

Industrial nature and species diversity in the Landscape Park Duisburg-Nord*

*modified and updated version of Keil (2016)

PETER KEIL

Biologische Station Westliches Ruhrgebiet e.V., Ripshorster Str. 306, D-46117 Oberhausen;
E-Mail: peter.keil@bswr.de

Introduction

Industrial brownfield sites (syn. industrial wastelands) form the backbone of urban biodiversity in the central Ruhr Region and are places for experiencing nature and for environmental education. In terms of its size, structural variety and biodiversity, the Duisburg-Nord Landscape Park occupies a prominent position. Its vegetation presents an almost complete spectrum of different development stages (succession stages) on diverse sites. These range from pioneer communities, tall herbaceous perennials and scrub formations to pioneer forests (industrial forest) and together produce an astonishing diversity of species.

The Landscape Park is quite rightly considered a local hotspot for biodiversity in the western Ruhr Region. Furthermore, its industrial nature is of high ecological value because it contributes not only to the preservation of many rare and endangered species but also to the conservation of urbanised nature in the Ruhr Region's conurbations. The Landscape Park contains this enormous species diversity because of its great variety of habitats. Besides the industrial technogenic soils around the former blast furnace site, the sinter plant, the mine and the cokery, it also includes agricultural soils at Ingenhammshof and Emstermannshof. The physiochemical properties of the soils are significantly different and so influence the species composition and plant ecology (Scholz et al. 2018).

The Biological Station has been involved in the collection of scientific data on plant and animal life since 2005, in cooperation with the park administration, are also involved with the formulation of maintenance and development plans (Keil 2016).

Flora in the park

Scientific assessments, which had been conducted by the Biological Station over the past fourteen years, identified over 700 plant tribes. Despite the fact that some were unstable and

disappeared after a time and others comprised planted or sown plants that had run to seed, this is an enormous number, rarely found on sites of a comparable size in Germany. We begin to appreciate this scale when comparing it to the approximately 2,000 plant species native to North Rhine Westphalia. Also impressive is the number of plants included on the Red List; almost 50 such species were identified in past years. It is remarkable that the majority thrive either on dry, warm, raw soils typical of industrial sites, large areas of which are found around the shaft mines or on the nutrient-poor, uncompacted banks along the Old Emscher. The park's many special habitats are important for the establishment of threatened Red List species, particularly the walls of buildings and bunkers as well as temporary water bodies, the Old Emscher and many water-filled basins.



Fig. 1 und 2: Industrial nature in the Landscape Park Duisburg-Nord. Remains of the former ironworks with spontan vegetation. (Fotos P. Keil).

Typical indigenous indicator species on dry, warm, nutrient-poor substrates are e.g. silvery cinquefoil (*Potentilla argentea*), small cudweed (*Filago minima*) or common centaury and

lesser centaury (*Centaureum erythraea*, *C. pulchella*). Rare non-indigenous plant species recently introduced to industrial sites (neophytes) are stinkwort (*Dittrichia graveolens*) or sticky goosefoot (*Chenopodium botrys*), to name but a few.



Fig. 3 and 4: High phytodiversity in different places in the park. Former railway tracks (l.); former site of a coalmine, shaft Thyssen 4/8 (r.) (Fotos P. Keil).

The bunkers and walls in the Landscape Park support a wide variety of special ferns which in North Rhine Westphalia mainly grow in upland regions and whose distribution is of phytogeographical interest. Particularly noteworthy are the two relatively common species hart's tongue fern (*Asplenium scolopendrium*) and maidenhair spleenwort (*Asplenium trichomanes*) but also other species not as commonly found in the region, e.g. black spleenwort (*Asplenium adiantum-nigrum*), limestone fern (*Gymnocarpium robertianum*) or different tribes of polypody (*Polypodium* spp). Aquatic plants and young reed grow in open, sunny stretches of the Old Emscher. Important floating leaf plants and reed beds include various pondweed species (*Potamogeton* spp), phragmites and different sedges. Freely growing stands of woody plants,

which were neither planted nor silviculturally managed, also provide high scientific interest. They develop into industrial woodlands whose peculiar and uncontrolled patterns create a jungle-like impression.



Fig. 5 and 6: Impressions from the park (l.) clarifiers with presence of jellyfish (*Craspedacusta sowerbii*); (r.) High biodiversity in dry greenland (Fotos P. Keil).

Fauna in the Park

Taking a look at the wildlife in the park also reveals some astonishing facts. The Biological Station has been recording groups of animals in the park for many years with notable results. Seven species of bats have been identified and 38 bird species are known to nest in the park; in addition, there are seven possible breeding birds. The Landscape Park provides habitats for six amphibian species, including the natterjack toad, an indicator species for industrial nature, and one reptile.

35 different dragonflies have also been identified, more than half of all dragonfly species currently found in North Rhine Westphalia. Additionally, 17 species of grasshoppers were noted,

with the blue-winged grasshopper (*Oedipoda caerulescens*), the slender blue-winged grasshopper (*Sphingonotus caeruleans*) and the ant-loving cricket (*Myrmecophilus acervorum*) as management indicator species for open industrial brownfields. Sufficiently detailed studies of butterflies and bees have not been conducted in the park but interesting evidence of significant and endangered species has been recorded.

Particularly fascinating is the occurrence of a yet to be scientifically described, non-native harvestman species (*Leiobunum* sp), which has been spreading in the park since 2006. Also remarkable is the nearly annual occurrence of the freshwater jellyfish *Craspedacusta sowerbii* in the round basins of the former sewage treatment plant since 2002 (see Fig. 5)

Environmental education in the park

This impressive, and in a national context remarkable industrial nature is the subject of environmental education programmes and public information activities by the Biological Station. In the context of a lack of near-natural open spaces in the densely populated north of Duisburg, the park offers a place for the experience of nature and the education of children and young people. Thoroughly embedded in its work in the Landscape Park is the cooperation with schools (weekly extracurricular lessons), excursions for citizens and universities, hosting of species diversity days, professional conferences and multiplier training courses for teachers and environmental educators (Niehuis et al. 2019).



Fig. 7: Environmental education. Training adults as multipliers of industrial nature (Foto P. Keil).

Literature

- Keil, P. (2016): Species diversity and industrial nature. - In: Latz, P: Rust red. The Landscape Park Duisburg-Nord. Essays by Bodmann, E., Danielzik, K.-H. , Dettmar, J., Keil, P., Latz, T., Lipkowsky, G., Riehl, W., Walter, K. & Winkels, R. and Introductions by Ganser, K. & Treib, M., Hirmer, Munich. p. 120-121.
- Keil, P.; Kowallik, C.; Kricke, R.; Loos, G. H.; Schlüpmann, M. (2007): Species diversity on urban-industrial brownfields with urban forest sectors compared with semi-natural habitats in western Ruhrgebiet (Germany) – First results of investigations in flowering plants and various animal groups. – EFUF 2007, May 16-19, 2007: 33-35.
- Niehuis, V.; Schneider, K.; Buch, C.; Keil, P. (2019): Environmental education in urban forest(s) in the Ruhr area. In: Vreese, R. d. (ed.): Urban Forests: Full of energy, 22nd European Forum on Urban Forestry (EFUF2019), May 22-24, 2019 Cologne, Germany. – Book of Abstracts: p. 73.
- Scholz, T.; Keil, P.; Schmitt, T. (2018): Nutrient and water supply of succession stages on industrial brownfield - a case study in the Landscape Park Duisburg-Nord, W-Germany [in german] – *Decheniana* (Bonn) 171: 24-37.