The Pollination Ecology of Showy Vernal Pool Annuals: A Pilot Survey of Insect Visitors to Three Endangered Plant Species

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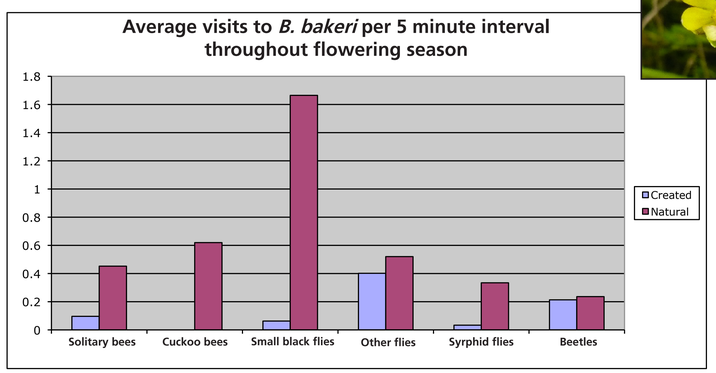
Introduction

The Santa Rosa Plain is home to both natural and created vernal pools and swales that harbor the endangered annual plants *Blennosperma bakeri*, *Limnanthes vinculans*, and *Lasthenia burkei*. Questions to be answered to promote the recovery of these species are:

1. What pollinators do plants rely on to reproduce?
2. What is the ecology and distribution of these insect pollinators?

During the spring of 2009, we conducted a pilot study to observe insect visitors to floral populations of each species at both naturally occurring and man-made or created pools across the blooming season. We performed timed observations across different flower cohorts and cover class densities.

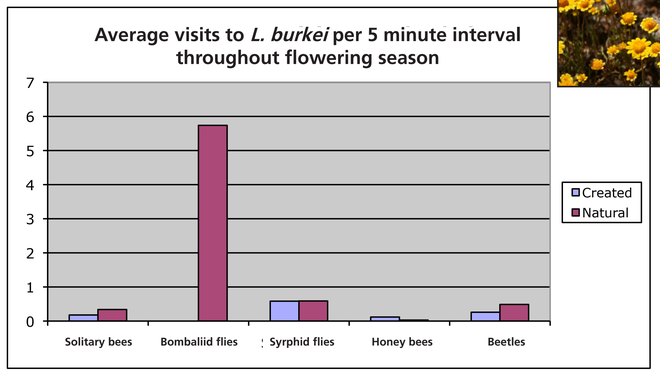


Objectives

1. Identify the common pollinators of the three plants.
2. Assess the insect community in natural and created vernal pool sites.
3. Assess flower-visitation rates of insects in natural vs. created sites and align this with seed set data.
4. Inform endangered species management and help promote recovery.

Methods

Half-meter square observation quadrats were placed randomly within each vernal pool and were assigned to a cover class standardized by the California Native Plant Society (CNPS). The area within the quadrat was observed over five replicates of five minute intervals. Insect visits were recorded each time contact was made with a new inflorescence. Short visits (less than 5 seconds) and long visits (5 seconds or longer) were noted in an attempt to differentiate quick perching from actual manipulation of floral parts. Time of day, temperature, and weather were recorded for each set of five replicates. We surveyed several flower cohorts throughout the blooming season to capture seasonal variability.



Insect Community

The following insects, identified to family, were the most common visitors of:

B. bakeri:
- bees
  - Andrenidae
  - Apidae
- beetles
  - Chrysomelidae
  - Melyridae
- flies
  - Anthomyiidae
  - Bibionidae
  - Muscidae
  - Syrphidae

L. vinculans:
- bees
  - Andrenidae
  - Apidae
- beetles
  - Chrysomelidae
  - Melyridae
- flies
  - Muscidae
  - Syrphidae

L. burkei:
- bees
  - Andrenidae
- beetles
  - Cantharidae
  - Chrysomelidae
  - Coccinellinae
  - Melyridae
- flies
  - Bombyliidae
  - Muscidae
  - Syrphidae

photo R. Houghton

Syrphidae in *L. burkei*

photo R. Houghton

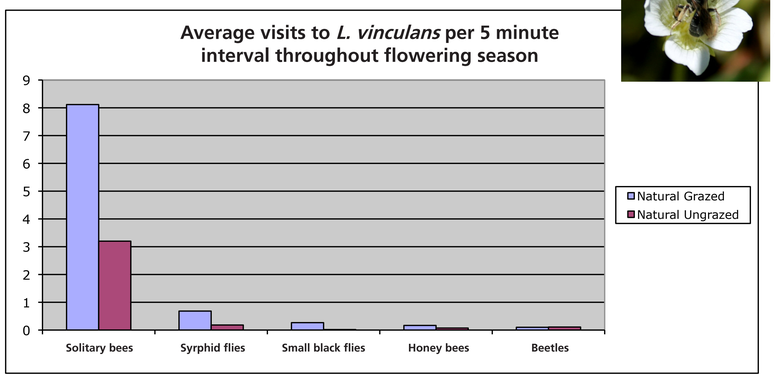
Andrenidae in *L. vinculans*

Preliminary Results

For *B. bakeri*, visitation rates of all observed insects were higher at naturally occurring pools than created pools and the insect visitors included solitary bees, cuckoo bees, flies, syrphid flies, and beetles. For *L. burkei*, visitation rates were slightly higher for observed insects in natural pools.

We were unable to compare pollinator visits at a constructed pool containing *L. vinculans*, but did survey pollinator activity between two natural sites, one grazed by horses and another ungrazed. We observed higher visitation rates at the grazed site. Specialist ground-nesting solitary bees were observed at all sites.

photo R. Houghton



Next Steps

In the following years we plan to further examine the relative role of specialist solitary bees and other flower visitors in the reproductive success of these endangered plant species. We will correlate successful seed set with insect visitation and test the efficacy of pollination of the various flower visitors.

Our findings will help promote systematic management and ultimately foster species recovery.

Acknowledgements

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