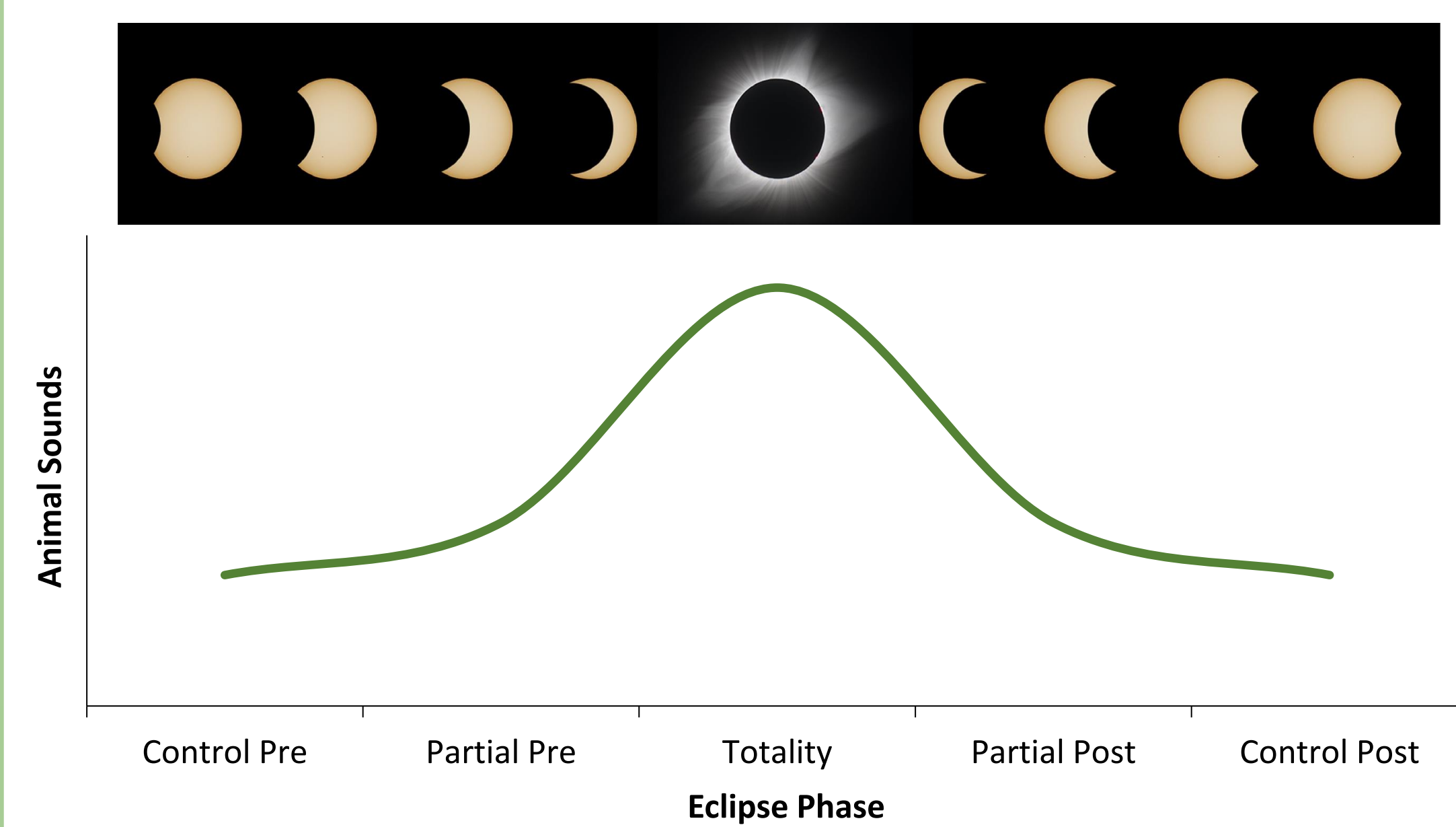


Introduction

- Eclipses have been suggested to alter animal behavior, with increases in behaviors such as vocalizations being previously noted.
- Records of behavioral changes have been mostly anecdotal and qualitative in nature.
- Previous standardized tests have focused on partial eclipses, which could have differing results from a total eclipse.
- This study will use highly controlled and well-replicated audio recordings to quantify changes in animal vocalizations in response to a total solar eclipse.

Hypothesis



Methods

- We recorded audio at 20 different locations during the total eclipse on April 8, 2024.
- Recordings began 30 minutes prior to the start of the partial eclipse and lasted until 30 minutes after the end of the partial eclipse.
- We listened to the recordings to quantify bird vocalizations and to detect calling frogs.
- Dataloggers tracked light and temperature across all eclipse phases.

Acknowledgements

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Results

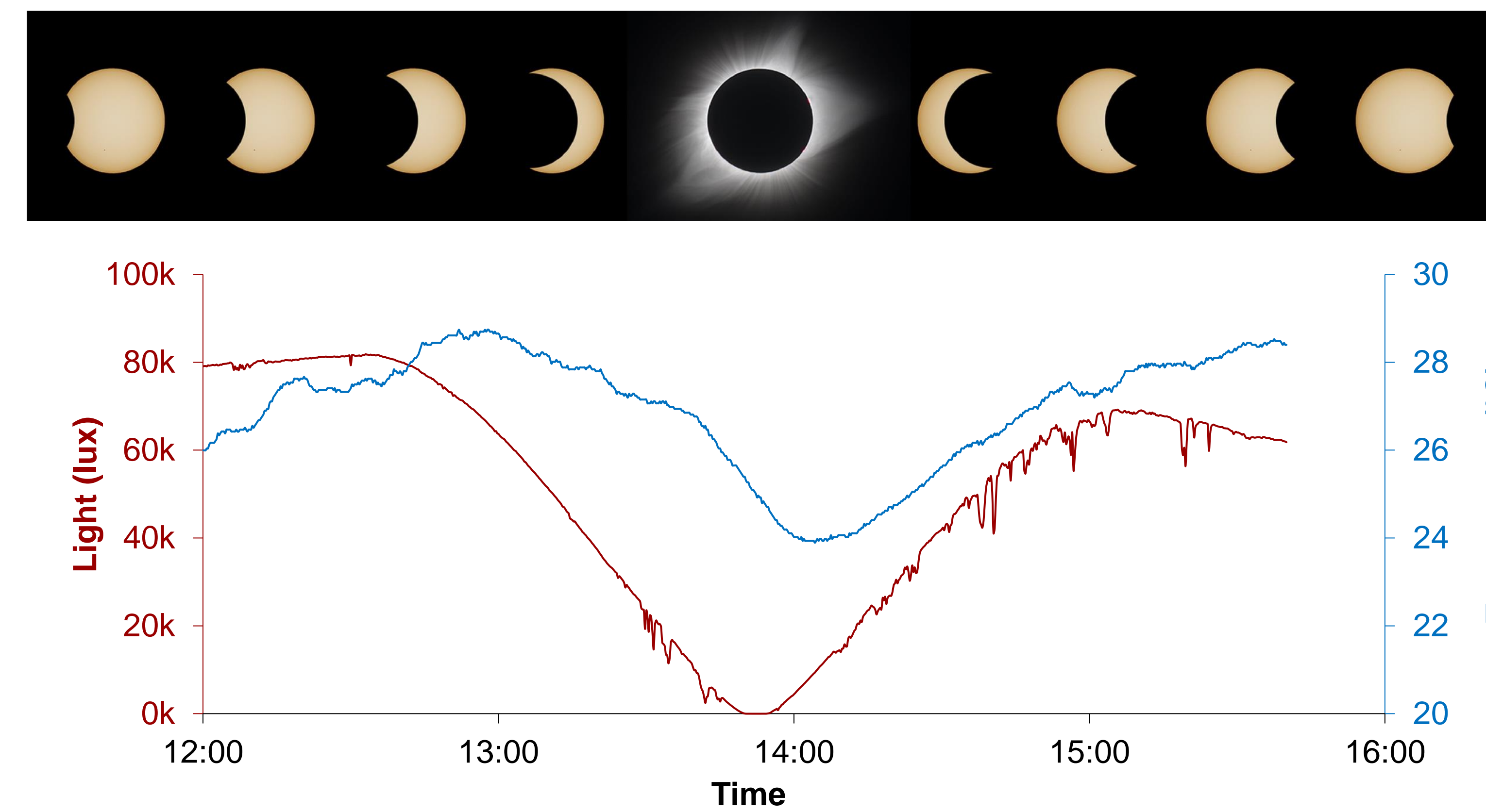


Fig. 1 : Light and temperature over time on the day of total eclipse (April 8, 2024).

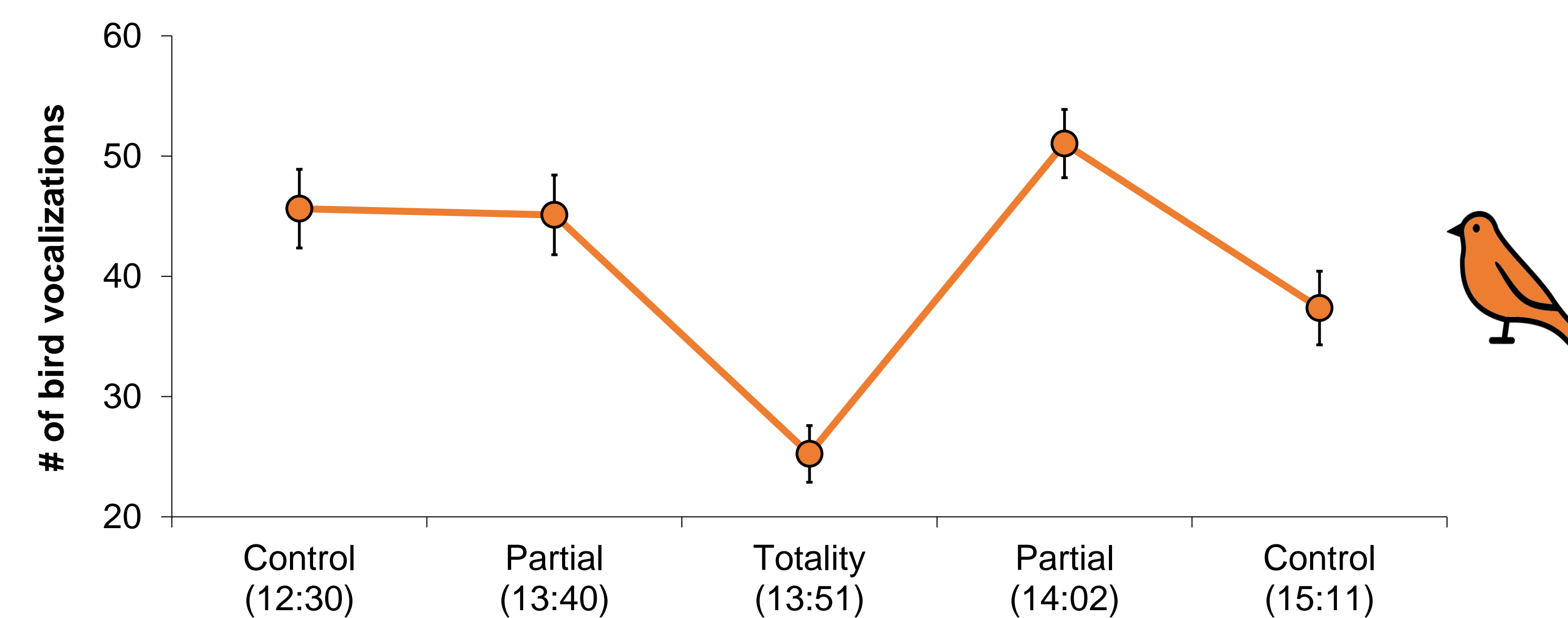


Fig. 2 : Number of bird vocalizations (±SE) across eclipse phases.

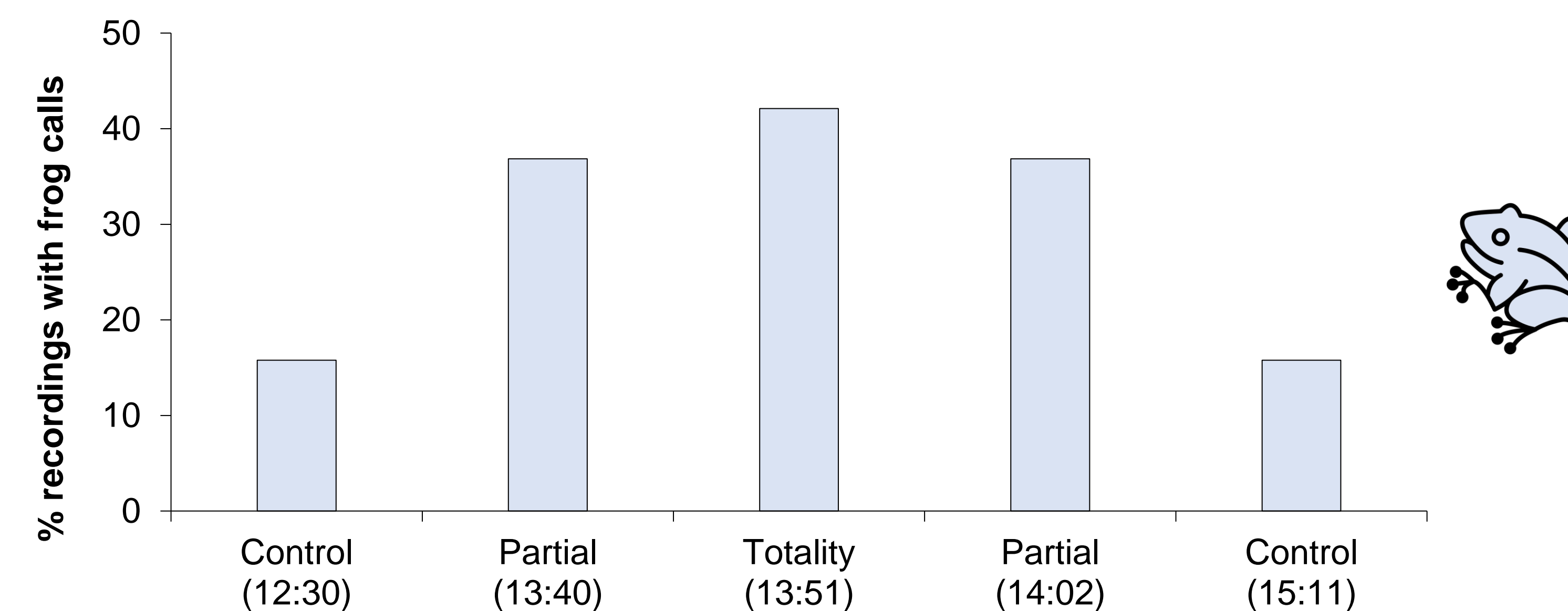


Fig. 3 : Percent of recordings with frog calls across eclipse phases.

Results

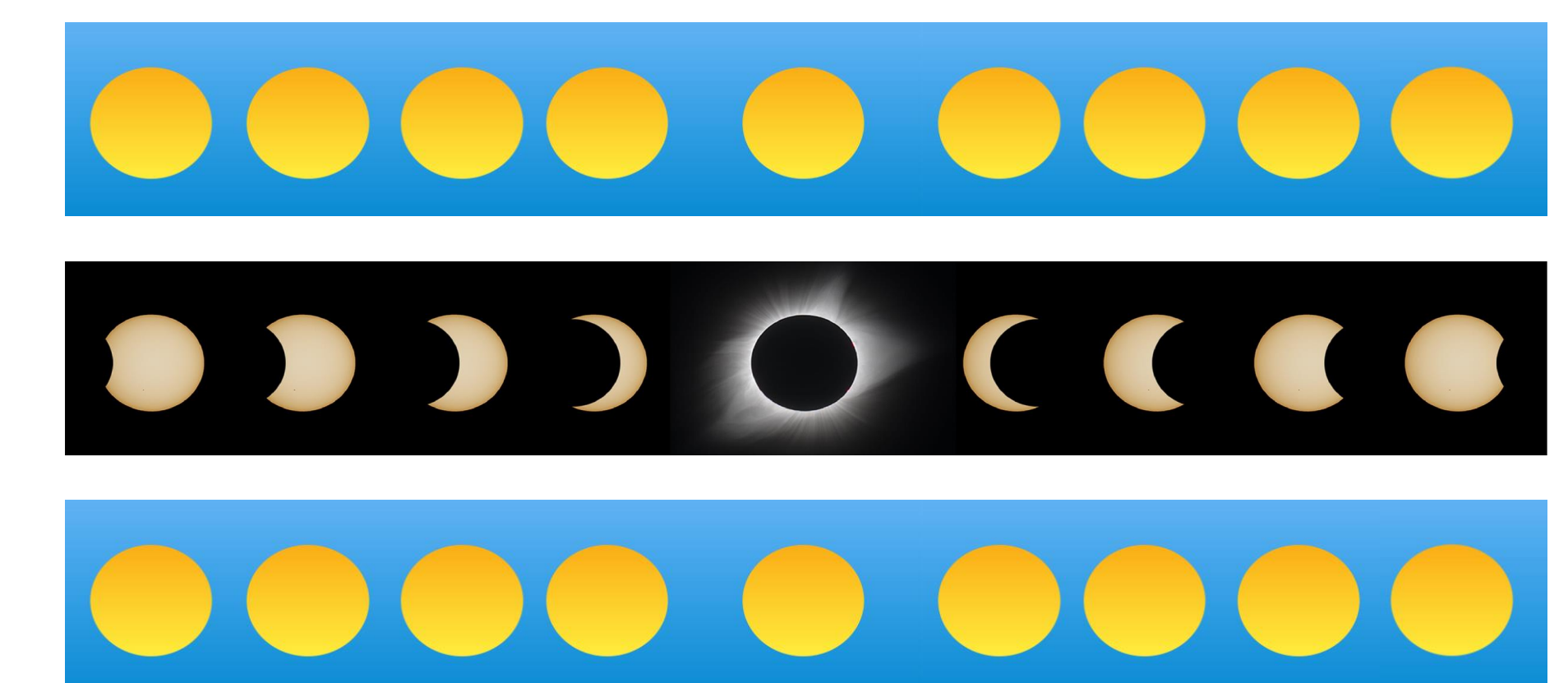
- The frequency of bird vocalizations changed significantly across eclipse stages ($F_{1, 69.5} = 14.44$, $p < 0.0001$; Fig. 2).
- Vocalization rates dropped during totality, rebounded during the partial eclipse, and then stabilized after the eclipse ended.
- Frogs called most often during totality, at intermediate levels during the partial eclipse, and least often during control periods ($X^2 = 6.17$, $p = 0.04$; Fig. 3).

Discussion

- Frogs showed the expected pattern of higher calling during totality.
- Birds showed the opposite pattern, with a nearly 50% reduction in vocalizations during totality.
- These differences likely arise because nocturnal frogs would be more active when dark, whereas diurnal birds would be more active when light.

Future Directions

- We will quantify animal sounds across additional eclipse phases.
- We collected and plan to analyze the following additional recordings:
 - Ultrasonic bat recordings from four locations.
 - Control recordings the day before and the day after the eclipse.



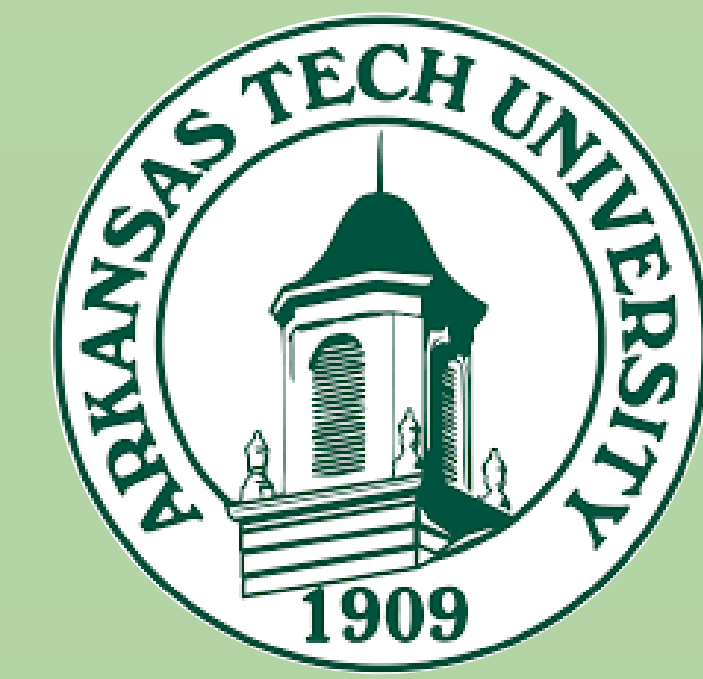
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Do phenotypic traits predict feeder use by wild birds?

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Introduction

- Approximately 50% of households in the United States feed wild birds [1].
- Supplemental feeding serves as one of the largest wildlife management movements in the United States [2].
- Supplemental feeding impacts bird populations in both positive (higher survival) and negative (increased disease) ways [3].

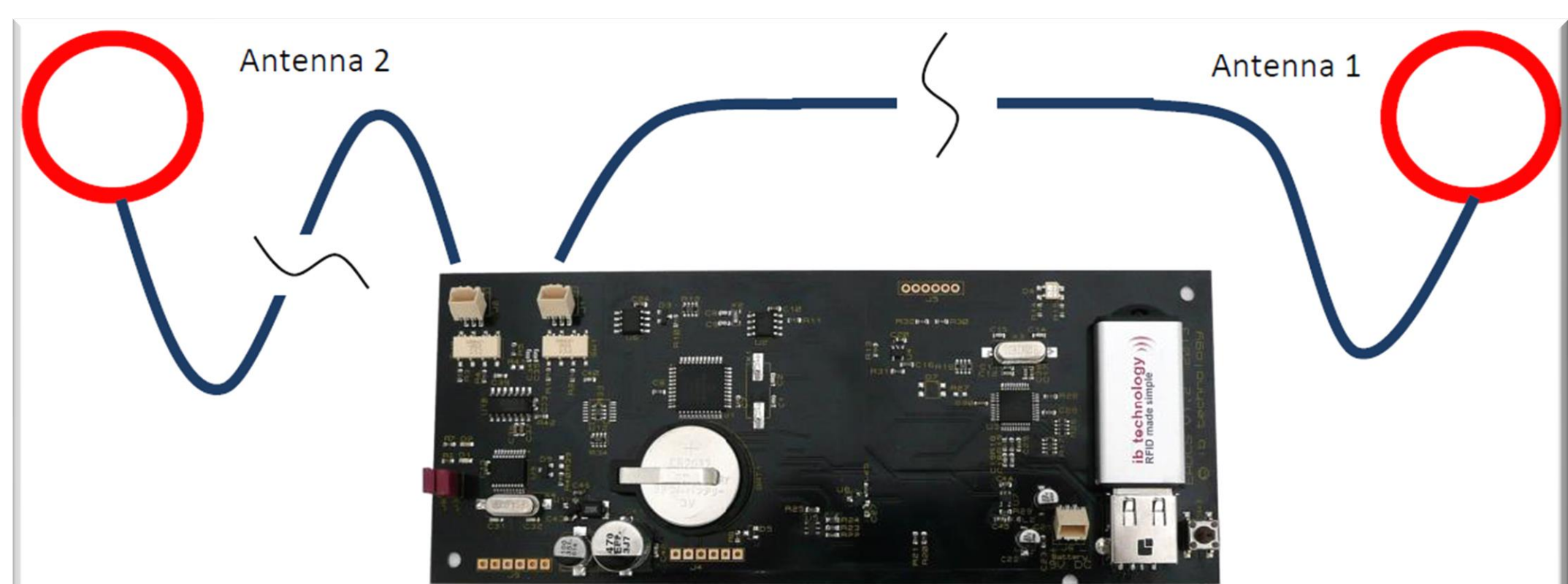


Objective

- Characterize interspecific rates of feeder usage
- Explore monthly patterns of feeder use in HOFI
- Decipher which intraspecific traits of HOFI predict feeder usage

Methods

- We established 8 bird feeders across the ATU campus in January 2017.
- Each feeder was equipped with a dual-antenna radio-frequency identification (RFID) datalogger that continuously record all bird visits.
- We captured 97 birds using mist-nets.
- Prior to release we took basic measurements and banded birds with USFWS bands and passive integrated transponder (PIT) tags.



Results

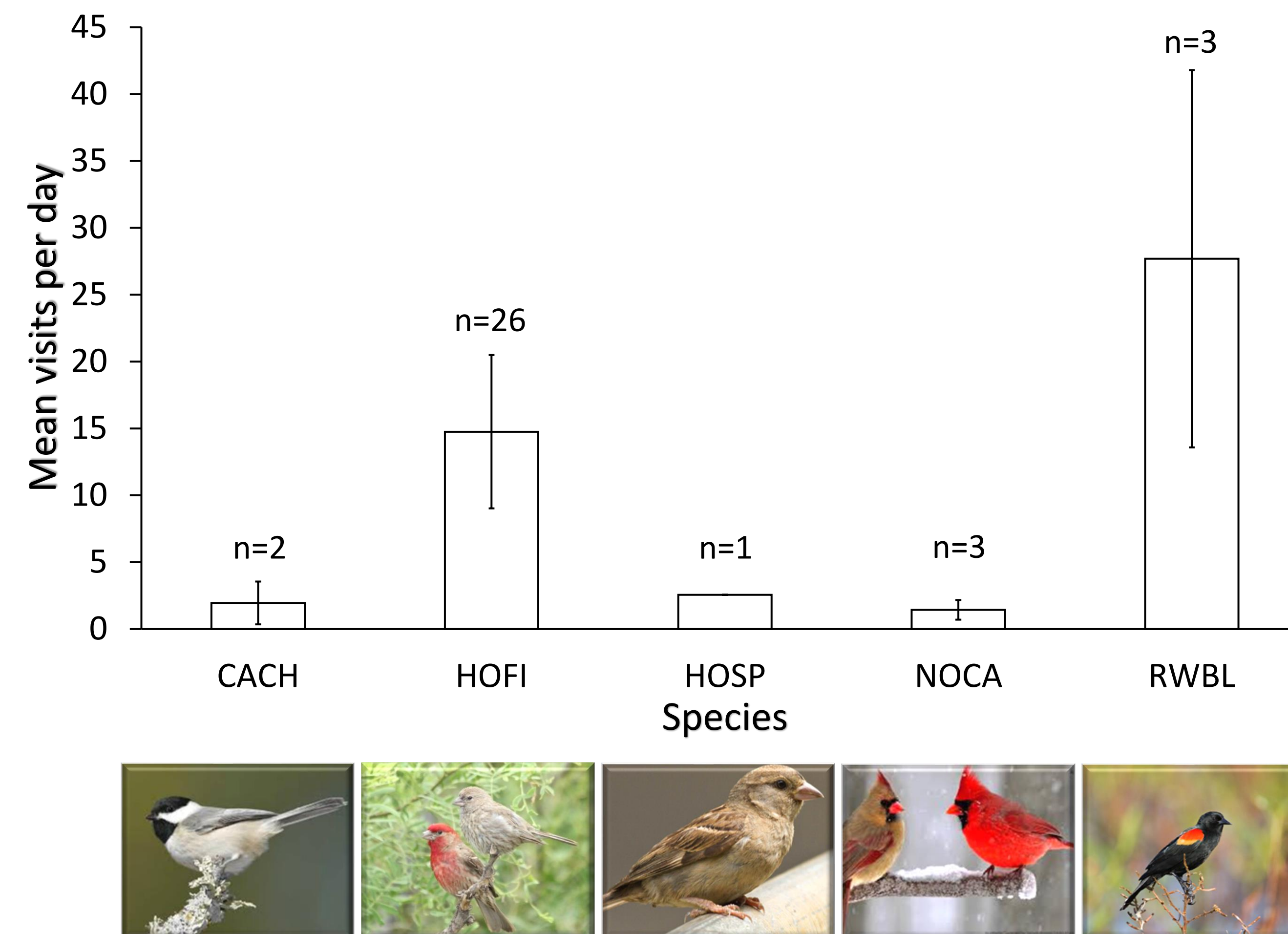


Figure 1. The mean (\pm SE) daily feeder visits by species including: Carolina Chickadee (CASH), House Finch (HOFI), House Sparrow (HOSP), Northern Cardinal (NOCA), and Red-Winged Blackbird (RWBL). n = sample size for each species.

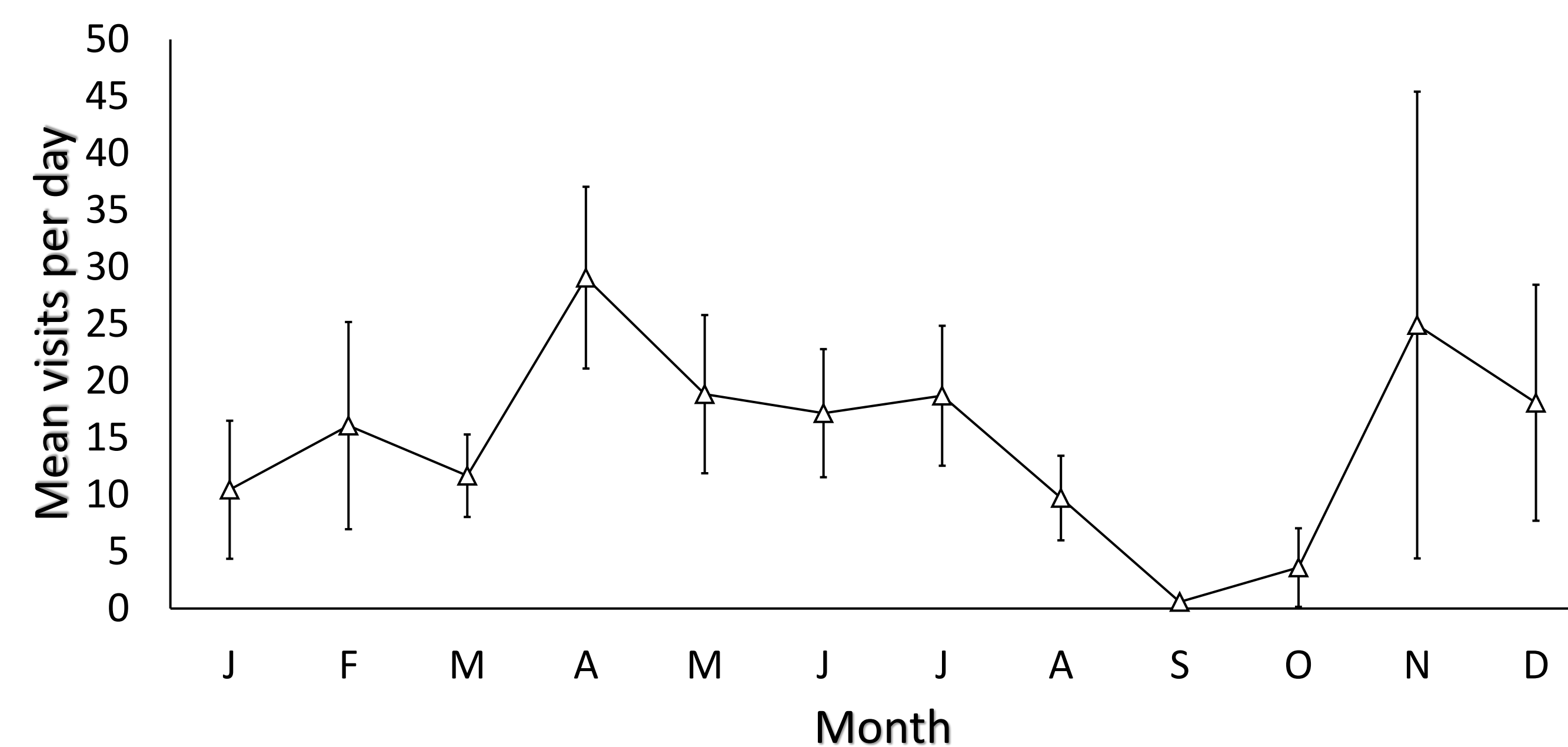


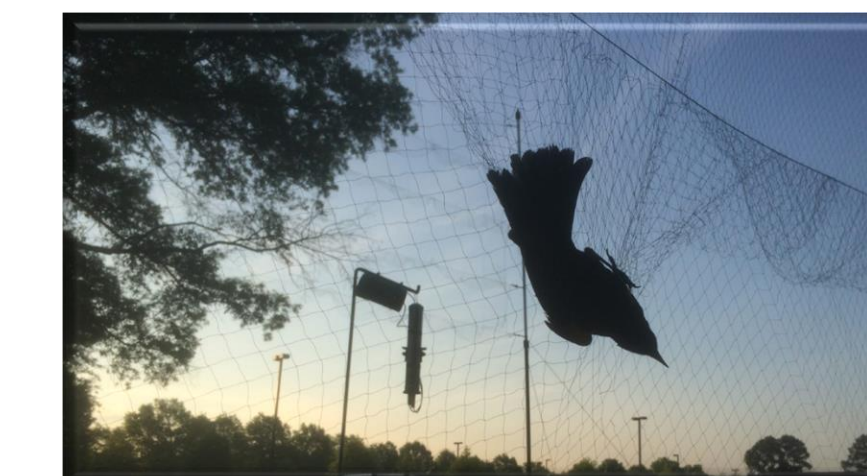
Figure 2. The mean (\pm SE) daily feeder visits by month for House Finches (*Haemorrhous mexicanus*) at Arkansas Tech University.

Table 1. Correlation between House Finch (*Haemorrhous mexicanus*) traits and mean daily feeder visits.

Trait	F-Value	Probability Level
Age	2.15	0.15
Sex	0.50	0.49
Mass	0.50	0.50
Parasite	0.01	0.93

Results

- 35 birds were recorded by our dataloggers from August 2017 – January 2019.
- Species exhibited extensive variation in feeding rates (Fig 1).
- House Finch feeding rates varied significantly across seasons ($F_{11,225,3}=2.26, p=0.01$; Fig 2).
- Traits of House Finches did not predict their feeder use (Table 1).



Acknowledgements

This work would not have been possible without extensive assistance from ATU students, in particular Bailey Coffelt, Stetson Collard, Kagan Davis, and Edgar Sanchez. We appreciate financial support from Arkansas Tech University, American Public University, and Arkansas Department of Health.

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