

Is There a Relationship Between Daily Percent Humidity and Daily Average Temperature with Spotted Lanternflies, In NYC?



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INTRODUCTION

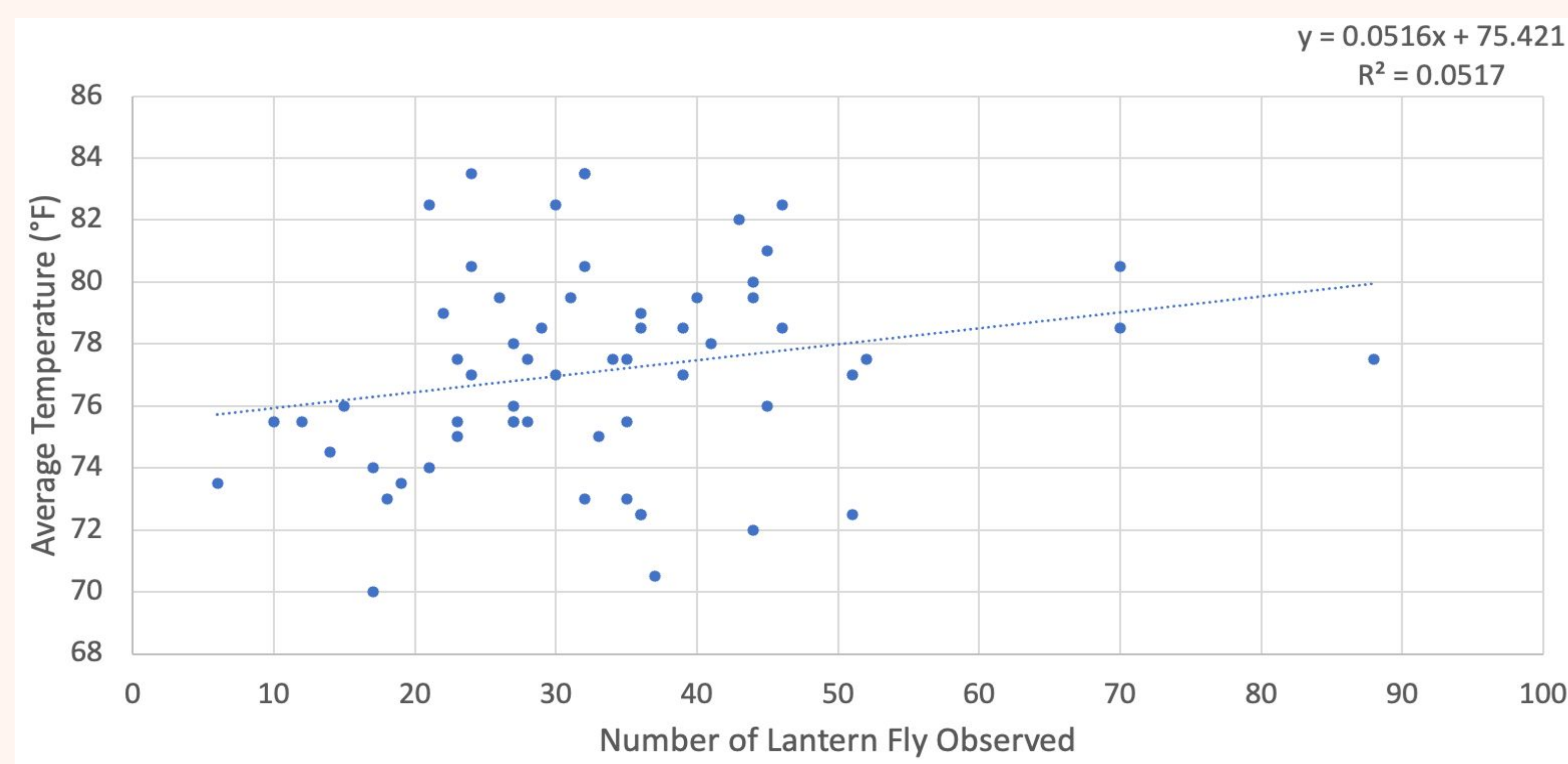
Spotted Lanternflies (*Lycorma delicatula*) are an invasive species to the East Coast of the United States. Originating in China, the species was introduced to the U.S. through human transportation and has a survival temperature between 15 °C and 30 °C (59 °F and 86 °F) (Kreitman, 2021). This study sets out to see how this survival temperature threshold relates to how lanternflies survive during the hotter months of the year, (in NYC), that are at the higher end of this survival threshold. To further expand on how weather could impact lanternfly presence we chose to use humidity.

METHODOLOGY

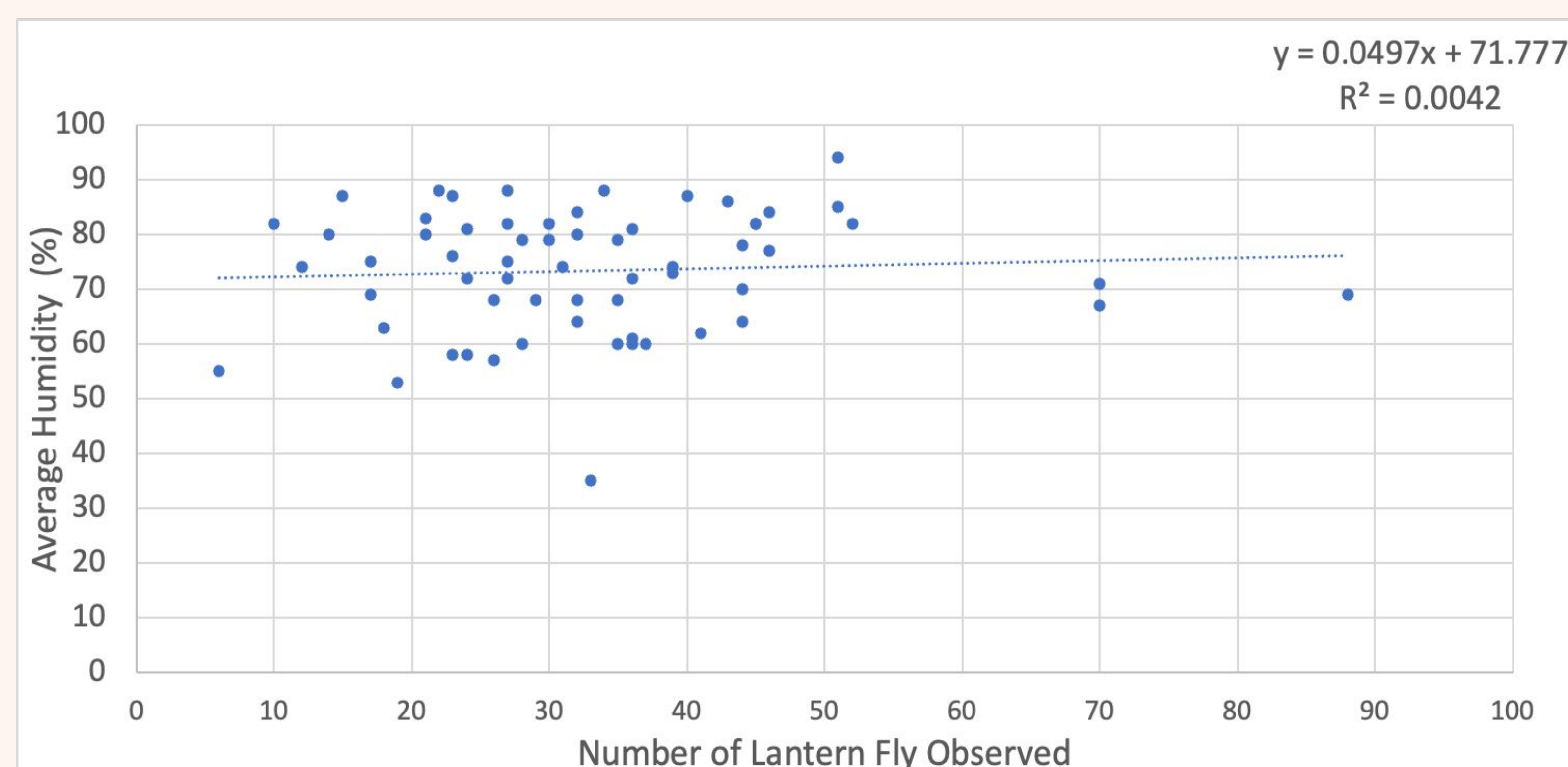
The number of lanternflies observed on each day of July 2023 and August 2023 was derived from the iNaturalist database. iNaturalist is a database of observations collected by citizen scientists. Therefore, we assumed that the population size of lanternflies is represented by iNaturalist. We collected the average daily temperature and average humidity in NYC each day for July 2023 and August 2023 from the Weather Channel. Two scatter plot graphs were created that portray the relationships between the factors compared to lanternfly presence in NYC.

RESULTS

The graph below is a representation of the average daily temperature each day in July 2023 & August 2023, compared with the observed lanternflies on those respective days.



The graph below shows the relationship between the average humidity each day in July 2023 & August 2023 compared to the number of observed lanternflies for those respective days.



In Graph 1 (upper graph), with an r-value of 0.05, there's likely no correlation between number of lanternflies observed and the average daily temperature in July 2023 and August 2023 since the farther away the r-value is from 1 the less likely there's a correlation from the two factors. In Graph 2 (lower graph), with an r-value of 0.004, there's likely no correlation between number of lanternflies observed and the average humidity per day in July 2023 and August 2023.

CONCLUSIONS

Our investigation reveals no correlational relationship between daily average temperature and percentage of humidity in NYC between the months of July 2023 and August 2023 to that of observed lanternflies. From the R values it is shown that humidity was farther away from having a correlational relationship with lanternflies, than daily average temperature was.

FUTURE WORK

Moving forward, temperature and humidity could still be factors, in comparison to a different data set of lanternfly population. iNaturalist served as proxy, and thus if a more accurate representation of the lanternflies were to be used the study could potentially have different results. Furthermore, future studies should be conducted to analyze possible relationships between lanternflies within the colder months of the year as opposed to July or August.

Our study could also be expanded through comparing lanternfly population with the daily highest and lowest temperatures rather than the daily average. The average daily temperature never went beyond a lanternflies survival threshold of 86 °F, but the highest temperature of those respective days was above 86°F, so there is another relationship to be analyzed from here as well.

WORKS CITED

Devin Kreitman, Melody A Keena, Anne L Nielsen, George Hamilton, Effects of Temperature on Development and Survival of Nymphal *Lycorma delicatula* (Hemiptera: Fulgoridae), *Environmental Entomology*, Volume 50, Issue 1, February 2021, Pages 183–191.,