Title: Interactions between bee foraging and floral resource phenology shape bee populations and communities<!–<RunningTitle>Interactions between bee foraging and floral phenology</RunningTitle>–>

Authors: Jane E Ogilvie, Jessica RK Forrest

PII: S2214-5745(17)30040-8
DOI: http://dx.doi.org/doi:10.1016/j.cois.2017.05.015
Reference: COIS 343

To appear in:

Please cite this article as: Jane E Ogilvie, Jessica RK Forrest, Interactions between bee foraging and floral resource phenology shape bee populations and communities (2010), http://dx.doi.org/10.1016/j.cois.2017.05.015

Interactions between bee foraging and floral resource phenology shape bee populations and communities

Short title: Interactions between bee foraging and floral phenology

Jane E. Ogilvie [a,b,*] and Jessica R. K. Forrest [b,c]

[a] Department of Biological Sciences, Florida State University, Tallahassee, Florida, USA

[b] Rocky Mountain Biological Laboratory, Crested Butte, Colorado, USA

[c] Department of Biology, University of Ottawa, Ottawa, Ontario, Canada

[*] Corresponding author, jogilvie@bio.fsu.edu

Highlights

- Bees experience landscapes with spatial and temporal variation in floral resources
- Life-history traits (diet breadth, sociality, size) affect bee responses to this variation
- Phenology shapes ecological and evolutionary linkages between bee and plant taxa
- Climate and land-use change can alter floral resource phenology
- Behavioural and demographic responses to resource fluctuations remain understudied

Abstract

Flowers are ephemeral, yet bees rely on them for food throughout their lives. Floral resource phenology—which can be altered by changes in climate and land-use—is therefore key to bee fitness and community composition. Here, we discuss the interactions between floral resource phenology, bee foraging behaviour, and traits such as diet breadth, sociality, and body size. Recent research on bumble bees has examined behavioural responses to local floral turnover and effects of landscape-scale floral resource phenology on fitness, abundance, and foraging distances. Comparable studies are needed on non-social, pollen-specialist species. We also encourage greater use of information contained in museum collections on bee phenologies and floral hosts to test how phenology has shaped the evolution of bee–plant associations.

Introduction

Bees are a species-rich and abundant group of flower-feeding insects that are important pollinators of crops and wild plants [1-3]. Bees are nutritionally dependent throughout their lives on floral resources,