ESA2019 LOUISVILLE

7: Effects of differing land-use practices on genus-level metrics of bee community structure

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

Background/Question/Methods:

Bees play a pivotal role in animal-mediated pollination; their absence could mean a major loss in important food crops. Reports of their decline have prompted research on different land-use practices that may harm or benefit local bee communities. Many studies often measure abundance, richness, or diversity. However, use of all three metrics may provide the most complete assessment of bee communities. For example, diversity is a measure of the number and balance of different types of organisms in an ecosystem, but does not account for organisms that are difficult to detect; richness is a simple count of the number of different organisms, but does not account for balance between the types; and finally, abundance is a simple count of the number of organisms, but alone does not indicate a healthy ecosystem. In the present study, six different sites of varying land-use practices were assessed to evaluate the magnitude and stability of native bee community abundance, richness, and diversity. Bees were sampled bi-weekly using pan traps and sweep nets from early spring to late fall in the years 2016, 2017, and 2018. Study sites were categorized into urban and rural based on percent impervious land cover using GIS-analysis.

Results/Conclusions:

Over three years, a total of 7,684 bees were caught and identified to genus. There was a significant effect of year and site on abundance, richness, and diversity (p<0.05 for all) while the interaction between site and year was also found to be significant (p<0.05 for all). Rural sites generally displayed higher abundance, richness, and diversity than urban sites, which is consistent with previous studies. Dunrovin Farm, the most rural site, had the highest abundance and richness, but not diversity, suggesting that both richness and diversity should be considered in determining bee community health. Native Meadow, a sustainably managed urban site, had metrics similar to the more rural sites, suggesting that these land-use practices may benefit bee communities in an urban setting. Overall, a decline in the bee community was observed for all three metrics between 2017 and 2018. Further monitoring will reveal if this is normal year-to-year variation or indicative of a long term trend. In conclusion, sustainable land-use practices may benefit the local bee community in urban settings; and utilizing abundance, richness, and diversity together may be necessary to provide the most comprehensive assessment of local bee communities.

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