Achieving farmland biodiversity benefits from diffuse pollution mitigation measures: conflicts and compromises

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COST Action Workshop: Riparian buffer strips as a multifunctional management tool
Ballater, Scotland: 25-28 April 2010
UK Wild bird population index: 1970-2007

Scotland: 1995-2007 (BTO)

Stable (but at low levels):
- Linnet
- Skylark
- Starling
- Yellowhammer

Declined:
- Curlew (-51%)
- Kestrel (-38%)
- Lapwing (-33%)
- Meadow Pipit (-25%)

Pressures on farmland biodiversity: landscape simplification
Scottish dairy farming systems
Government response to faecal contamination of bathing waters
Impact on invertebrate abundance

![Graph showing the impact of different margin widths on invertebrate abundance. The x-axis represents different margin widths: Field, Open Margin, Narrow Margin, Wide Margin, and Wide Middle. The y-axis represents log abundance. The graph shows the abundance of Harvestmen, Sawfly, and Cicadellidae with error bars indicating variability.](#)
Impact on vegetation height and density

![Graph showing the impact on vegetation height and density for different margins and middle areas. The x-axis represents different areas: Field, Open Margin, Narrow Margin, Wide Margin, Wide Middle. The y-axis represents the average cm. The graph indicates that Wide Margin has the highest density and height, followed by Narrow Margin, Open Margin, Field, and Wide Middle.]
Impact on ground beetle assemblage structure

CCA Axis 1
CCA Axis 2

- Wide Margin
- Wide Middle
- Narrow Margin
- Open Margin
- Field

Field
Impact on ground beetle assemblage structure
Impact on ground beetle assemblage structure

- **Field**
  - Flightless, spring breeder, overwintering adult only
  - Flightless, autumn breeder, overwintering adult & larvae
  - Winged, autumn breeder, overwintering winter adults & larvae
  - Winged, spring breeder, overwintering adult only

- **Wide Margin**

- **Open Margin**

- **Narrow Margin**
Conclusions

- Wide riparian margins supported different ground beetles than intensively managed grassland fields
- Ground beetles in narrow margins were not different from the adjacent fields
- Wide & narrow margins increased other invertebrates
- Potentially more invertebrate prey for birds to feed on
- Unmanaged margins have long and dense vegetation which could impede foraging birds
Conclusions

Signage sites in central and southern Scotland

[Map showing locations of signage sites]

[Image of a field]

[Photo of a bird]
Conclusions

TOO NARROW

GETTING BETTER

TOO DENSE

MUCH BETTER
Conclusions

• General underlying ecological principles:
  • Need a greater diversity of habitats in the landscape
  • Need to reconsider intensity of farm management (at least in parts of the farmed landscape)

• Need to actively manage buffer strips

• Need to consider compromises
  • Would grazing in winter months to enhance biodiversity value in spring/summer be acceptable?