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# How does connectivity of permanent grasslands influence bird and plant communities?

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## Abstract

In France, legislation now requires local authorities to integrate ecological networks into planning documents and knowledge is needed about how to construct such networks for maximum benefits to wildlife. Landscape ecological research has tended to focus on wooded habitats but less on the effects of open habitat networks. We studied the contribution of permanent grassland continuity to the maintenance of common biodiversity in agricultural landscapes of north-western France, characterised by hedgerow networks. We selected sites to optimize differences in grassland connectivity. A total of 21 and 33 permanent grasslands were sampled for birds and plants respectively. Using existing land cover databases, automatic classification of satellite corrected by photo-interpretation and ground-truthing, we produced habitat maps, paying particular attention to the accurate estimation of permanent grassland distribution. Within buffers around each sampling point we measured the proportions and edge lengths of permanent grassland and wooded habitats, as well as landscape composition and configuration heterogeneity indices. Bird communities were mainly concentrated in hedgerows and were unaffected by grassland connectivity. Abundance of nesting birds responded significantly to habitat heterogeneity, however the relationship could be opposite for forest specialists compared to typical open farmland species. Plant species richness tended to increase with the proportion of permanent grasslands in the landscape but was negatively influenced by increasing field size, perhaps because of variation in farming practices. The response of these two groups to landscape composition and structure is therefore complex, which is likely to pose challenges for the definition of rural ecological networks.

**Keywords:** Permanent grassland, connectivity, birds, wild flora, heterogeneity, hedgerows

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