May I introduce? The city of the Grey-Backed Mining-Bee *Andrena vaga* and her flat mates

Gardein, Hanna[1]; Diekötter, Tim[2]; Greil, Henri[1]

[1]Julius Kühn Institute (JKI) – Federal Research Centre for Cultivated Plants, Institute for Bee Protection, Braunschweig, Germany.
[2]Christian-Albrechts-University, Department of Landscape Ecology, Kiel, Germany.
Email of corresponding author: hanna.gardein@julius-kuehn.de

Ground-nesting bees constitute the vast majority of all wild bee species. Although they are the most abundant functional group of wild bees, ground-nesting bees are less studied than cavity nesting bees. The importance of floral resource availability on bees has been studied extensively, whereas findings about their nesting requirements are lacking. Especially precise measurements and detailed descriptions about the nesting site characteristics specific ground-nesting bees depend on are needed. Information about nesting site preferences and tolerable ranges is crucial for wild bee conservation.

In our study, the Grey-Backed Mining-Bee *Andrena vaga* is used as a model species to draw conclusion how the ideal nest site location for this and other ground-nesting bee species might be characterised. In the study area, *Andrena vaga* is quite common. Further, it is easily identifiable and forms large nest aggregations, which allows locating as many nesting sites as possible with the help of Citizen Science.

Around 60 nest aggregations within the city of Braunschweig were found of which 27 were selected for detailed analyses. For this purpose, soil samples were taken and are currently analysed regarding texture, water content, pH, organic material, salinity and the presence of heavy metals. Additionally, both the soil and the surface temperature as well as the solar irradiation were monitored. Site characteristics like the soil density, slope, exposition and vegetation cover were surveyed. All parameters will be compared with the conditions on an un-colonised control. With the help of this data, ideal nesting sites, especially within cities, can be protected or created. Further, this knowledge helps to conduct studies of nesting individuals within a laboratory.

Additionally, the health status of the bees should be analysed and compared between the different aggregations. Hence, emergence traps were used to sample recently emerged individuals and relate them to the nesting sites. With the help of the traps, it can be controlled that collected bees have not immigrated from other nest sites. The parasitism rate and the sex ratio were calculated. Furthermore, the body size of the sampled animals will be measured by their intertegular distance. The variables will then be analysed for correlations with landscape characteristics, aggregation size and the nesting site parameters. With the help of this data, it is possible to draw conclusion, which factor determines the development and chances for reproduction of the bees.