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22 July 2020

The effect parasitic mites have on incubating House Wrens (*Troglodytes aedon*)

**Introduction**

 For this research project, I tried to analyze and compare the nests of House Wrens that had little-to-no mites to those who had moderate-to-severe amounts of mites in their nests. The hypothesis I formulated is that there is a correlation between the amount of mites in a nest and how long the House Wren will incubate her clutch. The purpose of this was to see how the mites would affect the incubation periods of the female House Wrens on her clutch. This would be done by comparing the amount of time the female House Wren would spend on and off her nest. By analyzing the data we gathered, we can perhaps look into how parasitic relationships may affect nesting and incubating birds. This could lead not only to breakthroughs in understanding parasitic relationships with nesting House Wrens and mites, but also with other species.

**Methods**

 iButtons were placed inside the nest, under the lid of the nest box, and on the outside of the nest box. These recorded the temperatures of the nest, inside the box, and the external temperature outside. The cup iButton recorded the intervals for which female House Wren was either on or off her nest. This was then turned into a graph, which was analyzed from the first time the female left the nest to the fifth time she left the nest. Both the external and internal temperatures of the nest boxes were recorded during this incubation time frame as well.

**Results**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mite Level | Time off | 1 off | 1 on | Lid  | Bot | 2 off | 2 on | 3 off | 3 on | 4 off | 4 on | 5 off | 5 on | Lid | Bot |
| Level 0 | 6:22 | 6.87 | 9.88 | 18.09 | 16.58 | 4.56 | 6.13 | 4.76 | 7 | 5.1 | 7.32 | 5.59 | 7.46 | 19.15 | 18.49 |
| Level 1 | 6:16 | 8.44 | 10.12 | 16.47 | 14.69 | 5.56 | 8.24 | 5.67 | 8.32 | 6.06 | 9.05 | 5.76 | 9.01 | 17.35 | 16.2 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average of 0 & 1 | 6:19 | 7.65 | 10 | 17.28 | 15.63 | 5.06 | 7.18 | 5.21 | 7.66 | 5.58 | 8.18 | 5.67 | 8.23 | 18.25 | 17.34 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Level 2 | 6:14 | 8.06 | 9.76 | 16.63 | 14.18 | 5.61 | 7.88 | 5.73 | 8.44 | 5.17 | 7.92 | 6.52 | 8.39 | 17.05 | 15.17 |
| Level 3 | 6:09 | 7.13 | 10.18 | 16.54 | 14.38 | 4.52 | 7.89 | 5.06 | 8.58 | 5.69 | 9.6 | 5.35 | 8.66 | 17.08 | 15.27 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Average of 2 & 3 | 6:11 | 7.59 | 9.97 | 16.58 | 14.28 | 5.06 | 7.88 | 5.39 | 8.51 | 5.43 | 8.76 | 5.93 | 8.52 | 17.06 | 15.22 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | T value | 0.15159 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | p value | 0.880595 |  |  |  |  |  |  |  |  |  |  |
|  |  | not significant at p < .05 |  |  |  |  |  |  |  |  |  |  |

 The results were not what I was expecting to find, specifically in the form of the t-test I ran on the overall averages of all four variations of mite level nests. This t-test disproved my hypothesis and upheld the null hypothesis that mite levels do not affect incubation bouts by the female House Wren. However, it was encouraging to see the relationships between the individual nests. Nests with low-to-no mites in them tended to start their day later (sleeping in) and had higher temperatures in their nest boxes, which encourages healthier growth for the clutch. The nests with higher numbers of mites were more restless, left their nests earlier, and spent more time on and off their nests. This is most likely due to the fact they need to spend more time gathering food for themselves and then spend more time incubating their clutch.

 My hypothesis was not upheld, which was discouraging. Looking at the raw data, I thought I was going to uphold my hypothesis. However, the t-test on the overall data disproved the hypothesis. Perhaps human error in entering data or just one extra set of incubating data could have been what disproved my hypothesis.

**Conclusion**

 Conducting this research project was very important to me. Specifically, I conducted this research o give me something very credible to put on my application to graduate school or medical school. Not many students take advantage of this opportunity at Albion College, specifically men, and I choose to utilize the opportunity Albion College gives us to further my academic career and promote my status as an accomplished student at Albion College. I plan on presenting my research, which I will be continuing to analyze data from previous years, at the 2021 Elkin Isaac symposium and perhaps even at the Wilson Ornithological Society Conference in Albany, NY, in April 2021.

**Acknowledgements**

 This project would not have been made possible without the help of Dr. Douglas White and Dr. Dale Kennedy. Recognition must also be given to Dr. Vanessa McCaffrey and Renee Kreger for heading the FURSCA program. A special thanks also needs to go to the Orpha Leiter Irwin Fellowship, for funding this research project.