Colony density and detection predications and outcomes

Forested landscape | Agricultural landscape

Prediction

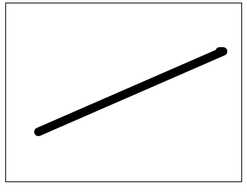
Rationale

colony density
colony detection

Hypotheses 1 & 2.

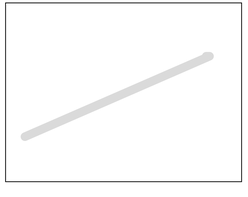
Forested landscape sites support more bumble bee colonies than agricultural landscape sites with higher detection

Colony density



Agriculture ➔ Forest

Colony detection



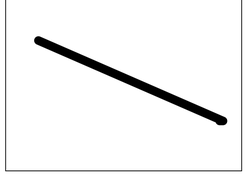
Agriculture ➔ Forest

Forested landscapes provide more nesting habitat and nesting habitat is closer to sites improving colony representation

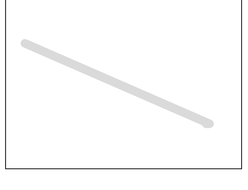
Hypothesis 5

Bumble bee density and detection fluctuate less in landscapes with more forest and semi-natural habitat

Change in colony density and detection



Agriculture ➔ Forest



Agriculture ➔ Forest

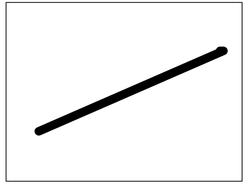
Landscapes with more semi-natural habitat maintain more consistent resources that reduce the influence of resource pulses

colony density
colony detection

Hypothesis 3.

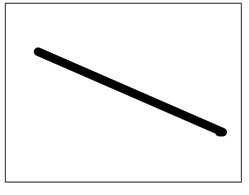
Colony density

A1. High floral density draws in bumble bees nesting further away promoting increased colony density



Optimal foraging theory: bees are attracted to cranberries and forage efficiently for high reward

A2. High floral density dilutes bumble bee presence resulting in decreased colony density during the resource pulse



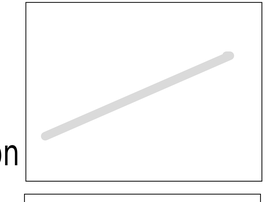
Dilution or displacement effect: bees are diluted through an abundant resource landscape or outcompeted by honeybees

Pre- and post-bloom ➔ Resource pulse

Hypothesis 4.

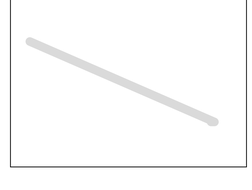
Detection

A1. High floral density draws in more foragers or colonies grow bigger, increasing detection



Optimal foraging theory: bees forage efficiently on concentrated,high reward resources

A2. Dilution of bumble bees or competion with honey bees reduces colony detection



Colonies are less represented at sites due to dilution or competition with honey bees

Pre- and post-bloom ➔ Resource pulse