Fateryga, A.V., Ivanov, S.P. (2009): Results of the centennial studying of the vespoid wasps (Hymenoptera, Vespidae) of the Karadag Nature Reserve and adjacent territories (in Russian). Zapovidna Sprava v Ukrayini 15: 65–70.

Lattin, G. de (1967): Grundriß der Zoogeographie. Gustav Fischer, Stuttgart, 602 pp.

Mauss, V. (2006): Observations on flower association and mating behaviour of the pollen wasp species *Celonites abbreviatus* (Villers, 1789) in Greece (Hymenoptera: Vespidae, Masarinae). Journal of Hymenoptera Research 15: 266-269.

Mauss, V. (2013): Description of *Celonites andreasmuelleri* sp. n. (Hymenoptera, Vespidae, Masarinae) from the Middle East with a key to the Palaearctic species of the *C. abbreviatus*-complex of the subgenus *Celonites* s.str. Journal of Hymenoptera Research 31: 79-95.

Mauss, V., Fateryga, A.V., Prosi, R. (2016): Taxonomy, distribution and bionomics of *Celonites tauricus* Kostylev, 1935, stat. n. (Hymenoptera, Vespidae, Masarinae). Journal of Hymenoptera Research 48: 33–66.

Müller, A. (1996): Convergent evolution of morphological specializations in Central European bee and honey wasp species as an adaptation to the uptake of pollen from nototribic flowers (Hymenoptera, Apoidea and Masaridae). Biological Journal of the Linnean Society 57: 235-252.

Richards, O.W. (1962): A revisional study of the masarid wasps (Hymenoptera, Vespoidea). British Museum (Natural History), London, 294 pp.

Schremmer, F. (1959): Der bisher unbekannte Pollensammelapparat der Honigwespe *Celonites abbreviatus* Vill. (Vespidae, Masarinae). Zeitschrift für Morphologie und Ökologie der Tiere 48: 424-438.

Impact of inundation regime and meadow management on wild bee communities and associated bee-flower networks

Ulrich Neumüller[1,3]*, **Bärbel Pachinger**[2] & **Konrad Fiedler**[1]

[1]Division of Tropical Ecology and Animal Biodiversity, University of Vienna, Rennweg 14, 1030 Vienna, Austria
[2]Institute for Integrative Nature Conservation Research, University of Natural Resources and Life Sciences Vienna (BOKU), Gregor-Mendel-Straße 33, 1180 Vienna, Austria
[3]Current Address: Universität Ulm, Institut für Evolutionsökologie und Naturschutzgenomik, Albert-Einstein-Allee 11, 89081 Ulm, Germany
*E-Mail: victoria.carla.moris@gmail.com

Before humans created a predominantly open landscape, the primary natural habitats of bees were often sand dunes and dynamic floodplains. In our study wild bee communities on flood-prone meadows were compared with those on rarely inundated sites in the Donau-Auen National Park. Flower-visiting bees were sampled on 32 meadows between April and August 2016. Altogether 92 wild bee species interacting with flowers of 62 plant species were recorded. Mowing activities and strongly related to that, abundance of feeding plants were the main drivers altering wild bee activity density and diversity. Interestingly, the flooding regime had no significant impact on observed individual numbers and species accumulation curves suggest that species richness was higher on meadows which are more regularly flooded (Fig. 1). As a potential driver of this pattern, a significantly higher bee differentiation diversity on annually flooded meadows could be identified. Since bees are predicted to be vulnerable to long-lasting soil wetness, it follows that bee assemblages must have recovered following the last unusually severe summer flood in 2013. To obtain further insight into the functional characteristics of the observed bee communities in relation to pollination, three network metrics, which were derived from a bipartite plant-bee interaction matrix, were analyzed. None of the network indices was affected by the flood regime. Hence it is concluded that, although floods may have strong effects on wild bee populations in the short term, stable and diverse bee communities are restored only after a few years. These findings underline the exceptionally high value of floodplain areas as habitat for wild bees and reinforce earlier studies in which other insect groups seemed to show a low resistance but high resilience towards flooding. The observed resilience surely highly depends on the surrounding landscape, which acts as a starting point for recolonization processes. Hence it is important to consider biodiversity on a landscape scale beyond the limits of the nature reserve.

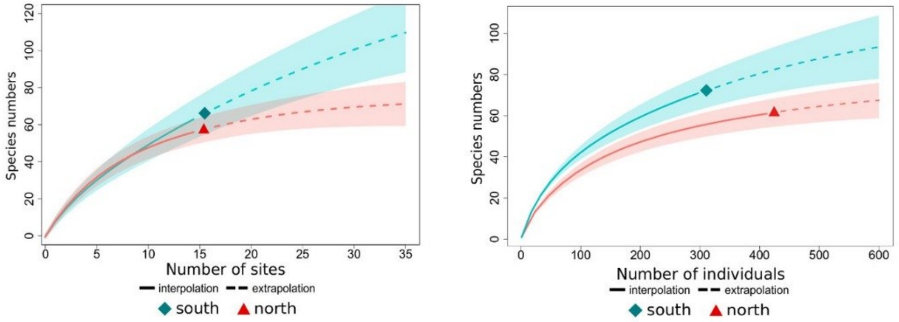

Fig. 1.: Sample site based (left) and individual based (right) randomized species accumulation curves of wild bee species numbers north (rarely inundated) and south (flood-prone) of the levee. The shaded areas represent 95% confidence intervals.

DNA barcoding for species identification of cryptic species: The case of wild bees

Robert J. Paxton

Martin-Luther-Universität Halle-Wittenberg, Allgemeine Zoologie, Halle (Saale)
E-Mail: robert.paxton@zoologie.uni-halle.de

Many insect species, including several wild bees, are difficult to identify using morphological characters. DNA barcoding, that is, the DNA sequence of a ca. 650 basepair fragment of the mitochondrial cytochrome oxidase I gene, is often used to aid identification of species. This approach is facilitated in Germany by the publication of a DNA barcode dataset of most German bees (Schmidt *et al.* 2015 *Molecular Ecology Resources* 15: 985-1000). Using examples from the genera *Andrena*, *Bombus* and *Nomada*, I show how useful DNA barcoding can be to recognise and separate among cryptic species. It is not, however, a panacea for all taxonomic difficulties. Therefore, at the same, I highlight some pitfalls and limitations in DNA barcoding for species identification. With additional sampling of bees, additional DNA barcoding and incorporation of other DNA-based methods, it is likely that additional cryptic species will be revealed in our fauna.

Zeitschrift/Journal: Mitteilungen des Entomologischen Vereins Stuttgart

Jahr/Year: 2018

Band/Volume: 53_2018

Autor(en)/Author(s): Neumüller Ulrich, Pachinger Bärbel, Fiedler Konrad

Artikel/Article: Impact of inundation regime and meadow management on wild bee communities and associated bee-flower networks 18-19