

CORTICOSTERONE'S RELATIONSHIP WITH PARENTAL INVESTMENT IN A SONORAN DESERT PASSERINE, THE RUFIOUS-WINGED SPARROW, *PEUCAEA CARPALIS*.

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Introduction:

- The hormonal control of parental investment in birds, and particularly the factors that control variation in parental care, are poorly understood.
- Investment in offspring, in the form of number of offspring produced and the amount of parental care provided, comes at a cost of energy and time to the parent. Parents should invest differently based on their opportunities for future reproduction and the value of their current clutch.
- The hormonal control of investment is hypothesized to involve corticosterone (CORT), a hormone that is secreted into the blood in response to stress, inhibits the activity of the reproductive system, and promotes behaviors, such as escape and foraging, that increase survival. These behaviors may draw parents away from maintenance of the clutch.
- We used Rufous-winged Sparrows (RWSP) to investigate whether plasma baseline (i.e., in non-stressed birds; BL) CORT or stress-induced (SI) CORT predicts parental investment.



Objectives:

- Hypothesis:** RWSP reduce plasma baseline and/or SI CORT in relation to increasing parental investment.
- Predictions:**
 - Parents with higher plasma baseline CORT will invest less in offspring than parents with low plasma baseline CORT.
 - Parents with higher investment will show a smaller SI increase in plasma CORT than those with lower investment.



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Methods:

- We located RWSP nests at the Santa Rita Experimental Range.
- We recorded the number of eggs and chicks in each nest to estimate parental investment.
- RWSP provide biparental care. Social fathers were captured using Japanese mist nets and bled within three minutes of capture to determine plasma baseline CORT.
- Captured birds were held in a breathable cloth bag for 30 minutes to induce a stress response, and bled to determine plasma SI CORT.
- Data was analyzed with one-way analysis of variance.

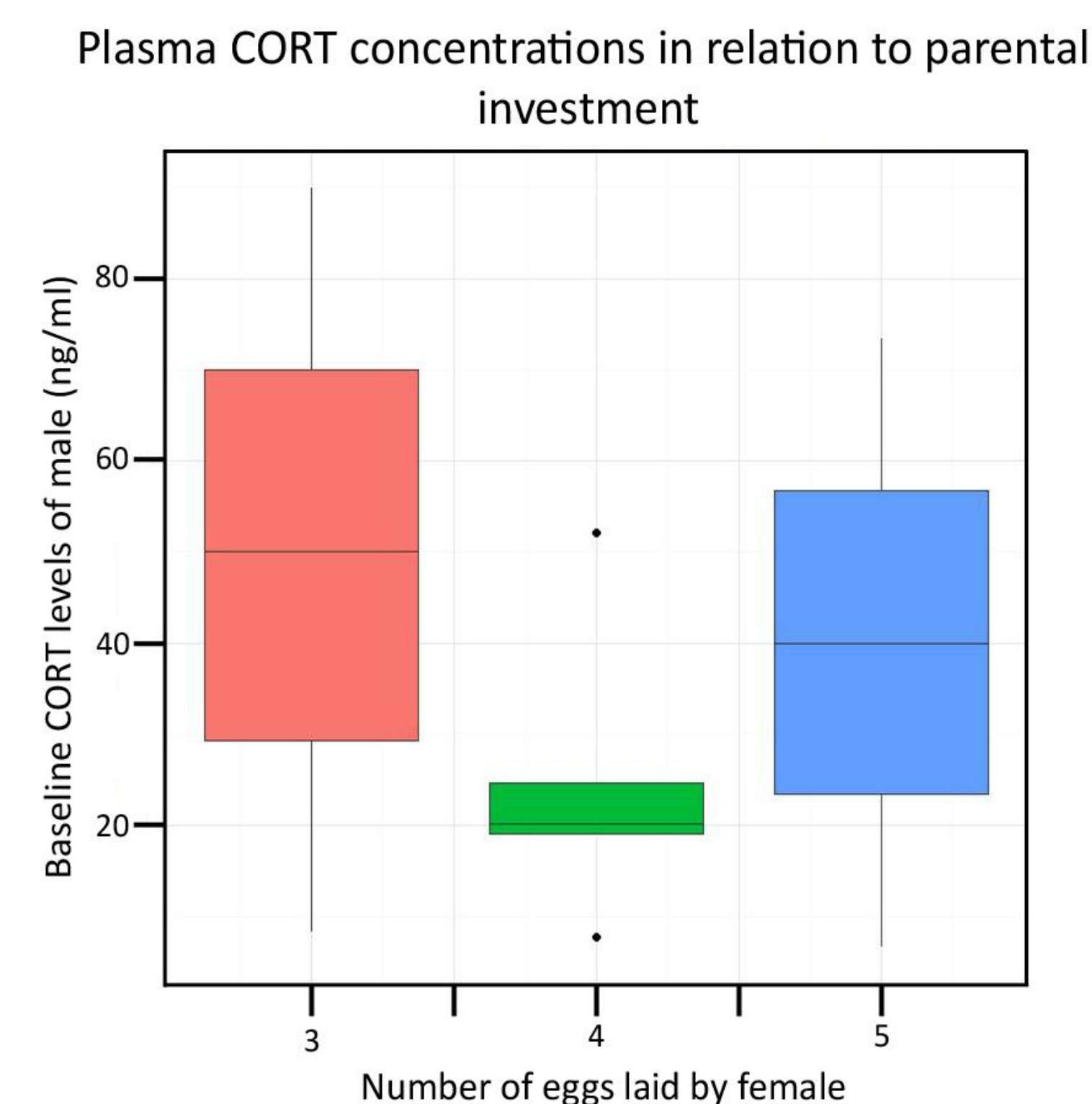


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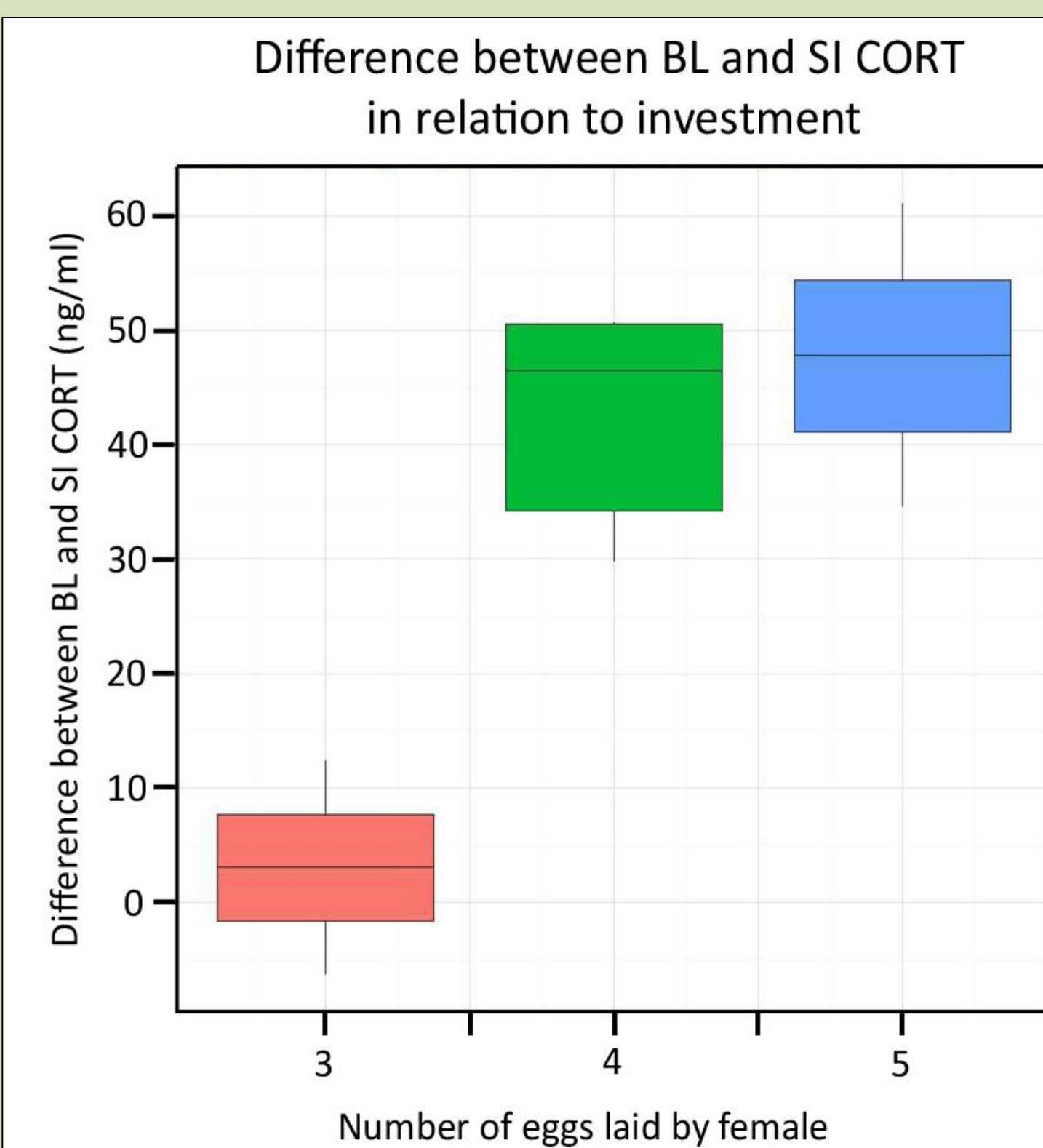


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Results:



Plasma baseline CORT and number of eggs. Plasma baseline CORT did not vary with clutch size ($P=0.561$). The graph is a standard boxplot that shows the general distribution of the data (range, median and lower quartile and upper quartiles) Outliers are represented by dots.



Difference between plasma baseline and SI CORT and number of eggs laid. The difference between plasma baseline CORT and SI CORT in the same male differed between with different sized clutches ($P=0.017$). Differences between plasma baseline and SI CORT were smaller in males with nests containing three eggs than four or five eggs (4 vs. 3 eggs: $P=0.026$; 5 vs. 3 eggs: $P=0.022$; 5 vs. 4 eggs: n.s.).

Conclusions:

The SI increase in plasma CORT differed between parents with different clutch size at the time of sampling and, therefore, potentially parental investment. However, differences were in the opposite direction than predicted: the larger the clutch size, the higher the SI increase was in plasma CORT.

Clutches of three eggs may have been incomplete. Males with yet incomplete clutches may have been occupied primarily with behaviors such as mate guarding and copulation, that would be less frequent during incubation. This could result in a different hormone profile. Lower plasma CORT increase during this time, representing a reduced stress response, might reflect a male's need to remain in his territory and vigilant towards the female instead of leaving her to forage or flee. Sampling males at specific time points during egg-laying and incubation should help clarify whether plasma CORT changes during these breeding stages.

Our initial hypotheses were not supported. Plasma baseline CORT was not associated with the investment of the parents as estimated by clutch size or number of chicks hatched.

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