

# Science for Environment Policy

## Choice of tree species and site can increase plant diversity in plantation forest

**Careful choice of tree species** and sites could transform plantations into refuges for woodland plant diversity, new research from Ireland suggests. Plantations of native species on or near historic woodland and those with adequate light levels below the tree canopy were found to support more plant species.

**Europe's forests cover 45%** of the land area, and provide important habitat for many endangered species. Plantation forests often have lower plant diversity than natural woodland, and are generally planted and managed to ensure a high yield of a single, or few species. However, in several EU Member States, they make up the majority of forest area, for example, 78% of Denmark's forests are plantation. It is therefore important to maximise the potential of plantation habitats to support increased woodland plant diversity.

In this study, researchers compared plantations and semi-natural forests across Ireland, examining management practices and conditions in plantations that drive higher diversity and greater similarity to native plant communities. A total of 55 plantations were chosen, including 44 dominated by conifers, such as Norway and Sitka spruce, and 11 dominated by native ash trees. These were compared to 20 semi-natural woodlands; ten were oak-dominated and ten were ash-dominated.

At each site, three 10m x 10m plots were identified, at least 50m from the edge of the forest, and at least 50m apart. The researchers measured a range of characteristics of each site, including the number of different plant species, the percentage of the forest floor covered by the tree canopy, the presence or absence of grazing animals and drainage. Finally, using records from 1831-1843, researchers also included whether the site was on or adjacent to sites that had been wooded in the past.

Overall, semi-natural ash woodlands had the highest number of plant species, an average of 40.9. Of the plantations, ash-dominated sites contained the most similar plant communities to the semi-natural ash woodlands and displayed the most diversity, although this was significantly lower than in semi-natural ash woodland (average of 25.2 species). The results also indicated that both conifer and ash plantations could support similar numbers of species to semi-natural oak woodlands; plantations contained 23.3 - 25.2 species per site and semi-natural oak woodlands hosted 26.1 species, on average.

The researchers also demonstrated that increased canopy cover and drier soils were associated with fewer species across all forest types, but sites with grazers, and those which were on or near historic woodland tended to have higher numbers of species.

The findings suggest that there is potential to increase plant diversity in plantations through targeted management. When considering afforestation, the researchers recommend planting native species, since native species plantations were more likely to support plant communities similar to natural woodland. Prioritising areas adjacent to historic woodland is also recommended, as the greater numbers of species seen at these sites suggests that these are important seed banks for natural woodland species.

Managers could also consider planting species, or mixtures of species, which have a reduced canopy cover to allow light to penetrate the forest floor and permit understory species to flourish. Allowing grazing within the forest is also beneficial; however, the study cautions that over-grazing will have a negative impact and may also cause damage to trees.



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