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**Corticosterone responses to different stimuli and phenotypic plasticity in corticosterone
responses in the kororā (little penguin, *Eudyptula minor*)**

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Abstract

The overall aims of the research presented in this thesis were to compare in little penguins (*Eudyptula minor*) corticosterone concentrations following exposure to a variety of stimuli with corticosterone responses to handling, to investigate the relationship between corticosterone response to handling and corticosterone concentrations after exposure to different stimuli, and to examine plasticity in corticosterone responses. The study involved measurement of corticosterone concentrations in blood samples collected after a 15 min stimulus. Handling resulted in a greater mean plasma corticosterone concentration than all other stimuli. Plasma corticosterone concentrations in little penguins in nestboxes after the presentation of a novel object were greater than concentrations after the sound of dog barking and the sound of human talking. Corticosterone concentrations were higher in birds that were exposed to penguin alarm calls than birds exposed to human talking. Differences between mean corticosterone concentrations after human talking and dog barking, and between mean concentrations after the penguin alarm call and the novel object, were not significant. The mean concentration after human talking was the lowest and the mean concentration after novel object was the highest relative to responses to handling. Corticosterone concentrations after handling and concentrations after exposure to other stimuli were not correlated. A reaction norm revealed the existence of plasticity in corticosterone concentrations in little penguins. The reaction norm approach used to determine plasticity in this study did not allow for the quantification of the degree of plasticity.

The findings of the present study have provided information about the way little penguins respond to different type of stimuli, whether responses to handling are similar to responses to other stimuli in the same bird, and show that the use of a reaction norm approach can provide useful information about plasticity in corticosterone responses to different stimuli in birds.

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