

## Phenology and Size in the Social Sweat Bee, *Halictus ligatus*, in an Urban Environment

**Authors :** Rachel A. Brant, Grace E. Kenny, Paige A. Muñiz, Gerardo R. Camilo

**Abstract :** The social sweat bee, *Halictus ligatus*, has been documented to alter its phenology as a response to changes in temporal dynamics of resources. Furthermore, *H. ligatus* exhibits polyethism in natural environments as a consequence of the variation in resources. Yet, we do not know if or how *H. ligatus* responds to these variations in urban environments. As urban environments become much more widespread, and human population is expected to reach nine billion by 2050, it is crucial to distinguish how resources are allocated by bees in cities. We hypothesize that in urban regions, where floral availability varies with human activity, *H. ligatus* will exhibit polyethism in order to match the extremely localized spatial variability of resources. We predict that in an urban setting, where resources vary both spatially and temporally, the phenology of *H. ligatus* will alter in response to these fluctuations. This study was conducted in Saint Louis, Missouri, at fifteen sites each varying in size and management type (community garden, urban farm, prairie restoration). Bees were collected by hand netting from 2013-2016. Results suggest that the largest individuals, mostly gynes, occurred in lower income neighborhood community gardens in May and August. We used a model averaging procedure, based on information theoretical methods, to determine a best model for predicting bee size. Our results suggest that month and locality within the city are the best predictors of bee size. *Halictus ligatus* was observed to comply with the predictions of polyethism from 2013 to 2015. However, in 2016 there was an almost complete absence of the smallest worker castes. This is a significant deviation from what is expected under polyethism. This could be attributed to shifts in planting decisions, shifts in plant-pollinator matches, or local climatic conditions. Further research is needed to determine if this divergence from polyethism is a new strategy for the social sweat bee as climate continues to alter or a response to human dominated landscapes.

**Keywords :** polyethism, urban environment, phenology, social sweat bee

**Conference Title :** ICE 2017 : International Conference on Entomology

**Conference Location :** Paris, France

**Conference Dates :** October 19-20, 2017