



Simple re-seeding projects can triple grassland biodiversity

Researchers have recommended new, improved ways of increasing the ecological value of European grasslands. Plant diversity – or species richness – can be increased by a factor of three through sowing grass and wildflower seed mixtures, together with a carefully controlled plan for animal grazing.

Grassland field margins - strips of land between the crops and the field boundary – naturally support very high biodiversity, acting as “island refuges” for many species of plants, invertebrates and birds. But agricultural practices, such as the use of inorganic fertiliser, are rapidly diminishing plant diversity.

The EU currently invests more than €3 billion annually in agri-environmental schemes¹, but although measures such as increasing soil nutrient levels, have been successful in preventing further diversity loss, a way of *restoring* and *enhancing* species diversity has not yet been found.

The new research compared three different ways that plant biodiversity could be increased in field margins of intensively managed grassland in Ireland. The scientists divided nine 90 metre strips into three equal sections and applied one of the following treatments: (i) fenced off from the rest of the plot, (ii) treated with a “rotavator” to churn up the soil, which encourages dormant seeds of naturally occurring species to develop and (iii) removed all vegetation, rotavated the soil and then applied a mixture of grass and wildflower seeds (once only at the start of the experimental period).

The scientists also looked at how controlled grazing by cows throughout the year affected plant biodiversity, compared to the standard practice of annual mowing. A complex statistical model then revealed which conditions led to the biggest increase in biodiversity over a seven-year period (2002 to 2008) compared to control plots, which had none of the treatments applied.

There was a large increase in the average diversity over time for the seeded plots (15.3 species compared to 4.5 in the controls). Diversity also increased in the rotavated-only plots and the fenced-only plots, but much less rapidly. The scientists suggest that these results were largely due to wind dispersal of seeds from the nearby seeded plots. The large difference between the seeded and unseeded plots indicated that grasslands were already too badly depleted in species diversity to be able to regenerate naturally, even with encouragement by disturbing the soil. This implies that restoring biodiversity in grasslands requires the direct addition of seeds, but that the effect of increasing biodiversity can persist for several years without the need to re-sow.

The use of a seed mixture also increased the proportion of herbaceous plants and decreased the proportion of weeds, compared to the unseeded plots. Interestingly, this also happened when the width of the plot was increased from 1.5 m to 3.5 m. From these findings, the scientists suggest that a small percentage of productive farmland area (perhaps 1-4 per cent) could be dedicated to expanded field margins to improve biodiversity.

The impact of grazing over time was more complicated, since grazing significantly increased biodiversity in the unseeded plots (both fenced-only and rotavated-only) but not in the seeded plots. Nevertheless, the researchers suggest that controlling the timing, intensity and frequency of grazing periods may be a useful technique to improve biodiversity, by providing more regular disturbance of the soil than annual mowing.

This approach would also require little input from farmers, which is likely to be an important factor in encouraging compliance with agri-environment policies.

1. See: EC Agriculture and Rural Development policy areas, http://ec.europa.eu/agriculture/envir/measures/index_en.htm

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