

The impact of crofting land management practices on bumblebees in northwest Scotland

Lynne M. Osgathorpe

Nicola Redpath, Kirsty Park and Dave Goulson



Introduction

- *Bombus distinguendus* is the UK's rarest bumblebee species and a UK BAP species
- Their current distribution is limited to crofted landscapes in northern Scotland
- The Outer Hebrides are an important stronghold for the species and their distribution closely reflects that of the machair habitats on the west coast of these islands
- Traditional crofting practices are thought to maintain populations of *B. distinguendus* and other bumblebee species
- However, quantitative evidence examining the value of croft land to bumblebees is currently lacking
- In this paper we examine the impacts of croft land management practices on the abundance of bumblebees and their key forage plants in northwest Scotland

Methods

- 31 crofts belonging to 10 crofters were surveyed throughout North & South Uist, Harris, Lewis and Durness
- Fieldwork was conducted between June and August 2008
- Bumblebee walks were carried out on all management types present on each croft and the number of foraging bees and their forage plants were recorded
- Vegetation surveys were carried out along the length of all bumblebee walks. A 0.5m x 0.5m quadrat was placed every 50m metres and the number of inflorescences recorded
- Each croft was surveyed three times for foraging bumblebees and flowers, once in each month: June, July & August
- Management type, livestock and livestock numbers were also recorded

Results

- Croft land management practices had a significant negative effect on bumblebee abundance in all months (June: $\chi^2_7 = 18.24$, $p = 0.0101$; July: $\chi^2_7 = 109.74$, $p < 0.0001$; Aug: $\chi^2_7 = 71.76$, $p < 0.0001$) (Fig.1)

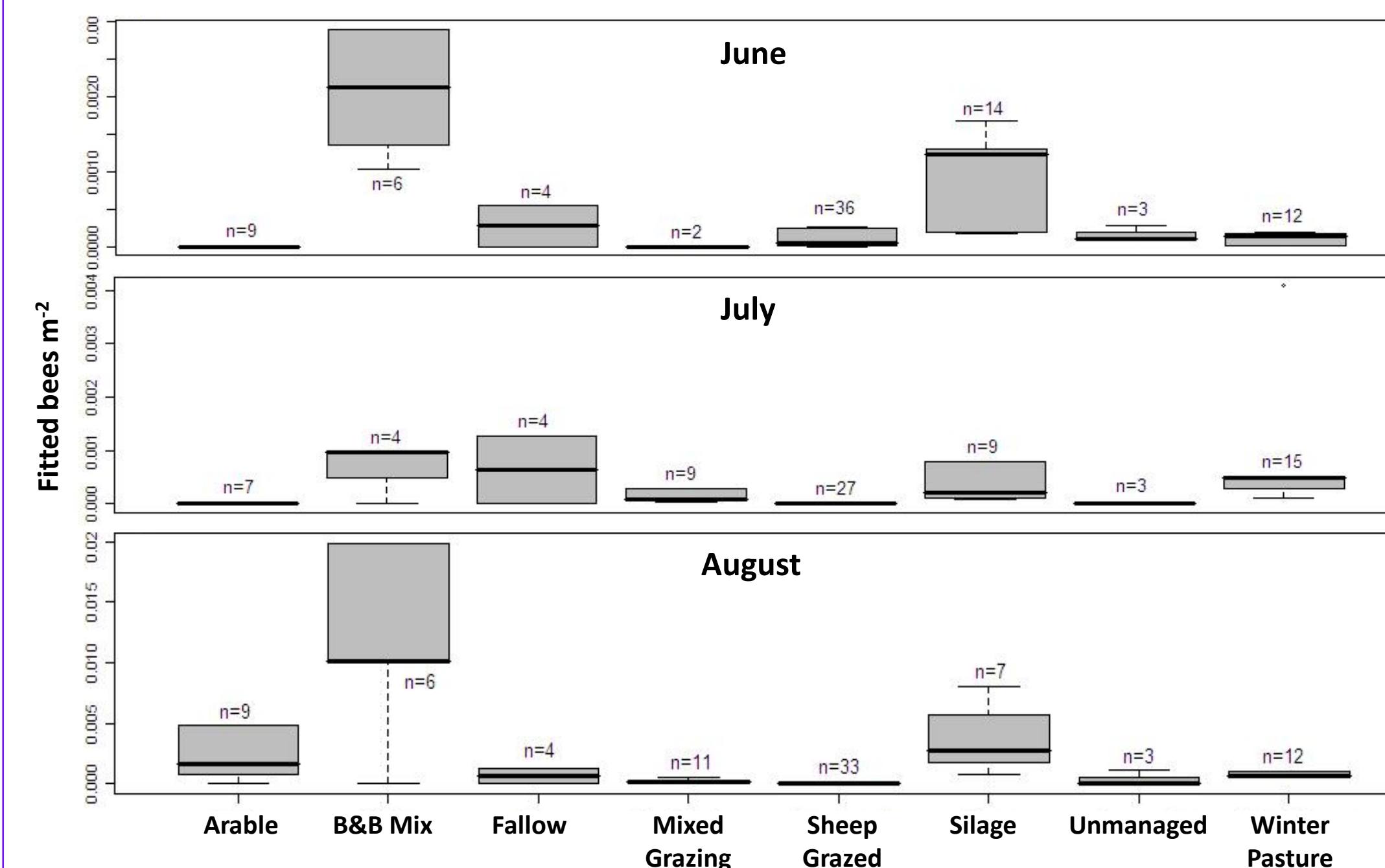


Fig. 1. Box plots showing fitted values from the models for bumblebee abundance across eight different croft management types in June, July and August respectively. Boxes represent the location of the middle 50 percent of the data and the whiskers indicate the interquartile range of the data

- Management also had a significant effect on the abundance of bumblebee forage: (June: $\chi^2_7 = 25.14$, $p = 0.0007$; July $\chi^2_7 = 17.82$, $p = 0.0128$; Aug: $\chi^2_7 = 5.56$, $p = 0.5921$)
- Only 246 bumblebees were recorded foraging on croft land, much fewer than recorded in similar studies
- Silage, fallow and Bird & Bumblebee conservation seed mix (B&B mix) were the most beneficial management practices for foraging bumblebees



- Sheep grazing during the summer had a significant negative effect on bumblebee abundance (June: $w = 2182.0$, $p = 0.02$; July: $w = 1782.5$, $p = 0.006$; August: $w = 2126.0$, $p < 0.0001$)

- Only 5 species of forage plants were used most frequently by foraging bumblebees. Species belonging to the Fabaceae family were particularly important



Red Clover Common Knapweed Tufted Vetch White Clover Yellow Rattle

Conclusion

- Current croft land management practices are not supporting bumblebee populations at present
- Crofting may still help bumblebee conservation through the adoption of Agri-Environment Schemes (AES) specifically aimed at low intensity farming systems. However, these are not currently available
- We recommend the creation of targeted AES which promote the use of Fabaceae rich conservation seed mixes and the late cutting of grass crops
- We also recommend the removal of sheep from inbye areas during the summer to reduce overgrazing and encourage natural regeneration of wildflowers

Further Information

Redpath, N. & Osgathorpe, L.M., Park, K. and Goulson, D. Crofting and bumblebee conservation: the impact of land management practices on bumblebee populations in northwest Scotland. *Biological Conservation*. In press.

Contact Details

Lynne M. Osgathorpe
Postgraduate Research Student
School of Biological and Environmental Sciences
University of Stirling
Stirling
FK9 4LA

lynne.osgathorpe1@stir.ac.uk



