World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:13, No:10, 2019

Impacts of Commercial Honeybees on Native Butterflies in High-Elevation Meadows in Utah, USA

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Abstract : In an effort to protect honeybees from colony collapse disorder, beekeepers are filing for government permits to use natural lands as summer pasture for honeybees under the multiple-use management regime in the United States. Utilizing natural landscapes in high mountain ranges may help strengthen honeybee colonies, as this natural setting is generally void of chemical pollutants and pesticides that are found in agricultural and urban settings. However, the introduction of a competitive species could greatly impact the native species occupying these natural landscapes. While honeybees and butterflies have different life histories, behavior, and foraging strategies, they compete for the same nectar resources. Few, if any, studies have focused on the potential population effects of commercial honeybees on native butterfly abundance and diversity. This study attempts to observe this impact using a paired before-after control-impact (BACI) design. Over the course of two years, malaise trap samples were collected every week during the months of the flowering season in two similar areas separated by 11 kilometers. Each area contained nine malaise trap sites for replication. In the first year, samples were taken to analyze and establish trends within the pollinating communities. In the second year, honeybees were introduced to only one of the two areas, and a change in trends between the two areas was assessed. Contrary to the original hypothesis, the resulting observation was an overall significant increase in the mean butterfly abundance in the impact areas after honeybees were introduced, while control areas remained relatively stable. This overall increase in abundance over the season can be attributed to an increase in butterflies during the first and second periods of the data collection when populations were near their peak. Several potential theories are 1) Honeybees are deterring a natural predator/competitor of butterflies that previously limited population growth. 2) Honeybees are consuming resources regularly used by butterflies, which may extend the foraging time and consequent capture rates of butterflies. 3) Environmental factors such as number of rainy days were inconsistent between control and impact areas, biasing capture rates. This ongoing research will help determine the suitability of high mountain ranges for the summer pasturing of honeybees and the population impacts on many different pollinators.

Keywords : butterfly, competition, honeybee, pollinator
Conference Title : ICE 2019 : International Conference on Entomology
Conference Location : Paris, France
Conference Dates : October 29-30, 2019