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Intro to R

Project proposal

**Broken Wing Display and Incubation Patterns in Killdeer**

**Introduction**

Nest defense is common across animals, but distraction displays designed to lead predators away from the nest seem to be widespread only within birds1,2. Among these, the ‘Broken Wing Display’ (BWD) is one of the most extraordinary because it involves the parent risking their own life to deceive predators from discovering their offspring. To date, we know that BWD is a widespread behavior that varies with nesting cycle, sex, and predator type3. However, we know little about the potential costs of BWD to offspring, especially since the initiation of BWD requires the incubating parent to leave the nest. My project will analyze how nest defense behaviors affect incubation patterns in Killdeer (*Charadrius vociferus).*

**Objectives**

1. Calculate the average incubation temperature for Killdeer
2. Perform ANOVA test to detect significant differences between incubation temperatures when the parent is on and off the nest
3. Perform linear regression to determine the relationship between ambient temperature and incubation temperature

**Methods**

Data for this project was collected in June of 2023 using ibutton temperature loggers placed in three incubating Killdeer nests in Nebraska. Loggers were programmed to collect temperature readings in ℃ every ten minutes, and every logger collected at least 25 data points, creating over 100 observations. Behavioral observations were also made to correlate temperature changes with net defense behavior. Two nests were located at lakeshore housing developments (loggers 2 and 3), while one was in a parking lot (loggers N and F). Logger F was placed outside of the nest to record ambient temperature directly outside the nest. Data from loggers 2,3 and N will be used to address objectives 1 and 2. Data from loggers N and F will be used to address objective 3.

**References**

1Humphreys, R. K. et al. (2020). Avian distraction displays: A Review. Ibis, 162(4), 1125–1145.

2de Framond, et al. (2022). The broken-wing display across birds and the conditions for its evolution. Proc. Roy. Soc. B, 289(1971).

3Brunton, D. H. (1990). The effects of nesting stage, sex, and type of predator on parental defense by Killdeer (Charadrius vociferous): Testing models of avian parental defense. Behav. Ecol. Sociobiol., 26(3).