Session A

A question of the location: food and nesting resources are main drivers of urban wild bee community composition

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Land-use change is a major driver of biodiversity loss, whereby urbanisation represents one of the most profound types of land-use change. Therefore, environmental conditions characteristic for urban areas may act as strong environmental filters for wild bee communities. These filters might lead to a systematic loss of species and consequently to biotic homogenisation. Alternatively, different environmental conditions might enable diverse biological communities to exist within urban areas.

Here, wild bee community composition across 49 study sites in the city of Braunschweig, Lower Saxony, Germany was examined. The study sites covered a gradient from city centre to rural surrounding. Dissimilarities between wild bee communities were compared to community of flowering plants, nearby land use and soil characteristics as well as geographic distances using multiple matrix regression.

The sampled wild bee species represent 30% of the species known for Lower Saxony and included Red Listed species. The sampled communities differed markedly. Thereby, dissimilarity of the community of flowering plants had a significant positive effect on differences in wild bee community composition, as well as dissimilarity of nearby soil texture. In contrast, geographic distance between study sites, distance to the city centre, or dissimilarity of nearby land use had no effect. On average, 1/3 of the overall wild bee diversity of the city was detected at one sampling point (median true beta diversity: 3.309 compositional units).

These results show that cities provide suitable habitats for various wild bee communities. The composition of these communities are driven by the composition of essential food and nesting resources, i.e., flowering plants and nearby soil texture, rather than by dominant urban-specific environmental filters. In order to conserve and improve the resulting heterogenic set of urban wild bee species communities, it is important to preserve and create heterogeneous plant structures within cities.