



BIODIVERSITY OF BIRDS AND BATS IN MANAGED AND VIRGIN FORESTS: BIBLIOGRAPHIC ANALYSIS

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Abstract: *The management of stands influences the structure of habitats and the faunal biodiversity associated with forests. This article presents a comparative bibliographic analysis of bird and bat diversity in managed forests and in virgin or quasi-virgin forests, with the aim of identifying the structural factors that shape these communities. Bird responses to forest management depend on the ecological guild and spatial scale, while bats show a higher sensitivity to the loss of arboreal shelters. Integrating structural conservation measures into forest management is essential for maintaining faunal biodiversity.*

• Introduction

Past and present forestry practices have led to the loss of forest-specific species and habitats. Integrating conservation practices into forest management can help conserve and enhance biodiversity, but requires well-documented information on how species respond to forest practices. Birds and bats are highly mobile species that respond rapidly to changes in their environment. Forest birds are also widely recognized as valuable ecological indicators of forest biodiversity. Bats are particularly sensitive to the structural characteristics of forests and are the target organisms of most retention programs. They are excellent indicators of measurable responses to environmental stressors, being sensitive to human-induced changes in ecosystems, habitat degradation and climate change. Given the increasing importance of sustainable forest management, a literature review that synthesizes current knowledge on these taxonomic groups is fundamental to identifying the ecological consequences of silvicultural interventions on them.

• Material and method

This article is a bibliographic synthesis of studies comparing bird and bat biodiversity in managed forests and virgin forests. The literature was identified by querying various databases: Web of Science, Scopus, Google Scholar, etc. based on relevant keywords to obtain the most exhaustive results.

• Results and discussions

Bird diversity depends on habitat structure and heterogeneity, and is directly influenced by forestry practices. Some species are specialized for virgin or mature forests, while others prefer successional stages or forest edges. Forestry interventions can have both positive and negative effects on birds, depending on their ecological preferences. For example, canopy openings can increase biodiversity, but can affect species dependent on compact forests.

Deadwood plays an essential role, providing habitat and food for many species. More structurally diverse forests support a greater richness of bird species. Proximity to riparian areas increases their diversity and abundance. There is no universally beneficial forestry practice for all species, and adapted strategies are needed. Ultimately, forest management must aim to maintain habitat diversity for the conservation of bird communities.

Habitat selection by bats is influenced by forest density, cavity availability, and insect abundance, all of which are affected by forestry practices. Logging is a major threat, reducing roosting sites and food resources. Forest edges created by logging can favor bat activity due to increased insect availability, but the effects vary by species. The lack of old trees and cavities is one of the main limitations for reproduction, as bats depend on such microhabitats. Virgin forests offer better conditions due to structural diversity and a higher volume of dead wood. Bat activity varies seasonally and is influenced by the availability of food and roosting sites. The complex structure of the forest favors insect production and, consequently, the presence of bats. Although some species can adapt, this capacity has limits. In conclusion, bat conservation requires maintaining diverse habitats and protecting unexploited forest areas.

• Conclusions

This literature review highlights the essential role of virgin and semi-virgin forests in maintaining the biodiversity of forest birds and bats, especially for species that are strictly specialized and dependent on mature forest structures. High structural complexity, ecological continuity and the availability of critical microhabitats, such as old trees, natural cavities and dead wood, are determining factors for the conservation of these faunal communities.

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