

# Pre-basic molt, feather quality, and modulation of the adrenocortical response to stress in two populations of rufous-collared sparrows *Zonotrichia capensis*

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Molt is an energetically expensive process in which birds may allocate 25% or more of their body protein mass to the production of new feathers. Stressful events can interfere with feather growth via the adrenal hormone corticosterone, which is released in response to environmental stress.

Corticosterone release, in turn, regulates gluconeogenesis which could directly inhibit protein synthesis and deposition during molt when feathers are growing, which potentially could reduce feather quality dramatically. Thus, many species suppress the adrenocortical stress response, and therefore maintain lower corticosterone levels during molt. In this study we assessed the relationship between plasma corticosterone levels and feather quality in rufous-collared sparrow inhabiting the valleys of the Atacama Desert ? one of the most stable and aseasonal environments in the world, and in the semiarid and seasonal Fray Jorge National Park in the north of Chile. We tested two hypotheses; 1) feather quality is positively related to the amount of corticosterone suppression during molt, relative to corticosterone levels during other life history stages; and, 2) feather quality is negatively related to the absolute levels of corticosterone. We found negative associations between corticosterone levels and feather quality. However, these effects were stronger in the Atacama Desert where birds showed minimal corticosterone suppression and overall low feather quality. Although we found better feather quality in Fray Jorge, corticosterone suppression in these birds was relatively low in comparison with other species inhabiting higher latitudes. It is possible that birds in a highly variable environment face a stronger trade-off between feather quality and the stress-response. Our results suggest that the strength of the trade-off between feather quality and

corticosterone levels could be dependent on energetic demands, seasonality, and unpredictable events. © 2018 The Authors

corticosterone

environmental heterogeneity

seasonality

environmental stress

feather

growth

heterogeneity

hormone

life history

passerine

seasonality

semiarid region

trade-off

Atacama Desert

Bosque Fray Jorge National Park

Chile

Coquimbo

Aves

Passeridae

Zonotrichia capensis