Do pollen nutrients constrain the diet of wild bees in urban areas?

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Abstract: Wild bees are crucial for biodiversity and ecosystem services such as pollination. However, wild bees are declining and continuously facing various challenges including habitat changes such as urbanization. Urban ecosystems with a mixture of native and exotic floral resources may threaten the dietary and nutritional requirement of wild bees. A previous study (Casanelles-Abella et al. 2021) on four common European wild bee species and their diet requirement in five urban areas (Antwerp, Paris, Poznan, Tartu, and Zurich) suggested that wild bees with generalized host plants were predicted to be less sensitive to urban intensity due to their broader diets. However, host-plant generalization does not necessary reflect nutrient generalization. In fact, generalized host-plant feeding bees can be nutrient-limited if they targeted on some uncommon nutrient shared within these host plants. Here, we will further explore the nutrient requirement based on Casanelles-Abella et al.(2021)'s study to get a deeper understanding on nutrient limitation for wild bees in urban ecosystems. Specifically, we will focus on a group of lipid nutrient, namely sterols, that cannot be synthesized by bees but are crucial for their growth, development, and reproduction. By analyzing sterol composition and amount in bees and in pollen they collected and stored in their nests, we ask: 1) do sterol profiles in bee's body match that in their pollen diet? 2) How consistent are the pollen sterol nutrient landscape for these four wild bees in different urban areas? 3) Are more generalized wild bees also more sterol generalists? This is a new study that we hope to get some preliminary results before the conference.

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