

# ESA2019

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## LOUISVILLE

### 33: How does percent impervious land-cover affect the correlation between ground nesting and non-ground nesting bee abundance, richness and diversity?

**Tuesday, August 13, 2019**

**04:30 PM - 06:30 PM**

📍 *Kentucky International Convention Center - Exhibit Hall*

#### **Background/Question/Methods**

Investigations into the connection between landscaping habits and native bee communities suggests that urban gardens may produce biodiversity in urbanized areas. We have previously reported that the most common bee nesting guild in Plymouth County, Massachusetts (ground-nesting bees) shows a positive correlation in abundance with other bee nesting guilds. In other words, sites that promote healthy bee communities do not favor one nesting guild over the other. However, it is currently unknown if higher degrees of urbanization and agriculture alter the correlations between nesting guilds. For example, increasing impervious land-cover accompanying urbanization may negatively impact the ground nesting bee community by limiting nesting resources. Therefore, in order to determine if urbanization specifically impacts ground-nesting bees the current study investigates how impervious land-cover may affect the correlation between ground-nesting and non-ground nesting bee abundance, richness and diversity. To test the hypothesis that more urbanized sites will favor non-ground-nesting over ground-nesting bees, sampling occurred bi-weekly from early spring to late fall of 2016, 2017, and 2018 by sweep netting and pan traps. ArcGIS was used to calculate percent impervious land-cover and classify sites as rural or urban.

#### **Results/Conclusions**

Over 3 years, 5540 ground nesters and 2143 non-ground nesters were sampled. Statistical analysis showed covariance between ground nesting and non-ground nesting bee abundance ( $F_{1,227}=70.6, p<0.0001$ ) with abundance differing at each site ( $F_{5,227}=8.40, p<0.0001$ ) and the same occurring for richness and diversity. These similar, positive correlations between ground-nesting and non-ground nesting bees suggest a lack of competition between nesting guilds across different levels of urbanization. Two rural sites with undisturbed land and high bee abundance had the strongest correlations for abundance with  $R^2$  values of 0.492 and 0.438. These sites also showed strong correlations for richness with values of 0.450 and 0.323, and the urban site with sustainable land-use practices had a comparable correlation to the rural sites with a value of 0.407. The rural commercial farm had weak correlations for abundance and richness, comparable to the unmanaged urban parking lot, with values of 0.262 and 0.195 for abundance and richness. There was no difference in correlation strength for ground nester and non-ground nester guild diversity across levels of urbanization, with all  $R^2$  values being less than 0.3. Overall, weaker correlations at the most urban sites suggests that urbanization affects nesting guilds differently, even though there is no indication of enhanced competition.

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