

Wake n' Bake: The Effects of Warming Temperatures on First Flight

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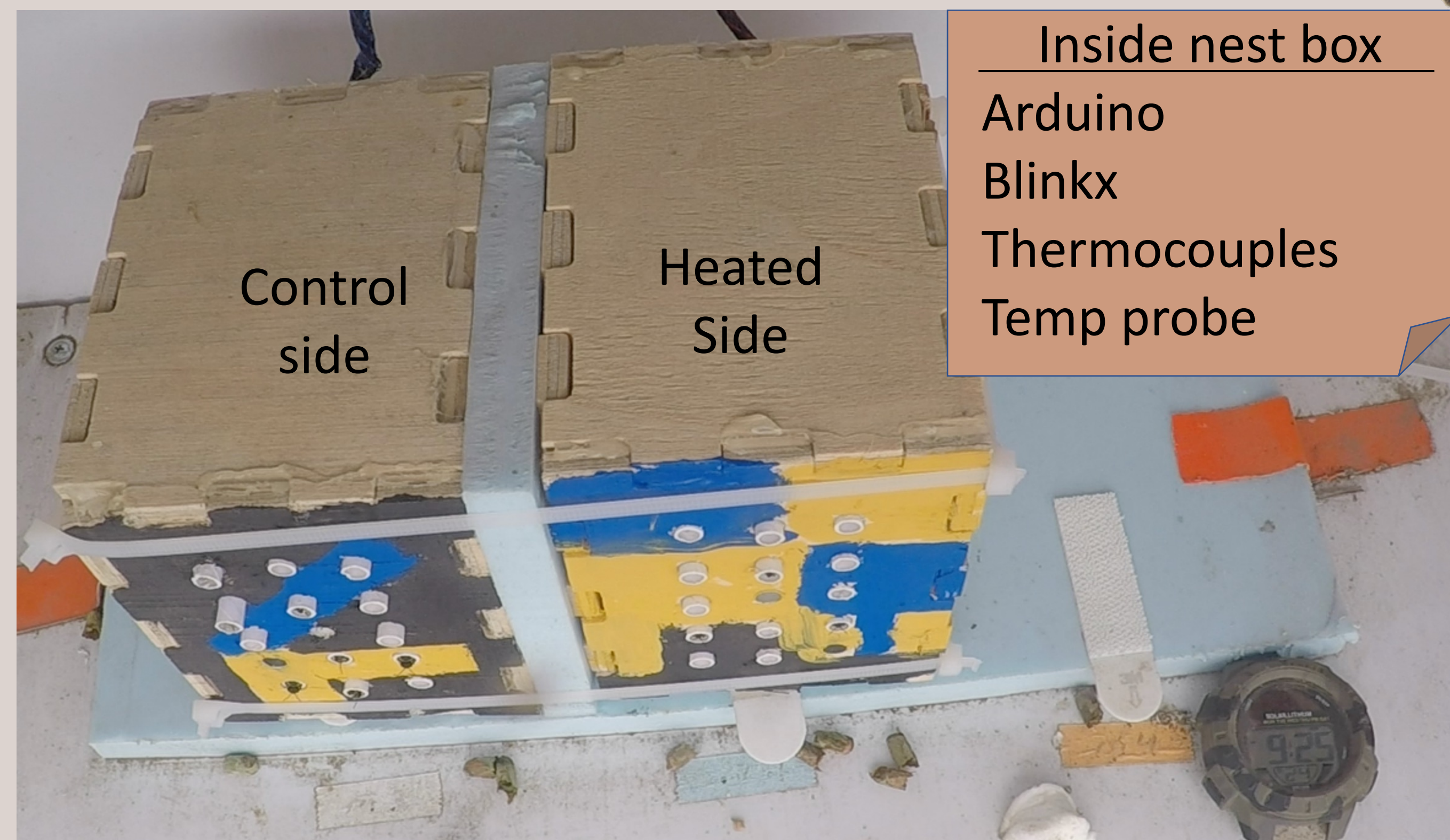
Introduction

Warm morning temperatures are known to have a positive effect on early flight in *M. rotundata*¹. There is also a known direct correlation between microhabitat temperature, and foraging, flight and reproduction². To better understand the microenvironmental flight factors in the alfalfa leafcutting bee, we heated nest boxes and compared first flight times to those in unheated controls.

Hypothesis

Alfalfa leafcutting bees fly earlier when nest box temperatures are warmer.

Methods



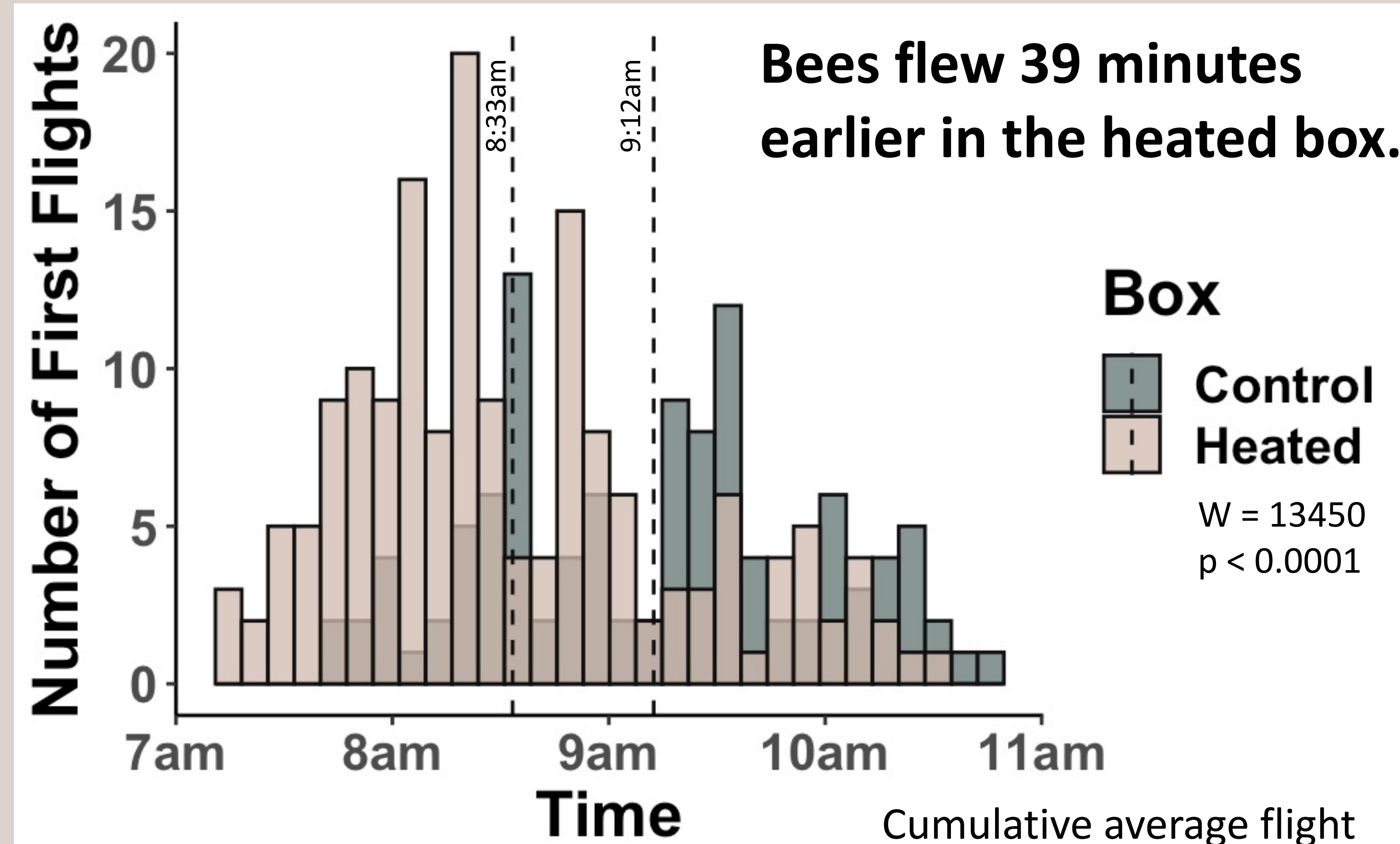
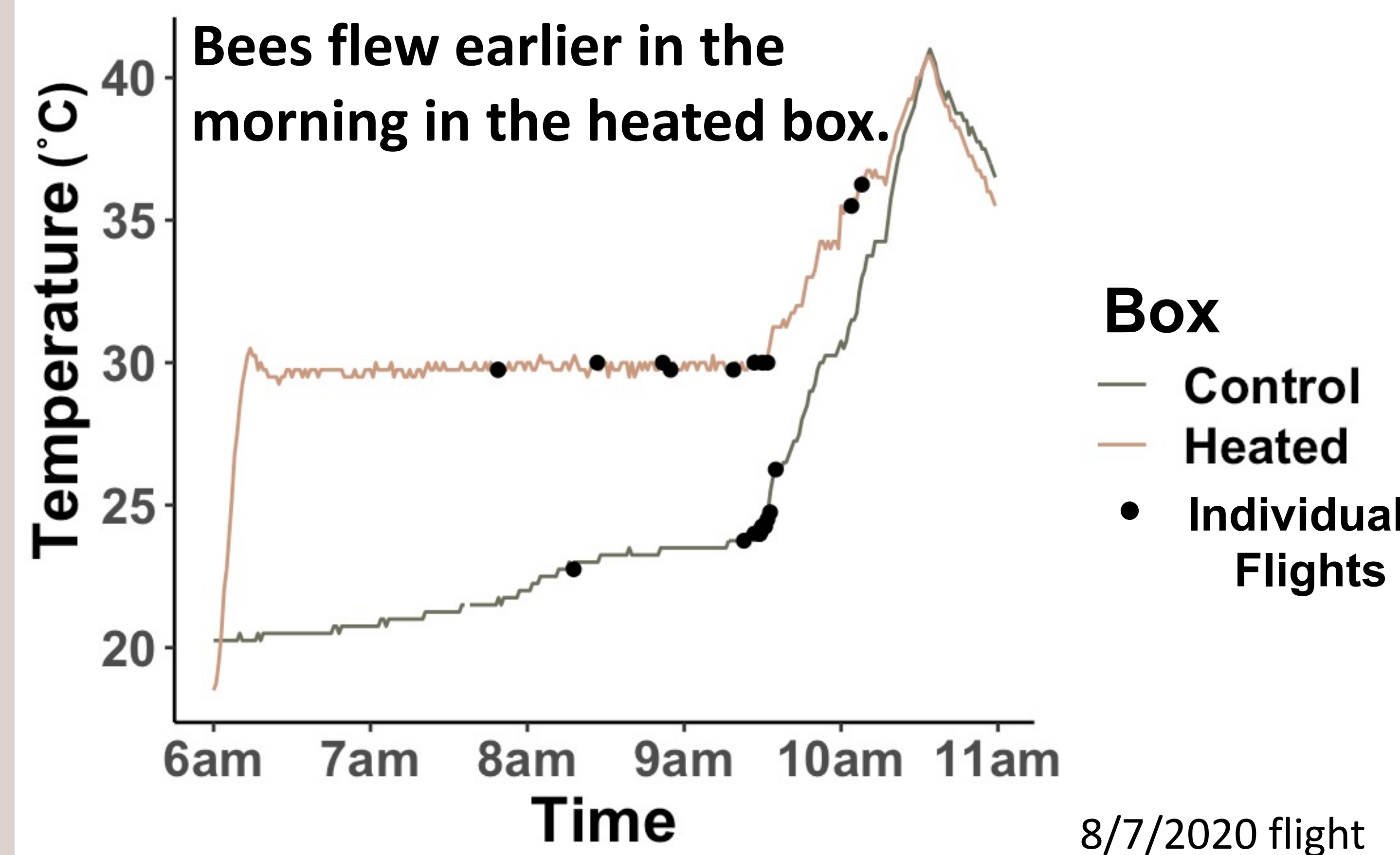
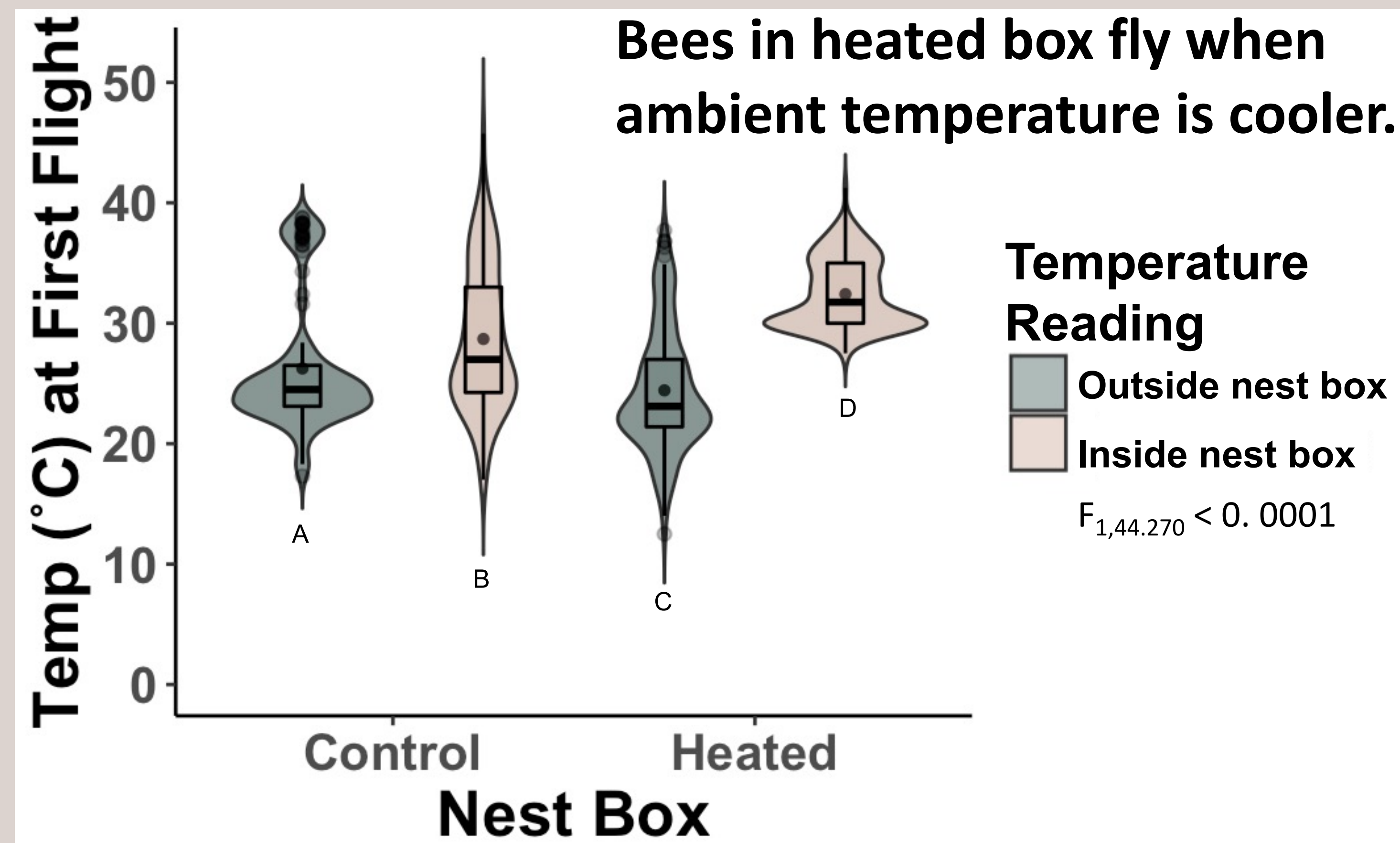
Data were collected daily between 8/7/20-8/26/20.

- Blinkx told GoPro to turn on/off at set times.
- Arduino controlled heating box and recorded temp probe data.
- Box was heated from 6^{am} - 11^{am}.
- GoPro camera recorded from 7^{am} - 11^{am}.

References

- ¹CaraDonna (2017) *Functional Ecology*, 32: 2345-2356
²Sinclair (2012) *Physiological and Biochemical Zoology*, 85: 594-606

Results



Summary Results

- At the time of first flight,
 - Heated box temperature was 32.9°C ± 0.23°C.
 - Control box temperature was 26.7°C ± 0.34°C.
 - Ambient air temp was 26.2°C ± 2.50, 24.4°C ± 1.89
- First flight in heated box is at 8:33:20^{am} ± 0:03:33SE
- First flight in control box is at 9:12:27^{am} ± 0:04:18SE

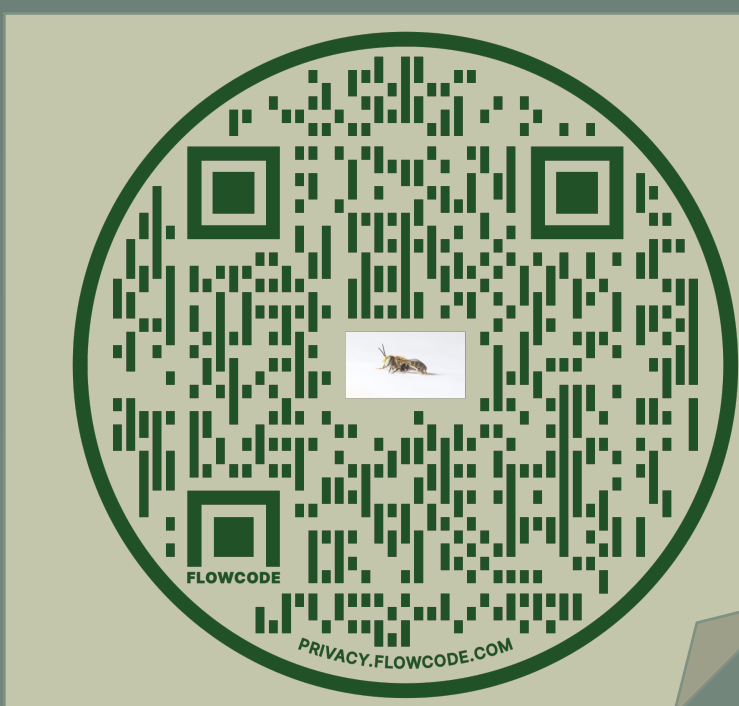
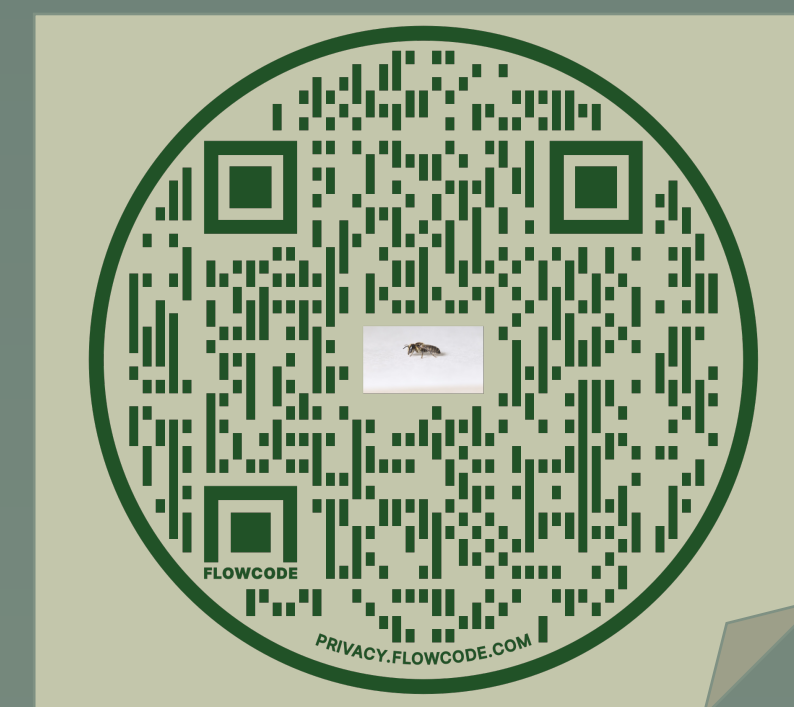
Conclusion

- The hypothesis was supported as the alfalfa leafcutting bees exposed to warmer nest box temperatures flew earlier when compared to the uncontrolled nest box.
- These results indicate that farmers can utilize warm nest box temperatures to help facilitate early flight in the alfalfa leafcutting bee even when outside temperatures are cooler.

Future Directions

- Determine effects of reproduction with the warming temperatures.
- Determine effects of feeding habits with the warming temperatures.

Scan to watch bee morning routine



Acknowledgements

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