



Weeds important for restoring biodiversity in farmland environments

The way in which agricultural land is managed can cause environmental changes that affect biodiversity and the services provided by ecosystems. A new study suggests agri-environmental schemes that focus on restoring common weeds, such as thistles, buttercups and clover, could have wide-ranging benefits as these plants appear to help stabilise the supportive links between different species found in farmlands.

Communities of plants and animals live and interact together in the environment, forming a variety of different networks, such as food webs, seed dispersal networks, and pollination networks. All these networks are also interconnected, forming a network of networks. Understanding how these complex interactions can affect the survival of species under environmental change can help conservationists target resources to provide the most benefit to the widest range of species.

In this study, researchers investigated interactions between different species of plants and animals within and among seven different networks (including food webs) on a farm in the UK. The researchers then modelled what would happen to different groups of animal species within the linked networks if certain species of plants were lost.

More than 1500 links between 560 organisms, which were part of the seven different food webs, were established. Animals in the food webs included pollinator butterflies and bees, seed-eating birds, rodents and plant and animal parasites.

Modelling different scenarios of plant loss revealed that some groups of species were strongly interconnected, so the removal of plant species that had a small impact on some animal groups would also have a small impact on the robustness of other animal groups. However, interconnections of animal species across all networks varied, so restoring some plant species in the landscape would benefit some but not all animal groups equally across the landscape.

For example, the bird seed-feeder, rodent seed-feeder and aphid and aphid parasite networks were more robust to plant loss than insect and butterfly pollinator networks, which would be more affected by plant loss and changes in the environment.

The study also identified the plants that were disproportionately important to the animals in the network of food webs in the agricultural environment. These plants included thistles, cow parsley, clover and buttercups, which can be regarded as weeds. The researchers hope that their study leads to further experimental work to test their findings.

Protecting biodiversity in the agricultural environment is important for sustainable food production. Farmers benefit from ecosystem services supplied, for example, by pollinators, such as bees and butterflies. Agricultural management could focus on restoring plant species that are particularly important in the networks, as these plants are predicted to offer the greatest benefit to biodiversity. This could be controversial, though, as some of these plants are farmland weeds.

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