

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

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**Abstract**

The high species diversity of urban-industrial brownfields is well-known from numerous studies (summarized e.g. in Sukopp & Wittig 1998 and Rebele & Dettmar 1996). In the Ruhrgebiet (Northrhine-Westphalia, Germany), lots of data are available for fallow areas in former coal mines and steel works which were embedded in urban settlements (see Seipel & al. 2006). Their high species-diversity is explained by the large variety of ecotopes and numerous microhabitats, e.g. urban forests. In the Western Ruhrgebiet (cities of Duisburg, Mülheim an der Ruhr and Oberhausen) urban-industrial fallow areas have been studied extensively in the past three years. In addition to flowering plants, various animal groups like birds, bats, amphibians, grasshoppers and dragonflies were studied. The results of the studies can be compared with those of natural or semi-natural habitats, to emphasize the importance of these deserted industrial areas for species diversity. Besides, a direct comparison of the number of species, an assessment of occurrence of threatened and endangered species is important as well (Red Data Book of Northrhine-Westphalia, LÖBF 1999). Among these taxa, the number of forest-dwelling species is interesting and highlights the conservation value of urban forests (even considering that flora and fauna of industrial forests differ from that of natural and semi-natural forests). This aspect is apparent in the high number of neophytic trees and shrubs in urban forests.

Urban-industrial open brownfields and forests are inhabited by numerous endangered species (according to Red Data Book of Northrhine-Westphalia, LÖBF 1999), e.g.: Flowering plants: *Asplenium adiantum-nigrum*, *Carex praecox*, *Centaureum pulchellum*, *Dianthus armeria*, *Genista tinctoria*, *Hyoscyamus niger*, *Kickxia elatine*, *Malva sylvestris*, *Nepeta cataria*, *Salvia pratensis*, *Sherardia arvensis*, *Viola tricolor*; birds: Meadow Pipit (*Anthus pratensis*), Little Ringed Plover (*Charadrius dubius*), Peregrine (*Falco peregrinus*), Northern Wheatear (*Oenanthe oenanthe*), Redstart (*Phoenicurus phoenicurus*), Green Woodpecker (*Picus viridis*), Little Grebe (*Tachybaptus ruficollis*), Lapwing (*Vanellus vanellus*); amphibians: *Bufo calamita*, *Rana lessonae*; dragonflies: *Lestes virens*, *Sympecma fusca*, *Sympetrum fonscolombi*; grasshoppers: *Oedipoda caerulea*.

Species diversity as well as the number of endangered species of open industrial brownfields is higher than in urban forest areas. Compared with most semi-natural habitats within the conurbation of the Western Ruhrgebiet it turns out that the number of endangered species on fallow land in general is fairly similar. And finally, total species diversity can be even higher on fallow land than in most semi-natural areas.

### **Key Words**

Ruhrgebiet, fallow areas, urban-industrial brownfields, endangered species, urban forest, semi-natural habitats, species biodiversity.

### **Key References**

- LÖBF 1999: Rote Liste der gefährdeten Pflanzen und Tiere in Nordrhein-Westfalen. 3. Fassung. – *Schriftenr. LÖBF* 17, 641 pp.
- Rebele, F. and Dettmar, J., 1996: *Industriebrachen – Ökologie und Management*. Ulmer, Stuttgart, 188 pp.
- Sukopp, H. and Wittig, R., 1998. *Stadtökologie*. Ed. 2. Gustav Fischer, Stuttgart, Jena, New York, 488 pp.
- Seipel, R., Keil, P. and Loos, G. H., 2006. Floristische und vegetationskundliche Untersuchungen auf dem Gelände der ehemaligen Sinteranlage in Duisburg-Beeck. *Decheniana*, 159: 51-75.

### **Biography**

Dr. Peter Keil studied Geography and Botany at the Ruhr University of Bochum. PhD in Geobotany. He worked for several years in a consultancy office for landscape planning and was scientific assistant for Special Botany at the Ruhr University. Since 2003 chief of the BSWR.

Dipl.-Landschaftsökol. Christine Kowallik studied Biology and Landscape Ecology (Universities of Bielefeld and Oldenburg). Before she moved to the BSWR in 2004 she studied the impact of wind turbines on distribution of wintering geese and worked for the local conservation agency of Naturschutzbund (NABU).

Dr. Randolph Kricke studied Environmental Sciences at the University of Essen. He focussed on Lichenology and studied the lichen flora of the Ruhrgebiet between 1997 and 2002. During and after his doctoral thesis about the re-invasion of lichens to the Ruhrgebiet he investigated the relationship between lichens and air pollution.

Dipl.-Geogr. Götz Heinrich Loos studied Geography, Botany, History and Sociology. Before he moved to the BSWR he worked at the Ruhr University of Bochum as a scientific assistant in the Geobotanic Working Group for many years.

Dipl.-Biol. Martin Schlüpmann studied Biology and Geography (Landscape Ecology) in Bochum. After that he worked in a consulting engineering office in landscape conservation, development and environmental protection for many years.

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**Abstract for a poster**  
**Abstract for an oral presentation**

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