The Role of Habitat Shaping Motion Detection in Two Songbirds

Elena A. Ritschard[1], Luke P. Tyrrell[2], Esteban Fernández-Juricic[2]
[1]Departamento de Ciencias Biológicas, Universidad de los Andes, Bogotá, Colombia, [2]Department of Biological Sciences, Purdue University, West Lafayette, IN 47907, USA

ABSTRACT

Double cones of birds are photoreceptors associated with motion perception, and perceiving motion is highly important to detect predators. Predation risks varies between habitats and may impose selective pressures that could affect organisms' traits. There is evidence that birds show interspecific variations in visual system properties, such as the photoreceptor densities (single and double cones) and distribution across the retina. However, little is known about the relationship between the distribution of double cones and predator scanning strategies in birds living in different habitats. The goal of this study was to compare double cones distributions of birds that live in open vs. closed habitats. We measured the density and distribution of double cones in 2 species of the order Passeriformes. We found that the density of double cones in both species (open and closed habitat) is greater in the retina dorsal region. This result suggests that other visual traits might be taken into account in future work to better elucidate the relationship between habitat type and sensing motion. Moreover, the White-throated Sparrow had a more homogeneous distribution of double cones, result expected for this closed habitat species. Future work is suggested to be done using more individuals and more species to assess fully understand the evolution of predator- prey interactions and learn how prey can optimize vigilance strategies in different habitats with different predation pressure.

KEYWORDS

Double cones, motion detection, predator- prey interaction, songbirds, scanning strategies