

Factors impacting crop pest abundance: Does spring migration distance influence the timing of breeding preparation in red-winged blackbirds?



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INTRODUCTION

- Some birds are changing their migration distance in response to changing winter temperatures.
- Migration distance may influence the reproductive hormone profile of birds on arrival at breeding grounds.
- The relationship between migration distance and reproductive hormones has primarily been studied using testosterone and monogamous species.
- Our study investigates this relationship in a polygynous species while incorporating estradiol.

We predict that individuals traveling from a shorter distance will have higher levels of testosterone and estradiol than individuals traveling longer distances. This may allow them to breed earlier and produce more young.

METHODS

- Male and female red-winged blackbirds (*Agelaius phoeniceus*) were captured upon arrival to the breeding site in Alice, ND.
- Baseline blood and claw samples were taken from each bird.
- The claw sample provides an estimate of the bird's overwinter location by measuring the stable isotope ratio of hydrogen.
- Testosterone and estradiol levels were measured in the blood plasma.
- Linear models were used to examine the effects of different migration distances.

RESULTS

Females typically travel a longer distance than males.



Figure 1. Estimated winter location for red-winged blackbirds

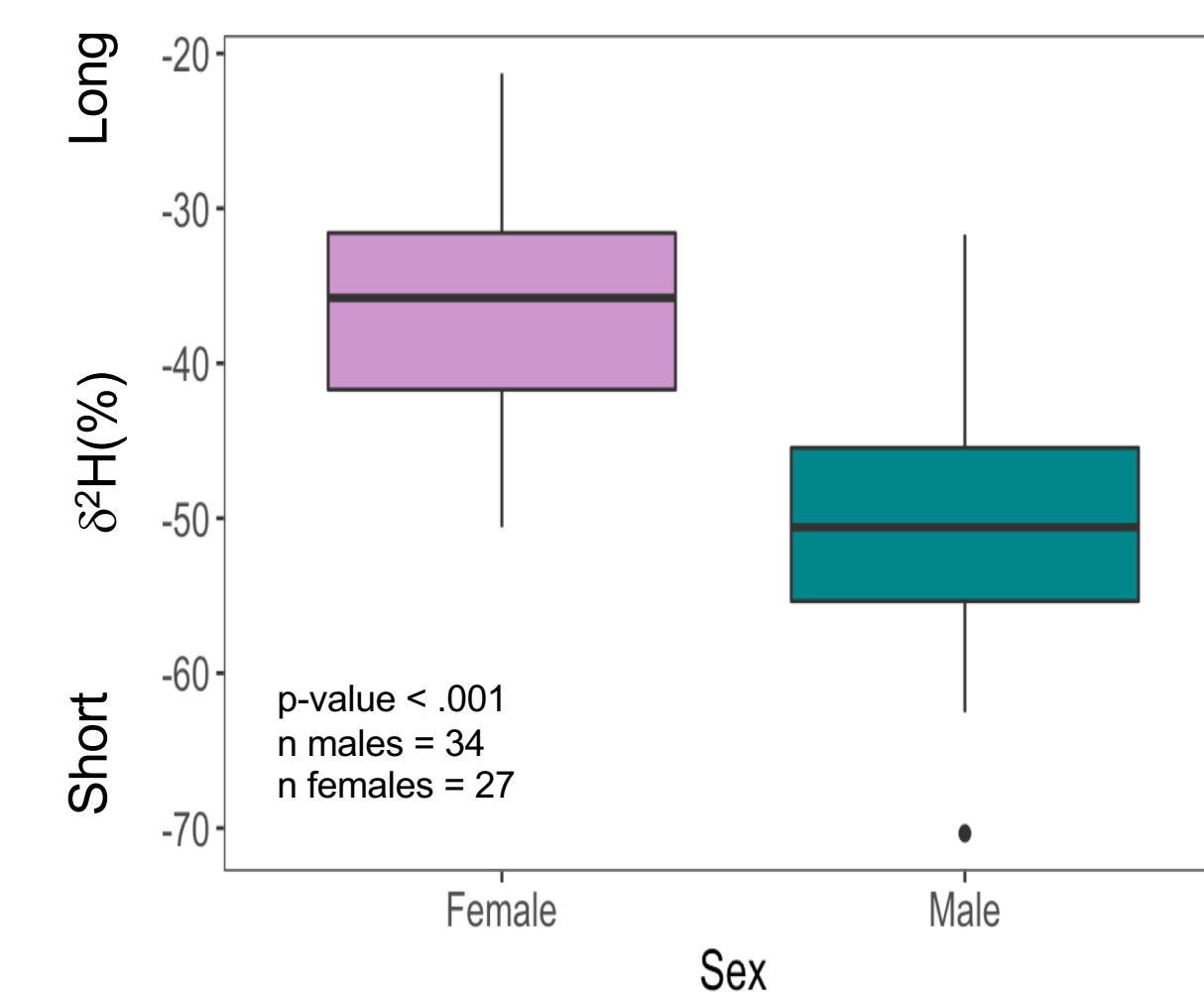


Figure 2. Female and male isotope values

For females, migration distance correlates more closely with arrival estradiol than testosterone. For males, migration distance was not correlated with testosterone.

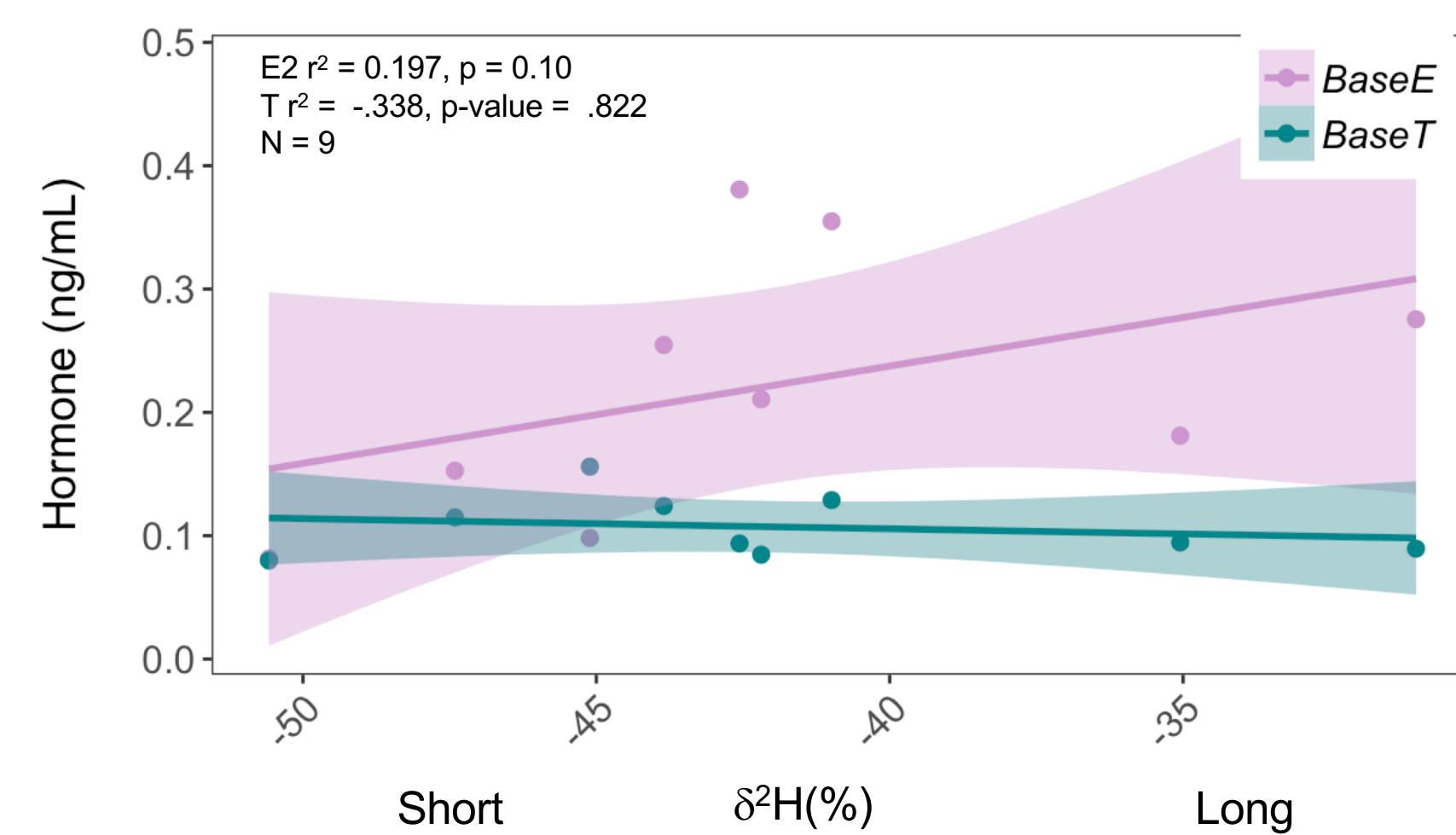


Figure 3. Female testosterone and estradiol levels and migration distance

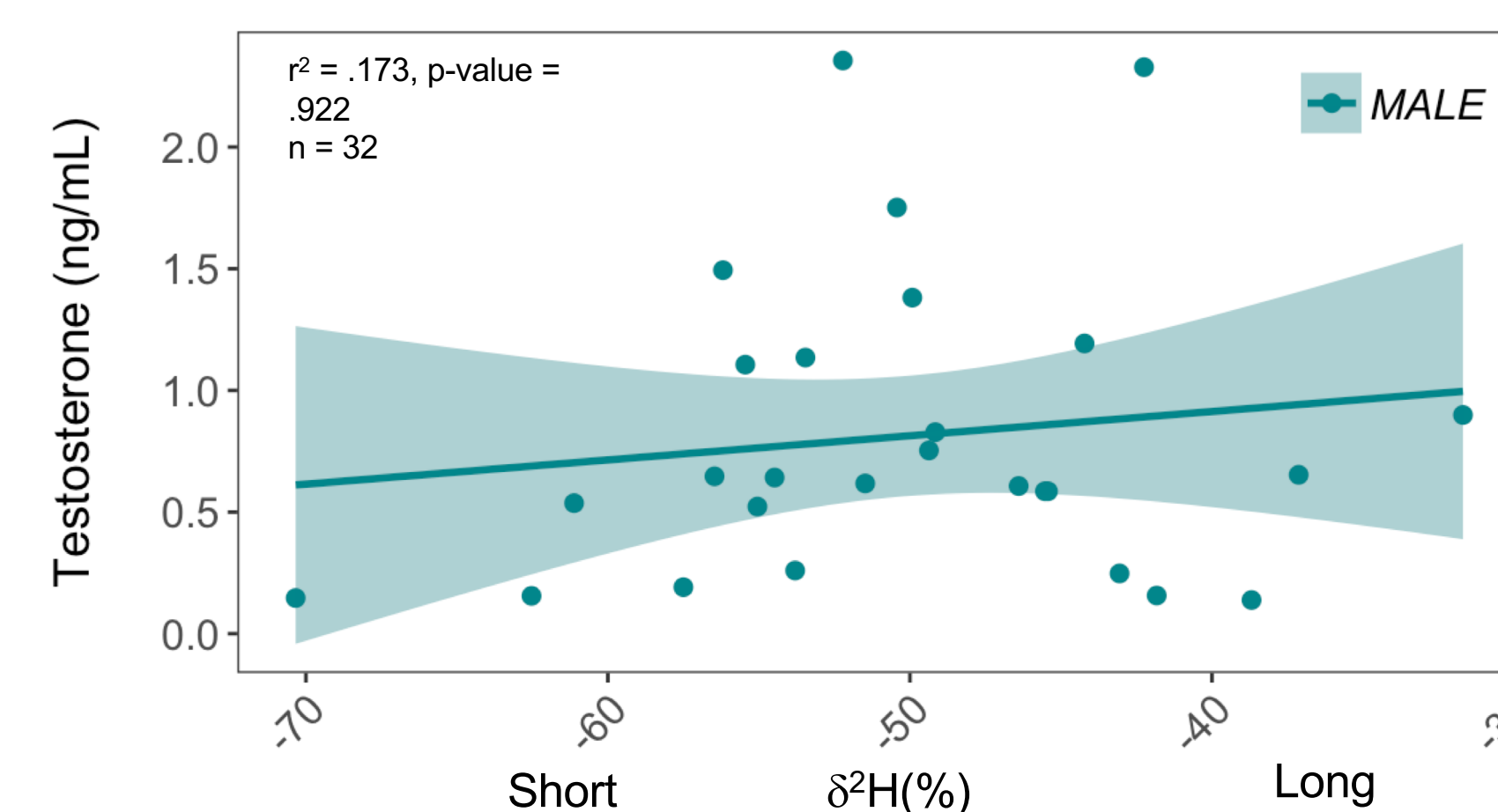


Figure 4. Male testosterone levels and migration distance

Migration distance was not correlated with capture date at breeding site.

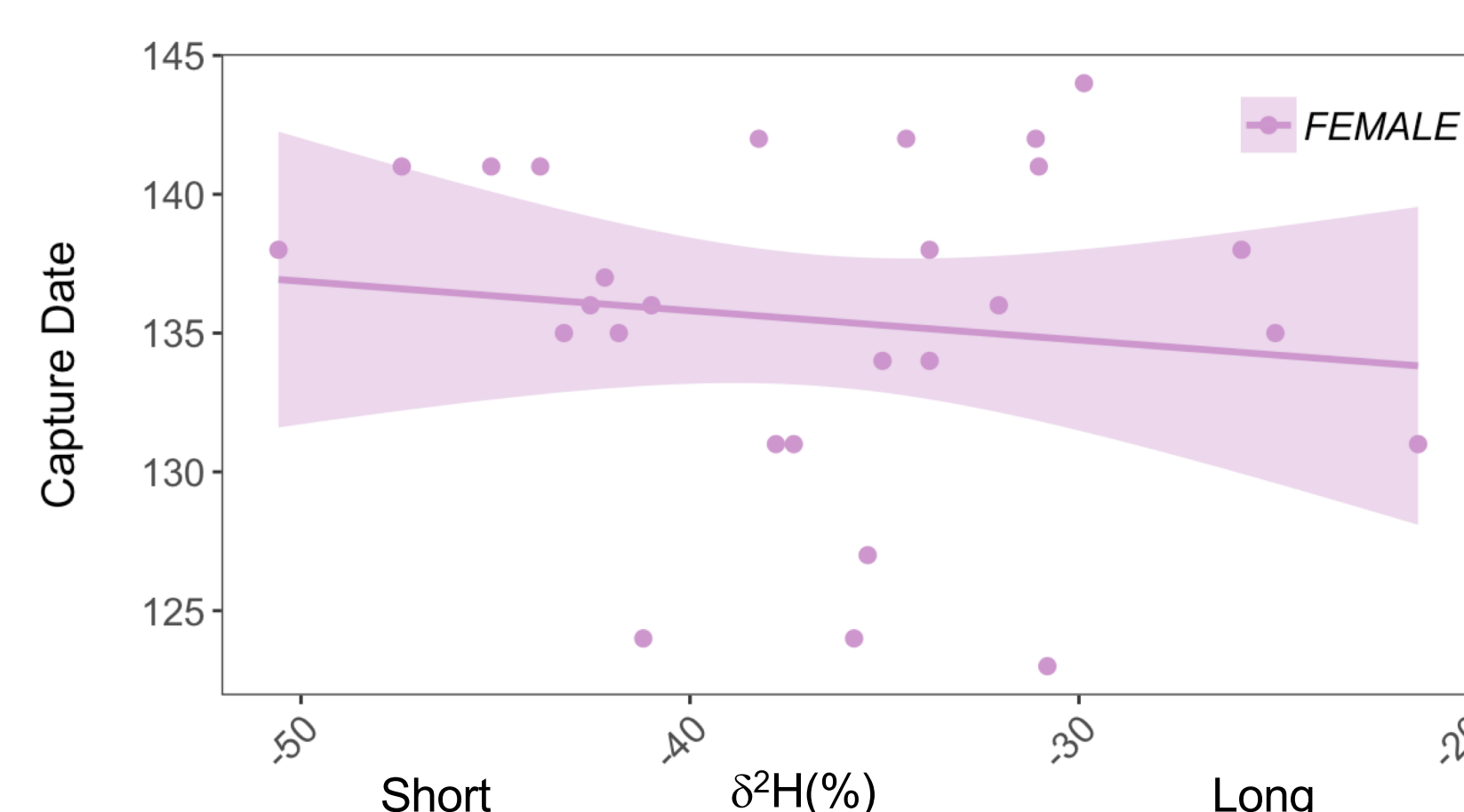
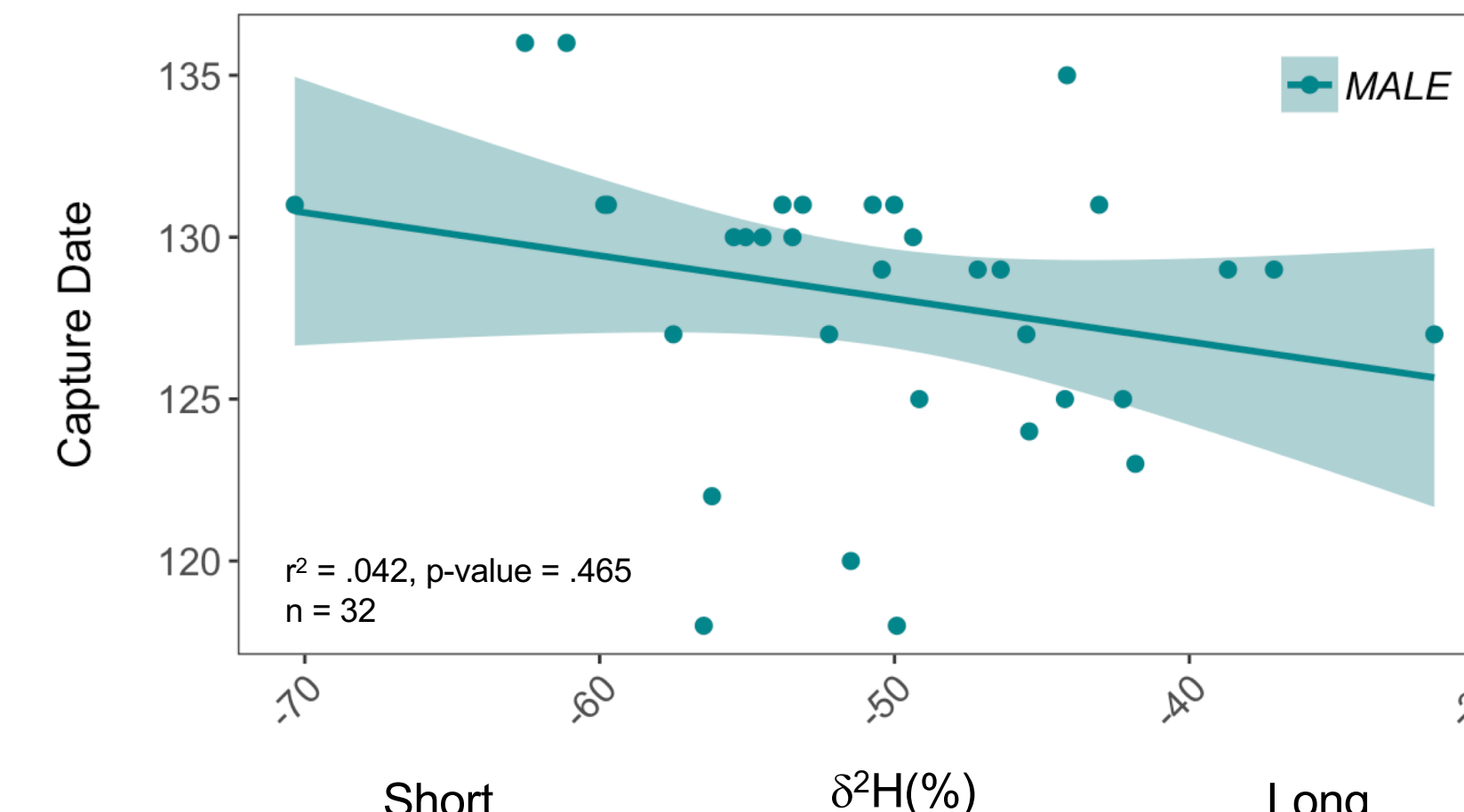


Figure 5. Relationship between capture date and stable isotope values



Migration distance may influence lay date, but lay date and estradiol levels at arrival to the breeding site were not correlated.

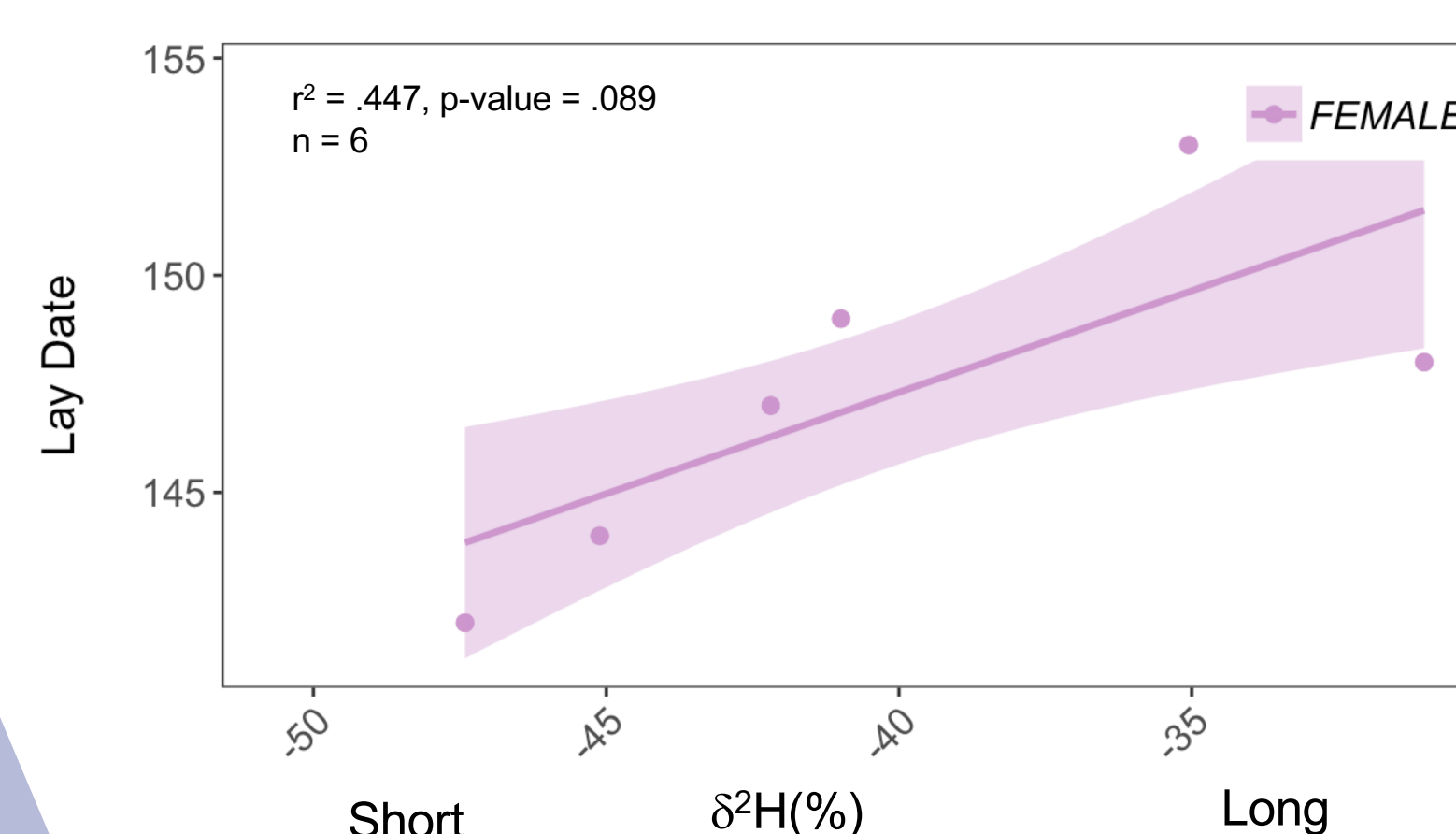


Figure 6. Relationship between lay date and stable isotope values.

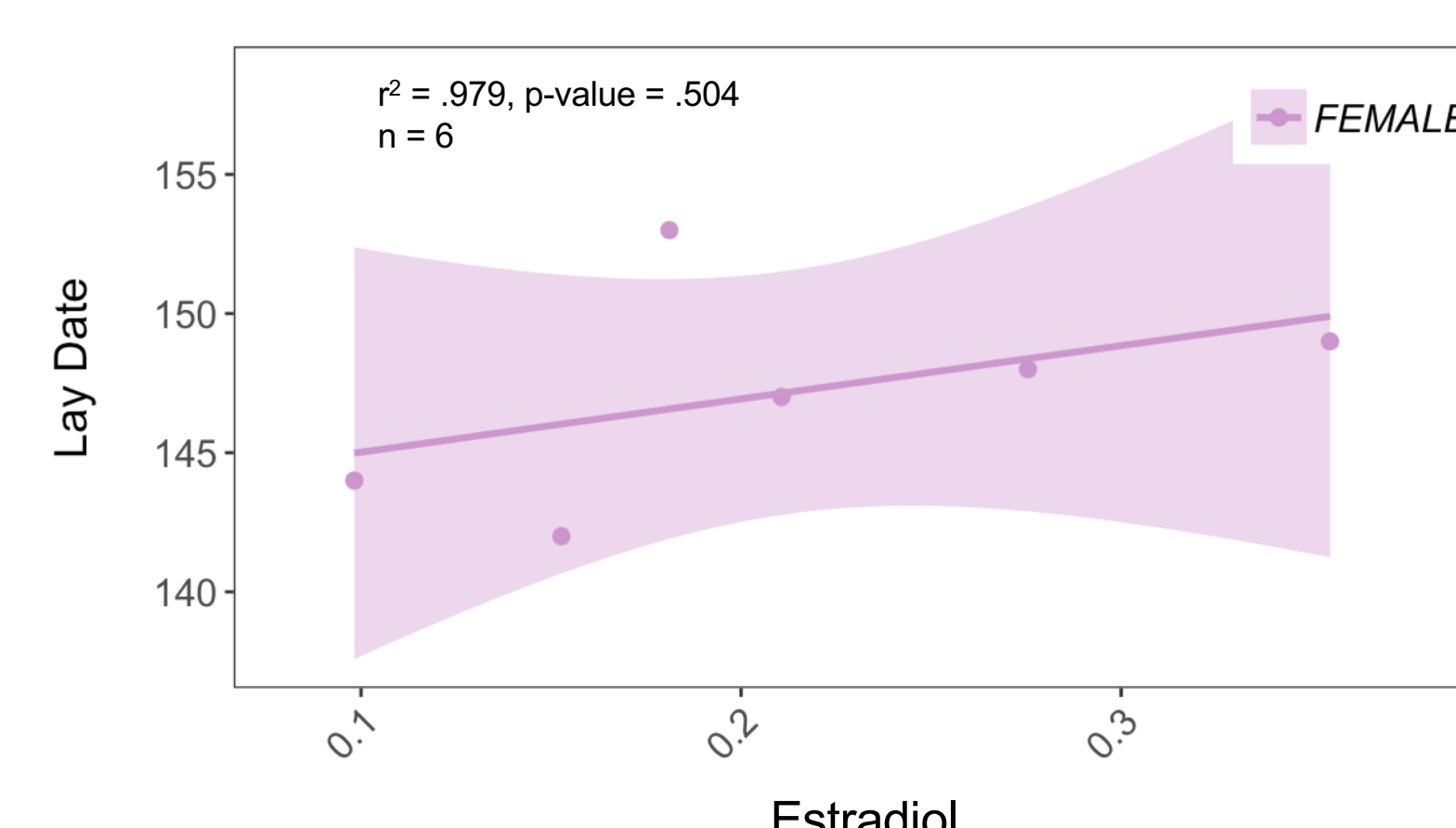


Figure 7. Relationship between lay date and estradiol at arrival.

CONCLUSIONS

- Females are traveling from a significantly more southern location than males.
- Testosterone levels upon arrival did not seem to be influenced by migration distance for males or females.
- Estradiol may be elevated upon arrival in individuals traveling from a longer migration distance.
- Migration distance was not correlated with capture date. This could potentially be due to abnormally cold spring conditions this year.
- Individuals that traveled a longer distance tended to lay eggs later in the season.

FUTURE DIRECTIONS

- Next season we will be recapturing individuals with GPS tags to gather a more accurate overwinter location.
- GPS tags may also provide information on stopover sites.
- Does the amount of time spent at stopover sites influence the reproductive hormones at arrival?
- Investigate how the initial hormone levels at the breeding site correlate with reproductive fitness.

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