough ground.

• *A. longipes* Drejer: the genuine presence of this species in Zeeland is questionable. There is not a single unequivocal record from there (FZ). Also from Belgium there are some recent claims (e.g. from a coal terminal in the Port of Ghent) but none are genuine *A. longipes*. Although they often show some resemblance to this species, flower stalks always seem to be much too short, suggesting that they rather belong to its hybrid with *A. prostrata* Bouch. ex DC, *A.* ×*gustafssoniana* Tascher. In France, *A. longipes* was recently discovered in several localities in the estuary of rivers Authie and Somme (Digitale2; see also Meirland *et al.* 2010).

129. Phytolaccaceae

• ***Phytolacca*** *acinosa* Roxb.: this species is no longer in the process of naturalization but locally naturalized and increasing, especially in Fl., Camp. and Brab. (wn.be). It is usually found in urban habitats, incl. (as a weed in) cemeteries.

• *P. americana* L.: the same applies to this species, but in more natural habitats. It is now locally naturalized in Fl., Camp. and Brab. (wn.be) and also increasingly seen in the southwestern parts of the Flora area (Pic., Tert. par.; SI-Flore). In some areas incipient invasive behavior has been noticed, especially in thermophilic acidophilous clearings (Adriaens *et al.* 2019).

132. Montiaceae

• ***Claytonia*** *perfoliata* Donn ex Willd.: in Fl., Camp. and Brab., this species is in many areas hardly rarer (and locally much expanding) than in Mar. (AC-AR, rather than AR). Beyond these districts, it is much rarer (wn.be, SI-Flore).

• *C. sibirica* L.: the main distribution of this species in the Flora area is clearly in Camp. where it occurs scattered (wn.be). The same applies to Zeeland (incl. Mar. sept.) where it is apparently not rare (FZ). In these two districts it is AR, whereas in Fl. and Brab. it is R-RR. Outside these districts, it is only occasionally observed, e.g. in Mosan and Ard. (wn.be).

• ***Montia*** *arvensis* Wallr.: in Brab., this species is not rarer than in Fl. and Camp., especially east of Brussels (at the border with Camp.) it is very widespread (at most AR in these districts) (wn.be, SI-Flore). Also in Mar., it is certainly not RR, at most R (in Zeeland it is considered to be only AR; FZ). This species is clearly expanding lately and increasingly found in rather ordinary habitats, such as urban lawns. It is also known from scattered localities in Tert. par. (Digitale2, database CBN Paris), a district not mentioned in NF6.

• *M. fontana* L. (s.str.): in NF6, this very rare species was said to have possibly disappeared from Ard., the only district from where it is known in the Flora area. Its presence there has been confirmed recently, at least in France (e.g. Plateau de Rocroi and neighboring areas; FG, SI-Flore, database CBN Paris). There is also a record from 2008 in the Grand Duchy of Luxembourg (MNHN-Lux).

• *M. hallii* (A. Gray) Greene var. *hallii*: this variety is also found in Eifel centr., in Birresborn (FT), a district that was not mentioned in NF6.

133. Portulacaceae

• ***Portulaca*** *oleracea* L.: this thermophilous species is much expanding lately, especially in Mar., Fl., Camp., Pic. mér., Brab., Mosan, Lorr., Champ. and Tert. par.; it has become AC-AR in these districts (wn.be, FZ, SI-Flore, database CBN Paris).

134. Hydrangeaceae

• ***Hydrangea*** *macrophylla* (Thunb.) Seringe: this ornamental shrub is not only cultivated, it has also been recorded as an escape from (or perhaps rather relic of) cultivation (wn.be).

136. Cornaceae

• ***Cornus*** *mas* L.: this species is no longer RR in Eifel centr., it has completely disappeared there (FT).

137. Balsaminaceae

• ***Impatiens*** *glandulifera* Royle: this invasive species has much expanded and has become much more common than indicated in NF6 (wn.be, AFW, FloraWeb, SI-Flore, FT). It is now AC-AR in all districts, except in Champ. where it remains rare and almost exclusively confined to parts of the Marne valley (database CBN Paris).

• *I. balfourii* Hook. f.: in NF6, this species was said to be in the process of local naturalization in the southern part of the Flora area. This is no longer the case, it has locally also naturalized in e.g. Fl., especially in urban habitats (wn.be). It was recently also observed for the first time in the Grand Duchy of Luxembourg (Krippel & Proess 2017).

• *I. parviflora* DC.: this species is in expansion everywhere and currently more common than indicated in NF6 (wn.be, AFW, FloraWeb, SI-Flore), especially in Fl., Camp., Brab. and Lorr. where it has become AC-AR rather than AR-R.

• *I. noli-tangere* L.: this species occurs throughout Eifel centr. and is AC rather than AR-R (FT).

• *I. capensis* Meerb.: this relatively recent newcomer in the Flora area is much expanding lately. It is now least rare in Fl. (rivers Scheldt, Rupel and Schipdonk canal), Camp. (especially valley of river Nete), Brab. (rivers Lys, Dyle and Willebroeck canal), Fluv. (Netherlands), Pic. mér. (Somme valley between Péronne and Abbeville) and Lorr. (especially Moselle valley between Metz and Nancy) (wn.be, wn.nl, SI-Flore, FLORAINE 2013, Stien 2018). In Belgium, it was only observed for the first time in 2002 (valley of river Nete near Lier). It has spread considerably since then.

138. Polemoniaceae

• ***Collomia*** *grandiflora* Dougl. ex Lindl.: in NF6, this North American species was mentioned from Ard. or. and Eifel centr., both in Germany. However, it never occurred in Eifel centr., only in neighboring regions in Ard. and in Osteifel, and it is strongly declining everywhere (FT). In addition, it is locally naturalized in a quarry in Zuid-Limburg (Brab. or.) in the Netherlands (H24). It is occasionally observed elsewhere, for instance in Saint-Valery-sur-Somme in 2000 (SI-Flore, Digitale2).

• ***Polemonium*** *caeruleum* L.: in Lorr., this species does not mostly but exclusively occur in the northern part of this district (FLORAINE 2013). In addition to the areas where it is naturalized, it is regularly seen as an ephemeral escape (wn.be).

139. Primulaceae

• ***Primula*** *veris* L. var. *columnae* (Ten.) B. Bock: this poorly known variety also occurs in the southern, French part of Ard. (mér.), near Chooz and Fromelennes (database CBN Paris). Elsewhere in Ard. (in or.), plants intermediate between var. *veris* and var. *columnae* were already known. It is unknown if these plants from the

Chooz area belong to typical var. *columnae* or rather to such intermediates.

• ***Androsace*** *maxima* L.: this species, considered to be 'only' R in Champ. and RR in Lorr. mér., has completely disappeared from the entire Flora area (SI-Flore, Digitale2, database CBN Paris, FLORAINE 2013). For Lorr., this species is even no longer mentioned by Vernier (2020), not even as extinct.

• ***Lysimachia*** *thyrsiflora* L.: this is a very rare native species but it is sometimes introduced deliberately and then can persist for quite a long time This applies, inter allia, to Zeeland (Mar.) (FZ) and doubtlessly to other areas as well. The species is known from a natural stand in Mauregny-en-Haye (Laonnois) (SI-Flore, Digital2) in Tert. par., a district from where it was not mentioned in NF6.

• *L. punctata* L.: in Fl., Camp. and Brab., the frequency of this species is comparable with that in Ard., i.e. AC-AR rather than R-RR (wn.be).

• *L. minima* (L.) U. Manns et Anderb.: there are several recent records in Fl. (for instance from heaths in Houthulst, Waardamme, Zedelgem) and Camp. (Mol) (wn.be). These two districts were not mentioned yet in NF6. In Eifel centr., on the contrary, this species has never occurred (FT) and it has completely disappeared from Lorr., both in its Belgian, Luxembourg and French part (FLORAINE 2013, wn.be, MNHN-Lux, AFW, SI-Flore).

• *L. europaea* (L.) U. Manns et Anderb.: this species is known from at least a single, reliable record in Lorr. (Buzenol) (wn.be, AFW), a district from where it was not mentioned in NF6. The same applies to Brab. or. (Zuid-Limburg, the Netherlands) from where the species was historically known but supposed to have disappeared (Weeda *et al.* 1988). It is, however, still present (and known since many years) in Munningsbosch in Posterholt (wn.nl, H24).

• *L. tenella* L.: there are several recent records (at least since 2007, up to the present) from near Sint-Niklaas (Sinaai: Fondatie) (wn.be) in Fl. as well as from the Rocroi-Monthermé area in the French part of Ard. (SI-Flore), two districts from where the species was not mentioned in NF6.

• ***Samolus*** *valerandi* L.: this species is much less rare in Fl. than it is in Camp. (R vs. RR) (wn.be). It is also known from a single locality in Boul. (Desvres) (SI-Flore) and in Brab. it is not limited to the western part of this district (there are records from the central and eastern part as well; wn.be).

140. Actinidiaceae

• ***Actinidia*** *deliciosa* (A. Chevalier) C.F. Liang et A.R. Ferguson: this species is increasingly often observed as an escape, it has become R rather than RR (wn.be).

141. Clethraceae

• ***Clethra*** *alnifolia* L.: this ornamental shrub is not only known from Camp. It is also established in Merkenveld in Loppem (Fl.), at least since 2012 (wn.be).

142. Ericaceae

• ***Chimaphila*** *umbellata* (L.) W.P. Barton: this species has been mentioned in NF from the very beginning. It is unknown on what this was based: the species was never documented from Belgium (e.g. Durand 1899, Verloove 2006a), nor from the Grand Duchy of Luxembourg, the Netherlands (part covered by our Flora), Germany (idem) or France (where it only occurs south of Paris) (SI-Flore, FloraWeb, Atlas-NL, etc.).

• ***Erica*** *tetralix* L.: this species is known from a single locality in Mar. mér. (Communal du Moulinel in Saint-Josse-sur-Mer; SI-Flore).

• *E. cinerea* L.: in Fl., this species is mostly but not exclusively confined to the Bruges area. In this district it is also found in Bovekerke (Koekelare) (wn.be). In Boul., it is no longer RR but long extinct, the records dating back to the end of the 19th century (SI-Flore, Digitale2). The same applies to Tert. par. (Digitale2, database CBN Paris).

• ***Rhododendron*** *luteum* Sweet: this ornamental shrub is locally naturalizing, especially in Camp. (wn.be).

• ***Andromeda*** *polifolia* L.: this species occurs in a single peat bog in the Laonnois (Tert. par.), in Cessières, where it was introduced in 1974 from a population in the Lower Normandy region (Baupte peat bog) as part of a safeguard operation to prevent its disappearance (Digitale2, SI-Flore).

• ***Vaccinium*** *oxycoccos* L.: in Tert. par., this species only survives in the Laonnois (Digitale2, database CBN Paris).

• *V. macrocarpon* Ait.: in Camp., this American species is still RR but definitely expanding. It has been discovered in two additional localities in Belgium (Groot Schietveld in Brasschaat and nature reserve De Maten in Genk; wn.be) and in several widely spread localities in the Netherlands as well (wn.nl).

• ***Empetrum*** *nigrum* L.: this species has disappeared from its unique locality in Mar. sept. (Zeeland). Moreover, it was in all likelihood merely planted there (FZ).

• ***Orthilia*** *secunda* (L.) House: this alien species is much declining in the Flora area. At present, it is probably only known from the Toul area in Lorr. (FLORAINE 2013) and from the southern part of Champ., northwest of Troyes (SI-Flore). From the latter district, this species was not mentioned in NF6.

• ***Pyrola*** *media* Swartz: this species is not RR in Eifel centr., it never occurred there. Its localities in the Eifel are in Osteifel, beyond the Flora limits (FT). It is still present in Tert. par. (Montagne de Reims, Mesnil-sur-Oger); however, according to the CBN Paris database it is merely naturalized there, not native. This district appears to be the only one where the species is still present these days: it seems to have disappeared from Ard. or. (AFW, FT, wn.be). The most recent record in the Luxembourg part of the Ardennes dates back to 1970 (MNHN-Lux).

• *P. rotundifolia* L.: this species is extinct now in Eifel centr. (FT).

• *P. chlorantha* Swartz: this very rare species is also known from at least a single locality in Tert. par. (Oger; database CBN Paris).

• ***Monotropa*** *hypopitys* L. subsp. *hypopitys*: this species occurs in at least one location, in Birresborn, in Eifel centr. (FT) and also in single localities in Champ. and Tert. par. (database CBN Paris), three districts from where it was not mentioned in NF6. Its presence in Brab. was recently confirmed in Forêt de Soignes (Delforge *et al.* 2016).

143. Garryaceae

• ***Aucuba*** *japonica* Thunb.: this ornamental shrub is no longer rarely but increasingly recorded as an escape from cultivation (wn.be). A future local naturalization is even likely.

144. Rubiaceae

• ***Rubia*** *tinctorum* L.: in Zeeland (Mar. sept.), this alien species was formerly not rare (Adema 1981) but it is now probably restricted to a single locality, in Kamperland, where the species appears to be well-established (FZ, wn.nl; contrary to H24). From Lorr., on the contrary, it has long disappeared or it was merely an ephemeral escape there. It was not mentioned by e.g. FLORAINE (2013) and only as a rare, presumably casual escape by Vernier (2020).

• ***Sherardia*** *arvensis* L.: this species is recently expanding (e.g. as a lawn weed, in urban habitats) and less rare than indicated in some districts. For instance in Fl., it is no longer RR (wn.be).

• ***Asperula*** *arvensis* L.: in NF6, this species was said to be R in Champ. and R-RR in Lorr. In fact, at present, it has completely disappeared in that (and the remainder of the Flora) area, the most recent observations (as a native/archaeophytic species) dating back to well before 1950 (SI-Flore). From Lorr., the species was no longer mentioned by e.g. FLORAINE (2013) or Vernier (2020) and it was last seen in its Luxembourg part in 1949 (MNHN-Lux). It is exceptionally recorded as an ephemeral alien, most recently in 2014 near a grain mill in the Antwerp port area (wn.be).

• ***Galium*** *glaucum* L.: this species has completely disappeared from Champ. (database CBN Paris).

• *G. boreale* L.: this boreal species is known from at least two localities in Ard. occ., north of Charleville-Mézières (SI-Flore), a district from where it was not mentioned in NF6.

• *G.* ×*pomeranicum* Retz.: according to SI-Flore this hybrid has disappeared from Lorr. and it was not mentioned either by FLORAINE (2013), whereas according to Vernier (2020) it is very rare in this district. H24, on the other hand, reports that the hybrid seems to be rather common where both parent species occur together.

• *G. palustre* L.: the exact distribution of the two subspecies, treated as two distinct species in FG, *G. palustre* s.str. and *G. elongatum* C. Presl, still needs to be assessed. According to SI-Flore, the latter is predominant in northwestern France (Mar., Boul., Pic., Brab. and the western part of Tert. par., with much more scattered occurrences further east), whereas *G. palustre* s.str. is more widespread in northeastern France (from Ard. occ. and the eastern part of Tert. par. further east and with much more scattered occurrences west of this area).

• *G. debile* Desv.: this very rare species was only known from a single extant locality in the entire Flora area (Plateau d'Helfaut, in Brab. occ.), from where it has been known since 1991. In the past years, however, it was discovered in several additional localities. In Mar. mér., it was found in 2004, then regularly confirmed, in the Larronville marshes in Rue (REFORME 2018). According to SI-Flore, it has recently also been known from at least one locality in Tert. par. (southwest of Épernay) and one in the southern part of Lorr. as well (west of Saint-Dizier).

• *G. mollugo* L.: the widespread subspecies in the Flora area is subsp. *erectum* Syme. The nominal subspecies is very rare and, according to NF6, only known from Lorr. mér. According to FT, however, it also occurs in the German (northeastern) part of Lorr. and in Eifel centr., respectively in Wasserliesch (Gutland) and Schönecken. The CBN Paris database also includes several records from the French part of Lorr. and from Tert. par. but these perhaps require confirmation. These two subspecies are genetically quite distinct and therefore perhaps better treated as two distinct species (*G. album* Mill. and *G. mollugo* s.str.), as was done in FG. However, on morphological grounds they can hardly be told apart (H24).

• *G. pumilum* Murray: this species is also known from scattered localities in Mar. mér., for instance on chalk near the estuaries of rivers Canche and Somme (SI-Flore, Digitale2).

• *G. fleurotii* Jord.: in NF6, this rare species was only mentioned from Lorr. [var. *bretonii* (Rouy) A. Donneaux] and Champ. (var. *fleurotii*). It is, however, also known from chalky outcrops (former quarries) in the Aa valley (three localities in Artois) in Brab. occ., at least since 1981 (SI-Flore, Digitale2). In general, this species is by far least rare in Champ. (SI-Flore) in the Flora area although it is unclear to which of the varieties these populations pertain (contemporary Floras such as FG no longer separate two varieties). Moreover, according to Vernier (2020) both varieties occur in Côte de Meuse in Lorr.

• *G. parisiense* L.: this thermophilous species is in expansion, especially in all southern parts of the Flora area where it has become R-RR, rather than RR (SI-Flore). Also further north, in Belgium and the Netherlands, it is increasing and no longer merely alien: it has naturalized locally in suitable suburban habitats, such as railway infrastructure, between cobble stones, etc., especially in Fl. and Camp. (wn.be).

• *G. tricornutum* Dandy: as a native/archaeophytic weed of arable fields, this species is probably extinct in the entire Flora area. In Eifel centr., it has definitely disap-

peared (FT) and in northwestern France it was last seen in Esquerdes (valley of the Aa river; Brab. occ.) in 1991 (Digitale2). The species has also disappeared from the remainder of northern France (SI-Flore), except perhaps from Metz in Lorr. (FLORAINE 2013) where it may be merely adventive. It is exceptionally seen as an ephemeral alien, mostly associated with imported cereals (wn.be).

• *G. spurium* L.: this species is indeed RR throughout the Flora area. In Belgium it is nearly exclusively observed as a grain alien, mostly in port areas. In recent times (2011-2013), it was only recorded in Nismes (Mosan) in a habitat where it could be considered native or archaeophytic (wn.be). In the French part of the Flora area it was recently only observed in Pic. (between Amiens and St. Quentin) and from scattered localities in Champ. (SI-Flore). In Lorr., it probably only occurs outside the Flora area (Vernier 2020).

• *G. murale* (L.) All.: this southern species has recently naturalized in the Flora area. Established populations are known from Mar. (especially in campsites; Verloove *et al.* 2020a), Fl., Camp. (mostly in the Netherlands, e.g. Breda), Brab. and Mosan (Liège) (wn.be, wn.nl).

145. Gentianaceae

• ***Cicendia*** *filiformis* (L.) Delarbre: this species has become very rare throughout the Flora area. A stable, long-known growth site is known from Zedelgem (Vloetemveld military base) in Fl., a district from where it was not mentioned in NF6. The species was formerly also found in Zeeland (Oostkapelle; Mar. sept.) but it has disappeared from that district (FZ).

• ***Exaculum*** *pusillum* (Lam.) Caruel: this very rare species was discovered in 2017 in the Netherlands between Neerpelt and Valkenswaard in the Hageven-De Plateaux nature reserve (Camp.) and its persistence there was regularly confirmed in the intervening years. The origin of this population is unknown (Lotterman *et al.* 2018, H24). In the 19th century, this species was not only known from Tert. par. (as stated in NF6) but also from other districts in France, e.g. Pic., Brab. and Ard. (SI-Flore).

• The hybrid ***Centaurium*** *erythraea* Rafn × *littorale* (D. Turn.) Gilm. [*C.* ×*intermedium* (Wheldon) Druce] is not only known from the Dutch part of Mar., also from the Belgian part (Brys *et al.* 2014). It is probably often overlooked, since it is frequently produced in areas where both parent species occur sympatrically (FG).

• *C. pulchellum* (Swartz) Druce: this species is not rarer in Fl. than in e.g. Brab., especially around Ghent and between Brussels and Antwerp (wn.be), thus R-RR rather than RR. Contrary to what was stated in NF6, the native distribution of this species does not include the Canary Islands (Acebes Ginovés *et al.* 2010).

• ***Blackstonia*** *perfoliata* (L.) Huds.: this species is slightly expanding. The claim that in Mar. this species mostly occurs west of Nieuwpoort has since been superseded: at present there are at least as much records east of this city. In fact, most records in the Belgian part of this district are now concentrated on the West and East coast as well as in the Antwerp and Ghent port areas (wn.be). The species is also relatively widespread in Zeeuws-Vlaanderen in the Netherlands (FZ). Similarly, in Brab., it is no longer restricted to the western and eastern part of this district (wn.be) and the species has also been reliably recorded from Ard. (e.g. Vielsalm; wn.be, AFW), a district from where it was not yet mentioned in NF6.

• *B. acuminata* (Koch et Ziz) Domin: this species was first discovered in Belgium, around Antwerp, in 2008. This is not surprising as the species is recently expanding in Zeeland as well (FZ).

• ***Gentiana*** *lutea* L.: this species is known since a few years from two Belgian localities, in Ard. and Mosan occ. respectively: since 2008 in the Fagne de Malchamps (heath) near Spa and since 2010 near Franchimont (calcareous grassland) (wn.be). The origin of these populations is unknown. In Champ., it was reported in NF6 from the Ardennes department (Mont-Frémin, La Neuville-en-Tourne-à-Fuy). However, it is no longer mentioned from these localities in the CBN Paris database, only further south (northeast of Troyes). Elsewhere in the French part of the Flora area, the species has been qualified as an obsidional plant (Vernier 2014); it is known as such from a single locality in Lorr. or. (Bacourt).

• ***Gentianella*** *campestris* (L.) Börner: this species is dramatically declining in the entire Flora area. It has completely disappeared from northern France, also from Tert. par. and Champ. where it was said to be RR in NF6. It was probably last seen in Laonnois in 1951 (SI-Flore, Digitale2). Its presence was recently confirmed from Brab. or. in Belgium (e.g. Thier à la Tombe nature reserve; wn.be) whereas in the Dutch part of this district its actual presence needs to be confirmed (wn.nl, despite H24). In the Netherlands, it is apparently also still present in Mar. sept. (e.g. Ouddorp; wn.nl), although the species was surprisingly left unmentioned in FZ.

• ***Gentianopsis*** *ciliata* (L.) Ma: in NF6, this species was mentioned from Boul. although the species is completely lacking there (Digitale2, SI-Flore). Its westernmost localities in northern France are from east of Amiens. Even there, its actual presence requires confirmation; it was last observed there in the 1990s (SI-Flore).

146. Apocynaceae

• ***Vinca*** *major* L.: this species is known by now from all districts in the Flora area, except Eifel centr. (FT). It also occurs in Ard., from where it was not mentioned in NF6 (wn.be).

• ***Vincetoxicum*** *nigrum* (L.) Moench: this alien vine is naturalizing locally in Brab. (Heverlee and Lanaye, since 2011 and 2015 respectively; wn.be). It has young twining stems and purple corollas that are hairy inside.

• ***Asclepias*** *syriaca* L.: in addition to the districts already cited in NF6, this exotic species is also known from Fl.

(e.g. Nazareth, Mechelen; wn.be). It is rather doubtful, on the contrary, that it is present in Tert. par., at least in the part covered by the Flora (Digitale2, database CBN Paris).

147. Boraginaceae

• ***Trachystemon*** *orientalis* (L.) G. Don f.: this species is naturalized in one place in Fl. (Roeselare) since the 1950s and is sometimes observed elsewhere. It resembles the genus *Borago* L. but differs from it by its early flowering (February-April) with inflorescences appearing a little before the leaves, the corollas with inrolled lobes and the basal leaves with a cordate blade.

• ***Heliotropium*** *europaeum* L.: the actual presence in Lorr. of this species, albeit RR, was recently confirmed by both FLORAINE (2013) and Vernier (2020). It is, however, not/no longer confined to the eastern and southern parts of this district (from where it may have disappeared). According to Vernier l.c. it only occurs in Pays-Haut. All occurrences in the Flora area are considered to be merely naturalized; in fact, those in the southernmost districts may well be 'natural' (species accepted as a native by CBN Paris).

• ***Borago*** *officinalis* L.: this species is slightly less rare than indicated, AR-R rather than R, especially in the northern part of the Flora area, e.g. in Flanders (wn.be).

• ***Amsinckia*** *micrantha* Suksd.: this North American weed is not merely adventitious but locally naturalized. In the Ghent port area (Rodenhuizedok), for instance, it has been present since 1986 (Robbrecht & Jongepier 1989).

• ***Lithospermum*** *officinale* L.: outside its native distribution range, this species is occasionally observed as an introduction, for instance at the ancient fortress belt in Wilrijk (Fl.) (wn.be).

• ***Buglossoides*** *purpurocaerulea* (L.) I.M. Johnst.: this species is much declining in the entire Flora area. According to FG it has become RR in the whole of France.

• *B. arvensis* (L.) I.M. Johnst.: in Mosan, this species turns out to occur in quite a few places after a targeted search, it is AR rather than R there (wn.be, AFW). In Eifel centr., on the contrary, it is completely absent (FT). In districts other than those enumerated, it is nearly always introduced (it is a rather regular grain alien in port areas).

• ***Pulmonaria*** *officinalis* L.: in Fl., this species is equally rare as in Brab., R-RR rather than RR and in Mar. it is not restricted to the northern part of this district (wn.be).

• *P. longifolia* (Bast.) Boreau: in NF6, the presence of this species in Tert. par. was said to be doubtful (confirmation required). It is indeed absent from this district (Digitale2, database CBN Paris).

• *P. mollis* Wulfen ex Hornem.: the presence of this species in Lorr. or. was considered possible in NF6 and it indeed appears to occur there (FLORAINE 2013). Vernier (2020) even mentioned it from yet other regions in Lorr. (Meuse and Plateau Lorrain Nord). However, according to FG, in France (where only subsp. *alpigena* W. Sauer occurs), this species has only reliably been recorded from the southern Vosges area. In addition, *P. mollis* has also been discovered since 2014 in two areas in Belgium: in Modave (Mosan) and Ard. or. (Reuland), in the easternmost part of Belgium, against the German border (wn.be). There is no reason to believe why it should not be native in these localities, especially in the latter.

• *P. montana* Lej.: this species is also present in a few localities in Champ., e.g. southwest of Châlons-en-Champagne (SI-Flore).

• ***Cynoglossum*** *germanicum* Jacq.: this species is also present in Champ., southwest of Châlons-en-Champagne and immediately north of Troyes, at the extreme southern limit of the Flora area (SI-Flore). In French Lorr., it is still present near Neufchâteau (FLORAINE 2013), at or just beyond the Flora limits.

• *C. officinale* L.: this species has completely disappeared from Eifel centr. (FT).

• ***Symphytum*** *caucasicum* M. Bieb.: this ornamental species was already known as an escape from Brab. and Camp. In addition, it has also been observed lately in Mar., Fl., Mosan and Ard. (wn.be) and doubtlessly occurs in other districts as well (wn.be).

• *S. asperum* Lepechin: in NF6, this species was said to mostly occur south of rivers Sambre and Meuse but this is not apparent from verifiable records. It is probably often confused with its hybrid with *S. officinale* L., *S.* ×*uplandicum* Nyman, also in the French part of the Flora area (comm. J.-M. Tison 02.2020).

• *S. grandiflorum* DC.: this ornamental species was already known as an escape (RR) from Fl. and Brab. It has become less rare in these districts (R). In addition, it has also been observed lately in Mar., Camp., Mosan and Ard. (wn.be) and doubtlessly occurs in other districts as well (wn.be).

• *S.* ×*hidcotense* P.D. Sell: this hybrid ornamental is now known from Fl., Camp., Brab. and Mosan (R-RR) (wn.be).

• ***Myosotis*** *sylvatica* Ehrh. ex Hoffmann: this species is rather common throughout Lorr., it is even considered AC according to FLORAINE (2013). It was suggested in NF6 that outside of the northern half of this district, this species would only occur as an escape in the rest of Lorr., which was thus incorrect.

• *M. discolor* Pers. and *M. dubia* Arrondeau are now treated as two distinct species but their respective distributions remain largely unknown, as is the case in surrounding countries like France or the Netherlands (FG, H24). The former mostly occurs in open grasslands and arable fields on dry sandy soils, whereas the latter is found on more compact, clayey-loamy soils (Dirkse *et al.* 2022). Genuine *M. discolor* appears to be much less common than *M. dubia*.

• *M. stricta* Link ex Roem. et Schult.: this species has dramatically declined in the whole of northern France.

Apart from a few localities near Reims (Tert. par.) and one in Lorr. (near Nancy), it has completely disappeared (SI-Flore). This also applies to Mar. mér. where, despite a targeted search in 2010, not a single of the historical localities could be confirmed (confusion in the past with *M. ramosissima* Rochel cannot be ruled out either; Digitale2). The species is absent from Mar. in the Netherlands (FZ) and recent claims from the Belgian part of this district (wn.be) require confirmation.

• *M. arvensis* (L.) Hill subsp. *umbrata* (Rouy) O. Schwarz: this poorly known subspecies (ecologically rather distinct but a mere ecotype according to FG) was recently reported from Ard. or. in Germany (FT).

• *M. ramosissima* Rochel: in Fl. and Camp., this species is not rarer than in most other parts of the Flora area, i.e. AC-AR rather than AR-R (wn.be).

• *M. secunda* A. Murray: the genuine presence of this species in the Flora area appears to be very unlikely judging from the map presented by SI-Flore and FG. It has its northernmost populations south of Le Havre.

• ***Anchusa*** *italica* Retz.: as an ephemeral alien, this species is much rarer than indicated, RR rather than R-RR. The most recent record dates back to 2000 (wn.be) and it was only exceptionally observed in the preceding decades as well.

• *A. procera* Besser: some further details are provided on the areas where this species is naturalized in the Flora area. Up to the present, it was only known from Mar. where it occurs in abundance between Ghyvelde (France) and De Panne (Belgium) (wn.be). In addition, it was also reported to be naturalized in the Metz area in Lorr. (FLORAINE 2013).

• ***Lycopsis*** *arvensis* L.: in NF6, this species was erroneously given as both AC and R in Fl. Like in Camp., it is rather AC than R in this district (wn.be).

• ***Pentaglottis*** *sempervirens* (L.) Tausch ex L.H. Bailey: this species is increasing and no longer RR in the districts mentioned (Mar., Fl., Camp., Pic. sept., Brab., Mosan, Tert. par.), rather AR-RR. Its actual presence in the latter district, however, requires confirmation, the most recent records dating back to the 1990s (SI-Flore).

148. Convolvulaceae

• ***Convolvulus*** *lineatus* L.: this alien species was formerly known from the Calandspolder in Zeeland (the Netherlands). It was last seen there in 1960 (FZ, H24), thus this information was no longer relevant and therefore removed.

• ***Cuscuta*** *gronovii* Willd. ex Schult.: in the entire Flora area, this species was only known from the German part of the Moselle valley. However, all growth sites are located some distance outside the Flora area, the closest near Kesten (FT). The species is also absent from the French and Luxembourg part of this valley (SI-Flore, MNHN-Lux) and thus actually does not occur in the Flora area. The species has recently naturalized in Fluv. in the Netherlands (valley of river Waal; H24, wn.nl) but these populations are also located beyond the Flora limits.

• *C. campestris* Yunck.: this North American weed is best known from river banks (habitat added), especially those of river Maas/Meuse in Belgium and the Netherlands (Fluv.), where it is in the process of naturalization (wn.be, wn.nl).

• *C. epithymum* (L.) L.: although RR, this species is known from several localities in Champ. and Tert. par. (e.g. Laonnois, Montagne de Reims, surroundings of Châlons-en-Champagne, etc.; SI-Flore). It was not mentioned from these two districts in NF6.

• *C. lupuliformis* Krocker: this alien species was discovered in 2013 in the valley of river Scheldt and subsequently naturalized between Bornem and Temse (Fl.; wn.be). At least since 2011, this species is also naturalized in the Dutch part of the valley of river Maas, downstream from Roermond (wn.nl). Its actual presence along river Moselle in the Grand Duchy of Luxembourg requires confirmation: it was apparently last observed there in 1986 (MNHN-Lux).

149. Solanaceae

• ***Solanum*** *villosum* Mill.: in NF6, it was stated that the usually encountered alien from this complex is subsp. *villosum*. It is just the opposite in fact, subsp. *miniatum* (Bernh. ex Willd.) Edmonds by far being the least rare of the two (wn.be).

• *S. physalifolium* Rusby var. *nitidibaccatum* (Bitter) Edmonds: this South American alien is recently expanding and has become slightly less rare, R-RR rather than RR, especially in Mar., Fl. and Fluv. From the latter district it was not yet mentioned in NF6. It has recently naturalized on both the Belgian and Dutch part of river Maas downstream of Maastricht (wn.be, wn.nl).

• *S. sarachoides* Sendtn.: this South American alien is, like the preceding, expanding. At least in the Ghent port area (Fl.), it has recently naturalized (wn.be).

• ***Lycium*** *barbarum* L.: in NF6, this species was said to be only AR in Lorr. In fact, it only occurs near Metz and Nancy and it is considered to be RR (FLORAINE 2013). Similarly, in Champ. and Tert. par., it was stated to be respectively AR and AC whereas it has almost completely disappeared from these two districts (SI-Flore).

• ***Nicandra*** *physalodes* (L.) Gaertn.: this (ephemeral) alien is much less rare than indicated in many parts of the Flora area, AR-RR rather than R-RR, for instance in Flanders (wn.be).

• ***Physalis*** *alkekengi* L. var. *alkekengi* L.: the actual presence of this variety in Lorr. was questioned in NF6. According to Vernier (2020) it is still present there, at least in the Meuse area. In Champ., on the other hand, this taxon may well have disappeared (SI-Flore). It is known from at least one recent locality in Tert. par. (Savigny-sur-Ardres),

a district not mentioned in NF6, where it is considered to be native (database CBN Paris).

150. Oleaceae

• ***Fraxinus*** *pennsylvanica* Marshall: this ornamental tree has also naturalized in Camp., especially along the Kempisch Kanaal (wn.be).

• ***Ligustrum*** *vulgare* L.: in Eifel centr., where this species was said to be AR-R in NF6, it is known from at most one locality (FT); it is thus RR in that district.

• *L. ovalifolium* Hassk.: this Asian ornamental shrub is not merely escaping; it is fact locally naturalizing and much expanding lately (wn.be).

• ***Jasminum*** *fruticans* L. was said to be naturalized in Lorr. in the Grand Duchy of Luxembourg. However, it was last seen there in 1963 (MNHN-Lux) and thus apparently has disappeared from its unique locality in the Flora area.

152. Plantaginaceae

• ***Anarrhinum*** *bellidifolium* (L.) Willd.: this ornamental species is allegedly native in the Moselle valley in Germany, just outside the territory of the Flora (FT). This nucleus is located quite disjunct from the species' main distribution area in southwestern Europe.

• ***Littorella*** *uniflora* (L.) Aschers.: this species is completely missing from the Belgian and French part of Lorr. and was last seen in its Luxembourg part in 1991 (FLORAINE 2013, wn.be, AFW, MNHN-Lux). It has thus apparently disappeared from this district.

• ***Plantago*** *coronopus* L.: this coastal species is very much expanding in the interior. In Fl., Camp., Pic. and Brab. (in the entire district, not more so in its central part) it now occurs almost area-wide and has become AC-AR rather than R (wn.be, SI-Flore). In Mosan it is naturalized at least in the valley of river Meuse (wn.be). Also in other districts that are not mentioned in NF6 it may be naturalized, at least locally, rather than merely adventive, e.g. in Champ. (SI-Flore).

• *P. maritima* L.: outside of the Mar. district, this species is occasionally observed as an introduction in the interior (Fl., Camp.; wn.be, Florabank), probably favored by the massive use of de-icing salt.

• *P. media* L.: in NF6, this species was not mentioned from Tert. par., suggesting that it is RR in that district. In reality, it is equally common there as in the other districts in northern France, i.e. C-AC. It was probably unintentionally left out in NF6.

• *P. major* L. subsp. *pleiosperma* Pilg.: this subspecies is fairly widespread in Brab., especially in its western (French) part and east of Brussels (SI-Flore, wn.be). In this district it is AR-R instead of R-RR.

• *P. arenaria* Waldst. et Kit.: this alien species is not merely adventive but locally naturalized, especially in Mar., Fl., Camp., Brab. and Fluv. (valley of river Maas) (wn.be, wn.nl, SI-Flore).

• ***Hippuris*** *vulgaris* L.: in areas where it is not native, this aquatic species is regularly introduced, as an ornamental (wn.be).

• ***Callitriche*** *cophocarpa* Sendtn.: this species was mentioned in NF6 although historical claims from the Flora area turned out to be erroneous. It was formerly found, in 1930 (H24), in the Netherlands but well beyond the Flora limits. Since it has no relevance at all for our area, the reference to this species was removed.

• *C. truncata* Guss. subsp. *truncata*: this subspecies, hitherto unknown in the Flora area, was discovered in 2011 in Marquise in the lower Slack valley (Boul.) (Delay & Petit 2011, Delay & Petit 2012; see also FG), subsequently also in Tardinghen in 2018 (Duluc 2019). Its persistence, at least in the first locality, was recently confirmed (Duluc l.c.). Given the geographical disjunction, these records may refer to an introduction.

• *C. truncata* Guss. subsp. *occidentalis* (Rouy) Braun-Blanq.: this subspecies is recently expanding in the Flora area. In Fl., where it was thought to be extinct, it was rediscovered in several localities (e.g. Destelbergen, Nazareth; wn.be). It was also discovered in districts from where it was not yet known: Camp. (scattered localities near Zonhoven; wn.be) and Ard. or. where it is known from one location in Eschfeld, Germany, where the species is considered to be non-native (FT).

• *C. stagnalis* Scop.: this species is less rare than indicated in NF6 in some districts, especially in Fl. and Camp. where it is AC-AR rather than AR-R (wn.be).

• *C. obtusangula* Le Gall: the Tert. par. district was left unmentioned in the distribution of this species in NF6. It is present there and its distribution and frequency are comparable with that in e.g. Pic., i.e. AR-R (SI-Flore).

• *C. platycarpa* Kütz. is less rare in Mar., Fl. and Camp. than indicated; AC-AR rather than AR-R (wn.be).

• *C. palustris* L.: this species is also present in Tert. par. (Montagne de Reims) (SI-Flore).

• *C. hamulata* Kütz. ex Koch: this species is also present in at least a few localities in the Épernay area, in both Champ. and Tert. par. (SI-Flore).

• *C. brutia* Petagna: the genuine distribution in the Flora area of this species remains largely unknown. Its presence in at least a locality in Brab. occ. (Plateau d'Helfaut: Bibrou) was confirmed by a chromosome count (Digitale2). There are also a few localities in Ard. occ., Lorr. occ. and Tert. par. (database CBN Paris).

• ***Veronica*** *hederifolia* L. and *V. sublobata* M. Fischer: the distribution of these two closely related species possibly needs to be reassessed. Both roughly have a similar distribution pattern and are likely C-AC in most parts of the Flora area, except in Ard. In Camp., where they were said to be AR in NF6, they are not markedly rarer than in e.g. Fl. (wn.be).

• *V. cymbalaria* Bodard: although a recent introduction in the Flora area (Hoste *et al.* 2016), this Mediterranean

weed managed to locally naturalize, especially in cemeteries. It is known at present from Mar., Fl., Camp. and Brab. (wn.be, wn.nl).

• *V. persica* Poiret: in NF6, this species was said to be AR in Fl. and Camp. Like in most of the Flora area, however, it is C-AC in these two districts (wn.be).

• *V. filiformis* Smith: this species was considered to be AR-RR throughout the Flora area. However, it is markedly less rare in Fl. and Camp. where it rather is AC-AR (wn.be).

• *V. agrestis* L.: in NF6, this species was not explicitly mentioned from Eifel centr., suggesting it was C-AC there. In reality, it is completely lacking in that district (FT).

• *V. polita* Fries: in Eifel centr., this species is not AR-R but absent (FT).

• *V. triphyllos* L.: in Lorr., this species was said to occur mostly in the northeastern and eastern part of this district. At present, in Lorr. it is confined to the Grand Duchy of Luxembourg (there, it is indeed not very rare: MNHN-Lux) and Belgium (wn.be), thus exclusively to the northern and northeastern part of the district. In French Lorr., there is a single extant locality, east of and beyond the limits of the Flora area (FLORAINE 2013).

• *V. verna* L.: in Lorr., this species only occurs in the Grand Duchy of Luxembourg and northwest of Toul (FLORAINE 2013); it is absent from the Belgian part of this district. The species' alleged presence in Champ. is probably erroneous: all records from that part of France are located in Tert. par., the easternmost in Laonnois (SI-Flore).

• *V. praecox* ALL.: the only current Belgian growth site is in Stockem near Arlon (Lorr.) where the species was discovered in 2009 (Remacle 2012, Remacle 2014a). The species was thought to have disappeared from most of the districts that were enumerated in NF6 (Mar., Pic., Brab., Mosan, Lorr., Champ., Tert. par.). However, it probably has only disappeared from Mosan (SI-Flore, wn.be) and Champ. (database CBN Paris).

• *V. acinifolia* L.: this species underwent a remarkable local expansion in tree nurseries around Diest and Lummen (Brab. or.) and Lesdain (Brab. occ.) (records respectively from 2012 and 2016 onwards; wn.be) where it is sometimes very abundant. In the same conditions it has been observed in Camp. sept. (Netherlands; H24). In addition, it is occasionally observed as an ephemeral (?) introduction, recently for instance in Antwerp and Boom (wn.be).

• *V. serpyllifolia* L.: in Mar. (incl. its northern part), this species occurs in almost every square (wn.be) and in Zeeland it is reported as "locally common" (FZ). It is thus AC-AR, not R, in this district.

• *V. beccabunga* L.: this species is indeed slightly less common in Mar. and Camp. but, like in Ard., AR not R (wn.be).

• *V. anagalloides* Guss.: the genuine presence of this species in the Flora area still needs to be confirmed. It was reported by Litzler (1953) from the estuary of river Somme but this claim is highly questionable (comm. B. Toussaint 06.2020). The species was not withheld for the Hauts-de-France department by Toussaint & Hauguel (2019) and FG does not refer to its presence either in northern France. However, according to SI-Flore there are a few records that fall within the limits of the Flora area: in Champ. (near Rethel and Châlons-en-Champagne), Lorr. (near Saint-Dizier; the species was also mentioned from other parts of Lorr. that fall within the Flora limits by Vernier 2020: Meuse, Woëvre and the northern Plateau Lorrain) and Tert. par. (near Reims).

• *V. montana* L.: this species is in slight expansion, e.g. in Fl. (wn.be). These are mostly or even exclusively questionably native populations, rather escapes from cultivation.

• *V. teucrium* L.: naturally occurring populations of this species in the Flora area belong to two distinct taxa (see Verloove 2023). Dutch populations are ascribable to var. *teucrium* and confined to Fluv. This variety is also grown as an ornamental and increasingly seen as an escape. In Zeeland, it has locally naturalized on dikes (FZ).

• *V. spicata* L.: in addition to natural populations in Tert. par., this species is sometimes introduced elsewhere in the Flora area and is locally more or less naturalized, e.g. on slag heaps in Camp. (wn.be).

• ***Cymbalaria*** *muralis* P. Gaertn., B. Mey. et Scherb.: this species is not R but completely absent from Eifel centr. (FT). In Lorr. (entire district), it is AC rather than R (FLORAINE 2013).

• ***Linaria*** *purpurea* (L.) Mill.: this ornamental species was best known in the Flora area from the ramparts of Saint-Valéry-sur-Somme, where it is naturalized since many decades (although its actual presence may require confirmation; Digitale2). It recently naturalized in identical circumstances on the ramparts of Ypres (Brab.) as well (wn.be). In addition, it is increasingly cultivated and frequently escaping in recent years and perhaps very locally more or less naturalizing in urban habitats.

• *L. repens* (L.) MILL.: in areas where this species is introduced, it is not RR everywhere. In some parts of Fl. and Camp. it is rather R-RR (wn.be).

• *L. arvensis* (L.) Desf.: the distribution of this rare species needed to be corrected. It never occurred in Eifel centr., only in adjacent areas in Ard. or. and further east, in Osteifel (FT). In Fluv. (the Netherlands) is has disappeared a very long time ago already, around 1936 (H24). It has also completely disappeared in Tert. par., the most northern, more or less recent (2014) localities are in Gironville-sur-Essonne, well outside the Flora area (database CBN Paris, Digitale2). On the other hand, it was observed recently in two districts that were not yet mentioned in NF: since 2019 a population with a few hundreds of individuals has been known from Tubize (Brab.) and in 2021 several dozens were observed in Boom (Fl.) (wn.be). These two populations are located on railway yards and perhaps to

be considered as introduced. Based on these new records the phenology of the species was also corrected: in the Flora area it is flowering from March to July, not from June to August (see also FG).

• *L. supina* (L.) Chazelles: in Mar., this species is only naturalized in France (mainly in the Dunkerque and Calais area; Digitale2). In addition to the districts where it was already known to be naturalized, it is also known from Fl.: at least at the Ghent railway station a stable population has been known since 2013 (wn.be), in circumstances similar to those in Camp. Its actual presence in Boul. requires confirmation (Digitale2).

• *L. simplex* (Willd.) DC.: this thermophilous species is a recent newcomer in the Flora area, that was already known from railway tracks in France (Mar., Brab. occ., Lorr.). Since 2013, it has been known also from Belgium, at first from tramway lines in Brussels (Brab.), subsequently (since 2021) from railway tracks in Meslin-l'Evêque and St.-Ghislain (both in Brab.), Flawinne (Mosan occ.) and Boom (Fl.) (wn.be). In French Lorr., it is known from the Metz and Nancy area (FLORAINE 2013) and its known presence elsewhere in northwestern France (e.g. Dunkerque area) was also confirmed lately (pers. obs. author). Since this species is apparently well-established and recently spreading, it was included in the key and a full account presented.

• ***Antirrhinum*** *majus* L.: in NF6, this naturalized ornamental was said to be least rare (R) in Pic., Mosan and Tert. par., and RR elsewhere. In reality, especially in urban habitats in Fl., Camp., Brab., etc., it has much increased lately. It is AR-RR throughout the Flora area (compare with H24: "vrij zeldzaam in Urb. (...), elders zeer zeldzaam").

• ***Gratiola*** *officinalis* L.: in Camp., where it was thought to be extinct, this species germinated again – after sod cutting – from the long-lived seed bank, in Beerse and Mol (wn.be). In the Dutch part of this district, it is actually known from several recent localities (wn.nl, H24). From Ard., Champ. and Tert. par., it has apparently indeed disappeared, as stated in NF6 (database CBN Paris).

• ***Digitalis*** *lanata* Ehrh.: this species was said to be naturalized in Esch-sur-Alzette in the Grand Duchy of Luxembourg. Apparently, it was last seen there in 1954 (MNHN-Lux) and thus unlikely to be genuinely naturalized.

• *D. purpurea* L.: this species occurs almost area-wide in Eifel centr. where it is at most AC-AR instead of R (FT). The species' distribution in the remainder of the Flora area is rather muddled, owing to the fact that the natural distribution is hardly distinguishable from the 'secondary' one. The species is certainly not R or RR in Fl. and Camp. (wn.be) but most occurrences in these districts doubtlessly refer to naturalized, not natural populations.

• *D. lutea* L.: this species is not RR but missing in Eifel centr., it is only present in one locality further east, in Osteifel (FT). Outside the species' native distribution range, it is occasionally locally naturalized, for instance in some quarries in Zuid-Limburg in the Netherlands (H24, wn.nl).

• *D. grandiflora* Mill.: in addition to its natural occurrences, this species is sometimes observed as an escape from cultivation (wn.be).

153. Scrophulariaceae

• ***Buddleja*** *davidii* Franch.: the earliest subspontaneous occurrences in Belgium and northern France date back to 1930 (Huy), not to 1940 as stated in NF6 (APB).

• ***Verbascum*** *blattaria* L.: in NF6, this species was mentioned for Mar. mér. However, in this district it now also occurs further north, in Belgium as well as in the Netherlands (wn.be, FZ). It is definitely increasing in the Flora area and no longer RR, although its frequency varies from region to region (e.g. wn.be, SI-Flore).

• *V. thapsus* L.: in NF6, this species was said to be less common in Mar., Fl., Camp. and Ard. (AR, whereas AC elsewhere in the Flora area). It actually is hardly any rarer (if at all) in these districts, thus AC-AR (wn.be).

• *V. densiflorum* Bertol.: this species has much expanded recently, not only around Ghent (Fl.) and Antwerp (Mar.). In many districts it has become AR rather than RR, although many of these recent localities doubtlessly refer to naturalized rather than native populations (wn.be).

• *V. phlomoides* L.: more or less the same applies to this species, although it is much rarer. In Fl., it is slightly less rare than indicated in NF6, R-RR rather than RR (wn.be).

• *V. lychnitis* L.: outside the species' native area, it is occasionally observed as a naturalized alien, e.g. on rough ground at the Bruges railway station (Fl.) or in the Campine coal mining area. From these areas, it has been known for many decades (wn.be).

• *V. nigrum* L.: this species too is expanding recently. In some districts, e.g. in Fl. and Camp., it is no longer RR (wn.be).

• ***Limosella*** *aquatica* L.: this species is declining in almost the entire Flora area except in its northern part where, on the contrary, it is slightly increasing. In Mar., it is no longer predominantly occurring in the southern part and in the Antwerp area: it was discovered recently in at least six localities on the Oostkust in Belgium (wn.be) and in Zeeland, in the Netherlands, it is now even considered to be AC (FZ). In NF6, this species was said to be RR in all districts; in reality, however, it is obviously less rare in Mar., Fl., Camp. and Fluv. (R), whereas RR in Mosan, Ard., Lorr., Champ. and Tert. par. (SI-Flore, wn.be).

• ***Scrophularia*** *canina* L.: in addition to the few districts where this southern species is naturalized, it is sometimes observed as an ephemeral alien, recently for instance in the Ghent port area (wn.be).

154. Linderniaceae

• ***Lindernia*** *procumbens* (Krocker) Borbás: in NF6, this species was mentioned from Camp. or. (Zonhoven), suggesting that it is still present there. However, it was only

recorded once in this locality, in 1995, as an ephemeral accidental introduction (Berten 1997).

• *L. dubia* (L.) Pennell: this American invasive species was first discovered in the Flora area in 1993 (exposed fishponds in Zonhoven); it was probably introduced by transport of fish from France, where the species already naturalized a century and a half ago. It then started to spread, first in the surroundings of Zonhoven, then elsewhere in Camp., Pic. and the adjacent part of Tert. par. (valley of river Oise between Compiègne and Saint-Quentin, see: https://www.cbnbl.org/lindernie-fausse-gratiole-nouvelle-plante-exotique-envahissante-notre-territoire) and in Fluv. It is likely to spread elsewhere and recently was observed for the first time in Fl. (Mechelen) as well (wn.be, wn.nl, Digitale2).

159. Lentibulariaceae

• ***Utricularia*** *vulgaris* L.: this species has not disappeared from Mar. where it is still known from scattered recent localities, both in Belgium (wn.be), the Netherlands (FZ) and France (Delplanque *et al.* 2012). It is also known from a few localities in Fl. (e.g. Eksaarde; wn.be), from where it was not mentioned in NF6.

• *U. australis* R. Brown: there are several localities for this species in Champ. (for instance in the surroundings of Châlons-en-Champagne) (database CBN Paris).

• *U. minor* L.: this species is completely missing in the French part of Lorr. (FLORAINE 2013). In this district, it is only known from a few localities near Vance, in Belgium, and thus in Lorr. sept. (wn.be). In the valley of river Aisne (Cormicy, in Champ.), this species is known for several years now (database CBN Paris). It was not yet mentioned from that district in NF6.

• *U. bremii* Heer ex Kölliker: the genuine presence of this poorly known species in the Flora area was questioned in NF6. According to SI-Flore, it is indeed absent from northern France, including from the valley of river Somme in Pic. mér. However, this species was discovered in the coastal marsh of Villiers (Mar. mér.) in 2005 (Duluc 2019). It is possibly less rare but overlooked for *U. minor* L.

• *U. intermedia* Hayne: this species is still present in Brab., in the Torbroek nature reserve (wn.be).

• *U. ochroleuca* R. Hartm.: this species is extinct now in the entire Flora area. It formerly occurred in Camp., Brab. occ. and Tert. par. (H24, wn.be, Digitale2, database CBN Paris).

• ***Pinguicula*** *vulgaris* L.: this very rare and much declining species is still present in a single locality in Pic. mér., near Amiens in the valley of river Somme (Digitale2).

160. Verbenaceae

• ***Verbena*** *officinalis* L.: this species seems to increase and its degree of rarity may have been exaggerated in some areas, especially in Fl. where it is AR rather than R (wn.be).

• *V. bonariensis* L.: this ornamental is increasingly escaping and locally naturalizing. At present, it is merely AR in Mar., Fl., Camp. and Brab., RR elsewhere (wn.be).

161. Lamiaceae

• The casual alien species ***Sideritis*** *montana* L. has been found in Malzéville near Nancy (Lorr. mér.) since the 19th century, although it is sometimes not seen for decades. It was recently rediscovered there (Voirin & Antoine 2017).

• ***Lycopus*** *europaeus* L.: this species certainly also occurs in Haute Ard., both in Hautes Fagnes and around Baraque Fraiture (wn.be).

• ***Mentha*** *pulegium* L.: there are also records for this species from Camp. in Belgium, but all refer to non-natural occurrences (wn.be). Natural populations have become very rare everywhere, but the species is regularly sown in nature development areas and then often naturalizes. See also Ronse (2012).

• *M. longifolia* (L.) Huds.: the presence of 'pure' plants of this species in Belgium is questionable, although there are numerous claims (e.g. wn.be). The species never occurred in Eifel centr., from where it was said to be RR in NF6 (FT). In Lorr., this species is also present in the southeastern portion of this district (FLORAINE 2013). It may be present elsewhere in the Flora area but remains poorly known (e.g. plants that are much reminiscent of and probably belong to it are abundantly naturalized along the canal de Roubaix near Leers in Brab. occ.; pers. obs. author).

• *M. arvensis* L. subsp. *arvensis* is also known from at least one locality in Eifel centr., in Birresborn (FT).

• *M. arvensis* L. subsp. *parietariifolia* (J. Beck.) Briq.: this subspecies is also known from at least one locality in Eifel centr. (FT).

• *M. ×suavis* Guss.: this very rare hybrid was supposed to have disappeared from the Flora area. It was, however, recently observed on the extreme southern border of the Flora area, in the Champ./Lorr. bordering area (Lassicourt) and in Lorr. (Bailly-aux-Forges) (database CBN Paris).

• *M. ×carinthiaca* Host: the actual presence of this hybrid in Tert. par. was questioned in NF6. It has indeed completely disappeared from that district (Digitale2, database CBN Paris).

• ***Salvia*** *officinalis* L.: this ornamental is also found on old walls and coal mining spoil heaps (e.g. wn.be).

• *S. verticillata* L.: in NF6, this species was said to be much rarer in the western part of the Flora area. At present, however, it is more or less equally distributed throughout, with hotspots in the mining areas in Camp. and Brab. occ. (in Belgium as well as in France) (wn.be, Digitale2, database CBN Paris).

• *S. pratensis* L.: in the northern part of Lorr., this species is much rarer than indicated in NF6, R rather than C (Champluvier & Saintenoy-Simon 2014).

• *S. nemorosa* L.: this species is nowhere genuinely naturalized, not even in Lorr. (as claimed in FG); it is a rather regular (ephemeral) escape, especially in Fl., Camp. and Brab. (wn.be).

• *S. verbenaca* L.: this southern species does not occur more often in the western than in the eastern part of the Flora area. In the Viroin area (Mazée) it seems more or less naturalized, at least it has continuously been observed there since 2008 (wn.be). According to Messean (2016) this species is apparently well-established (or even indigenous) in a few places in Tert. par. (Épaux-Bézu, Villiers-Saint-Denis).

• ***Hyssopus*** *officinalis* L.: this ornamental species is still present in Mosan: there are several recent localities in and near Dinant and it is also found in Durnal. It was also observed in Bure (Tellin), in Ard. (wn.be).

• ***Thymus*** *praecox* Opiz subsp. *praecox*: this species is not RR but has never been present in Eifel centr. (FT).

• *T. serpyllum* L.: claims of this species in Fl., Lorr., Champ. and Tert. par., already considered doubtful in NF6, are likely erroneous indeed (wn.be, Digitale2, database CBN Paris). Yet, its presence in Lorr. has been mentioned by both FLORAINE (2013) and Vernier (2020) but these claims require confirmation.

• ***Clinopodium*** *vulgare* L.: this species is in parts of Fl. and Camp. certainly not RR, e.g. around the larger cities (Ghent, Antwerp) or in the former coal mining region in Limburg where the species occurs on slag heaps. There is also a striking cluster of observations in the northern part of the province of East Flanders, for instance on chalky clay dikes (wn.be; comm. W. Van Landuyt 11.2022).

• *C. acinos* (L.) O. Kuntze: this species is not very rare in the eastern part of Camp., especially on slag heaps and on chalky slopes of the Albert Canal (wn.be).

• *C. nepeta* (L.) O. Kuntze subsp. *nepeta* var. *nepeta*: this taxon has also been recorded in Mar. (old wall in Veurne, 2006, *F. Verloove* 6445 in BR, LG).

• *C. nepeta* subsp. *nepeta* var. *glandulosum* (Req.) B. Bock: this taxon is no longer in the process of naturalization but genuinely naturalized in several locations, sometimes even in large numbers (e.g. abandoned railway yard in Wevelgem, etc.; wn.be). It was recently also reported for the first time from Mosan in Jambes (Wastiaux 2019).

• ***Melittis*** *melissophyllum* L.: in Lorr., this species is rarer than indicated in NF6 (AC-R). In reality, it is genuinely rare with most populations located in the northwestern and southern part of the district (FLORAINE 2013).

• ***Lamium*** ×*holsaticum* E.H.L. Krause: this hybrid has also been observed once in Fluv. in Belgium (Mazenhoven, 2017; wn.be).

• *L. galeobdolon* (L.) L. subsp. *galeobdolon* is also present in a few localities in Ard. or. and Eifel centr. (FT).

• *L. galeobdolon* (L.) L. subsp. *argentatum* (Smejkal) J. Duvigneaud: this invasive ornamental is rapidly spreading and has become widely naturalized throughout the Flora area (wn.be, etc.).

• *L. maculatum* L.: in areas where not native, this species is increasing, as an escape from cultivation, sometimes naturalizing locally (wn.be).

• *L. hybridum* L.: in Mar. (especially polders), Fl. and Brab. occ., this species is much less rare (AC rather than AR; wn.be), in Zeeland even very common (FZ).

• *L. confertum* Fries: this poorly known species was recorded in Belgium for the first time in 2018 in Aalter (Fl.) (Van Vooren & Hoste 2019) and it was subsequently observed in several other places as well. It is not known whether the species is expanding or has been under-observed before. Its genuine distribution remains poorly known. According to Atlas-NL the species is also found in Zeeland (and Zuid-Limburg) in the Netherlands, but it is not mentioned in FZ and there are no records substantiating these claims on wn.nl. In NF6, *L. confertum* was erroneously said to be present in the Iberian Peninsula; this refers to a different, similar species, *L. coutinhoi* García (Castroviejo *et al.* 2010).

• ***Galeopsis*** *speciosa* Mill.: this species almost disappeared in Fl. and needs to be considered RR, like in e.g. Mar. In Belgium, this species is least rare now east of Brussels (Brab. or.) (wn.be).

• *G. pubescens* L.: this species was recently discovered in Camp., in the Postel area, where it seems firmly established (wn.be). It may have been overlooked before and should be looked for elsewhere.

• *G. tetrahit* L.: this species is certainly rarer in Mar. but slightly less so than indicated in NF6 (see also FZ: AR). For example, it is hardly more common in the Borinage in Brab. (wn.be).

• *G. segetum* Neck.: this species appears to have almost completely disappeared in Fl. and Brab.: there is not a single reliable record (substantiated by photos) on wn.be. It has become RR in these districts.

• *G. ladanum* L.: this species seems to have declined dramatically in Belgium; in recent years, it was only seen as adventitious in the Ghent port area (2016-19: wn.be). According to AFW, it was seen in several places after 1980 and is least rare in the Viroin area (Mosan). It is probably RR everywhere now in Belgium, especially in Ard. and Lorr. In French Lorr., the species is now considered to be RR as well (FLORAINE 2013). It is perhaps least rare in the Grand Duchy of Luxembourg ('Least Concern' according to the Red List; Colling 2005). The species is also known from at least one locality in Champ. (Oyes) (database CBN Paris), a district not mentioned in NF6.

• *G. angustifolia* L.: outside the districts mentioned in NF6, this species is found here and there in important nuclei, e.g. in the coal mining region in Limburg (Camp.) and the Borinage (Brab. occ.), where it is undoubtedly introduced (railway lines, slag heaps) (wn.be). It appears to be increasing, contrary to the preceding species with

which it is sometimes confused. In Lorr., however, where it was said to be C in NF6, it is actually R (FLORAINE 2013).

• ***Stachys*** *recta* L.: since 2009, this species is known from several locations in Zuid Limburg in the Netherlands (wn.nl). H24 does not refer to these records even though their identity is correct.

• *S. annua* (L.) L.: this species was reported in NF6 from Brab. or. in the Netherlands but these are actually historical finds (from the 19th century; Duistermaat 1996). In 2014, however, the species was found again (once?) in Zuid Limburg, in Berg (wn.nl). In Eifel centr., this species is extinct (FT). Also in other parts of the Flora area, it is declining. For instance, in Pic., it has disappeared from many localities (Digitale2).

• *S. alpina* L.: this species is known since 2014 from one location on the Dutch part of Sint-Pietersberg (Brab. or.; wn.nl). In Eifel centr., it has much declined: at present it is known from a single extant locality and thus has become RR (FT). In Pic. mér., it is still present, near Amiens (Digitale2).

• *S. sylvatica* L.: AR in Mar. and Camp., as stated in NF6, is exaggerated and not apparent from the heatmap (wn.be); it is at most slightly less common than elsewhere in these districts (see also FZ: AC).

• *S. germanica* L.: in NF6, this species was said to have disappeared from Eifel centr. However, it has never occurred there (FT).

• ***Marrubium*** *vulgare* L.: on the one hand, natural populations of this species are disappearing in many districts (e.g., there are no recent records from Pic.; Digitale2); but on the other hand, it is increasingly found as an escape from cultivation (wn.be).

• ***Ballota*** *nigra* L. subsp. *meridionalis* (Béguinot) Béguinot: this taxon is much less rare in Fl. (especially in and near the larger cities) than in Camp., at most AR (wn.be).

• ***Leonurus*** *cardiaca* L.: this species is markedly rarer in Zeeland (FZ) than in Belgian Mar. In Fl., Camp. and Brab., it is significantly less rare than in Mosan, Ard., etc., AR-R rather than R-RR (wn.be). In general, it appears to be in expansion rather than in regression (as was stated in NF6).

• ***Prunella*** *grandiflora* (L.) Schöller: outside the districts mentioned in NF6, there are several recent records of this species, e.g. along river Maas (Fluv.) and in Kerkom (Brab.) (wn.be), where it seems to persist well. It is unclear what status should be assigned to these records. The species is also cultivated and sometimes escapes.

• *P. laciniata* (L.) L.: this species is sometimes found as an introduction, e.g. an established population is known since 2016 from a slag heap in Waterschei (Genk). In Ard., it also occurs outside of the Oesling area, especially south of Rochefort (wn.be).

• ***Scutellaria*** *galericulata* L.: in Fl. and Brab. or., this species is at most AR, not R (wn.be, wn.nl).

• *S. minor* Huds.: this species is clearly less rare in Brab. than in the other districts listed as RR: e.g., it is scattered in the region east of Brussels, immediately south of Camp. (from Leuven to Hoeselt). Also in Brab. occ., there is an important cluster of localities around Ypres, although the species was only confirmed in a single locality there recently (Zillebeke) (wn.be). Schneider & Wolff (2018) published an overview of the species' distribution in the Grand Duchy of Luxembourg.

• *S. columnae* All.: as an escape, this species is not only known from the Netherlands; it was also seen in at least one locality in Belgium, on city walls in Diest in 2017 (wn.be). The naturalized populations in Tert. par. are in fact located outside the territory covered by NF. Moreover, it has disappeared from most of its localities there and is now RR rather than R (database CBN Paris).

• *S. altissima* L.: this naturalized ornamental is no longer restricted to Mosan; it was found in many other places in the meantime (in Fl., Camp., Brab. and Champ.) (wn.be, database CBN Paris), where it is either merely ephemeral or locally naturalized.

• ***Ajuga*** *chamaepitys* (L.) Schreb.: this rare native is known since 1999 from a limestone slope near Harmignies in Brab. occ. (AFW, wn.be). Elsewhere in Belgium, it has become RR now, also in Mosan where it has nearly disappeared. The species is also extinct in Eifel centr. (FT). In Lorr., it is actually R, not AC-AR (FLORAINE 2013) and it has disappeared in the Belgian and Luxembourg parts of this district (wn.be, Colling 2005).

• *A. reptans* L.:in NF6, this species was said to be C throughout, except in Mar., Fl. and Camp. sept. However, it is hardly any rarer in Fl. and Camp. (sept.), at most AC-AR (wn.be), and also in Mar. it is at most R (see also FZ: AR).

• *A. pyramidalis* L.: Krippel & Thommes (2015) provided an update for the species' distribution in the Grand Duchy of Luxembourg: all known populations are located in the northern part of the country, with a clear predominance in the north-west. During the past 20 years, several large populations have been discovered in the Upper-Sûre region.

• *A. genevensis* L.: outside the species' native distribution range in the Flora area, it is occasionally observed as an introduction, for instance in an abandoned railway yard in Lille in France (Brab. occ.; Lemoine 2018).

• ***Teucrium*** *botrys* L.: this species is indeed sometimes found as an alien, e.g. in a few places in Zeeland (FZ, H24). In Belgium, it was recently also observed in Ghent (2020) and in 1992 in Staden (with imported bark) (wn.be).

• *T. scorodonia* L.: the degree of rarity in some districts of this species is probably slightly exaggerated and strongly depends on the region. E.g. in Fl., where it is said to be AR, it is common on the (slightly) poorer sandy soils between Bruges and Ghent, around Ypres and Houthulst, etc. and virtually absent elsewhere (wn.be).

• *T. chamaedrys* L.: this species is also grown as an ornamental and sometimes found outside its natural area (Mar., Camp., Brab.; wn.be), either as an escape, adventive or deliberately sown or planted.

• *T. scordium* L.: this rare native has completely disappeared from Mar. north of Calais (no post-1999 records; Digitale2), Belgium (last record in 1978; wn.be) and the Netherlands (only north of the Flora area, in Voorne; wn.nl). In 2016, a population was discovered along an old branch of the Scheldt river south of Ghent (wn.be). The population counts a few hundred individuals and actually represents the only one in Belgium.

162. Phrymaceae

• ***Erythranthe*** *moschata* (Douglas ex Lindl.) G.L. Nesom: in the Dutch part of the Flora area, this species is considered to be a mere escape rather than a naturalized alien (H24, Atlas-NL). Moreover, the only two records in the extreme southeastern part of the Netherlands are from the valley of river Maas (wn.nl), and thus from Fluv., not Brab. or. In Mosan (valley of river Vesdre), where it was also said to be naturalized, there is not a single recent record (AFW, wn.be); the species has probably disappeared from there (last seen in 1966; see APB). In NF6, this species was also said to be naturalized in Pic. or. and sept.; however, it is completely absent from the whole of northwestern and north-central France (Digitale2, database CBN Paris).

• *E. guttata* (Fisch. ex DC.) G.L. Nesom: this species also occurs in at least one locality in Eifel centr. (Steffeln; FT), a district from where it was not mentioned in NF6.

163. Paulowniaceae

• ***Paulownia*** *tomentosa* (Thunb.) Steud.: this ornamental tree is increasingly escaping and locally naturalizing. At present, it is at most AR in urban areas (especially in Fl. and Brab.) and RR elsewhere (wn.be, Digitale2).

164. Orobanchaceae

• ***Lathraea*** *clandestina* L.: this species is slightly expanding lately. It has become less rare in some districts from where it was already known (especially Fl. and Brab. occ. where it is R now instead of RR) and was recently firstly reported from three districts: Mar., Camp. and Mosan. In Brab. centr. and or., it has also further expanded and it is no longer limited to Meise and the Geer valley respectively (wn.be). It is increasingly likely that the species' isolated occurrences in Belgium relate to an ancient introduction (see also FG).

• ***Orobanche*** *reticulata* Wallr.: this species was already mentioned in NF6 although its very few populations (all in the Netherlands) were located well outside the Flora area. However, the species has been observed since 2014 in a locality in Mar. sept (Roggenplaat in Zeeland) (FZ, H24, wn.nl).

• *O. gracilis* Smith: this species has completely disappeared from Tert. par. (database CBN Paris, Digitale2).

• *O. alba* Steph. ex Willd.: there are reliable records of this species from Tienne de Breumont (Viroin) in Mosan since 2008 (wn.be, AFW), a district not mentioned in NF6. An update of its occurrence in the Belgian part of Lorraine was given by Hennerese (2013): there are 13 extant localities and all plants grow exclusively on *Thymus pulegioides* L. There are also historical occurrences in Eifel centr., from where the species now has disappeared (FT). Its actual presence in Pic. or. is questionable and requires confirmation (Digitale2, database CBN Paris).

• *O. picridis* F.W. Schultz: this species may have been overlooked (it is much reminiscent of *O. minor* L.) in some parts of the Flora area or has been expanding slightly in recent years. It was recently discovered in Mar. (port of Dunkerque area; it perhaps should be looked for in the adjacent Belgian part of this district) and in the southern part of Pic. (valley of river Somme) (Digitale2; author observations).

• *O. hederae* Vaucher ex Duby: this species is recently expanding. In Mar., it is no longer restricted to the southern part of this district: there are at least three localities in the Belgian part of it (wn.be) and, since 2008, also at several locations in Zeeland (FZ). It now also occurs in several places in Fl. and Camp. (wn.be), two districts not yet reported in NF6. In Mosan and Lorr., it is no longer restricted to the valley of river Meuse and the northeastern part of the district respectively (wn.be, FLORAINE 2013, Vernier 2020). In many newly recorded localities it is found in urban habitats and is probably (inadvertently) introduced. Its recent expansion almost exclusively relates to such populations (see also H24 for the Netherlands).

• *O. alsatica* Kirschl.: this very rare species is also present in the southeastern part of Champ., near its border with Lorr. (Couvrot; database CBN Paris).

• *O. lutea* Baumg.: this species never occurred in Eifel centr., only east of it, in Osteifel (FT), and thus beyond the Flora limits. Analogously, Dutch populations in Fluv. sept. are located along river Waal near Nijmegen and thus also outside of the territory covered by NF (wn.nl).

• ***Phelipanche*** *purpurea* (Jacq.) Soják: there is a well-known cluster of observations around Brussels (Brab. centr.) (wn.be; see also Ronse & Dierickx 2007). This species does also occur in Eifel centr., even in several localities (FT), and in Champ (e.g. Champfleury; database CBN Paris). All these districts were not yet mentioned in NF6.

• ***Euphrasia*** *frigida* Pugsley: this species was mentioned in NF6 although its unique locality was considered to be just outside the Flora area. This is not correct: this species was found in Stadtkyll, which is indeed located in Eifel centr. and thus within the limits of the territory covered by NF. It was discovered there by the German specialist Kalheber (1983). However, the population was destroyed shortly afterwards (comm. R. Hand 03.2021, FT).

• *E. confusa* Pugsley: the possible occurrence of this species in Mar. mér. was mentioned in NF6. It is, however,

lacking from all contemporary French Floras and local databases (FG, Digitale2, SI-Flore). In fact, this species is endemic to the British Isles (E+M Plantbase, Stace 2019) and thus not relevant to the Flora area.

• ***Odontites*** *luteus* (L.) Clairv.: in Camp. or., this species was at first known from slag heaps in Zolder and Genk, as stated in NF6, but by now also occurs elsewhere in the Campine mining area (wn.be).

• *O. jaubertianus* (Boreau) D. Dietrich ex Walp.: this species has completely disappeared from Tert. par. In north-central France, it is now confined to a small area north-west of Troyes, in Champ., at the extreme southern border of the Flora area (database CBN Paris, Digitale2).

• ***Parentucellia*** *viscosa* (L.) Caruel: this species is also known from rather numerous localities in Camp., both in Belgium and (particularly) in the Netherlands (wn.be, wn.nl). In Mar., this species is chiefly found in the Netherlands (as stated in NF6) but also in Mar. mér . where it is actually known from several localities south of river Canche (Digitale2) as well as in the Belgian part of this district (e.g. Antwerp and Zeebrugge port areas). There is also a single record from the area northeast of Troyes (Piney), in Champ., at the extreme southern border of the Flora area (database CBN Paris).

• ***Rhinanthus*** *alectorolophus* (Scop.) Pollich subsp. *buccalis* (Wallr.) Schinz et Thell.: in Lorr., this subspecies is much rarer in the Belgian (northern) part of this district: RR instead of AC (Champluvier & Saintenoy-Simon 2014).

• ***Pedicularis*** *palustris* L.: this species has completely disappeared from Eifel centr. (FT).

• *P. sylvatica* L.: this species occurs in the swamps of Balançon-Cucq et Villiers, in Mar. mér. (Delplanque *et al.* 2012).

165. Aquifoliaceae

• ***Ilex*** *aquifolium* L.: in addition to natural occurrences, this species is also very commonly grown as an ornamental and increasingly naturalizing, seriously obscuring its natural distribution in the territory of the Flora.

• *I. crenata* Thunb.: this Asian ornamental shrub is recently naturalizing and spreading in Camp. where it is actually at most AR-R (wn.be). It is confined to slightly acidic woodlands and thus much rarer in other districts.

166. Campanulaceae

• ***Campanula*** *cervicaria* L.: in NF6, this species was said to have formerly been present in Eifel centr. According to FT, however, it never occurred there. It has completely disappeared from Tert. par. (Digitale2, database CBN Paris; see also Filoche *et al.* 2010). There are, on the contrary, a few extant localities in Champ., a district not mentioned in NF6, northeast of Troyes (database CBN Paris), at the extreme southern limit of the Flora area.

• *C. glomerata* L.: this species is much rarer than indicated and declining in Lorr. sept., R rather than AC-AR, especially in the Gaume (Champluvier & Saintenoy-Simon 2014). In addition to the districts where this species naturally occurs, it is occasionally observed as an escape from cultivation. In some localities it persists rather well, for instance on the verge of the Calmeynbos in De Panne (wn.be).

• *C. rapunculus* L.: this species is R rather than RR in Fl. (wn.be).

• *C. patula* L.: this species has disappeared from Eifel centr. (FT).

• *C. poscharskyana* Degen: this ornamental is increasing in urban habitats. It is now fully naturalized in several districts and R-RR (wn.be).

• ***Legousia*** *speculum-veneris* (L.) Chaix: this species has disappeared from Eifel centr. (FT). The same probably applies to some other districts: in the whole of northwestern France (particularly Pic. and Brab. occ., from where it was mentioned as RR in NF6) the most recent record as a weed of agricultural fields dates back to 1993 (Digitale2).

• *L. hybrida* (L.) Delarbre: in Eifel centr., this species has become RR instead of R. According to FT there is only a single extant locality, in Schönecken.

• ***Phyteuma*** *spicatum* L.: this native species is sometimes cultivated as an ornamental and locally naturalized. It is well-known for instance from the Steengelaag woodland in Stekene in Fl. (wn.be).

• *P. nigrum* F.W. Schmidt: this species occurs in several localities in Montagne de Reims in Tert. par. (database CBN Paris). Like the preceding species, it is sometimes grown as an ornamental and occasionally escapes (wn.be).

• ***Lobelia*** *urens* L.: this species has completely disappeared in the Flora area. It was probably last seen in 1993 in Oisy-le-Verger in Pic. (Hendoux 1997).

167. Menyanthaceae

• ***Menyanthes*** *trifoliata* L.: this species is also known from at least one locality in Champ. (Bétignicourt; database CBN Paris). Like *Nymphoides peltata* (S.G. Gmel.) O. Kuntze, it is much declining in its natural habitats but increasingly often introduced as an ornamental, also in semi-natural biotopes, unfortunately heavily blurring the data concerning its spontaneous distribution.

168. Asteraceae

• ***Prenanthes*** *purpurea* L.: this species was already briefly mentioned in NF6 because it was formerly found in the Grand Duchy of Luxembourg (most recent record in 1968; MNHN-Lux) and the adjacent part of Lorraine in France. In addition, it formerly also occurred in Eifel centr., on the border of West- and Osteifel (Prüm) (FT).

• ***Limbarda*** *crithmoides* (L.) Dum.: this southern species was discovered in 2006 in Goeree in the Netherlands. Contrary to what was stated in NF6, this locality is not located in Zeeland but in Zuid-Holland. Its presence there (in Kwade Hoek) was regularly confirmed ever since, at

least up to 2015 (wn.nl). Interestingly, despite its southern origin, it apparently recently also established itself further north in the Netherlands (Schiermonnikoog, Texel; wn.nl). In 2016 nine individuals were also discovered in Wimereux in Mar. mér. (Toussaint 2016a). By 2022, the population had expanded to about a hundred plants (comm. M. Leten, 07.2022).

• Two accidental aliens already mentioned in NF6 need some additional information. There are scattered recent claims of ***Adenostyles*** *alliariae* (Gouan) A. Kerner from French Lorr. (AFL, SI-Flore), including one near to the Franco-Belgian border (west of Longwy). These records require confirmation and are probably erroneous (comm. S. Antoine, 05.2021). In 2020, however, this species was also recorded in Montagne de Reims (Romery) (database CBN Paris), in Tert. par. (as an escape?). An old record of ***Amphiachyris*** *dracunculoides* (DC.) Nutt., also from French Lorr., was recently published (Pax 2019).

• ***Galatella*** *linosyris* (L.) Reichenb. f.: this species was said to be R-RR in Lorr. or. It is, however, completely missing in this district, in its French (FLORAINE 2013, Vernier 2020) as well as in its Belgian or Luxembourg part (wn.be, Colling 2005, MNHN-Lux).

• ***Erigeron*** *acris* L.: in Eifel centr., this species was said to be AR-R. In reality, however, it is completely lacking in that district (FT).

• *E. annuus* (L.) Desf.: this species was said to be R in Fl. and Camp. It is more likely AC-AR and much increasing in these two districts (wn.be).

• *E. karvinskianus* DC.: this ornamental is not rarely but frequently cultivated. In addition, it is a widely naturalized and much increasing escape in urban habitats. In Mar., Fl. and Brab. (not only in its western part) it has become AR-R rather than R-RR and it has also been known from Camp., Ard. and Lorr., where it is still RR (wn.be, AFL, Digitale2).

• *E. sumatrensis* Retz.: the species' distribution in Lorr. is unclear: it is completely missing according to most sources (FLORAINE 2013, SI-Flore, wn.be, Colling 2005) whereas Vernier (2020) reports it at least from the northern Plateau Lorrain. Although a relatively recent newcomer in the Flora area (Verloove & Boullet 2001), this species has much expanded lately, especially in Mar., Fl. and Camp. where it has become at most AC-AR (wn.be).

• *E. bonariensis* L.: although still very rare, this species has naturalized locally in urban habitats, especially in Antwerp (wn.be) and Zeeland (FZ).

• *E. bilbaoanus* (J. Rémy) Cabrera: in addition to the habitats already mentioned in NF6, this species also occurs on exposed gravelly river banks (it is locally frequent along river Maas in Fluv.; wn.be). Especially in the western part of the Flora area, it is expanding: it has become at most AR-R in Mar., Fl., Camp. and Brab. (wn.be). The species is also known from scattered localities in Pic. (Digitale2), a district not yet mentioned in NF6.

• ***Baccharis*** *halimifolia* L.: this American ornamental shrub has naturalized in coastal areas. In addition, it is occasionally also observed in inland localities (wn.be).

• ***Bombycilaena*** *erecta* (L.) Smolj.: the actual presence of this very rare species in the Flora area (Lorr., Champ. and Tert. par.) was questioned in NF6. At least from the latter district, it was recently confirmed: Mont-Saint-Martin, Aisne (Messean 2016); also in Grauves (database CBN Paris). According to this database, it has indeed disappeared from Champ.

• ***Filago*** *pyramidata* L.: this very rare native species is exceptionally observed as an introduction, e.g. in campsites in coastal areas (Verloove *et al.* 2020a).

• *F. germanica* L.: after having dramatically declined in the past decades, this species is recently increasing again in the Flora area (see also H24), although probably exclusively in anthropogenic habitats (railway infrastructure, quarries, by tracks, etc.). In Camp., a district that was not mentioned in NF6, it is at most R (wn.be).

• *F. lutescens* Jord.: this very rare species was thought to have probably completely disappeared from the Flora area. However, it is not extinct and still known from a single locality in Briquemont near Rochefort in Mosan (AFW, wn.be; see also Wastiaux 2019). Apparently, the species is also still present in the Moselle valley in Lorr. mér. (FLORAINE 2013, Voirin 2017), for instance in Tonnoy (https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=FR4100227) and in Rosières-aux-Salines (Bonassi *et al.* 2017). Finally, it is also known from scattered localities in Camp. in the Netherlands, e.g. in Overloon and Castelresche Heide (H24, wn.nl).

• *F. neglecta* (Soyer-Will.) DC.: this enigmatic species was believed to have possibly disappeared from Lorr. In fact, it is extinct everywhere in the small area where it once occurred (FG).

• *F. arvensis* L.: this species was not mentioned in NF6 from Eifel centr. It is in fact still fairly scattered, especially on lava (FT).

• ***Logfia*** *gallica* (L.) Coss. et Germ.: this species indeed seems to have completely disappeared from the Flora area. In northwestern France, the northernmost extant locality is in Martot (Eure department), well beyond the limits of the Flora. It is still present in the Paris area (FG) but only outside the Flora area (database CBN Paris). It is regionally extinct in northeastern France (Bonassi 2015).

• ***Antennaria*** *dioica* (L.) Gaertn.: a small population of this presumably extinct species in Flanders was found in 2019 in a moor in Brecht (Camp.; wn.be). As this is a site frequented by military engines, its nativity there is uncertain, although the species was formerly not quite rare in Camp. (AR-R, according to Durand 1899). It also still occurs in several places in Eifel centr. (FT) whereas in Lorr. it has completely disappeared from the French and Luxembourg part of this district (FLORAINE 2013, Colling 2005); it is still present in the Belgian part (wn.

be). The species has also disappeared from Pic., there are no post-1960 records (Digitale2).

• ***Gnaphalium*** *uliginosum* L.: this species was said to be R in Mar. in NF6. This is not correct, in Zeeland it is even considered to be common (FZ). It rather falls in rarity class AC-AR (see also wn.be).

• ***Laphangium*** *luteoalbum* (L.) Tzvelev: this species was formerly almost restricted to coastal areas but has much expanded lately. In Mar., Fl. and Camp. it has become AC-AR and in Brab. AR rather than R (wn.be). It is also present in Pic. (e.g. valley of river Somme), from where it was not yet mentioned in NF6 (Digitale2).

• ***Helichrysum*** *arenarium* (L.) Moench: in the entire Flora area this species is only known from Lorr., at least as a wild species. In NF6, it was said to be present in the northern and eastern part of this district. However, it seems to be restricted to the former and absent from the latter (FLORAINE 2013). In northeastern France, it also occurs in Alsace, beyond the Flora boundaries. In Camp., in the Netherlands (Oirschotse Heide), this species was discovered in 2021 (wn.nl) but it is rather doubtful that this refers to a natural occurrence.

• ***Inula*** *racemosa* Hook. f.: this recently naturalized ornamental is least rare in Brab. occ. (AR-R), RR elsewhere (Verloove 2008, Lemoine 2015, wn.be).

• ***Dittrichia*** *graveolens* (L.) Greuter: this southern species is slowly but definitely expanding in the Flora area. In recent years it has also been observed in Fl. and Camp. (wn.be), Ard or. (Germany: motorway near Winterspelt-Steinebrück; FT) and in Lorr. and Champ. The species is in fact in rapid expansion in Champagne-Ardenne in France, e.g. near Sainte-Menehould (Lorr.), in Cuperly and between Châlons-en-Champagne and Troyes (Champ.), etc. (Saint-Val 2018; previously also already reported in FLORAINE 2013).

• *D. viscosa* (L.) Greuter: this species seems to be in the process of local naturalization, especially in Mar. (port areas of Antwerp, Zeebrugge and Dunkerque; wn.be, Stien 2018, pers. obs. author).

• ***Pulicaria*** *vulgaris* Gaertn.: in Lorr., this species is not restricted to the northern part of this district: there are several records near Metz and south of Nancy (FLORAINE 2013). Similarly, in Camp. this species does not exclusively occur in the eastern portion of this district (wn.be). It is also relatively widespread (and perhaps least rare in Belgium) in the valley of river Maas (Fluv.), a district not mentioned in NF6 (wn.be, wn.nl).

• ***Buphthalmum*** *salicifolium* L.: in addition to the few indigenous and naturalized populations already mentioned in NF6, this species is sometimes observed as an adventive (e.g. slag heap in Genk, since 2016) or as escape from cultivation (e.g. cemetery wall in Bruges, since 2018) (wn.be).

• ***Telekia*** *speciosa* (Schreb.) Baumg.: this ornamental was initially discovered in Brab. centr. and for quite a long time least rare there. However, at present, this species is known from most districts (except perhaps in northwestern France) but R-RR throughout the Flora area (wn.be, wn.nl, Digitale2).

• ***Ambrosia*** *artemisiifolia* L.: this North American weed has become relatively frequent in Flanders (AC-AR), R-RR elsewhere in the Flora area (wn.be). It is still predominantly ephemeral, only exceptionally naturalized.

• ***Guizotia*** *abyssinica* (L. f.) Cass.: this species has become a quite characteristic birdseed alien and is less rare than indicated in NF6, it is at most AR (wn.be).

• ***Coreopsis*** *lanceolata* L.: this North American ornamental has been recorded in two additional districts: Mar. (wn.be) and Lorr. mér. (Art-sur-Meurthe; Antoine & Aubry 2015).

• ***Cosmos*** *bipinnatus* Cav.: this ornamental is still frequently cultivated and less rare as an escape than indicated, R-RR rather than RR (wn.be).

• ***Bidens*** *cernua* L.: this species was not explicitly mentioned from Eifel centr., suggesting that it is AR in this district; it is, however, completely lacking there (FT). In Fl., it is AR rather than R (wn.be).

• *B. connata* Muhlenb. ex Willd.: in Lorr., this North American weed is only known from very few localities in Belgium and, at least recently, none from the Luxembourg (it was last seen there in 1959; MNHN-Lux) and French part of this district (FLORAINE 2013); it is RR rather than R. In the whole Flora area, it is obviously least rare in Camp. where it is actually AC-AR. Also in Fl., it is slightly less rare than indicated, R rather than RR (wn.be).

• *B. frondosa* L.: this alien species has slightly increased, especially in Fl. and Mar., where it has become AC and AR respectively, instead of AR and RR (wn.be).

• *B. radiata* Thuill.: this species is still RR throughout most of the Flora area but definitely increasing. In addition to the districts already mentioned in NF6, it was recently also observed in Fl. (most notable from the Bourgoyen-Ossemeersen nature reserve near Ghent, since 2019). It is by far least rare in Fluv. along river Maas, in Belgium as well as in the Netherlands (wn.be, wn.nl, H24).

• ***Gaillardia*** ×*grandiflora* Van Houtte: this ornamental is naturalized in coastal dunes and is expanding. It was initially confined to the Koksijde area but now has invaded other parts of the dunes as well: especially west of Ostend it has become AR-R rather than R-RR (wn.be).

• ***Anthemis*** *arvensis* L. and *A. cotula* L.: these two native species are much decreasing as weeds of agricultural fields but are regularly seen as adventives, mostly as grain aliens (wn.be).

• ***Chamaemelum*** *nobile* (L.) All.: in addition to natural populations in Mar. mér. (Ambleteuse) and Tert. par., this species has recently been observed as a more or less established lawn weed, in Antwerp (Fl.) and Meise (Brab.) (wn.be).

• ***Achillea** filipendulina* Lam.: this ornamental is increasingly escaping and locally tends to naturalize in urban habitats (wn.be). A short description was added.

• *A. maritima* (L.) Ehrend. et Y.-P. Guo: this southern species was recorded once in Mar. mér., in the 1980s, but has disappeared ever since (Digitale2).

• *A. nobilis* L.: this species does not only occur as an escape from cultivation but also as a genuine, unintentionally introduced alien, e.g. as grain alien in the Ghent port area (wn.be). Its persistence as a naturalized species in Camp. or. and Lorr. sept. was recently confirmed (wn.be, MNHN-Lux). Especially in the southern part of the Grand Duchy of Luxembourg it is apparently widely naturalized.

• ***Leucanthemum** vulgare* Lam. and *L. ircutianum* DC.: the frequency, distribution and ecology of these two species are poorly known but the widespread, ubiquitous species certainly is the latter. Genuine *L. vulgare* is probably confined to meso-xerophilous grasslands; its presence has been confirmed e.g. in Stevensweert (Fluv.; Zuid-Limburg) in the Netherlands (Haveman 2017) and in Weinsheim in Eifel centr. (FT).

• ***Cotula** coronopifolia* L.: though still rare, this South African species is further expanding in the Flora area. In addition to the districts from where it was already known, it has also been observed in Fl., and in Brab. it is no longer restricted to the western part of this district (wn.be). It is by far least rare in Mar. (polders, port area north of Antwerp): R, elsewhere RR (wn.be).

• *C. australis* (Spreng.) Hook. f.: this South African species has recently naturalized in the Flora area. It is at present known from Mar., Fl., Camp. and Brab. and chiefly occurs in urban habitats (foot of walls, cracks in concrete, between cobble stones), in Belgium for instance in the cities of Brussels (since 2015; Olivier 2015), Ghent (since 2017), Ieper (since 2020) and Antwerp (since 2021) (all wn.be). In addition, this species is naturalized in several campsites, mostly (but not exclusively) in coastal areas (Verloove *et al.* 2020a).

• ***Soliva** sessilis* Ruiz et Pav.: this recently naturalized weed is known at present from Mar., Fl. and Camp. where it exclusively occurs in disturbed lawns in campsites (Verloove *et al.* 2020a).

• ***Artemisia** princeps* Pamp.: this invasive alien species has been known since the 2000s in the Flora area, but has gone unnoticed for a long time (Verloove & Andeweg 2020, Verloove *et al.* 2020b). Many of the huge populations of alleged *A. verlotiorum* (especially those from the port of Antwerp) actually turned out to belong to *A. princeps*. The latter is at present known from Mar. and Fl. but likely to have been overlooked elsewhere.

• *A. absinthium* L.: in NF6, this species was not explicitly mentioned from Eifel centr., suggesting that it is R in that district. In fact, it is completely lacking there (FT).

• *A. verlotiorum* Lamotte: this invasive species is also known from Lorr., for instance in Virecourt along river Moselle (Bonassi *et al.* 2017). The species is poorly known there since it has long been confused with native *A. vulgaris* (FLORAINE 2013).

• *A. campestris* L. (subsp. *campestris*): this very rare native (sub-)species has been known as a naturalized introduction on a slag heap in Beringen, at least since 2007 (wn.be). In NF6, its subsp. *maritima* (DC.) Arcang., with main distribution in southwestern Europe, was said to have a small, disjunct area in the Netherlands, suggesting that it is native there. However, there is not the slightest doubt that this subspecies was formerly introduced on purpose there and thus merely naturalized (Weeda *et al.* 1991). In Belgium, it has been known since 2001 from De Panne and recently seems to expand to other coastal areas (wn.be). In the same district (Mar.), the subspecies is also known from Zeeland (FZ).

• *A. annua* L.: this alien species is indeed chiefly naturalized in Brab. For many decades it was restricted to its central part (Brussels) but in recent years (since 2012) it has established more or less permanent populations in the wide area around Kortrijk as well, much further west (wn.be). In Brab. occ., it is also known on the other side of the border in France, in the Lille metropolitan area (Digitale2). It is apparently not rare in Tert. par. (database CBN Paris) but probably only just outside the Flora area.

• ***Petasites** pyrenaicus* (L.) G. López: this ornamental is naturalized in several places in Zeeland, in Mar. sept. (H24, FZ, wn.nl).

• *P. albus* (L.) Gaertn.: this species is known from Ard. or. in Germany. Formerly, it also occurred in the adjacent part of Eifel centr., near Roth (FT). Since at least 2008, several naturalized populations have also been known from the Belgian part of Ard., more precisely from the area between Meyerode and Atzerath (Sankt Vith) and from Mont (Houffalize) (wn.be). It is occasionally observed elsewhere as an escape from cultivation.

• *P. japonicus* (Sieb. et Zucc.) Maxim.: this ornamental is naturalized locally in Mar., Fl., Camp. and Brab. where it is R-RR (wn.be, Lecron 2010).

• ***Tephroseris** palustris* (L.) Fourr.: in Pic., this species has been known historically from the Douai area (Pic. sept.). However, it also occurs elsewhere in this district, for instance in Villers-sur-Authie (Digitale2).

• *T. helenitis* (L.) Nordenstam: this rare species is much declining in the Flora area. In some districts mentioned in NF6, its actual presence needs to be confirmed. For instance, in Mar. mér. (Merlimont) it has not been observed after 1999 (Digitale2). In nearly all districts it is known from very few localities.

• ***Senecio** sarracenicus* L.: in Fluv., this species not predominantly but exclusively occurs in its Dutch, northern part. Also in the Netherlands, there are scattered localities in Zuid-Limburg (H24, wn.nl), in Brab. or. In Brab. occ., it was recently discovered in a second locality: in addition to the locality in Haaltert (Den Dotter), known since

2013, it is now also known from Wodecq (since 2019). In 2020, the species (1-2 individuals) was also discovered in a meadow in a nature reserve in Boortmeerbeek, on the verge of Fl. and Camp. (wn.be). The residence status of this species in Belgium remains uncertain. In Fluv., it is usually considered to be native (at the northwesternmost limit of its natural area; Weeda *et al.* 1991) but elsewhere in the Flora area it is probably at most naturalized.

• *S. hercynicus* Herborg: this species is also known from several localities in French Lorr. (AFL). According to Vernier (2020), in the Flora area, it occurs in Côte de Moselle and the southern Plateau lorrain. FG also confirms the species' presence in the Ardennes.

• *S. sylvaticus* L.: in NF6, this species was not mentioned from Mar., suggesting that it is RR in this district. Interestingly, in Zeeland (the Netherlands, especially north of the Scheldt estuary; Mar. sept.) it is not rare at all, according to FZ even AC.

• *S. vernalis* Waldst. et Kit.: this species was said to be R in Eifel centr. In fact, it only occurs immediately east of this region, in Osteifel (FT). In NF6, the flowering period of this species was said to be May(-July). However, nearly all flowering specimens on wn.be are from April and May (some even late March).

• ***Jacobaea*** *aquatica* (Hill) P. Gaertn., B. Mey. et Scherb. (subsp. *aquatica*): this species is not quite rare in Boul. (Digitale2), a district from where it was not mentioned in NF6, erroneously suggesting that it is absent or RR there. The distribution of its subsp. *erratica* (Bertol.) Verloove remains uncertain. Its presence in northeastern France was recently confirmed (Thévenin 2013). FLORAINE (2013) further reported it from the area northeast of Thionville and Vernier (2020) on the Plateau lorrain, all in Lorr. The database of the Paris CBN includes several records from Montagne de Reims in Tert. par. Its presence in northwestern France still requires confirmation (Digitale2) although it seems to have been confirmed at least from near Calais (Hames-Boucres; Duluc 2019). There are no confirmed records from Belgium (wn.be) but this taxon was mentioned in H24 (without details on its distribution) in the Netherlands. According to wn.nl and Atlas-NL there might indeed be records of it in the Dutch part of the Flora area, especially in Fluv., but these need to be confirmed. From Duluc's morphometric studies it appears that distinguishing features mentioned in contemporary Floras are not always reliable.

• ***Doronicum*** *plantagineum* L.: the genuine presence of this species in the Flora area (and its residence status) were questioned in NF6. According to the Paris CBN database it is indeed present in Tert. par. and, moreover, considered to be native there. In Pic., on the contrary, there are only recent records south of river Somme, i.e. beyond the Flora limits (Digitale2).

• ***Arctium*** *tomentosum* Mill.: this species formerly also occurred in several localities in Eifel centr. but it is extinct now (FT).

• *A. nemorosum* Lej.: this species was not mentioned from Eifel centr. in NF6, suggesting that it is RR or absent there. In fact, it is not rare at all in Eifel centr.: its distribution and frequency are similar to that of *A. minus* (Hill) Bernh., thus AR rather than RR (FT).

• ***Carduus*** *tenuiflorus* Curt.: this species was not mentioned from Lorr. in NF6, suggesting that it is merely adventive there. However, it naturally occurs in calcareous fields in the southern part of the Meuse department, e.g. in Abainville (Bonassi *et al.* 2017). In the entire Flora area, it is by far least rare in Mar., however, this only applies to the French and Belgian portion of this district; it is completely lacking in its Dutch part (H24, FZ).

• *C. nutans* L.: the species' abundance in Lorr. (C according to NF6) is strongly overestimated, certainly in Lorr. sept. (Champluvier & Saintenoy-Simon 2014). Overall, it is at most AC in Lorr. according to Vernier (2020).

• *C. acanthoides* L.: the distribution and frequency of this poorly known species were recently reassessed (Verloove 2014). It is overall RR but locally AC, notably in Mar. (port of Antwerp area). It is also increasingly recorded elsewhere in the Flora area and seems to be in expansion: in addition to the numerous records from the Antwerp area, there are confirmed records from Fl. (Ghent area), various parts of Brab., Fluv. (the Netherlands) and on the verge of Fl. and Camp. (Lier) (wn.be, wn.nl). In northern France, it is present in the bordering area of Champ. and Tert. par. (Reims, Cuis; database CBN Paris).

• ***Cirsium*** *eriophorum* (L.) Scop.: in addition to the districts where this species naturally occurs, it is occasionally observed as a casual or more or less established introduction. For example, it was present for some time in Eifel centr., as an introduction, but has disappeared again (FT). In Grootenhout (Lille: Giels Bos; Camp.) a small population persists since at least 2013 (wn.be).

• *C. acaulon* (L.) Scop.: in Lorr. sept ., this species has become AR rather than C, due to the disappearance of its habitat (Champluvier & Saintenoy-Simon 2014).

• *C. heterophyllum* (L.) Hill: this naturalized species was thought to have probably disappeared from the Flora area. However, its persistence was recently confirmed in at least two localities, both in Ard.: Amel (2017) and Saint-Hubert (2010) (wn.be). In the latter area, it has been known since the 1960s (Delvosalle 1966). It was formerly also naturalized in an arboretum in Tervuren (Brab.) but its actual presence there was not confirmed lately (APB).

• *C. dissectum* (L.) Hill: this species is dramatically decreasing in the entire Flora area. It has certainly disappeared from some districts, for instance in Fl. and Brab. (wn.be). In the latter district it was formerly known from the valleys of rivers Scheldt and Scarpe but it is long extinct there (Digitale2). A small population was known since c. 2012 from Vorsdonkbos in Betekom but the species was introduced there (wn.be) and most likely has disappeared again lately (comm. A. Jacobs 10.2022).

• *C. tuberosum* (L.) All.: in NF6, this very rare species was still mentioned from Mosan (Marche-en-Famenne, Mariembourg). It is, however, long extinct in the whole of Belgium (Lawalrée & Delvosalle 1969) and the same applies to the Grand Duchy of Luxembourg (MNHN-Lux).

• ***Silybum*** *marianum* (L.) Gaertn.: it is very unlikely that this species is native anywhere in the territory covered by the NF (compare with FG, Verloove 2006a). It probably occurs in all districts, not markedly more frequently so in one than in the other.

• ***Centaurea*** *calcitrapa* L.: this species is dramatically decreasing throughout the Flora area and certainly has disappeared from some of the districts mentioned in NF6. For instance, in Mar. mér. it has not been recorded for several decades (Digitale2) and its actual presence in Mosan probably also requires confirmation (AFW, wn.be). In Belgium and the Netherlands, it is at present only known from Brab. or. (surroundings of the Sint-Pietersberg where it is still quite frequently observed; wn.be, wn.nl). It should be noted that in this area, part of the records are from the gravel banks of river Maas and thus in Fluv. In the part of northern France that belongs to the Flora area, it has also almost completely disappeared. Recently confirmed populations are known from Pont-sur-Seine in Tert. par. (database CBN Paris). It is absent from the French part of Lorr. (FLORAINE 2013, Vernier 2020) and was last seen in the Luxembourg part in 1949 (MNHN-Lux).

• *C. stoebe* L.: outside Lorr. or., this species does not only occur as a casual adventive or escape, it is locally naturalizing. This applies particularly to the Waasland port area (wn.be) where a weedy, tetraploid race was formerly introduced that is locally spreading, subsp. *australis* (A. Kerner) Greuter.

• *C. nigrescens* Willd.: this species is known from at least two localities in Fl. and Brab. (Aalter, Oudenaarde) where it is locally naturalized (Hoste *et al.* 2015). It may have been overlooked elsewhere. There are historical claims from northeastern France as well (for instance from Vouziers in Lorr. occ.; database CBN Paris), an area where the species ought to be sought.

• ***Cyanus*** *segetum* Hill: the distribution given in NF6 is no longer applicable. As an archaeophytic weed of crop fields it has become RR throughout most of the Flora area. However, at present, it is regularly cultivated for ornament in gardens, but also often introduced as a component of wild flower seed mixtures, especially at the edges of crop fields. As a result, despite being rare as a native/archaeophytic species, it has now become more widespread, as an ephemeral or naturalizing neophyte.

• ***Carthamus*** *lanatus* L.: this species was recently rediscovered in Thierville-sur-Meuse, near Verdun in Lorr., in a region where the species has been known for two centuries (Courte 2019). This district was not mentioned in NF6. In Tert. par., this species has dramatically decreased: it has almost disappeared from all its localities in the Flora area (database CBN Paris).

• ***Lapsana*** *communis* L. subsp. *intermedia* (Bieb.) Hayek: this non-native subspecies is apparently slightly increasing in the Flora area. As mentioned already in NF6, it is naturalized in Lorr. sept. in the Grand Duchy of Luxembourg where its actual presence in several localities has been confirmed lately (MNHN-Lux). In addition, it has been observed recently in at least three localities in northeastern France as well, in Sedan (Ard.) and in Florent-en-Argonne and Vienne-la-Ville (Lorr. occ.) (database CBN Paris).

• ***Arnoseris*** *minima* (L.) Schweigg. et Körte: this very rare species has almost completely disappeared from the Flora area. In NF6, it was still mentioned from Fl., Camp., Lorr. and Tert. par. It is likely extinct in Fl. where it was last seen in 2003 in Heikant (the Netherlands; FZ). The same applies to Tert. par. (database CBN Paris). In Camp., there are scattered extant populations, in Belgium as well as the Netherlands (wn.be, wn.nl). However, these refer for the most part to re-introductions (e.g. in Lichtaart and Zonhoven in Belgium; wn.be).

• ***Hypochaeris*** *glabra* L.: it was already known that this species was slightly less rare in the southern part of Mar.; the same applies to the northern part of this district, in Zeeland in the Netherlands. According to FZ it is only AR there. It has, on the contrary, completely disappeared from Lorr.: it is absent now from the Belgian and French part and since the 1960s also from the Luxembourg part of this district (FLORAINE 2013, Vernier 2020, wn.be, MNHN-Lux).

• ***Leontodon*** *saxatilis* Lam.: in NF6, Eifel centr. was not mentioned, suggesting that this species is only AR-R in this district. However, it is completely lacking there (FT).

• ***Picris*** *hieracioides* L.: this species has been expanding rapidly in recent times. In Fl., Camp. and (to a lesser extent) Ard., it is no longer AR-R, rather AC-AR (wn.be).

• ***Helminthotheca*** *echioides* (L.) Holub: the same applies to this species. In Fl., where it was considered to be RR in NF, it has become at most R now (wn.be).

• ***Tragopogon*** *porrifolius* L. × *pratensis* L. (*T.* ×*mirabilis* Rouy): this hybrid is not only known from the western part of the Flora area. Although rare everywhere, it has been recorded throughout the entire territory (wn.be).

• *T. dubius* Scop.: in NF6, this species was said to be merely adventive or perhaps locally naturalized in Lorr. In fact, it is not quite rare and relatively widely naturalized in this district. According to FLORAINE (2013) it is R, whereas according to Vernier (2020) it is locally (Wöevre, Plateau lorrain) even AC. See also Remacle (2014a: railway yards Stockem, Athus).

• ***Podospermum*** *laciniatum* (L.) DC.: this species is probably extinct in the entire Flora area. It has certainly disappeared from Lorr. (FLORAINE 2013, Vernier 2020) and the same applies to Tert. par. and Mosan mér. (database CBN Paris). In the Grand Duchy of Luxembourg it was last seen in 1960 (MNHN-Lux), in Belgium apparently in Merlemont in the 1980s (Lambinon *et al.* 1994).

• ***Chondrilla*** *juncea* L.: this thermophilous species is recently expanding in the Flora area. In addition to the southern districts where it has been known since several decades [Mar. mér., Pic., Lorr. (surtout or.), Champ. and Tert. par.] it is in the process of naturalization further north, especially in the port areas of Dunkerque (France) and Antwerp (Belgium), as well as in the coal mining area in Camp. (wn.be, Stien 2018).

• ***Taraxacum***[3] section *Erythrosperma* (Lindb. f.) Dahlst.: 1) *T. glauciniforme* Dahlst.: this species does probably not occur along the Dutch coast; claims from Zuid-Limburg, on the other hand, are correct. 2) *T. lacistophylloides* Dahlst.: Piet Oosterveld never observed this species in the Netherlands. At present, its presence in the Flora area is confirmed from the following districts: Mar., Pic., Brab., Mosan, Lorr., Ter. par. and Eifel centr., where it is AC-R (e.g. Matysiak 2012). 3) *T. taeniatum* Hagl. ex Holmgr.: this species is restricted to the coast of the North Sea. 4) *T. clemens* Matysiak: the distribution of this species in the Flora area was specified: it is known from Mar., Pic., Brab. and Ter. par. 5) *T. scanicum* Dahlst.: this species is found in ordinary, urban habitats (such as lawns, sidewalks) and thus probably is AC rather than AR. 6) *T. lacistophyllum* (Dahlst.) Raunk.: this species is much less rare in Mar. (AC) than elsewhere in the Flora area (AR). 7) *T. argutum* Dahlst.: this species has been known from Mar. mér. (Matsyiak 2017).

• *T.* section *Palustria* (Lindb. f.) Dahlst.: in northwestern France, this section is mainly distributed in Mar., the most species rich locality being "les Mollières" in Berck-sur-Mer. The least rare taxa (each with around ten occurrences) are *T. palustre* (Lyons) Symons and *T. ciliare* v. Soest. They are often found together. *T. udum* Jord., well known from eastern France, was recently discovered near a slag heap in Wingles in northwestern France (Brab. occ.) (Matysiak 2018).

• *T.* section *Celtica* A.J. Richards: 1) *T. zevenbergenii* v. Soest: this species was found in France, in Avesnois (Mosan occ.; Matysiak 2018). 2) *T. nordstedtii* Dahlst. and *T. hygrophilum* v. Soest are both known from Zeeland in the Netherlands (FZ), the latter also from at least one locality in the Belgian part of Mar. (Peerdevisschersweide in Oostduinkerke; comm. M. Leten and I. Jacobs, 05.2022). 3) the recently described *T. frugale* Hofstra has been documented from Mar., Boul., Brab. and Pic. (it is R everywhere).

• ***Sonchus*** *tenerrimus* L.: this thermophilous weed has been known since several years from plant nurseries and garden centers, where it is one of the more characteristic weeds (Hoste *et al.* 2009). Up to the present, however, it was considered to be a mere casual. In 2021, a seemingly established population with a few hundred of individuals was detected on and near a railway yard in the port area of Dunkerque (Mar., France; obs. author). A future local naturalization in climatologically suitable areas and habitats in the Flora area seems likely.

• *S. palustris* L.: this species is expanding lately. In Fl., along river Scheldt, it is no longer restricted to the area downstream of Dendermonde and it is now also present in the valley of river Leie (wn.be). In Lorr., it is no longer confined to the northwestern part of this district. FLORAINE (2013) also indicated its presence around Toul, in Lorr. mér. The species recently also appeared in several localities in the coastal part of Picardy (Mar. mér.) and in the valley of river Somme in Pic. mér. (Digitale2).

• ***Lactuca*** *saligna* L.: in NF6, extant populations of this very rare and much declining species were only mentioned from Lorr., especially from the valley of river Moselle. However, even there it has completely disappeared. FLORAINE (2013) still reported it from Neufchâteau (i.e. beyond the Flora limits) and Vernier (2020) only mentioned it from Hautes-Vosges. It is thus extinct in the entire Flora area.

• *L. serriola* L.: this species is much expanding lately and has become more common than indicated in NF6. In Fl., Camp. and Brab. it is actually C-AC rather than AC-R (wn.be).

• *L. virosa* L.: although evidently much rarer, this species also seems to be slightly expanding lately (wn.be).

• *L. muralis* (L.) Gaertn.: this species too is in expansion, especially in urban habitats (a habitat not yet mentioned, moreover, in NF6). In Fl. and Camp., it is AR rather than R-RR (wn.be).

• ***Crepis*** *sancta* (L.) Bornm.: the species' actual presence in Lorr. is uncertain: according to FLORAINE (2013) it has completely disappeared, whereas Vernier (2020) still reported it from Meuse.

• *C. foetida* L. subsp. *rhoeadifolia* (Bieb.) Čelak.: this alien subspecies is much expanding lately. It was already known from slag heaps in Camp. or. but at present also abundantly occurs in the Antwerp port area (roadsides, railway infrastructure) (wn.be).

• *C. setosa* Haller f.: in Lorr., this species is RR rather than R. It only occurs in the Belgian part of this district (Lorr. sept.) and is completely lacking in the French and Luxembourg part (FLORAINE 2013, MNHN-Lux).

• *C. praemorsa* (L.) F.W. Walther: this species, which is native to France, Germany and the Grand Duchy of Luxembourg, and already occurred near to the Belgian border, was discovered in a moor in Elsenborn (Ard.) in 2010, for the first time in Belgium (Frankard & Dahmen 2013).

• *C. paludosa* (L.) Moench: contrary to what was stated in NF6, this species is absent from Lorr. or. In this district it is restricted to the northern, Belgian part (wn.be, FLORAINE 2013).

• ***Pilosella*** *cymosa* (L.) F.W. Schultz et Schultz-Bip.: this species was mentioned in NF6, as an introduced species, in Eifel centr. In fact, its populations are located just beyond the Flora limits, in Ost-Eifel (FT).

[3] The account for the genus *Taraxacum* was updated by Jean-Patrice Matysiak.

• *P. flagellaris* (Willd.) P.D. Sell et C. West: this poorly known species is also known from Brab. (Saintenoy-Simon 2016), including several localities in the Brussels area (Ronse & Gottschlich 2017).

• *P. peleteriana* (Mérat) F.W. Schultz et Schultz-Bip.: this very rare species is historically known from a very small area in Belgium (Mosan: valleys of Hermeton and Lesse; Ard.: valley of Houille). In the same area, it was recently also discovered in France, in the valley of river Meuse (Chooz and Rancennes) (database CBN Paris).

• *P. piloselloides* (Vill.) Soják is expanding recently, especially in the southern (French) part of the Flora area. In addition to the districts already mentioned in NF6, it is also known from Mar. (Dunkerque area), Pic. (especially in the mining area), Ard. (not only in Oesling as stated in NF6 but also in the French, southern part of this district), Champ. and Tert. par. (Digitale2, database CBN Paris).

• *P. ziziana* (Tausch) F.W. Schultz et Schultz-Bip.: this species also occurs in Eifel centr., in Birresborn (FT). In Lorr. sept. (Grand Duchy of Luxembourg), on the contrary, where it is considered to be possibly native, its actual presence requires confirmation: it was last seen there in 1957 (MNHN-Lux).

• *P. caespitosa* (Dum.) P.D. Sell et C. West: this species was recently discovered in Zeeland (Mar. sept.) (FZ) and it is also known from several localities in Champ. (database CBN Paris). Its genuine presence in Pic. (and the French part of Brab.), on the contrary, requires confirmation: according to Digitale2 its presence in northwestern France is doubtful [confusion with *P. bauhini* (Schult.) Arv.-Touv.?].

• ***Hieracium*** *diaphanoides* Lindeb.: this species, more precisely its subsp. *deductiforme* Zahn, is also known from Eifel centr., in Steffeln (FT).

• *H. onosmoides* Fries: the possible presence of this species in Eifel centr. was already mentioned in NF6. FT indeed confirms its historical presence there (in Gerolstein) but it is extinct now. In Ard. or., also in Germany, it is still known from a single locality (FT).

• *H. wiesbaurianum* Uechtr.: in the German part of the Flora area, this (micro-) species only occurs in Ard. or., not in Eifel centr. (FT).

• *H. fuscocinereum* Norrlin and *H. caesium* (Fries) Fries: in NF6, these two (micro-) species were mentioned from Tert. par. It is doubtful that this refers to the Flora area: Digitale2 does not refer to these species and the CBN Paris database only indicates a few records from outside the Flora area, the most recent record for the former moreover dating back to 1969.

• *H. amplexicaule* L.: all known populations in the Flora area (Pic. sept. and Brab. occ. and or.) in fact belong to *H. pulmonarioides* Vill. (Verloove & Tison 2019). According to the CBN Paris database "H. amplexicaule" also occurs in a single locality in Lorr. occ. (Autry) but it is unknown whether or not this refers to *H. amplexicaule* s.str.

169. Adoxaceae

• ***Adoxa*** *moschatellina* L.: this species is hardly any rarer in (many parts of) Fl. than in for instance Brab., i.e. AR rather than R-RR (wn.be).

• ***Sambucus*** *ebulus* L.: this species is expanding slightly and is now found in areas where it was very rare or absent before (notably in Mar., Fl., Camp.; wn.be, FZ). At least in some of these localities, it is doubtfully native.

• *S. canadensis* L.: in the Flora area this North American ornamental is not merely known as an escape: at least in the Midden-Limburg Vijvergebied (Camp.) it is naturalized for several decades by now (wn.be). In this district, it is also known from several localities in the Netherlands (wn.nl).

• *S. racemosa* L.: this species too is locally expanding; it has become rather widespread in Camp. and also in the western part of the Flora area it is no longer 'virtually absent' as stated in NF6 (wn.be).

• ***Viburnum*** *rhytidophyllum* Hemsl.: this Asian ornamental is increasingly escaping and tends to naturalize locally, especially in Mar., Fl. and Camp. (wn.be).

• *V. opulus* L.: in NF6, this species was said to be C-AC throughout the Flora area, except in Mar. where it is R. This is no longer true: in Zeeland it is considered to be even CC (FZ) and it is hardly any rarer in the Belgian part of this district (wn.be). Many populations, however, refer to escaped garden plants.

• *V. lantana* L.: the same applies to this species: in addition to the districts where it occurs naturally, it is increasingly observed as an escape from cultivation, also in areas where it is not native (wn.be).

170. Caprifoliaceae

• ***Cephalaria*** *gigantea* (Ledeb.) Bobrov: in NF6, this ornamental species was said to have persisted for a few years near Luxembourg (city). This refers to 1952-1955 and thus is no longer relevant (MNHN-Lux).

• ***Lonicera*** *acuminata* Wall.: this ornamental liana is increasingly escaping and locally perhaps naturalizing (wn.be).

• *L. periclymenum* L.: according to NF6, this species is C-AC throughout the Flora area, except in Mar., where it is R-RR. However, this only applies to the polders; in coastal dunes this species is not rare at all (wn.be).

• *L. caprifolium* L.: although RR, this ornamental species is widely spread in Lorr. and not confined to the north-eastern part of this district as stated in NF6 (FLORAINE 2013). However, it should be noted that the 'usual' species of this complex in eastern France is *L.* ×*italica* Tausch (*L. caprifolium* × *etrusca* Santi) (comm. J.-M. Tison, 11.2021). The identity of plants that are naturalized in Lorr. thus possibly needs to be reassessed.

• *L. xylosteum* L.: this native species is also much grown for ornament and is readily escaping wherever planted. It easily naturalizes and has become R-RR rather than RR

in areas where it is not native, for instance in parts of Fl. (wn.be).

• *L. nitida* Wils.: this Asian ornamental is much escaping lately and has locally naturalized, especially in Mar., Fl., Camp. and Brab., where it is AC-AR (wn.be).

• the same applies to *L. pileata* Oliv., although this species is less common, rather AR-R (wn.be).

• *L. japonica* Thunb.: this ornamental Asian liana is increasingly escaping and locally naturalizing, especially in Fl., Camp. and Brab., where it is R-RR (wn.be).

• ***Dipsacus*** *fullonum* L.: in NF6, this species was said to be R-RR in Fl., Camp. and Ard. In the first two of these districts it is in fact at most AC-AR (wn.be). In Ard., on the contrary, it is indeed much rarer (wn.be, AFW).

• *D. laciniatus* L.: this species has naturalized locally in Fl. and Brab. (R-RR) (wn.be). It also occurs around Metz and Nancy in Lorr. (FLORAINE 2013) but it is unclear whether the species is also naturalized there. The species also occurs in at least two localities in Champ. (Bouy, Veuve) where it is even considered to be native (database CBN Paris).

• *D. pilosus* L.: this species is omnipresent in the valley of river Maas (Fluv.) where it is much less rare than elsewhere in Brab. or. (AR-R, rather than RR) (see also H24). In Eifel centr., it was said to be R-RR in NF6; in reality, it is absent there (FT). In general, this species seems to be slightly expanding lately and it certainly has become less rare in some of the districts, for instance in parts of Brab. (e.g. fairly common in Flemish Ardennes). Moreover, the species also occurs (RR) in districts that were not yet listed in NF6, e.g. in Mar. (FZ, wn.be).

• *D. strigosus* Willd. ex Roem. et Schult.: this species has only been known since 2012 in the Flora area where it was first observed in Brussels. It then underwent a remarkable expansion although it cannot be excluded that the species was previously confused with *D. pilosus* L. (Verloove 2012). At present it is known from Fl. (especially Ghent area), Brab. centr. (Brussels area) and or. (the Netherlands), Fluv. (the Netherlands) and Lorr. (Meurthe-en-Moselle). In these districts it is still RR but naturalized and expanding (wn.be, wn.nl, H24, Pax 2018b).

• ***Knautia*** *arvensis* (L.) Coulter s.l.: peculiar plants with pinkish-purplish corollas [tentatively ascribed to *K. purpurea* (Vill.) Borbás in NF6 but perhaps closer to *K. timeroyi* Jord.] were already known from Lorr. mér. (Metz and Nancy areas). Very similar and probably identical plants have recently become known from Latour near Arlon (Lorr. sept.) (wn.be, since 2018). Vernier (2014) considers this taxon to be a war-adventive ("plante obsidionale") in northeastern France, known moreover from rather numerous localities, including near Verdun.

• *K. dipsacifolia* Kreutzer: this very rare native species is known from at least two localities in Lorr. (a district from where it was not mentioned in NF6), near Nancy and east of Thionville (FLORAINE 2013, Vernier 2020). SI-Flore further indicates its presence south of Luneville, just south of the Flora area.

• ***Scabiosa*** *atropurpurea* L.: this species was already mentioned in NF6, as an escape from cultivation. It is more often observed in recent years (wn.be), probably mostly from wild flower seed mixtures (subsp. *atropurpurea*). In Mar. (port of Dunkerque) and Camp. (slag heap Heusden-Zolder), however, apparently naturalized populations have been known (in Dunkerque at least since 2010) of subsp. *maritima* (L.) Arcang., an adventive subspecies with pale corollas (Stien 2018). Its genuine naturalization in climatologically suitable parts of the Flora area is quite possible.

• *S. columbaria* L. subsp. *pratensis* (Jord.) Br.-Bl.: this subspecies, of debatable taxonomic value, is slightly less rare in Lorr. than indicated in NF6, AR-RR, rather than R-RR (FLORAINE 2013).

• ***Centranthus*** *ruber* (L.) DC.: this ornamental is naturalized since quite a long time in Mosan. In the entire Flora area, it is much expanding lately and locally naturalizing, especially in urban habitats (wn.be).

• *C. angustifolius* (Mill.) DC.: in addition to the few localities in Lorr. that were already cited in NF6, this species is also naturalized in Côtes de Moselle between Metz and Nancy (FLORAINE 2013, Vernier 2020).

• *C. calcitrapae* (L.) Dufr.: this thermophilous species has been known from the Lille metropolitan area in France (Brab. occ.) since 2016 and is now abundantly naturalized in some railway yards (pers. obs. author). It was subsequently also observed in the Ghent area in Fl. and is expected to further expand via railway infrastructure (Verloove *et al.* 2019).

• ***Valeriana*** *officinalis* L. subsp. *repens* (Host) O. Bolòs et Vigo: this taxon is C-AC throughout the Flora area, except in Mar. where it was said to be R-RR in NF6. In fact, this only applies to the coastal dunes area; in the polders it is a bit less rare (wn.be). It is also considered common in Zeeland, also outside the coastal dunes (FZ).

• ***Valerianella*** *carinata* Loisel.: this species seems to be expanding slightly (or has gone unnoticed before?), especially in some districts (Mar., Fl.; wn.be). Its current distribution remains to be determined.

• *V. locusta* (L.) Laterr.: this species was said to be R in Camp. in NF6. It is, however, hardly any rarer than in e.g. Fl. or Brab., at most AR (wn.be).

• *V. dentata* (L.) Pollich: as a weed of agricultural fields, this species is much declining in much of the Flora area. For instance, in Brab., where it was said to be merely AR, it has apparently not been recorded in the past decades, at least in Belgium and France (wn.be, Digitale2; it is still present in Zuid-Limburg in the Netherlands, see H24, wn.nl). Also in many of the other districts it may be (much) less common than indicated. In areas where it is not native (or archaeophytic), it is occasionally observed as a casual alien (mostly in port areas, as grain alien).

• *V. rimosa* Bast.: more or less the same applies to this species that is even less common. The genuine present-day distribution and frequency of these two species need to be reassessed.

• *V. eriocarpa* Desv.: this very rare species, and considered to be alien in the Flora area, is known from a few localities in the Tert. par. / Champ. bordering area (surroundings of Reims) where it is accepted as a native species (database CBN Paris).

171. Araliaceae

• ***Hedera*** *hibernica* (Kirchn.) Bean probably has been overlooked for quite some time in the Flora area and its actual distribution and frequency are still imperfectly understood. It is probably AC-AR in Fl., Camp. and Brab. (wn.be) and RR elsewhere (e.g. in Ard.; Bizot 2012a – also e.g. in Mar., Pic.; Digitale2). It may be much more widespread and common (Boeraeve *et al.* 2021). It is often more vigorous than *H. helix* and, for this reason, much more often cultivated than the latter these days. It is increasingly observed as an escape but its nativity in the territory of the Flora, especially in the extreme southwestern part, cannot be ruled out, although this is rather unlikely.

• ***Hydrocotyle*** *vulgaris* L.: in Lorr., this species does not predominantly but exclusively occur in the northern part of this district (wn.be, FLORAINE 2013).

• *H. ranunculoides* L. f.: this invasive aquatic weed has much expanded lately, especially in Fl., Camp. and Brab. where it is no longer R but AC-AR (although newly detected populations are usually readily eradicated nowadays). It is now also known from Ard. (wn.be, AFW).

172. Apiaceae

• ***Trinia*** *glauca* (L.) Dum.: in NF6, this species was mentioned from Champ. and Tert. par. However, none of these populations are located within the limits of the Flora area. The nearest locality apparently was in Saint-Fiacre (department Seine-et-Marne) but the species was last seen there in 1912 (database CBN Paris).

• ***Eryngium*** *giganteum* Bieb.: this species was already mentioned as an escaped ornamental in NF6. In addition, it is also present in some localities in French Lorr. (surroundings of Verdun and Nancy) where it is considered to be a war alien ("plante obsidionale"; Parent 2004, FLORAINE 2013, Vernier 2014).

• ***Astrantia*** *major* L.: this ornamental has been recorded in several additional districts: Mar., Fl. and Brab. (wn.be). In Ard., from where it was already known, it was recently reported from riparian woodland (Champluvier & Germeau 2013), while the species normally occurs in disturbed or other ordinary habitats.

• ***Chaerophyllum*** *byzantinum* Boiss.: this West Asian species was previously recorded from Mosan but probably as a mere ephemeral. Since 2016 a small, apparently naturalized population has been known from Genk in Camp. or. (wn.be).

• *C. temulum* L.: in Fl., this species is slightly less rare than indicated in NF6, AC rather than AR-R (wn.be). Only in Ard., it is indeed much less common than in the other districts.

• *C. bulbosum* L.: in NF6, this species was said to be AC in Lorr. which is a gross overestimation. It is AR or even R there (FLORAINE 2013). This species is occasionally observed as an (ephemeral) introduction, recently for instance in Fl. (Moerbeke, 1997) and Brab. (Moen, 2015) (wn.be).

• *C. aureum* L.: this species has recently naturalized in Montagne de Reims (Tert. par.) where it is known from three localities (Thévenin *et al.* 2014). It is occasionally observed as an (ephemeral?) introduction elsewhere in the Flora area, for instance in Camp. (Olmen, 2011-13; wn.be).

• ***Anthriscus*** *sylvestris* (L.) Hoffmann: this species was said to be AR in Fl. and Camp. (except in river valleys). This is no longer the case: it is by no means less common in Fl. and Camp., nor less frequently outside river valleys (wn.be).

• *A. caucalis* Bieb.: this species is in recent expansion, especially in Fl. and Brab. where it has become AR rather than R. In addition, it is slightly less rare in Camp. than in the rest of the Flora area (R instead of RR) (wn.be, Digitale2).

• ***Torilis*** *nodosa* (L.) Gaertn.: this species seems to be in recent expansion, especially in Fl. and Brab., two districts where it was thought to be RR, if not absent, until recently. It is predominantly seen in lawns and is presumably spread by lawn mowers. Even in Mar., where the species occurs naturally, it has become AC-AR, rather than AR-R (wn.be, FZ). Also elsewhere in the Flora area, it is on the rise but its status (ephemeral vs. naturalized) needs to be assessed (see also Bonassi *et al.* 2017 for a recent record in a lawn in Nancy in Lorr.). In Pic., it has not disappeared: the species is still present in the extreme south of this district, in the valley of river Somme in the surroundings of Amiens (Digitale2).

• *T. japonica* (Houtt.) DC.: in Camp., this species is AC rather than AR, especially when compared with Haute Ard., where it is indeed much rarer (wn.be).

• *T. arvensis* (Huds.) Link: there are dozens of reliable recent records from the Viroin (Mosan) (wn.be), where it is R rather than RR. The species may have been overlooked there before.

• ***Orlaya*** *grandiflora* (L.) Hoffmann: this species is dramatically declining in the Flora area. It probably has completely disappeared in Tert. par. and possibly also in Champ. (database CBN Paris). In Mosan, there is at least one extant population, in Comblain-au-Pont (wn.be).

• ***Caucalis*** *platycarpos* L.: the same applies to this species. It had already disappeared in Mosan (Othée) in 1980 (Fabri 1993) and also seems to be extinct now in Champ. and Tert. par. (database CBN Paris). There probably are a

few populations left in French Lorr. (FLORAINE 2013). In the Luxembourg part of this district it was last seen in the 1950s (MNHN-Lux).

• ***Turgenia*** *latifolia* (L.) Hoffmann: the same applies to this species. It is long-extinct in Belgium and the Grand Duchy of Luxembourg where it was last seen as a weed of agricultural fields in 1933 and 1959 respectively (MNHN-Lux; Colling 2005). It probably has also disappeared from most (if not all) of Champ. (database CBN Paris).

• ***Coriandrum*** *sativum* L.: this ephemeral alien is slightly less rare than was indicated in NF6, R-RR rather than RR (wn.be).

• ***Conium*** *maculatum* L.: this species is recently in strong expansion locally in the central reservation of motorways, especially in parts of Flanders. In Fl., it is therefore no longer R-RR, rather AR-R (wn.be).

• ***Bupleurum*** *tenuissimum* L.: this species, presumed extinct since 1928 in Belgium, was rediscovered on a dike near the Zwin nature reserve in Knokke in 2011. Its persistence there was regularly confirmed ever since (wn.be). It was also discovered, just outside the Flora area, on the south side of the Somme river, at Cap Hornu, in 2015 (Duhamel & Delaporte 2017).

• ***Helosciadium*** *inundatum* (L.) Koch: this species, thought to be extinct in Fl., has been known for 10-15 years from the Gulke Putten nature reserve in Wingene (numerous reliable records on wn.be). It is also known from very few localities in Lorr. occ. (Autry) and Tert. par. (Brie) (database CBN Paris), two districts not mentioned in NF6.

• *H. nodiflorum* (L.) Koch: in Lorr., this species is not C-AC but rather AR (FLORAINE 2013).

• ***Petroselinum*** *crispum* (Mill.) Fuss: in NF6, this species was said to be escaping or naturalizing in the Flora area. It is, however, strictly ephemeral but perhaps slightly less rare than indicated, R-RR rather than RR (e.g. wn.be).

• ***Sison*** *amomum* L.: outside its natural distribution area, this species is occasionally observed as an introduction, for instance in Kanne (Brab. or.) in 2016 (wn.be).

• ***Cicuta*** *virosa* L.: this species never occurred in Eifel centr., only further east, in Osteifel (FT). In the whole of northwestern France (at least the part covered by the NF), it has almost completely disappeared in the past decades: there is a single extant locality in Audomarois (Clairmarais) (Brab. occ.) but the species is probably extinct in Pic., even in the valley of river Somme where it was not rare until the 1990s (Digitale2). In recent years, this species is occasionally introduced: there are, for instance, a few localities in West-Flanders where the species is found in recently constructed retention basins (wn.be).

• ***Ammi*** *majus* L.: this xenophyte is much expanding recently and has definitively naturalized in parts of the Flora area (Ronse 2019). It is probably least rare now in Fl., Pic., Brab., Fluv., Champ. and Tert. par. (wn.be, Digitale2, database CBN Paris). In the latter two districts, it may be considered a native species (natural range expansion). In Fluv., it has naturalized, sometimes in abundance, on the gravel banks of river Maas.

• ***Ptychotis*** *saxifraga* (L.) Loret et Barr.: in NF6, this species was only mentioned for the entire Flora area, as naturalized, in Euville in Lorr. mér., from where it may have recently disappeared according to Vernier (2020). There are a few other localities in the extreme southern part of the Flora area, not only in Lorr. mér. (Éclaron-Braucourt-Sainte-Livière) but also in the bordering area of Champ. and Tert. par. (Villers-Marmery, Soudé, Vindey, etc.) (database CBN Paris). These may result from a recent range expansion and could thus, at least in part, be considered as wild occurrences. A previous claim from Belgium, from a canal bank in Camp. (Heylen & Van Reet 2001), was erroneous and referable to *Carum carvi*. This atypical habitat was therefore deleted.

• ***Falcaria*** *vulgaris* Bernh.: in Eifel centr., there is only a single locality left for this species (FT), it is thus RR not R. In Mar., this species occurs in Zandvoorde since at least 1988 (wn.be) and it was also known in Zeeuws-Vlaanderen (the Netherlands) until a few years ago, from where it apparently disappeared recently (FZ). It was also found in Haulchin near Mons in Brab. occ. in 2015 (wn.be). In the latter district, it may be a mere temporarily persisting introduction but at least in Zandvoorde it seems to be naturalized.

• ***Trocdaris*** *verticillatum* (L.) Raf.: this very rare native species is much declining recently. In Belgium, it is only known from three extant localities in Camp. and two in Ard. occ. (AFW, wn.be). In the Flora area, it is by far least rare in Plateau de Rocroi (Ard. occ., France) (database CBN Paris).

• ***Bunium*** *bulbocastanum* L.: the distribution of this species was specified: in Mar., it is only present in France (Digitale2) and Zeeland (FZ). In Mosan, it is more or less equally dispersed throughout the district (not predominantly in its southern part) and in Brab. or. it is only known from the Netherlands (Zuid-Limburg) (wn.be, wn.nl, H24).

• ***Conopodium*** *majus* (Gouan) Loret: in Lorr., this species is not restricted to the Luxembourg part of this district: there are at least two localities further south, in France (FLORAINE 2013).

• ***Sium*** *latifolium* L.: in Brab., this species does not occur more often in the western part of this district, it is more or less equally dispersed throughout the district (wn.be). In NF6, for Lorr., it was said to be least rare in the valley of river Meuse. Even there, it has possibly mostly disappeared: FLORAINE does not indicate a single record in the whole of French Lorr. and SI-Flore only mentions one more or less recent record (2003) from Verdun. In the Belgian part of this district there are still some extant localities (wn.be).

• ***Foeniculum*** *vulgare* Mill.: this southern species is expanding and locally naturalizing. In Fl. and Brab., where

it was considered to be RR, it has become at most AR (wn.be). In Zeeland, it is considered to be even AC (FZ).

• ***Crithmum*** *maritimum* L.: this coastal species is clearly expanding lately and now occurs along the entire Belgian coast (numerous records; wn.be); it is no longer RR there, rather AR-R. Also in the southern and northern part of Mar. it has become less rare (AC-AR, rather than AR) (Digitale2, wn.nl). In Zeeland, it is now considered to be AC (FZ).

• ***Seseli*** *montanum* L.: in AFW and wn.be, there are a few claims for this species from the Belgian part of Mosan but these require confirmation (most likely erroneous identifications).

• *S. annuum* L.: in NF6, this species was said to be least rare in Tert. par. where it was considered to be merely R. However, it has probably completely disappeared from this district (at least from the part covered by NF), the nearest extant localities being in Val d'Oise and Haute Marne (database CBN Paris, Digitale2), i.e. beyond the Flora limits. A claim from the Belgian part of Mosan (AFW) requires confirmation but is most likely erroneous.

• *S. libanotis* (L.) Koch: there are several recent records at various places on the left bank of the Scheldt river north of Antwerp (since 2011) (Mar.) and one near Sint-Niklaas (2019) (Fl.) (wn.be) where it doubtlessly is adventive. A previous record in Fluv. mér. (river Maas, 2008) may also be classified as introduced rather than natural.

• ***Aethusa*** *cynapium* L.: in NF6, var. *cynapium* was said to be AR in Fl. and Camp. This, however, is not confirmed by data from wn.be, rather on the contrary. In Ard., it is indeed much less common than elsewhere in the Flora area. The distribution of var. *gigantea* Lej. is still imperfectly known. It is apparently least rare in Mosan and Lorr. and in Tert. par. it is known from e.g. Montagne de Reims (Thévenin *et al.* 2014). Claims from Fl. (wn.be) require confirmation.

• ***Oenanthe*** *aquatica* (L.) Poiret: in Mar., this species is not rarer than in Fl. and Camp., AC rather than AR (heat map wn.be; for comparison: in FZ it is also considered to be AC). In Brab. (entire district, not more so in its western part) it is rather AR than R (wn.be). Contrary to NF6, it is also known from Ard., both in the Belgian and French part of the district, e.g. from Sourbrodt and Renwez (wn.be, database CBN Paris).

• *O. fluviatilis* (Bab.) Colem.: this species is much declining recently. In the whole of northwestern France (Pic., Brab. occ.) it has almost completely disappeared in the past two decades (Digitale2). In northcentral and northeastern France, it was mentioned from Champ. (Marne) and Tert. par. in NF6. However, records from the latter district (all from near Meaux in Seine-et-Marne) are located well beyond the Flora limits. The species is still present in the valley of river Marne but only near Doulaincourt-Saucourt and thus in Lorr., not in Champ. (database CBN Paris). Moreover, these records are on (or rather beyond) the extreme southern border of the Flora area.

• *O. fistulosa* L.: in NF6, this species was said to be AC-AR in Fluv. This only applies to the Dutch part of this district, it is virtually absent from the Belgian part of it (wn.be, wn.nl).

• *O. silaifolia* Bieb.: this species was recently (re-?) discovered in the valleys of river Leie (Deurle; Fl.) and Scheldt (south of Oudenaarde; Brab.) (wn.be).

• *O. pimpinelloides* L.: this species has disappeared from Fluv. where it was last seen in Vianen about 20 years ago (H24, wn.nl, Westhoff & van der Meijden 2000). The same goes for Fl. (Gulke Putten nature reserve in Wingene, where it was last seen about 25 years ago). It was recently discovered in two new districts, both in France: in Mar. (Grande-Synthe) and two localities in Tert. par. (Brasles, Viffort) (Messean 2018, Digitale2). Its status in these newly detected localities remains unclear.

• *O. peucedanifolia* Pollich: this rare species was historically also known from Eifel centr. (FT). There is at least one extant population in the valley of river Marne, in Vésigneul-sur-Marne, in Champ., a district not mentioned in NF6. In this area, this species was historically known from several localities (database CBN Paris).

• *O. crocata* L.: this species is in slow but definite expansion. In Mar., it is no longer restricted to the southern and northern part of this district: it was found on the Belgian coast, in ruderalized dunes in Raversijde, in 2021 (comm. G. Rappé, 06.2021). It was recently also recorded for the first time in Camp., along Groot Schijn in Oelegem (wn.be). Finally, the first record in Schouwen-Duiveland dates back to 1986, not 1987 (FZ).

• ***Angelica*** *sylvestris* L.: in NF6, this species was said to be C-AC in most of the Flora area, except in Mar. where it was considered to be AR. However, also in Mar. it is AC rather than AR; there is hardly any difference in density between Mar. and e.g. Fl., Brab. or Camp. (wn.be; see also FZ).

• *A. archangelica* L.: this species is at least as common in Mar., Fl. and Brab. as in Mosan (AR) (wn.be; also FZ). In Mosan, it is more or less equally dispersed now upstream and downstream of Namur. In Fluv., it is indeed well-represented but only in the Dutch part of this district (wn.nl).

• ***Selinum*** *carvifolia* (L.) L.: this species has been found in rather numerous localities in Camp in recent years (wn.be); in this district it is R rather than RR.

• ***Silaum*** *silaus* (L.) Schinz et Thell.: there is an increasing number of reliable records in natural habitats of this species in Fl. (wn.be), probably due to a better prospection in recent years (comm. W. Van Landuyt, 12.2022); in this district it is R-RR rather than RR.

• ***Thysselinum*** *palustre* (L.) Hoffmann: only in Camp., this species is much less rare than in the other districts (AC-AR) (wn.be). In Fluv., even in its Dutch part, it is much rarer than indicated in NF6, R rather than AC-AR (wn.be, wn.nl; see also H24).

• ***Dichoropetalum*** *carvifolia* (Vill.) Pimenov et Kljuykov: this species is apparently not rare at all in Fluv., yet

a district from where it was not mentioned in NF6. Most records are from river Waal (beyond the Flora limits) but there are several occurrences along river Maas as well (e.g. in the surroundings of 's Hertogenbosch and near Demen; wn.nl). According to H24 it is even AC in this district. It is exceptionally observed further south in Fluv., including in Belgium (Hochter Bampd, since 2020; wn.be). Similarly, this species is known from several localities in Ard. (France) and Tert. par. (database CBN Paris), two districts not mentioned in NF6. In addition, it is sometimes recorded as an introduction, for instance in Zeeland in the Netherlands (FZ).

• ***Oreoselinum*** *nigrum* Delarbre: the species' presence in Tert. par. was questioned in NF6. Apparently, it is present in that district (database CBN Paris) but only beyond the Flora limits.

• ***Cervaria*** *rivini* Gaertn.: this southern species was observed in Givet in 2006 (Mosan) (database CBN Paris). Its status there is unknown.

• ***Pastinaca*** *sativa* L. subsp. *sativa*: this native subspecies is slightly expanding locally. In Fl., for instance, it is no longer AR-R, rather AC-AR (wn.be).

• *P. sativa* subsp. *urens* (Req. ex Godr.) Čelak.: this alien subspecies is much expanding lately, especially along motorways and around the major cities. In parts of Fl. and Camp. (especially its eastern part), and in the wide areas around Antwerp and Ghent, it has become at most AR instead of RR (wn.be).

• ***Heracleum*** *mantegazzianum* Somm. et Lev.: this invasive ornamental has further expanded lately. It has become AC-AR throughout most of the Flora area. Especially in urban areas it is no longer rare (although often eradicated). According to H24 it has become common in the 'urban district'.

• ***Tordylium*** *maximum* L.: contrary to NF6, this species has not disappeared from Pic. mér. It is still present in the valley of river Somme, at least near Abbeville and Amiens (Digitale2).

• ***Laserpitium*** *latifolium* L.: in Lorr., this species is no longer restricted to the Grand Duchy of Luxembourg and the area south of Verdun (SI-Flore, Saint-Val 2015, AFL, etc.). In 2018, a small population of what is supposed to be this species (only non-flowering individuals) was discovered in Rocherath in Haute Ard. (wn.be). Even if its identity were confirmed, it is rather unlikely that this species is indigenous in this locality, where it grows along with *Campanula glomerata* L. (comm. I. Jacobs, 11.2021).

• ***Laser*** *trilobum* (L.) Borkh.: this species is, in the entire Flora area, only known from Côtes de Moselle between Metz and Nancy. Vernier & Robaine (2021) provided an overview of the species' local distribution and ecology. It may be an archaeophyte rather than a genuinely native species.

• ***Smyrnium*** *perfoliatum* L. and *S. olusatrum* L.: these two alien species are increasingly observed and locally tend to naturalize. The former is least rare and has been known from the Flora area since the 19th century. Its naturalization, however, only started around 2009. It is now more or less established, especially in Fl., Camp. and Brab. (wn.be). The latter species is a more recent introduction, first observed in Belgium in 2016, and likely to naturalize in, especially, Mar. where it recently was detected in a short period of time in the French, Belgian and Dutch part of this district (wn.be, Digitale2, Toussaint 2016b; see also FZ). It has also been recorded in inland districts (Fl., Brab.) but its degree of naturalization is unclear there.

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