Preferences of *Bombus mixtus* (bumblebee) for flowers in meadows of the HJ Andrews Forest

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Research Question

• Bombus mixtus: generalist, “bumble bee species in a given area can vary greatly in their plant preferences”

• RQ1: How does the abundance of the flowers most visited by Bombus mixtus relate to the number of interactions between the plant and pollinator?

• RQ2: Are these flowers visited the most because they are preferred by the pollinator?
Definitions/Notation

• Visit: A pollinator having at least one interaction with a plant species

• Interaction: A pollinator landing on a flower

• Stalks: The number of stems of a flower grouped together all coming from the same root system

• Abundance: The number of stalks of a flower species that was surveyed from the plots in the meadows
Methods

• Flower filter: measure of relative number of visits to a flower species

• Uniform visit

• $52.5 \times 6 = \text{Cirsium callilepis, Delphinium nuttallianum, Orthocarpus imbricatus, Sedum oreganum}$
The Number of Stalks of *Cirsium callilepis*

Interactions of *Bombus mixtus* with *Cirsium callilepis*
The Number of Stalks of Cirsium callilepis Compared to the Number of Interactions of Bombus mixtus with Cirsium callilepis

\[ R^2 = 0.0452 \]
Bombus mixtus vs. Delphinium nuttallianum

The Number of Stalks of Delphinium nuttallianum

The Number of Interactions of Bombus mixtus with Delphinium nuttallianum

- 2011
- 2012
- 2013
- 2014
- 2015
The Number of Stalks of Delphinium nuttallianum Compared to the Number of Interactions of Bombus mixtus with Delphinium nuttallianum

\[ R^2 = 0.3981 \]
Bombus mixtus vs. Orthocarpus

The Number of Stalks of Orthocarpus imbricatus

Interactions of Bombus mixtus with Orthocarpus imbricatus

2011  2012  2013  2014  2015
The Number of Stalks of Orthocarpus imbricatus Compared to the Number of Interactions of Bombus mixtus with Orthocarpus imbricatus

\[ R^2 = 0.1929 \]
The Number of Stalks of Sedum oreganum

Interactions of Bombus mixtus with Sedum oreganum

Number of Interactions between Bombus mixtus and Sedum oreganum

Bombus mixtus vs. Sedum
The Number of Stalks of Sedum oreganum Compared to the Number of Interactions of Bombus mixtus with Sedum oreganum

$R^2 = 0.2521$
Sneha’s Preference Model

• The most preferred for 2011-2014:
  • Orthocarpus, Sedum, Delphinium
  • Hypericum perforatum (filter out x5)
  • Cirsium has lowest $r^2$ value
Conclusion

• Linear relationship; abundance increase, interaction increase

• Low $r^2$ values, not a strong predictor, but also could be errors in observations, outliers

• 3/4 flowers popular and preferred, best for looking at abundance/interaction relationship

• Preference can be seen in most popular flowers

• Spikes of interactions
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