Effects of Farm Size and Organic Farming on Biodiversity

In most European countries, the agricultural landscape has been modified because of intensification of farming practices in order to increase yields and overall productivity. This intensification has been achieved by increased use of artificial fertilisers, pesticides, and monocultures, resulting in loss of non-cultivated habitats and grazed pastures. These changes in agriculture management practices are linked to habitat loss and degradation, which in turn results in reduction of species richness in agricultural landscapes. A large number of studies show a strong positive effect on biodiversity by organic practices (no use of pesticides), but no studies have assessed how diversity is affected by changing farm sizes.

Swedish researchers have analysed how the differences in management practices between small and large farms affect biodiversity. A second goal of the study was to determine whether bird abundance could be used as an indicator of the status of lower trophic level species (e.g. insects). The authors have used statistical analysis to compare diversity and abundance of birds, butterflies, bumblebees, and herbaceous plants between six small farms (<52 ha arable land) and six large farms (>135 ha arable land) in southern Sweden. Two of the large and four of the small farms were certified organic (in accordance with EU 2092/91).

The results suggest that the management practices associated with farm size are an important factor affecting biodiversity. More than twice as many bird species and territories, butterflies, and herbaceous plant species and five times more bumblebees were found on the small farms compared to the large ones. Factors that could explain these differences are lack of pesticides, use of crop rotation, and high grazing intensity, most of which are more common on small farms. When comparing small organic farms with large organic farms, some differences were also noted: 56% more bird species were found on the small farms. The authors argue that this is because the more heterogeneous landscapes with higher crop species diversity on the small farms can harbour more bird, butterflies, and bumblebees species than the more homogeneous landscapes found on the large farms. The largest differences were found between small organic and large conventional farms.

Finally, a positive correlation was found between abundance of birds and abundance of butterflies and herbaceous plants, thus supporting the fact that bird assessment could be used as an indicator of the lower trophic level species.

The current study illustrates how important it is to preserve small-scale agricultural areas in order to avoid further decline in bird diversity. The measures taken by current European policy to prevent further loss of biodiversity may not be sufficient since the overall population trend of many farmland bird species across Europe is still negative. The authors state that, not only organic agricultural practices, but also farm size should be taken into consideration while devising new conservation schemes.


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