ESA2019 LOUISVILLE

11: How does percent impervious land cover correlate with bee abundance and richness at different spatial scales?

Tuesday, August 13, 2019
04:30 PM - 06:30 PM
Kentucky International Convention Center - Exhibit Hall

Background/Question/Methods

Pollinators play a crucial role in many ecosystems as well as in agriculture. Declining bee abundance and richness may indicate diminishing ecosystem health as well as threaten the global food supply. Urbanization and the accompanying increase in impervious land cover may degrade bee habitat and contribute to this observed decline in bee communities. Differing spatial scales were chosen as many studies that correlate a land attribute with an marker for ecosystem health, such as bee abundance and richness, use a variety of spatial scales. This study was designed to find the most optimal sized spatial scale by evaluating different sizes to find which scale that impervious land cover correlated best with bee abundance and bee richness. Therefore, we investigated the correlations between impervious land cover and bee richness, as well as bee abundance, in Southeastern Massachusetts at four different spatial scales. Percent impervious land cover was calculated for six study sites at 100, 300, 600, and 900 meter spatial scales through ArcGIS software. Bees were sampled on a biweekly basis from early spring to late fall, in the years 2016 through 2018, using pan traps and sweep-netting techniques.

Results/Conclusions

A total of 7648 bees were caught across a three year sampling period, with richness ranging from 0 (when no bees were caught) to 16 different genera. Percent impervious land cover differed at each spatial scale for all of the sites. Statistical tests were done using Pearson's correlation coefficient (r-value). All results produced statistically significant negative correlations of impervious land cover with both richness and abundance which were stronger with increasing spatial scale size, with 900 meters having the strongest correlation (r = -0.4138 and r =-0.2956 respectively). This suggests that, out of all the spatial scales tested, 900 meters would be the best for correlating the effect of impervious land cover on bee richness and abundance for this specific study. Future analysis will need to be done with spatial scales greater than 900 meters to see when the correlation will begin to weaken.

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