



### Variation in resource provision in agrienvironment scheme options for pollinators

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## Measures to provide floral resources – how effective are they?



#### Introduction and aims

- Various options are available to provide floral resources for pollinators, some supported by agri-environment schemes.
- How well do they perform on commercial farms?
- Monitoring is time consuming and expensive.
- Indicators of habitat quality needed:
  - Rapid assessment
  - Good predictors of habitat value

#### Habitats studied

#### Wild bird seed mixtures

#### Field margins

Nectar mixtures

#### Species-rich grassland

Hay meadows

#### Methods



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- Surveys of plants and pollinators in 2013
- Transects 100m long x 6m wide
- Numbers of flowers of each plant species recorded in 20 x 1m<sup>2</sup> quadrats per transect
- All insect pollinators visiting flowers recorded on up to 3 occasions (June, July, August)
- Transect walks only between 10:00 & 17:00 in temp > 13° (sunny) or 17° (overcast), low wind
- Nectar production for each site calculated using Bristol University database of nectar values for each species



## Variables included in analyses

#### Floral attributes

- Flower number
- Nectar value
- Weather
- Temperature
- Wind
- Sunshine

#### Time

- Month
- Morning/afternoon

#### Site details

- Habitat type
- Aspect
- Slope

#### Data from 2013 field work

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#### Number of pollinators by habitat category





### **Outcomes of analysis**

- Results presented for all bumblebees, hoverflies and all pollinators combined
- Factors most strongly linked to pollinator numbers:
  - Flower number (or nectar),
  - Month
  - Aspect
- Flower number selected in more models than nectar

#### Flower numbers vs nectar

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#### Effect of month





#### Effect of aspect





▼N + NE

log\_Tot\_flowers



Effect of aspect





#### bumblebees

## Implications for management (1)

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- Large variability in provision of floral resources and use by pollinators within habitat types suggests scope for better management in many cases
- Where land managed specifically for pollinators, managing small areas for high flower density more effective than larger areas at lower density

## Implications for management (2)



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- Importance of providing resources throughout the flight period including late summer. Where habitats are cut, only cut part at a time or cut on rotation
- Location: greatest value from habitats facing W/NW, S/SW, E/SE. Fewer insects use habitats facing N/NE or away from shelter.
- Largest numbers of bumblebees were found on areas receiving afternoon sunshine

# Implications for assessment of habitat value



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- Flower density is a good predictor of habitat use by pollinators
- Sheltered habitat patches or strips facing between North West and East are likely to give best results
- Presence of plant species with flowering periods spanning pollinator flight periods beneficial
- Further work needed on value of nectar and pollen measures as indicators.
- Further analysis required on phenology of flowers

## Field surveys: Honeybee colony deployment



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- Local measure of foraging success (bee health)
- Resource usage vs available forage (pollen)
- Placed in field for 2 weeks
  - 01-04 May to 15-18 May 2012
  - 18-21 June to 02-05 July 2013
- All 6 regions, 4 treatments per region
  - Honeybees set high, pesticides set low
  - Floral resource x habit fragmentation

#### Field surveys



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#### Measures for each hive/site

- Comb drawing empty frames
- Brood production
- Colony weight gain
- Weight of pollen in trap
- Diversity of pollen (1-18 pollen types)
- Longevity of adults produced on site
- Immune function of adults

#### **Developmental nutrition**



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#### Landscape effects

#### Larvae hatched in controlled conditions to measure:

- Longevity
- Immunity



## Results: honeybee colony deployment



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## Data analysis still in progress – Watch this space!

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