Habitat creation for pollinators on farmland: a research update

Claire Carvell
NERC Centre for Ecology & Hydrology

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Outline

1. Policy context
2. Habitat quality
3. Quantity - how much habitat?
4. Where in the landscape?
5. Impacts on crop yield
6. Future priorities
1. Policy context – National Pollinator Strategy

First of five key areas (2014 – 2024):

Supporting pollinators on farmland through the CAP & voluntary initiatives and outcomes:

“more, bigger, better…diverse high-quality flower-rich habitats supporting our pollinators across the country”
1. Policy context – Countryside Stewardship

Wild Pollinator and Farm Wildlife Package

- Set of options to provide **key floral and nesting resources** throughout the year
- New **incentive** for wild pollinators, birds and other wildlife in the wider countryside
- **1-3 ha flower-rich habitat/100 ha**
- **500 m to 2 km of flowering hedgerow/100 ha**
- **Targeted** to locations where declining species recorded

www.gov.uk/countrysidestewardship
2. Habitat quality

• Limited uptake and poor quality of habitats under ELS?
(6.6% of ELS agreements included nectar flower mix)

• Good establishment and management key to success

Photo: C. Carvell
Photo: M Nowakowski
2. Habitat quality

- Limited uptake and poor quality of habitats under ELS?

- Good **establishment** and **management** key to success

- Farmer experience and training benefit habitat quality and pollinators


*RELU Policy and Practice Note No. 37 (July 2012)*
3. How much flower-rich habitat?

Example *Bombus hortorum* Colony
(6 workers sampled)

![DNA genotyping](image)

![Bumblebee](image)

**b) *Bombus ruderatus***

![Map with worker locations and colony foraging radius](image)

Proportion worker preferred summer flower cover

Carvell et al. (2014). BBSRC Grant reference BB/I000925/1
Redhead et al. (in press) Ecological Applications
3. How much flower-rich habitat?

1. Which species to target?

   *6 common wild bee species, key crop pollinators*

2. Which resources limit their populations in farmed landscapes?

   *floral resources, especially pollen*

3. Which management options provide these resources?

   *flower-rich grasslands, sown mixtures*

4. What area of each option is needed to provide enough resources?

   *pollen demand/bee; bees/nest; nests/ha, pollen volume/flower, flower density/ha habitat*
3. How much habitat?

Low estimates of pollen demand for larval rearing, in floral units/100 ha, for six common wild bee species

- **Bombus pascuorum**
- **B. terrestris + B. lapidarius**
- **Andrena sp.**

Thousands of floral units/100 ha farmland

- **2 ha of nectar and pollen mix or wildflowers** (1 ha if high quality)
- **765 m of flowering hedgerow per 100 ha**

4. Where in the landscape?

“ecological contrast”

5. Linking habitat creation to food production

Wildlife-friendly farming increases crop yield: evidence for ecological intensification

Richard F. Pywell¹, Matthew S. Heard¹, Ben A. Woodcock², Shelley Hinsley¹, Lucy Ridding¹, Marek Nowakowski² and James M. Bullock¹

¹NERC Centre for Ecology and Hydrology, Wallingford OX10 8BB, UK
²Wildlife Farming Company, Bicester OX26 1UN, UK

Study design
1000ha Hillesden Estate, Bucks
5. Linking habitat creation to food production

Yield Deficit
(as a ratio of national yield)

Business as usual  ELS  ELS Extra
0%  3%  8%

% land removed for habitat creation

Combined yield trend with time

Yield as Ratio of Regional/National average

Cross Compliance  ELS  ELS Extra

2006  2007  2008  2009  2010  2011
6. Future Priorities

• Knowledge transfer

(Copies of “Habitat Creation and Management for Pollinators” will be freely available from the Centre for Ecology & Hydrology in early 2016)

• Systematic monitoring of bee and hoverfly abundance to measure long-term impacts of habitat creation and predict future threats
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