

## Summary Wild Bee Monitoring 2019

As part of the Interreg project AgriNatur AT-HU, a wild bee monitoring was carried out in 2019 in the Lobau in the National Park Donau-Auen in Vienna.

### Methodology

Five sample runs were carried out from March to August 2019 on four arable areas including their edges (bushes and forest edges), one grassland fallow and one semi-dry grassland. In 2019, winter rye, winter wheat, early potatoes, and green peas were cultivated in one of the fields respectively. To record the species spectrum of the study area, additional areas were sampled on two additional days.

### Results

Based on a total of 1,770 records, 158 wild bee species could be identified, so the study area can be classified as very rich in species.

Numerous remarkable records of species that are very rare in Vienna could be produced in the course of the study: *Andrena nigrospina*, *A. saxonica*, *A. trimmerana*, *Biastes emarginatus*, *Lasioglossum angusticeps*, *L. pallens*, *Lithurgus cornutus*, *Melitta tricincta*, *Nomada bispinosa*, and *Sphecodes majalis*. Other rare species were *Andrena bluethgeni*, *A. chrysoceles*, *A. combinata*, *A. impunctata*, *A. limata*, *A. niveata*, *A. oralis*, *A. scita*, *Anthidium septemspinum*, *Chelostoma ventrale*, *Eucera pollinosa*, *Halictus quadricinctus*, *H. sajoii*, *H. seladonius*, *Hylaeus incongruus*, *H. intermedius*, *H. lineolatus*, *H. variegatus*, *L. bluethgeni*, *L. discum*, *L. pygmaeum*, *Liturgis chrysurus*, *Megachile melanopyga*, *M. pilicrus*, *N. sheppardana*, *Pseudapis diversipes*, *Rophites hartmanni* and *Tetraloniella dentata*

Only a low number of species, 13-16 species each, could be detected on the fields of winter rye, winter wheat, and green pea. In the early potato field 34, partly also rare species could be detected. The high number of brood-parasitoid wild bees in the fields was striking, which suggests that nests are established by their hosts directly in the arable land. More species-rich than the fields themselves were their marginal structures, 50 wild bee species were found next to the potato field, 41 next to the winter rye field, 37 next to the green pea field and 25 next to the winter wheat field.

The grassland fallow with 51 species was similarly species-rich as the early potato field.

The most wild bees, 67 species and 297 individuals were found on the grassland with the highest number of bees. 20 species could be detected exclusively in this area. Adding up the number of these from the field and the marginal area, the site Camp II (early potato) is the richest in biodiversity.

A further 17 species were found at the special sites.

As habitat for wild bees in the project area, it is not the arable land that is of central importance, but the landscape shaped by the Danube and the xeric habitats embedded in the study area. Besides, the blossom supply at the respective locations has a decisive influence on the occurrence of wild bees. Particularly in the cereal fields, a low proportion of flowering plants was found, and in the course of the cereal growth, these were overgrown. However, if the sites were rich in flowers at the time of the survey, significantly more species and individuals were found. Therefore, open sites rich in flowers are particularly important for the species richness in the study area, as well as forests rich in structure and deadwood and light forests. Depending on the wild bee species, open sites, sunlit, lying

and standing deadwood, marrowy or hollow stalks, or larger stone structures are required for nesting.

#### Suggested Management measures

**Crop diversification:** At present, there is little diversity in the field crops in the project area. If the site conditions allow, insect-pollinating crops such as buckwheat and sunflower could be added. Field beans and oil squash would also be beneficial.

**Fallow land:** Annual and multi-year set-aside could create valuable habitats for wild bees. If certain plants are dominant and species impoverishment occurs on the land, reseeding is necessary. Nitrogen-binding plants such as clover, lucerne, and sweet lupines should not be sown, as this is not a measure to promote biodiversity. Dead plant stems must be left standing over the growing season and must not be broken up.

**Flower strips:** Flower strips often promote only frequent and undemanding bee species, as flowering mixtures often specialise only in papilionaceous plants. For wild bees, mixtures of 40 native early to late flowering, annual to biennial plant species from at least six plant families (Asteraceae, Brassicaceae, Lamiaceae, Fabaceae, Apiaceae, Campanulaceae) are useful.

**Field margins:** On lean field margins, instead of flowering mixtures with the existing soil seed material, a spontaneous succession of the area should be permitted. The variety of arable weeds promotes the food supply of wild bees. Soil nesting species benefit from gaps in the soil, which are often found in extensive areas. Especially winter wheat and winter rye fields are suitable for the targeted extensification of the field margins.

Priority measures from the perspective of wild bee conservation:

- Reduced sowing rate through double row spacing
- Reduction of fertiliser application (improvement of the light climate for field weeds requiring light)
- Reduction of mechanical weed control
- winter crop rotation
- Higher cut at harvest
- subsequent stubble
- Reduction of seed cleaning
- ploughing depth not more than 10cm (protection of bees' nests)
- Minimum width of the field border of 5m

**Stubble fields:** Due to the light conditions and the open soil, low-growing vegetation rich in herbs can grow on stubble fields, which are important habitats for wild bees. Delayed stubble fall in September helps to preserve them longer. A minimum threshing height of 30cm is recommended.

**Landscape features:** Particularly valuable for the promotion of wild bees are unpaved field paths, hollow paths, raw soil sites, field shrubs, hedges, sunlit standing and lying deadwood, rows of harvest stones, cairns, road and path edges, and open meadow ditches.