

Intrinsic factors influence physiological stress in a forest bird community: Adults and females have higher H/L ratios than juveniles and males

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March 29, 2024

Abstract

Physiological stress parameters have the potential to serve as valuable early warning indicators for the conservation of animal populations. However, measuring stress in wildlife is often challenging, due to the lack of knowledge about baseline levels, and intrinsic differences between individuals across species. This study is aimed at filling this gap by investigating the influence of intrinsic factors, including sex, age, body condition, and reproductive status on the physiological stress of a forest bird community. For measuring stress levels, we used the heterophil to lymphocyte (H/L) ratio of the bird community which was assessed using a novel deep learning approach based on Convolutional Neural Networks applied to whole blood smear scans. Using phylogenetically controlled analyses across the bird species, we found higher H/L ratios in adult birds than in juveniles and observed higher stress levels in females than in males. While body condition had no effect on the H/L ratio, reproductive birds tended to have higher H/L ratios than non-reproductive birds, regardless of their sex. Furthermore, we found a robust phylogenetic signal of the H/L ratio in the studied bird community. Our results emphasize the importance of considering intrinsic factors when using stress physiology for assessing the condition of bird populations and communities.

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