Understanding Sunflower Pest Abundance: Red-winged Blackbird Migration and Its Relationship with Bird Reproduction

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Conceptual Framework

Red-winged blackbirds cause $3.5 million in damage to sunflower crop annually in North Dakota[1] and young of year blackbirds comprise a significant portion of the fall population

- Band and recapture studies indicate that red-winged blackbirds (*Agelaius phoeniceus*) breeding in North and South Dakota do not overwinter together[2]
- Spring migration distance and overwinter habitat have been shown to influence reproduction in other species [3,4]

Questions:

- ***Do birds breeding in the same wetland overwinter together?***
- ***Does spring migration distance influence reproduction?***

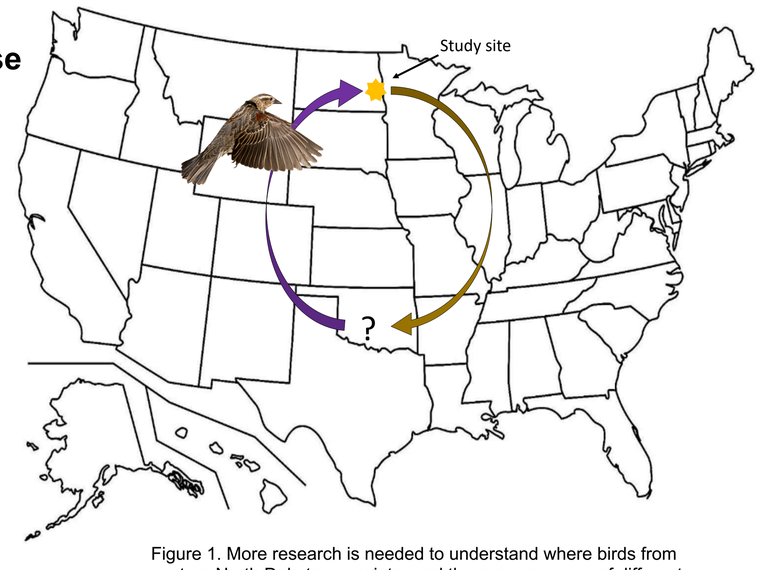


Figure 1. More research is needed to understand where birds from eastern North Dakota overwinter and the consequences of different overwinter locations

Predictions:

Individuals breeding in the same wetland will travel to different overwinter locations.

Birds traveling from a more northern overwinter location will have more reproductive hormones, breed earlier, and produce more offspring.

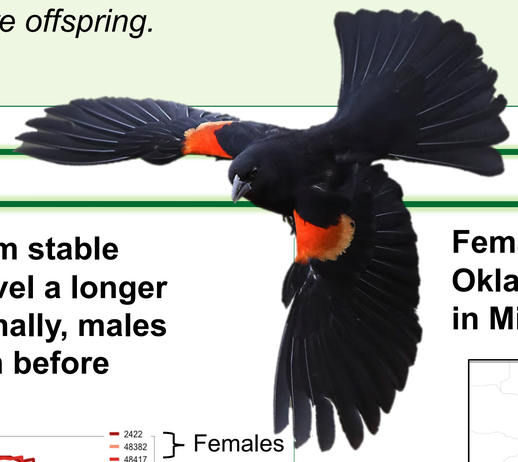
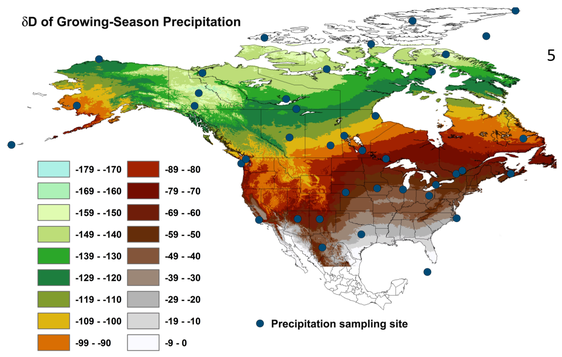


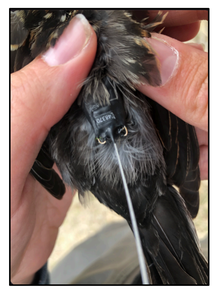
Photo credit: Robert (Bob) McQuade

Materials and Methods

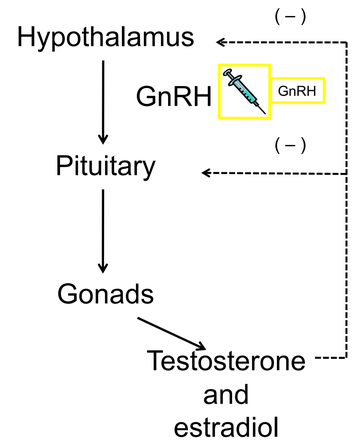
Experimental Design

- This study was conducted in 2018 and 2019
  - Stable isotopes of hydrogen found in claw samples estimate migration distance for males (n=31) and females (n=28)
- In 2018, a subset of individuals (n=29) also received GPS data loggers which can record up to 80 points throughout the year



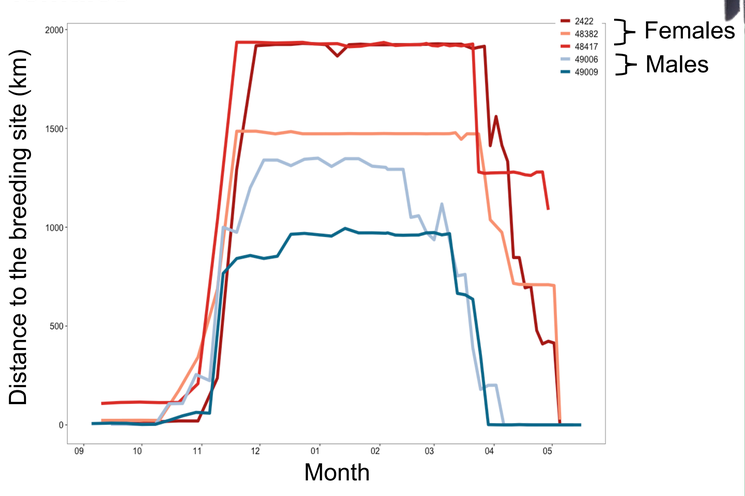


- Male baseline and post-GnRH testosterone were measured
- Females baseline testosterone and estradiol were measured
- Individuals were followed throughout the breeding season to measure reproductive fitness

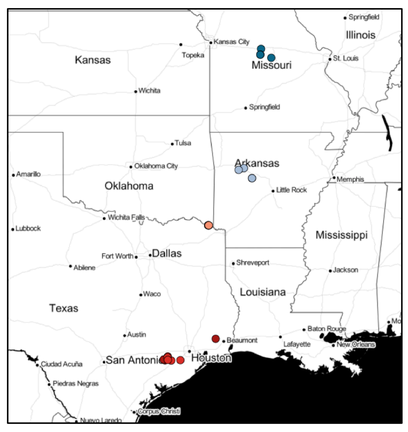


Results

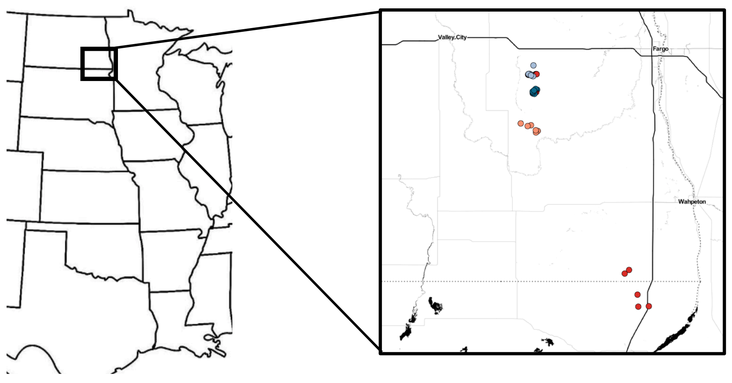
GPS logger tags (n=5) confirm stable isotope data that females travel a longer distance than males. Additionally, males arrive approximately a month before females



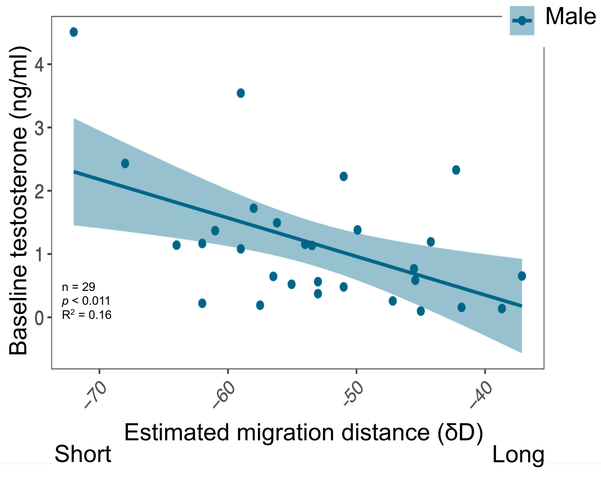
Females overwintered in Texas and Oklahoma and males overwintered in Missouri and Arkansas



Locations during peak of sunflower destruction in August and September



Male baseline testosterone was higher for males with a shorter migration distance



Discussion

Photo credit: Mdf/Wikimedia Commons

We found that **individuals from the same wetland population travel to a variety of overwinter locations, but baseline testosterone was the only variable correlated with migration distance**

- Why is migration distance not more correlated with reproduction?
  - In more northern breeding populations, birds from a variety of overwinter locations may develop their reproductive capabilities at a stopover location near the breeding grounds and arrive in a similar reproductive state
  - Increased sample size may be needed to see relationships

Future Directions

- Are red-winged blackbirds from across the country roosting together in the winter?
- What are the overwinter habitat features that blackbirds require to sustain their populations?

Acknowledgments

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