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Influence of Forest Proximity on Species Composition and Diversity of Avifauna in Buffer Zones

Sankalana, K.M.V.*, De Zoysa, D., Senanayake, F.R., Chathuranga, H.N., Chandana, M.K.L.

Earth Restoration (Pvt.) Ltd, Beragala, Sri Lanka
**sankalanavishwa301@gmail.com*

Abstract

Buffer zones play a crucial role in maintaining biodiversity flow and connectivity by providing transitional habitats between natural forests and anthropogenic environments. Understanding the variations in avian diversity within buffer zones is essential for effective conservation planning. This study aims to assess the variations in species composition and diversity of avian communities in proximity to the forest within the buffer area. The Belipola Arboretum, a 45-year-old analog forest situated in the Badulla District of Sri Lanka, was selected as the main forest. The buffer zone consisted of home gardens, agricultural lands, and other anthropogenic settlements. Eight line transects, labeled as T1 to T8, each 100m in length, were deployed, starting from the forest edge and continuing outward from the forest. The Visual Encounter Survey method was employed for data collection, utilizing binoculars. Observations were conducted for 10 minutes at each transect between 06:00 h and 08:00 h, twice a month from April to August 2025. A total of 66 species were observed, including 11 endemic species. The species richness of T1 to T8 were 31,35,31,34,27,23,28, and 31, respectively, while the Shannon-Wiener Diversity Index values were 3.040,3.043,3.084,2.937,2.576,2.653,2.931, and 2.974, respectively. First three transects recorded seven endemic species each, while the last three transects only recorded two endemic species each. Two endangered species were recorded: *Picus xanthopygaeus* in T3 and *Hirundo domicola* in T5 to T8. The results revealed a gradual reduction in diversity while species richness remained relatively constant in relation to the increasing distance from the forest. This pattern suggests that even though the number of species does not significantly decrease, species composition and evenness of the avian communities change along with the forest gradient. Transect 3, though located further from the analog forest, was adjacent to a small remnant forest patch, likely contributing to its higher diversity of forest-dependent species. The presence of endemic species concentrated in the transects closer to the forest indicates their sensitivity to habitat degradation. Overall, the results demonstrate that even subtle changes in habitat structure across short spatial scales can influence avian community composition, and that conserving small forest patches within buffer zones can significantly contribute to a higher avian diversity.

Keywords: *Avian diversity, Buffer zone, Forest gradient, Species composition*