

Abstract

Relationship between animal signalization and environmental conditions, where these species are living, is one of crucial topics of ecology. Using two complementary statistical approaches (fourth-corner and RLQ analyzes) I investigated geographical variation in parameters of bird vocalization in South Africa (RSA) and Lesotho. Altogether, I used nine quantitative and five qualitative acoustic traits for 472 bird species and nine environmental variables which could significantly influence parameters of their vocalization. My results supported findings of previous studies about the important effect of body size on species-specific vocal characteristics. In passerines, analyzes corrected for body size showed that the number of elements and element types were increasing with variability of natural conditions and were highest in very arid and climatically unpredictable areas. Element and element type rate were positively associated with altitude. Minimal song frequency in passerines and frequency range of vocalization in other birds were negatively correlated with average temperature of warmest and coldest month of the year, respectively. Similarly, environmental variables significantly influenced distribution of several qualitative song traits in passerines. Passerines, where female song and territorial song were present, occupied only the most productive areas of RSA with stable climate. On the other hand, the imitation in vocalisation occurred predominantly in arid and less productive environments in both bird groups. Such pattern could be linked to increased strength of sexual selection or positive environmental selection on cognition capacity increment of birds in these low productivity areas. Aerial display in passerines was present mainly in open and higher elevated regions. Taken together, this study shows that avian song characteristics are not distributed evenly across South African environments.

Key words: birds, environment, fourth-corner analysis, geographical variability, RLQ analysis, song, South Africa, vocalization