

A surprising discovery of new adventive weeds at the Esch-sur-Sûre retaining wall

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Abstract. An unusual association of adventive weeds was observed growing on a recently established lawn near the Esch-sur-Sûre dam wall (Luxembourg). A plot filled with allochthonous substrate proved to be home to a large variety of *Amaranthaceae* and *Solanaceae*, as well as rare and new adventive species such as *Diploaxis tenuifolia*, *Heliotropium europaeum* and *Tribulus terrestris*. These findings underline the importance of considering the origin of soils used in the planning of construction sites in order to prevent the spread of unwanted or invasive species.

Keywords. *Amaranthaceae*, *Tribulus terrestris*, *Datura stramonium*, adventive plants, allochthonous substrate, compost, Luxembourg.

1. Introduction

The dam of the Upper-Sûre water reservoir is located in the Sûre valley in north-western Luxembourg (LUREF 62,343/108,527). As the reservoir is the main source of drinking water for the country's southern regions, maintenance and improvement works on the facilities, including the dam wall, are ongoing. More recently, works have been carried out on the road at the top of the retaining wall, accompanied by landscaping measures in the surrounding area. These included minor earthworks using an allochthonous substrate seeded with a mixture of lawn grasses. During a visit to the site in August 2025, however, the author observed a wide range of ruderal, pioneer and spontaneous taxa developing, some of which were uncommon or even unknown in the region. This led to a more thorough investigation of the area as well as an attempt to identify the cause of the phenomenon and provide recommendations for addressing the issue.

2. Materials and methods

During two visits in August 2025, a comprehensive inventory of all plant species occurring within a recently developed area along the footpath leading to the dam platform (Fig. 1) was compiled. Taxa were recorded using the iNaturalist and Observation applications, and photographs of each species were taken within an area of approximately 350 m².

All observations were consolidated into a single species list and georeferenced using precise coordinates. Species frequency was estimated using a semi-quantitative scale comprising four categories: *common* (c), *scattered* (s), *sporadic* (sp), and *rare* (r) (Wolff et al., 2020). For the present study, this scale was supplemented by two additional categories: *rare, forming small-scale dominant stands* (rd) and *locally aspect-building* (la) (Table 1).

The records were entered into the national biodiversity database (MNHNL 2000-),



Figure 1. Aspect of the newly planted area. Photo: J.-P. Wolff, 2025-08-16.

and specimens of rare taxa were deposited in the LUX herbarium. Table 2 lists the rare and uncommon taxa recorded at the site, together with their Red List status (Colling et al., 2025) and frequency category according to the *Nouvelle Flore* (Verloove & Van Rossum, 2024). References to the corresponding photographs and Luxembourg herbarium accession numbers are also provided. Taxonomy and nomenclature follow Verloove & Van Rossum (2024).

3. Results

3.1. Origin of the substrate

Investigations into the origin of the substrate used to develop the study area revealed that it was a mixture of ‘Moselle soil’ and so-called ‘Minett Kompost’ (Administration des Ponts et Chaussées in litt.). ‘Minett Kompost’ is promoted as a 100% organic, universal fertiliser produced by the ‘Minett Kompost’ facility from kitchen and garden

waste collected in member municipalities in southern Luxembourg. According to the producer’s website, ‘Minett Kompost’ is quality-assured by the independent German Institute for Quality Assurance (RAL) and is free from germinable weed seeds and sprouting plant parts (Minett-Kompost 2026).

3.2. Species list

A total of 66 taxa were recorded (Table 1), including 12 introduced or adventive species. 20 species can be attributed to the ruderal associations of *Sisymbrienea* (Pott 1992), annual ruderal plant communities that primarily grow on open, nitrate-rich soils near settlements and cultivated land. While many of these plants are adventive species, some are also neophytes (Pott 1992). We recorded 16 taxa belonging specifically to an association described by Holzner (1972) as *Helianthemo-Lycopersicetum* which colonises household waste dumps and sludge from sewage treatment plants (Table 1).

Table 1. List of taxa recorded during the floristic survey of the study site. Abundance = frequency of observations in the study area using a semi-quantitative scale: a = abundant, s = scattered, i = isolated, r = rare, rd = rare, forming small-scale dominant stands, la = locally aspect building.

Taxa	Abundance
Taxa of Helianthemo-Lycopersicetum (Ass.)	
<i>Amaranthus blitum</i> L. subsp. <i>emarginatus</i> (Moq.ex Uline et Bray) Carretero, Munoz Garmendia et Pedrol	s
<i>Amaranthus hybridus</i> L. subsp. <i>hybridus</i> var. <i>pseudoretroflexus</i> (Thell.) Carretero	a
<i>Amaranthus retroflexus</i> L.	a
<i>Bromus hordeaceus</i> L.	s
<i>Chenopodium album</i> L.	a
<i>Datura stramonium</i> L. var. <i>stramonium</i>	a
<i>Datura stramonium</i> var. <i>tatula</i> (L.) Torr.	s
<i>Digitaria sanguinalis</i> (L.) Scop.	a
<i>Diplotaxis tenuifolia</i> (L.) DC.	r
<i>Eragrostis minor</i> Host.	s
<i>Medicago arabica</i> (L.) Huds.	r
<i>Persicaria lapathifolia</i> L. subsp. <i>brittingeri</i> (Opiz) Sojak	a
<i>Portulaca oleracea</i> L.	a
<i>Solanum lycopersicum</i> L.	s
<i>Solanum nigrum</i> L.	a
<i>Sonchus oleraceus</i> L.	r
Other species of Sysimbrietea	
<i>Barbarea intermedia</i> Boreau	s
<i>Chenopodiastrum murale</i> (L.) S. Fuentes, Uotila et Borsch	r
<i>Fallopia convolvulus</i> (L.) A. Löve	r
<i>Sinapis arvensis</i> L.	r
Other species of ruderal and segetal communities	
<i>Achillea millefolium</i> L.	s
<i>Amaranthus albus</i> L.	s
<i>Calystegia sepium</i> (L.) R. Brown	i
<i>Capsella bursa-pastoris</i> (L.) Med.	s
<i>Dactylis glomerata</i> L.	s
<i>Echinochloa crus-galli</i> (L.) Beauv.	s
<i>Erodium cicutarium</i> (L.) L'Hérit.	s
<i>Euphorbia helioscopia</i> L.	r
<i>Euphorbia lathyris</i> L.	i
<i>Galeopsis tetrahit</i> L.	s
<i>Heliotropium europaeum</i> L.	s
<i>Lipandra polysperma</i> (L.) S. Fuentes, Uotila et Borsch	r
<i>Lolium perenne</i> L.	r

Table 1. (cont.)

Taxa	Abundance
<i>Mercurialis annua</i> L.	s
<i>Oxalis fontana</i> Bunge.	s
<i>Plantago lanceolata</i> L.	s
<i>Plantago major</i> L.	r
<i>Rorippa palustris</i> (L.) Besser	s
<i>Rumex obtusifolius</i> L.	s
<i>Senecio jacobaea</i> L.	r
<i>Setaria pumila</i> (Poiret) Roem. et Schult.	s
<i>Setaria verticillata</i> (L.) Beauv.	s
<i>Setaria viridis</i> (L.) Beauv.	s
<i>Sonchus asper</i> (L.) Hill	r
<i>Taraxacum officinale</i> agg.	i
<i>Urtica dioica</i> L.	r
Accompanying species	
<i>Agrostis stolonifera</i> L.	s
<i>Amaranthus viridis</i> L.	r
<i>Camelina sativa</i> (L.) Crantz	r
<i>Centaurea jacea</i> L.	s
<i>Cucumis sativus</i> L.	i
<i>Geranium molle</i> L.	s
<i>Heracleum sphondylium</i> L.	la
<i>Hypericum maculatum</i> Crantz	r
<i>Phacelia tanacetifolia</i> Benth.	r
<i>Phleum pratense</i> L.	rd
<i>Potentilla reptans</i> L.	r
<i>Ranunculus repens</i> L.	s
<i>Robinia pseudoacacia</i> L.	s
<i>Rumex acetosa</i> L.	s
<i>Rumex crispus</i> L.	r
<i>Tribulus terrestris</i> L.	i
<i>Trifolium hybridum</i> L.	s
<i>Vicia sativa</i> L.	s

The list is dominated by Amaranthaceae such as *Amaranthus blitum* subsp. *emarginatus*, *A. retroflexus*, *A. hybridus* subsp. *hybridus* var. *pseudoretroflexus* and *A. albus*, followed by taxa of the Chenopodioideae subfamily (Fuentes et al. 2012) such as *Chenopodium album*, the uncommon *Lipandra polysperma*

and a specimen of *Chenopodiastrum murale*, which is considered regionally extinct (RE) in the new Red List (Colling et al. 2025). In total, 17 rare or uncommon species were identified, as well as other endangered plants from the Red List (Colling et al. 2025), 3 established exotic species and 7 new or

uncommon taxa (including adventive species) not included in the new Red List (Table 2). Among the latter are *Amaranthus blitum* subsp. *emarginatus* and *Amaranthus hybridus* subsp. *hybridus* var. *pseudoretroflexus*, as well as Mediterranean species such as *Heliotropium europaeum* and *Tribulus terrestris*.

Datura stramonium, an established alien species (Colling et al. 2025), is abundant at this location and, in addition to specimens of var. *stramonium*, specimens of var. *tatula*

were found. Many purslane plants were found and identified as *Portulaca oleracea*. The picture was finally completed by numerous *Solanum nigrum* plants and some tomato seedlings (*Solanum lycopersicum*).

3.3. New, rare and adventive vascular plants

With reference to Table 2, an exhaustive description of several new, rare and adventive taxa found in the study area is provided, together with information on their classifica-

Table 2. List of rare and uncommon taxa recorded at the study site. RL = *Red List of vascular plants for Luxembourg* (Colling et al. 2025): CR = critically endangered, EN = endangered, VU = vulnerable, NT = near threatened. EA = established alien. / = no data. NF = frequency in the *Nouvelle Flore* for the Ardennes district (Verloove & Van Rossum 2024): AC = quite common, AR = quite rare, R = rare, RR = very rare, adv. = adventive. Herbarium no°/Photo ref. = Herbarium reference Jean-Paul Wolff or reference to photo. Herbarium LUX n° = Herbarium reference Museum of Natural History Luxembourg. Species marked with * are protected by law (Mémorial 2010).

Taxa	RL	NF	Herbarium n° Photo ref.	Herbarium LUX n°
<i>Amaranthus albus</i>	/	AR-R	Fig. 2A	MNHNL192136
<i>Amaranthus blitum</i> subsp. <i>emarginatus</i>	/	R-RR	Fig. 2B	MNHNL192137
<i>Amaranthus hybridus</i> subsp. <i>hybridus</i> var. <i>pseudoretroflexus</i>	/	AR-R	Fig. 2C	MNHNL192138
<i>Amaranthus retroflexus</i>	EA	RR-nul	2025082006 Fig. 2D	
<i>Amaranthus viridis</i>		adv.	Fig. 2E	MNHNL192139
<i>Camelina sativa</i>	/	R-RR		MNHNL192140
<i>Chenopodium murale</i>	RE	R-RR-Nul	Fig. 2F	MNHNL192141
<i>Cucumis sativus</i>	/	adv.	Fig. 3G	
<i>Datura stramonium</i> var. <i>stramonium</i>	EA	AR-R	2025081603	
<i>Datura stramonium</i> var. <i>tatula</i>	EA	AR-R	Fig. 2G	
<i>Diplotaxis tenuifolia</i>	EN	R-RR	2025081604 Fig. 2H	
<i>Heliotropium europaeum</i>	/	adv.	Fig. 2I	MNHNL192145
<i>Lipandra polysperma</i>	VU	AR-R	2025082003	MNHNL192147
<i>Persicaria lapathifolia</i> subsp. <i>brittingeri</i>	/	C-AC	Fig. 2J	MNHNL192152
<i>Rorippa palustris</i>	NT	RR	Fig. 3I	
<i>Setaria pumila</i> *	NT	R-RR	2025082005 Fig. 3D	
<i>Setaria verticillata</i>	DD	R-RR	2025082004 Fig. 3E	
<i>Setaria viridis</i>	NT	AR-R-nul	Fig. 3F	
<i>Tribulus terrestris</i>	/	adv.	Fig. 2L	MNHNL192162

tion, distribution and ecology. This information was obtained either from the National History Museum database (MNHNL 2000-) or from literature referring to the territory covered by the *Nouvelle Flore*, namely Belgium, Luxembourg and adjacent regions of neighbouring France and Germany, including the Trier region (Hand et al. 2016; Hassler 2004–2025; Tison & Foucault 2014; Verloove & Van Rossum 2024).

***Amaranthus albus* L.**

Amaranthus albus L. (Fig. 2.A) was first collected in Luxembourg by L. Reichling in 1948 in Dommeldange (et al. 1950, herb. LUX n° 17329). The latest observation, also made by Reichling, was in 1958 in Kleinbettingen (MNHNL 2000-, herb. LUX n° 25238). Verloove & Van Rossum (2024) consider this adventive species to be rare, occurring on wasteland, roadside verges, railway ballast and ruderal dunes. The species originates from the southern USA and Mexico.

In neighbouring countries, it is a naturalised neophyte occurring in dry, often stony, ruderal vegetation, especially around railway tracks, in ports and on slag heaps. The species is mineral-tolerant. Otherwise, it is rare and often synanthropic in settlements. It grows scattered across the Upper Rhine Plain, the Lower Rhine and the Ruhr area, as well as in drier areas in the east, whereas in the Trier region the species is not yet considered established. It grows scattered throughout France and is more frequent in the Midi and Corsica (Hand et al. 2016; Hassler 2004–2025; Tison & Foucault 2014).

***Amaranthus blitum* L. subsp. *emarginatus* Moq. ex Uline et Bray**

Amaranthus blitum subsp. *emarginatus* (Fig. 2.B, Syn.: *A. lividus* L.) was already mentioned by Tinant (1836). While former records refer to *A. blitum* subsp. *blitum* var. *blitum* (formerly *A. blitum* var. *ascendens* (Loisel) DC.), Wolff & Krippel (2022) underline that the recent findings of the taxon belong to the subspecies *emarginatus* recorded in 2021, among others in Ettelbruck, Kautenbach and Esch-sur-Sûre – the latter weed being distinguished, among other things, by its

small seeds and lightly coloured, more deeply indented leaf blade (Verloove & Van Rossum 2024; Walter & Dobes 2004).

In neighbouring Germany, the taxon has only recently immigrated. In contrast to *A. blitum* subsp. *blitum*, *A. blitum* subsp. *emarginatus* is found on drying muddy soils on riverbanks or on formerly wet soils and is similarly thermophilic and unstable in sunny ruderal locations (Hand et al. 2016).

Amaranthus blitum subsp. *emarginatus* is expanding throughout France and regionally tends to supplant subsp. *blitum* (Tison & Foucault 2014).

***Amaranthus hybridus* L. subsp. *hybridus* var. *pseudoretroflexus* (Thell.) Carretero**

The national database of Luxembourg (MNHNL 2000-) states one observation of *Amaranthus hybridus* subsp. *hybridus* var. *pseudoretroflexus* (Syn.: *Amaranthus powellii* S. Watson) (Fig. 2.C) in Luxembourg by Ch. Reckinger, in 2007 near Masseler – ‘beautiful population along a cornfield’ (Krippel & Colling 2008).

Verloove & Van Rossum (2024) describe the subspecies as rather rare to rare, naturalised and sometimes spontaneous. It is cultivated as an ornamental plant in parks and gardens (var. *erythrostachys*). In Germany, the taxon is widespread and is locally common to moderately common, but rare or absent in the north and in the low mountain ranges (Hand et al. 2016; Hassler 2004–2025). In France, both the subspecies and the varieties are widespread across the country (Tison & Foucault 2014).

***Amaranthus viridis* L.**

The occurrence of *Amaranthus viridis* (Fig. 2E) at the surveyed site near the Esch-sur-Sûre dam wall represents the first documented record of this species in Luxembourg. Verloove & Van Rossum (2024) describe the species as adventive in the *Nouvelle Flore* region.

The heat-loving species, native to the Mediterranean region, has rarely been found in Germany to date, occurring in ruderal vegetation, on riverbanks and beaches. It

is mostly unstable, rarely established in the long term and limited to Berlin and North Rhine-Westphalia (Hassler 2004–2025). *Amaranthus viridis* is not mentioned in *Flora der Region Trier* (Hand et al. 2016), and in France, the species is reported mainly from the Corsican coast (Tison & Foucault 2024), highlighting the remarkable nature of this record in Luxembourg.

***Chenopodium murale* (L.) S. Fuentes, Uotila et Borsch**

The recently published *Red List of the vascular plants of Luxembourg* (Colling et al. 2025) categorises *Chenopodium murale* (Fig. 2.F) as regionally extinct (RE). The national database (MNHNL 2000-) holds a total of ten observations, the first made in 1884 by J. Feltgen ‘uncultivated land near the forges in Colmar’ (herb. LUX n° 2377), the most recent in 1962 by L. Reichling near Girst, ‘village and valleys to the south’ (MNHNL 2000-).

According to Verloove & Van Rossum (2024), the species occurs in wastelands, at the foot of walls, on ruderalised sand, on roadside verges and in crops. It is categorised as rare or very rare in Lorraine and even absent in the Ardennes and Eifel. It has become increasingly rare in the *Nouvelle Flore* area.

In Germany, *C. murale* can be found in dry ruderal vegetation at the foot of walls and on industrial wastelands. It is scattered in the east, rare throughout and almost extinct in many places, including Bavaria, Schleswig-Holstein and Saarland (Weicherding 2016).

Tison & Foucault (2014) consider the species as scattered and unstable in France, but more frequent in the Mediterranean region.

***Datura stramonium* L.**

The national database (MNHNL 2000-) lists 99 records of *Datura stramonium*, 77 of which date from 1983 to 2025.

In the area covered by the *Nouvelle Flore* (Verloove & Van Rossum 2024), the species is of uncertain origin and is now considered sub-cosmopolitan and medicinal. The variety *tatula* (L.) Torr., which has a light purple-

blue corolla, and stems, petioles, veins and calyxes tinged with purple (Fig. 2.G), is sometimes found in the same nutrient-rich habitats as var. *stramonium*, which has a white corolla and grows on wastelands, weeded crops and roadsides.

Most sightings in the Trier region come from valleys with a warm summer and mild winter wine-growing climate. The species is present throughout France and is naturalised in root crops and vineyards (Hand et al. 2016; Tison & Foucault 2014).

***Diplotaxis tenuifolia* (L.) DC.**

The first historical observation of *D. tenuifolia* (Fig. 2.H) was made by E.-J. Klein (MNHNL 2000-) around 1899 on some old walls in Luxembourg City (herb. LUX n° 16404). The Natural History Museum’s database (ref) contains around 60 records, approximately 40 of which date from 1996 to 2025.

The preferential habitats of rocket are embankments, roadsides, ruderal calcareous sands, old walls and railway ballast (Verloove & Van Rossum 2024). It is rare to very rare (R-RR) but frequently cultivated as a food plant as a substitute for cultivated rocket (*Eruca sativa*).

In Germany, the species is considered a naturalised neophyte and has become feral through cultivation activities such as forestry, fruit growing and agriculture; it occurs in dry, slightly eutrophic ruderal vegetation, vineyards, industrial wastelands and roadsides (Hassler 2004–2025). It is not particularly common in the Moselle region and is in decline due to human intolerance of ‘untidy areas’ (Hand et al. 2016).

D. tenuifolia is distributed throughout France in mesophilic to xerophilic perennial scrubland and paleo-temperate areas and is expanding (Tison & Foucault 2014).

***Heliotropium europaeum* L.**

The Meise Botanic Garden herbarium holds a specimen collected by Feltgen in 1885 (BR000001254782) and the herbarium LUX (MNHNL 2000-) holds a specimen also collected by Feltgen in 1887 (LUX005793),

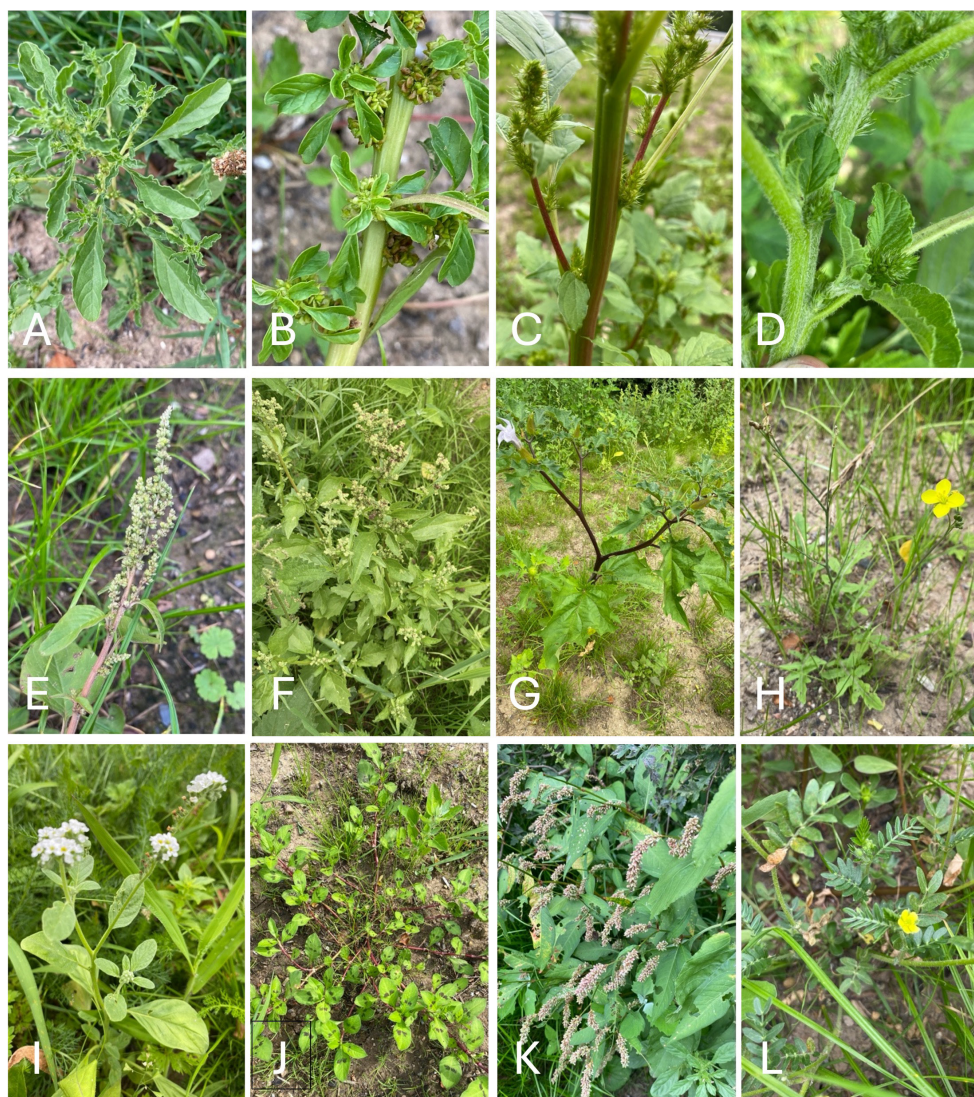


Fig. 2. A - *Amaranthus albus*. B - *Amaranthus blitum* subsp. *emarginatus*. C - *Amaranthus hybridus* subsp. *hybridus* var. *pseudoretroflexus*. D - *Amaranthus retroflexus*. E - *Amaranthus viridis*. F - *Chenopodium murale*. G - *Datura stramonium* var. *tatula*. H - *Diplotaxis tenuifolia*. I - *Heliotropium europaeum*. J - *Persicaria lapathifolia* subsp. *brittingeri*. K - *Persicaria lapathifolia*. L - *Tribulus terrestris*. Photos: J.-P. Wolff, 2025-08.

both from a wet wasteland near Wintrange on the River Moselle.

Verloove & Van Rossum (2024) describe *Heliotropium europaeum* (Fig. 2.I) as growing on wastelands, crop margins, vacant lots, R-RR, sometimes adventive and native to Mediterranean Europe, SW Asia, North Africa and Macaronesia.

Hand et al. (2016) assume that this species had already arrived in the Moselle region with viticulture in Roman times. Here, it reaches the northern limit of its range. It is highly endangered with extensive vineyard cleaning being one cause of decline.

Heliotropium europaeum is spread throughout France (Tison & Foucault 2014) but is



Fig. 3. A - *Digitaria sanguinalis*. B - *Echinochloa crus-galli*. C - *Eragrostis minor*. D - *Setaria pumila*. E - *Setaria verticillata*. F - *Setaria viridis*. G - *Cucumis sativus*. H - *Portulaca oleracea*. I - *Rorippa palustris*. Photos: J.-P. Wolff, 2025-08.

unstable outside the Mediterranean region and is found in crops and eutrophic wasteland.

Persicaria lapathifolia* subsp. *brittingeri (Opiz) Sojak

Persicaria lapathifolia s.l. (Fig. 2.K) is a highly polymorphous hygrophilous species that grows in cultivated fields, roadsides, ditches and wasteland, and on the banks of ponds and streams and exposed mudflats. It is considered common to quite common (C-AC) in the area of the *Nouvelle Flore* (Verloove & Van Rossum 2024).

In Germany, the subspecies *brittingerii* (Fig. 2.J) is considered a streamside plant ('Stromtalpflanze'), occurring on riverbanks and, less commonly, in gravel pits and on railway facilities (Hassler 2004–2025). In the Middle Moselle region, it has so far only been documented by R. Wisskirchen (Hand et al. 2016).

According to Tison & Foucault (2014) the taxon grows throughout France in mesophilic to hygrophilous eutrophic meadows and fallow land, sometimes in cultivated land.

Both Verloove & Van Rossum (2024) and Tison & Foucault (2014) cite subsp. *brittingerii* and indicate that several authors distinguish four subspecies; however, their taxonomic value remains uncertain.

***Tribulus terrestris* L.**

The Zygophyllaceae *Tribulus terrestris* (Fig. 2.L) is a widespread weed in arid and semi-arid zones of the Middle East, Africa, Asia Minor and Australia. The plant contains tribulusterine, an alkaloid responsible for frequent sheep poisoning in regions where the plant thrives, for example in New South Wales, Australia (Bremner et al. 2003).

To date, *Tribulus terrestris* has not been documented in Luxembourg (MNHNL 2000-).

In Europe, it is found in Mediterranean countries and those of the Pannonian region. Tison & Foucault (2014) describe it as partly naturalised in southern France and Corsica. Verloove & Van Rossum (2024) have no data on its occurrence in Belgium, although

the species has recently been observed in Brecht-Antwerp, as well as in Brussels (Vanreusel et al. 2025). There have been sporadic observations in Germany (GBIF 2026). Amarell (2010) describes a large population at Mannheim railway station that has been severely depleted by frequent herbicide use and is at risk of disappearing. In the neighbouring Trier area, Hand et al. (2016) do not mention *Tribulus terrestris* in their recent flora.

4. Discussion

These rather unusual discoveries show how the seemingly straightforward design of a new embankment can have far-reaching ecological implications. Here, the use of processed substrate opened the door to the introduction of non-native or even potentially invasive species. The composition of the soil, which may have been alluvial, as well as the compost used, which must have contained a considerable number of active seeds, must be called into question. Seeds of *Solanum lycopersicum* and amaranth, the latter increasingly used as a superfood, as well as *Datura* seeds from garden waste, are all capable of surviving even industrial composting and sewage treatment. This could explain why these species were relatively concentrated in the substrate used. For instance, Bozic et al. (2015) showed that seeds of *Amaranthus retroflexus*, *Artemisia vulgaris*, *Chenopodium album*, *Digitaria sanguinalis*, *Echinochloa crus-galli*, *Portulaca oleracea*, *Setaria viridis* and *Solanum nigrum* survived in all treatments of their experimental composting setup.

One positive aspect of this unexpected discovery is the resurgence of *Chenopodium murale*, a species previously classified as regionally extinct (Colling et al. 2025). However, given the highly anthropogenic nature of the treated area, this finding should be interpreted with caution, as should the relatively frequent occurrence of *Setaria pumila* and *Setaria viridis*, both classified as Near Threatened (NT), and *Lipandra polysperma*, classified as Vulnerable (VU) in the new Red List (Colling et al. 2025).

It is noteworthy that the new *Red List of Vascular Plants of Luxembourg* (Colling et al. 2025), which does not list purely adventive taxa, mentions only one species of the Amaranthaceae family, the widespread *A. retroflexus* (EA), whereas five, mostly adventive, species were documented in the area under investigation.

The unintentional spread of *Datura stramonium* is highly problematic. *Datura* has a significant allelopathic inhibitory effect on the growth of neighbouring plants, strong environmental adaptability, potential for invasion, and resistance to drought, infertile soil and pollution (Lv et al. 2023). The longevity of the seeds and the toxicity of the plant mean that thorough monitoring and a reassessment of composting methods are warranted. Even if none of the adventive species appears in the *List of Invasive Alien Vascular Plants* (Ries & Pfeiffenschneider 2020) relevant to Luxembourg, the nature conservation authorities should be made aware of the problem so that they can develop a strategy together with compost producers to address the issue.

Climate change could favour the spread of another adventive species: *Tribulus terrestris*. This species can thrive in a wide range of climatic conditions and causes problems for crops and livestock (Pacanoski et al. 2015).

Most importantly, these findings highlight the extent to which the planning process for such landscaping works needs to consider the source of the soil used in order to prevent the spread of unwanted species. In the past, problematic species have spread unintentionally as a result of soil displacement. *Conium maculatum*, *Impatiens glandulifera*, *Fallopia* spp. and *Lupinus polyphyllus* are just a few examples of species that develop rapidly on recently deposited soil.

Further monitoring should therefore be carried out at the study site and, if needed, action should be taken to prevent these partly problematic newcomers from spreading. Finally, it is worth noting that, during a follow-up site visit in May 2026, the contaminated soil had been replaced and only a few specimens of *Setaria* sp remained within the newly established lawn.

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