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Performance and Signaling in the Green Anole Lizard

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Abstract

Green anoles are small lizards of the Southeastern United States. They possess an extensible throat-fan called a dewlap. Males have larger dewlaps and display them more often than females. Displays occur during courtship, during agonistic interaction, and during encounters with potential predators. The size of the dewlap of male green anoles is positively correlated with maximum bite force capacity. Bite force capacity, in turn, is predictive of the winner during agonistic interactions. The correlation between these traits suggests that dewlap size may be used as a reliable signal of maximum bite force capacity. In this dissertation, I address three components of this system. First, I manipulate dewlap size and stage interactions between male green anoles. By removing the correlation between dewlap size and bite force, I was able to show that during staged encounters, bite force is predictive of the winner, but dewlap size is not. In the second chapter, I test for potential costs due to an increased predation risk as a result of dewlap displays. I observed no difference in recapture rates between animals that were experimentally prevented from extending their dewlaps and control counterparts. However, other data suggest that the presence of a pink dewlap may increase risk of predation. These results suggest that though there may be a predation-based cost to dewlap displays, green anoles use behavioral means to ameliorate this risk. Finally, I use a castration and hormone-replacement experiment to test whether testosterone mediates seasonal changes in dewlap size and bite force. I hypothesized that testosterone would mediate changes in both traits in order to maintain the correlation between them. However, I found no effect of testosterone on change in dewlap size or bite force performance. Another trait, sprint speed performance, was affected by hormone treatment in the breeding season such that animals with high levels of testosterone ran faster than animals from the other treatment groups. My results corroborate other research showing that hormones regulate plasticity in some systems, while other systems are insensitive. However, the mechanisms that regulate changes in the two components of the reliable signaling system in green anoles remain unknown.

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