# Plant traits as drivers of habitat selection and community composition in North American forest birds

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**Abstract**

Forests are constantly altered by human activities. The recent development of broad-scale, remote-sensing methods has allowed the quantification of changes in forest composition with an increasing accuracy and scale. However, the implications for advances in remote sensing for capturing species-habitat associations and associated changes on avian biodiversity remain poorly understood. Here, we investigated whether functional and structural plant traits, as captured by advanced remote sensing, are influencing habitat selection in forest birds of Wisconsin. We asked (1) Are specific forest bird species responding to variability in plant traits? (2) Do these differences in species-habitat associations influence the diversity and composition of forest bird communities? We studied 26 forest sites covering the full-range of stand densities and tree species composition present in Northern United States (Wisconsin). Plant traits were measured and point counts carried out over two field seasons. Bird abundances and several metrics characterizing bird communities, such as species and functional richness or community trophic index, were correlated to spatial variation in structural and functional plant traits. We found that the abundance of individual forest birds varied strongly along plant-related environmental gradients, with specific nesting requirements making it difficult to predict the bird responses based on their functional traits alone. At the community level, however, plant traits appeared to be clearly driving diversity metrics such as species richness, functional richness, functional divergence or several trait-related indices. Our results suggest that (1) bird species are highly responsive to the functional properties of forests, with a wide variety of species-specific responses, (2) functional and structural plant traits are two independent variables influencing different properties of birds communities, and (3) remote sensing methods can be used as an alternative to time-intensive ground-based methods to monitor forest avian biodiversity and potentially predict changes in community diversity.

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