

Deer Selfies – Analysis of Camera Trap Data to Determine Variations in Visitation Rates to 4-Poster Tick Management Devices under Altered Feeding

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Abstract

Due to a history of high levels of tick-borne disease related cases at Brookhaven National Laboratory the Environmental Protection Division implemented the use of the 4-poster tick management system to reduce the number of ticks on the property. This project has been in place at the lab since 2013. Each year during the summer tick surveys are conducted to determine how effective these devices are in the reduction of ticks at the laboratory. With a more than 90% reduction rate in tick populations in the areas of use the Lab began an experiment, at the request of New York State, in 2018 to determine if an altered feeding rate would result in continued effectiveness. This study includes a determination of visitation rates to 4-Poster devices based on time lapse photography using Moultrie game cameras placed at each 4-Poster location. Photos were downloaded and archived for later sorting into those containing deer and those without deer.

This data was then quantified by day, then analyzed using Microsoft Excel to determine variations in visitation rates based on the feedings between weekly and tri-weekly sites.



Figure A. – Camera trap photographs of deer visiting a 4-Poster device

Introduction

The 4-Poster device have been designed to reduce tick populations on white-tailed deer which are the primary/ final host for ticks. Developed by the U.S. Department of Agriculture's Research Service in 1994,¹ the 4-Poster device consists of an incorporated central bin for holding corn that is connected to feeding troughs and two paint rollers on each side of the bin. The paint rollers absorb and transfer a 10% permethrin acarcide to deer. A plate incompletely covers each feeding trough, which ensures contact between the rollers and the deer as they feed.² Use of this device has resulted in decreases in tick populations by greater than 90%. Normal use of 4-Poster devices includes charging rollers with permethrin at a minimum of once per week. The New York State Department of Environmental Conservation has requested research into the viability of continued effectiveness with reduced servicing of devices. Reduced servicing also factors in overall costs in time and materials being invested into the operation and maintenance of the 4-poster devices. While NYSDEC would like to place a ban on these devices they haven't. The reduce servicing is to the feeding of wild deer and lessen the congregation of spreading chronic wasting disease among the herds.

Results & Discussion

Based off the data provided deer would visit the weekly 4-posters often then tri-weekly posters, due to that majority of the time it was almost guaranteed that food would be available at those sites. Therefore indicating that there is a significant difference between alter feedings within the weekly and tri-weekly 4 posters locations ; which is also justified by performing a t-test between the two, where we rejected the null hypothesis; p-value <0.05, the exact p-value for both the two-tailed and one-tailed test is 0.000. In reference to the analysis of camera trap data in determining the variations of visitation rates among the 4-Poster devices under altered feedings However, in the case of upcoming goals, a more developed analysis on deer visitation will be conducted.



Figure 1: These graphs represent the average daily deer visits within each Weekly and Tri-Weekly 4-Poster location

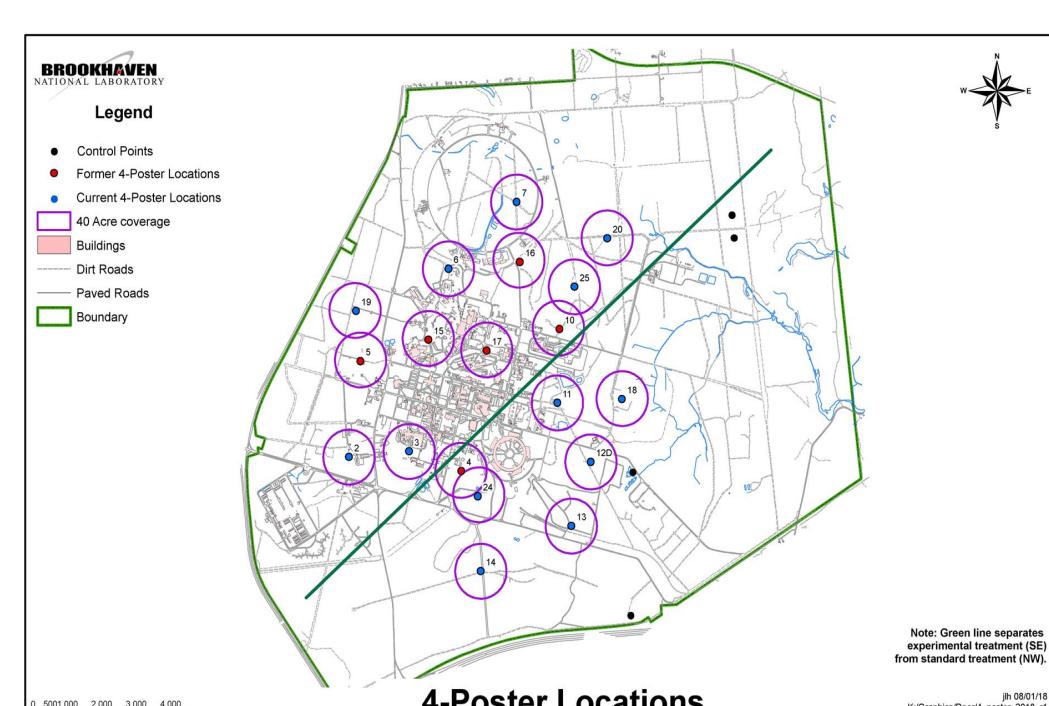


Figure B & C. – Photo of a Moultrie 501 Camera and a Map of 4-Poster locations throughout the property of Brookhaven National Laboratory

Methods & Materials

- Cameras were serviced on a monthly basis at which time memory cards were removed and exchanged for a blank memory card; batteries were replaced; and cameras reset to take time-lapsed photos.
- Full memory cards were taken back to the lab and photos were uploaded to the computer for archiving by device location and date for eventual sorting.
- Photos were sorted between those photos containing deer and those without deer.
- The number of photos per day in each category were recorded in an Excel spreadsheet for analysis.

Conclusion

Based off the analysis tri-weekly applications may be more costly than weekly. However, future research will consist of a comparative analysis of data over the previous 7 years.

Acknowledgments

This project was supported in part by Brookhaven National Laboratory-Virginia Pond Scholarship. A huge thank you to the U.S. Department of Energy, Dr. Fred Rispoli for his assistance with the statistics, and the continued support from my mentor Dr. Green during my time here at Brookhaven National Laboratory.

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