

Scottish Natural Heritage

Farmland and Lowland Ecosystems Group

Biodiversity and intensive cropping



SCOTTISH
BIODIVERSITY
FORUM



Introduction

This leaflet sets out a range of actions and management procedures which when incorporated into the management on an intensive unit can enhance their biodiversity. The word biodiversity is short for 'biological diversity' and can be summarised as "the total variety of all living things". There are many specialist husbandry techniques particular to individual crops which can improve biodiversity, such as the use of predator insects to control pests. The main opportunities are, however, in the margins, boundaries and uncropped areas of production areas. We urge

you to consider some of the following suggestions where appropriate and see if any could be incorporated into the management of your unit. The measures are unlikely to have any major effect on the viability of your enterprise. In most cases you will find you are already contributing to the biodiversity of your unit and may be carrying out some of the suggestions. You may wish to discuss other issues with an adviser or consultant, who will be able to provide guidance upon how best to implement the measures.

Enhancement of biodiversity within the production system

Given that the aim of most production systems is to provide weed-free and pest-free growing conditions, biodiversity is bound to be lower within the crop itself than it might be in the surrounding areas. There are, however, a number of measures that could be taken to enhance biodiversity within the production system without reducing profitability.

It may be financially sound to tolerate low levels of weed or pest infestations and only spend money on control measures once the economic damage threshold has been reached. This threshold varies according to the crop and the weed or pest type. The grower should take advice on the level of infestation sustainable and on monitoring methods so that they can make informed decisions on weed and pest control.

Where appropriate, the use of certified stock and resistant varieties may reduce the impact of pests, weeds and diseases on the crop, making specific control measures less likely to be necessary. Similarly, plants growing in optimum conditions of water and nutrient availability are better able to tolerate pest attack or competition from weeds than plants under environmental stress.

For many pests and diseases, roguing out infected plants may be more cost-effective than treating the whole crop with a pesticide. Manual or mechanical methods of weed control such as hoeing and mulching can be targeted to priority areas within the crop more easily than herbicide sprays. Where chemicals are used, spot weeding should be considered in preference to sprays or broadcast granules. Where selective herbicides, fungicides or insecticides are available, these will have a lower impact on biodiversity than broad-spectrum products.

Biodiversity and pest control can both be enhanced by production methods that limit damage to the pests' natural enemies. These methods include the provision of nectar sources for adult hoverflies and lacewings and overwintering sites for lacewings and ground beetles. Selective insecticides such as pirimicarb, a specific aphicide, will have less effect on beneficial insects than broad spectrum products like the synthetic pyrethroids. For protected crops, the insect growth regulator buprofezin can be integrated with biological control methods. Low input, minimum tillage systems are better for beneficial insects but when intensive methods are used, thought should be given to maintaining conditions around the edge of the crop that will encourage natural enemies and allow them to move into the crop to feed on pest species.

Consider what could be done to enhance biodiversity

Buffer Strips, typically 2 to 6 metres in width, provide an ideal filter for diffuse pollution between a production area and areas which need protection, in particular watercourses. Simple and cheap to install, easy to maintain, they provide a physical barrier to contain the leaching of nutrients and pesticides in the soil.

Amenity Planting

The planting of small groups of trees and shrubs provides opportunities for:

- Shelter
- Shade
- Landscape enhancement
- Screening

Non-productive areas and field corners are particularly suitable. It is a longterm and relatively cheap option to enhance the biodiversity assets of a production site. Consider taking advice on the selection of species.

Hedgerow Maintenance

Hedgerows, particularly those of native species, benefit biodiversity in several ways. Hedge bottoms provide a habitat for a variety of plants and offer cover for small mammals. The hedgerow itself provides a nesting area for birds and can produce large quantities of seeds and berries as a food source for wildlife. Invertebrates will also find a range of habitats within the hedgerow area.

Applying herbicides to hedge bottoms or excessive trimming which prevents the production of fruiting wood or prematurely removes the berry crop, greatly reduce the value of hedgerows. High levels of fertilisers applied into the base of hedgerows disturb the balance of flora and reduce the diversity of plant species.

Hedgerow management to benefit biodiversity can be carried out at negligible cost by ensuring that:

- non-selective herbicides are not sprayed into the base of hedges;
- trim hedges in late winter, ideally after berries have been eaten and before nesting starts;
- stagger hedge trimming so not all hedges are trimmed in the same year;
- fertilisers are not spread beyond the field edge by modifying the distribution pattern from the spreader;
- pesticide spray drift is minimised by careful nozzle selection;
- hedges are trimmed in a flat A shape to increase volume.

Water margins

The banks of watercourses, ditches and ponds are potentially a very important area for a wide range of wildlife ranging from invertebrates to mammals such as otters and water voles. Tall bankside vegetation provides shade which protects the water from overheating to the detriment of small fish. It also attracts invertebrates which fall into the stream providing a source of food for fish. Cultivations encroaching near to the water's edge can cause erosion of banks preventing the build up of vegetation which helps to stabilise the banks and provides shelter for wildlife.

Fencing such margins to prevent stock access and ensure cultivations are kept back from the waters edge by several metres will not greatly affect production and can save future costs of bank repair work. The cost of fencing itself will incur expenditure but if fences are replaced further back from the waters edge when the fence is due for renewal or advantage taken of various grant schemes the cost need not be prohibitive.

There is also the opportunity to carry out ditch maintenance at little extra cost and to the benefit of biodiversity if only one bank is cleared in any one year. This allows the cleared bank to be regenerated by seed from the uncleared side and does not remove all the cover for wildlife.

If cleaning ditches in areas where water voles are present, avoid disturbing vole runs and obtain a licence to clean the ditch.

Ponds

Ponds are often very rich in biodiversity and are particularly important for aquatic invertebrates, wetland plants and amphibians. Constructed wetlands and ponds can also be used as a way of improving water quality in Sustainable Urban Drainage Systems (SUDS).

Consider some of the following suggestions to enhance wildlife around ponds.

- For existing ponds consider undertaking a survey and seek advice before beginning any invasive management work such as dredging or extensive changes to woodland surrounds.
- Maximise water quality reaching pond basins through buffer zones around the pond.
- Locating ponds close to wetlands or freshwater habitats is generally better for wildlife.
- Before creating a new pond consider the value of the existing habitat, for example, don't destroy an existing wetland to create a new pond.
- Avoid using non-native species if planting around ponds.
- Consider the water source before making a pond. Creating ponds that are linked to a watercourse is generally discouraged because pond plants and animals are adapted to live in still water.

Woodlands/shelterbelts

Woodland, especially native woodland, together with the associated understorey, provide a habitat for a wide range of plants and animals. In particular, you may wish to consider the following management of woods and trees on the farm.

Thinning and Pruning Trees

Thinning helps to diversify woodland habitat. It also improves timber quality and the growth potential of trees. Pruning broadleaves improves their form and ultimate value.

Leaving Deadwood and Brashings

Natural forests are characterised by deadwood in standing trees, fallen trees and branches. Deadwood is a key component of woodland ecology and enriches the habitat.



What impact is my production system likely to have on the wider environment?

Diffuse Pollution

An intensive system requires high levels of nutrients and possibly pesticides. Whilst most systems are highly efficient in using these inputs, there is inevitably a risk of loss of these potential pollutants into the soil. The leaching of this excess outwith the production area is termed 'diffuse pollution'. The effect of diffuse pollution is particularly dangerous if pollutants reach watercourses.

By-products, Residues & Waste

Intensive systems tend to produce by-products, residues and waste which can have potential to pollute, spread disease and downgrade the landscape. Careful consideration is needed to ensure this material is handled to minimise the impact on the wider environment through safe destruction, safe disposal, and recycling.

Visual Impact

Some intensive systems (such as glasshouses and polytunnels) can have a major impact on landscape. In the few cases where this impact is highly intrusive, consideration should be given to screening and landscaping using native species.

Checklist

Use this checklist to help audit what is relevant to you and what action you can take.

	Action
Biodiversity within the production system	
Buffer strips	
Hedgerows	
Water margins	
Ponds	
Woodlands and shelterbelts	
Diffuse pollution	
Waste disposal	
Conservation Audit	

Why help biodiversity?

There are many arguments in favour of supporting biodiversity:

- it increases the variety of wildlife on the farm and can enhance the sporting interest, tourist potential and the enjoyment of wildlife for its own sake
- it creates a better balance by preventing the loss of genetic material and beneficial organisms
- protecting biodiversity is a strong public relations argument which helps the whole of the agricultural industry
- by becoming more involved in the biodiversity process and raising your awareness of the issues involved, you are likely to be better placed to deal with any cross-compliance and GAEC measures introduced as part the agricultural support schemes
- the satisfaction of knowing that you are contributing to an ideal which has widespread support and encouragement from Government, conservation bodies and the industry generally. You as a land manager are now able to do something practical about the situation.

Organisations represented on the Farmland and Lowland Ecosystems Group:

Crofters Commission	Scottish Environment Link
Forestry Commission	SCRI
Game Conservancy Trust	SGRPID
LBAPs	SEPA
NFUS	SNH
SAC	SRPBA
Scottish Crofting Foundation	

Other Leaflets in the series are:

- 1) Biodiversity on lowland arable farms
- 2) Biodiversity on hill and upland farms
- 3) Biodiversity on croftland and common grazing
- 4) Biodiversity on intensive grassland
- 6) Biodiversity and sporting enterprises

To obtain the other leaflets contact your local adviser or consultant or visit www.biodiversityscotland.org.uk

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