Yellowjacket Trapping Efficacy Trials, NYS IPM Program, 2017

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Note: For a detailed discussion of the project's background, procedures, and results, see the 2016 report. Field work was completed in 2016.

Students affiliated with Cornell's Statistical Consulting Unit worked with us on analysis initially of the 2006 data, which was funded by a grant from the Pest Management Foundation. They plotted the catches in the center of plots that had peripheral trapping versus catches in the center of plots without peripheral trapping and did a t-test with R https://www.r-project.org/ . Although the average of center catches in peripheral trapped plots is lower than in non-peripheral trapped plots, the difference was not statistically significant ($P \leq 0.05$). This contrasts with our initial analysis using the t-test in Excel. We have yet to follow through with one suggestion the students made: "Perhaps we could plot the proportion of the catches. For instance, if we have 100 catches in the middle and 300 catches in the periphery, the proportion is 100/(100 + 300) = 0.25. This might be better than the raw count because the scale of catches for one trial could be different from another, depending on the site and day, etc. I would suggest creating another column for 'proportion', and re-plot these proportions against the environmental factors."

The students then developed a linear mixed model incorporating the following fixed effects: treatment, temperature, wind speed, rain, time in trial, and landscapes. (Treatment: peripheral trapping or not; temperature: average on sampling date; wind speed: average on sampling date; rain: total on sampling date; time in trial: sampling period, 1 through 4, within a trial; landscape: percent within a ¾-mile radius circle around a pair of plots, two categories used based on frequency and size – highest priority were woodland, annual crops/hay, rural property; second highest priority were old field, mowed field, orchard, pasture, shrubland.) They ran, via JMP, with the 2006 data alone and also for all years. Treatment was not significant in all models. Statistical significance was associated with the site (geographical location of a pair of plots) and when within a trial the sampling was done. In one of the models (all years data, both highest and second highest priority landscape variables), temperature was significant but not when the second highest landscape variables were excluded. The students indicated this implies that temperature has an important effect on the number of yellowjacket captures in certain landscapes. The students also indicated that there are still differences between trials that are not being statistically explained by the tested climate and landscape variables and that may have contributed to the lack of significance of the treatment variable in all models.

Summary of analysis to date: complex landscape and climate factors influence yellowjacket activity but may not be predictive of activity.