

Abstract

Species with particular traits are not randomly distributed across landscape. Habitats provide the templet on which evolution forges characteristic morphologies and life-history strategies and environmental determinants in an ecological processes represent a filter for certain species with appropriate traits. It is essential to understand how spatial differences in community composition are affected by geographical patterns in a distribution of species characteristics. I was interested in searching and determining the relationships between species traits and environmental parameters within avifauna of south Africa. I investigated the effect of which variables of environment most influenced bird assemblage composition and distribution of species traits in space. Relationships between the environmental factors and the species traits and life-history strategies were investigated using RLQ analysis, a multivariate ordination method able to relate a species trait table to an environmental table by way of a species presence/absence table. The first axis of the RLQ analysis was highly statistically significant and explained most of the variability. It was strongly positively related to increasing productivity, to attributes reflecting vegetation character and to availability of water sources. The rest of the variability were explained by latitudinal and altitudinal gradient of different aspects of the area. Species composition was then affected mainly by east-west gradient of environmental variables and also by vegetation heterogeneity and by availability of food sources. In the most diverse habitat of savanna there is a role for life-histories associated with environmental predictability and with low adult mortality; altricial birds with defended territories inhabit soliter open or closed nests. They are often sedentary and host nest parasites. Other traits also showed significant relationships with the main environmental axis; the habitat with dense vegetation and rainfall is preferred by species with longer bills, eating on invertebrates or nectar and often inhabited cavity nests. In the opposite direction of the environmental gradient, in arid unpredictable and fluctuant climatic conditions, increases occurrence of carnivorous species with longer tarsus and wings, breeding near the ground and often characterized by nomadic way of life. Less productive habitats of grassland and fynbos allow higher representation of granivorous species breeding on the ground with precocial young and host prevalent vagrants and temperate-zone migrants. Birds with larger body mass, often also folivorous, living colonially or certain species exhibiting larger clutches, dominate in the areas of productive grasses. The use of the habitat templet concept provides deeper insight into the problems than the common study of the species-environment relationships because life-history traits of species, rather than the species themselves, can be directly associated with environmental conditions and this connection allows the precise definition of functional groups, which can be used to characterize functional diversity and possible impact of environmental changes.