

## Summary of weed monitoring 2019-2020

In the project area of the National Park Donau-Auen Lobau, there is currently a habitat mosaic of forests, meadows, fields, and water bodies together with their accompanying vegetation. Pioneer sites originally accompanying the water bodies no longer exist after the Danube regulation and construction of the Danube Island; only the fields form anthropogenic large-scale pioneer sites. Arable fields provide habitats for other plants and animals than habitats otherwise present in the Lobau (Bönsel et al., 2013; Fuchs & Stein-Bachinger, 2008; Hügel 2020; Holzner & Glauningner, 2005; Hofmeister & Garve, 1986; Strauch 2018; Sauberer, 2019; Becker et al., 2020; Strauch, 2018; Adler & Mrkvicka, 2003; Lenglacher et al., 2018; Becker et al., 2020).

Abandonment of farmland habitat in the Lobau would lead to species losses. Abandoned farmland would also require cost-intensive management to counteract the spread of invasive species.

The monitoring of the arable flora on selected sites in the Lobau aimed to determine the extent to which species losses have occurred within the arable flora despite decades of cultivation according to the guidelines of organic farming. For this purpose, monitoring plots were defined on 8 fields on which vegetation surveys were carried out according to the Braun-Blanquet method or the extended Braun-Blanquet scale according to Reichelt & Wilmanns 2019 and 2020.

In addition to the cultivated plants, 88 other plant species were found on the fields in 2019, and in 2020 the number increased to 98 plant species, whereby all species of 2019 were also found in 2020. After deduction of the fallow species and germinating young woody plants, 72 species remained that could be attributed to the arable flora in the narrower sense.

Of the 51 indigenous species, 14 are on the Austrian Red List and one species on the Vienna Red List, of the 12 archaeophyte species, 1 species each is on the Austrian Red List and one species on the Vienna Red List. 9 species are neophytes, two of these species (*Ambrosia artemisiifolia* and *Datura stramonium*) are considered invasive.

On summer crops, *Amaranthus retroflexus*, *Amaranthus powellii*, *Chenopodium album*, *Chenopodium ficifolium*, *Cirsium arvense* and *Sinapis arvensis* dominate the weed flora. The field thistle (*Cirsium arvense*), which requires special attention in organic farming, appeared to varying degrees at all the sites studied, depending on the soil and crop rotation. Other root weeds were only found on individual sites (Schusterau: *Sonchus arvensis*, Oberleitnerwasser: *Sonchus arvensis*, *Stachys palustris*, *Persicaria amphibia*). *Persicaria amphibia* is on the Austrian Red List.

Except for *Persicaria amphibia*, *Mercurialis annua* and *Asperugo procumbens*, almost all Red List species occur only in winter cereal fields (e.g.: *Veronica* species, *Lamium amplexicaule*, *Buglossioides arvensis*, *Camelina microcarpa*, *Consolida regalis*, *Cyanus segetum*, *Fumaria officinalis*, *Stachys annua*, *Valerianella locusta*, *Apera spica-venti*). Most of the Red List species hardly compete or do not compete with the cultivated winter cereals.

Other species not on the Red List (e.g., *Thlaspi arvense*, *Capsella bursa-pastori*, *Stellaria media*) also form an important basis for animal agrobiodiversity without posing serious competition for the crops grown in the Lobau.

A total of 17 species of the Red List Austria (Niklfeld et al., 1986) were found, two of these species are also on the Red List Vienna (Adler & Mrkvicka, 2003). Depending on soil, crop types and management during the survey period, the number of Red List species per site and mapping area varies between 3 and 10 (Oberleitnerwasser).

Other species formerly native to the Lobau (*Adonis aestivalis*) have also disappeared here but could be reintroduced by means of regional seeds (Adler & Mrkvicka, 2003).

Based on the results of the survey, measures for the conservation and promotion of biodiversity among arable weeds and the associated animal biodiversity were proposed, considering the agricultural practice of herbicide-free weed control. This should also contribute to a multifunctional agriculture in the Viennese part of the National Park Donau-Auen.

The currently cultivated fields of the Lobau mostly have a good water and nutrient supply due to the fertile soil. Although this is advantageous for climate-friendly cultivation with good yields, it also favours the occurrence of root weeds (above all Canada thistle - *Cirsium arvense*), which was considered in the proposed measures.

The following measures are proposed to promote rare field weed species of conservation value:

**Seed rate reduction:** only on dry, nutrient-poor fields with low thistle pressure.

**Harrowing reduction/renunciation:** as root weeds cannot be regulated by harrowing but harrowing causes a loss of seed weeds that are usually less competitive and valuable for nature conservation.

**Annual or perennial fallow strips:** the establishment of annual or perennial fallow strips and the creation of so-called "lark windows".

**Late stubble turning:** promotes the preservation of so-called "stubble flowering plants" and provides nectar and pollen for associated insect species. Likewise, field birds and small mammals can take advantage of the supply of volunteer grain. Field thistles promoted by late stubble fall should be countered by growing vigorous summer grasses and deep-rooted main crops. As it is not possible to leave stubble and plant green cover at the same time, these measures to increase biodiversity and control thistle should take place in different years.

**Greening mixtures:** should consist of annual vigorous species and be composed of species from different plant families. As flowering species-rich summer greening also provides food for some mostly polylectic insect species, these also contribute to increasing biodiversity. The annual greening plants are to be regarded as additional cultivated plants. The sowing of perennial alien "flower strip species" should be avoided. Agriculture with a species-rich field herb flora and diverse landscape elements enriches the landscape and the experience for the numerous visitors to the Lobau; it can also bring the topic of agriculture closer to the visitors.

The implementation of biodiversity-enhancing, multifunctional and resilient agriculture in the Lobau can be exemplary for the arable farming areas of the flat and hilly countryside in the Vienna-Győr metropolitan area.