

The Effect of Land Use on Diversity and Abundance of Native Bees in the Adirondacks

Melissa Yanek , Dr. William L. Romey

Bees are significant pollinators and play an important role in agriculture, as a third of crops are fertilized by pollinators (Buchmann and Nabhan 1996). The nonnative honeybee, *Apis mellifera*, has been commonly utilized, but since 1990, as a result of parasitic varroa and tracheal mites, colonies have declined 25% in the United States. Therefore, the potential needs of native bees must be understood to maintain both agricultural yields and biological diversity (Allen-Wardell, et. al 1998). In 2003, during the months of June and July, Apoidea samples were collected to determine the correlation between land use practices and Apoidea abundance and diversity in New York State's Adirondacks.

Using transects of pan traps, we sampled four sites at the Forest Ecology Research and Demonstration Area of the Paul Smiths Visitor Interpretive Center near Saranac Lake (NY: Franklin Co.). The four five-acre sites were logged using the methods of clearcut, where all trees are felled, shelterwood, where most trees are cut, leaving a small number for shade and seed, singletree, where a small number of trees are felled, creating light gaps on the forest floor, and a control plot that was not logged. The transects consisted of equal numbers of blue, white, and yellow bowls filled with soapy water to capture bees. In addition, the symmetry of *Lasioglossum* and *Andrena* individuals was measured as an indicator of fitness and stress. Portions of the wings were measured to determine the effects of land use on health and development.

Andrena and *Lasioglossum* were the most abundant genera found. Using an ANOVA general linear model, it was determined that a few genera, such as *Lasioglossum*, exhibited a preference for certain color bowls, while most other genera, such as *Andrena*, *Nomada* and *Sphecodes* showed no significant color preference. Using the Shannon index, we determined that the diversity of Apoidea genera was greatest in the clearcut plot, while the shelterwood plot was less diverse, and the singletree plot was found to be the least diverse. No Apoidea were found in the control plot. The abundance and diversity of pollinators determines plant composition of an area and, by fostering the most suitable habitats for pollinators, appropriate communities can be created. While no comprehensive study of Apoidea in the Adirondacks has been undertaken before, determining land use preference of native pollinators is essential to the region, as the park is based upon multiple land uses.

Literature Cited

Allen-Wardell G., Bernhard P., Bitner R., Burquez A., Buchmann S., Cane J., Cox P.A., Dalton V., Feinsinger P., Ingram M., Inouye D., Jones C.E. Kennedy K., Kevan P., Koopowitz H., Medellin R., Medllin-Morales S., Nabhan G.P., Pavlik B., Tepedino V., Torchio P., Walker, S. 1998. The potential consequences of pollinator declines on the conservation of biodiversity and stability of food crop yields *Conservation Biology* 12: 8-17.

Buchmann S.I. and Nabhan G.P. *The Forgotten Pollinators*. Washington, D.C.: Island Press. 292 p.

