

The role of year-round vegetation in ditches as refugia for key insect pests and insect natural enemies affecting Ventura County crops

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Introduction

- Agricultural drainage ditches host year-round weedy vegetation, including invasive plant species and non-native insect pests that may colonize adjacent farms.
- Three key agricultural pests causing multimillion dollar losses to coastal agriculture (*Plutella xylostella*, *Lygus hesperus*, and *Frankliniella occidentalis*) use ditches as refugia, yet little is known about their year-around population dynamics.
- Understanding the role that ditches play in supporting vegetation and harboring arthropods is a vital component of integrated pest management.

Objectives

- Characterize vegetation composition, structure, and seasonal changes of agricultural ditches.
- Explore relationship between ditch vegetation and presence of insect pests.
- Identify if agricultural drainage ditches serve as refugia for insect predators and contribute to pest suppression in adjacent crops.

Methods

Vegetation Surveys

- Eight ditches in the Oxnard Plain, Ventura County.
- Surveys were conducted in **November 2023, and March, June, and September 2024.**
- At each site, **20m transects** were laid out parallel to the waterline with **1m² quadrats** placed every **5m** above and below the transect to record:
 - Species composition
 - Percent cover



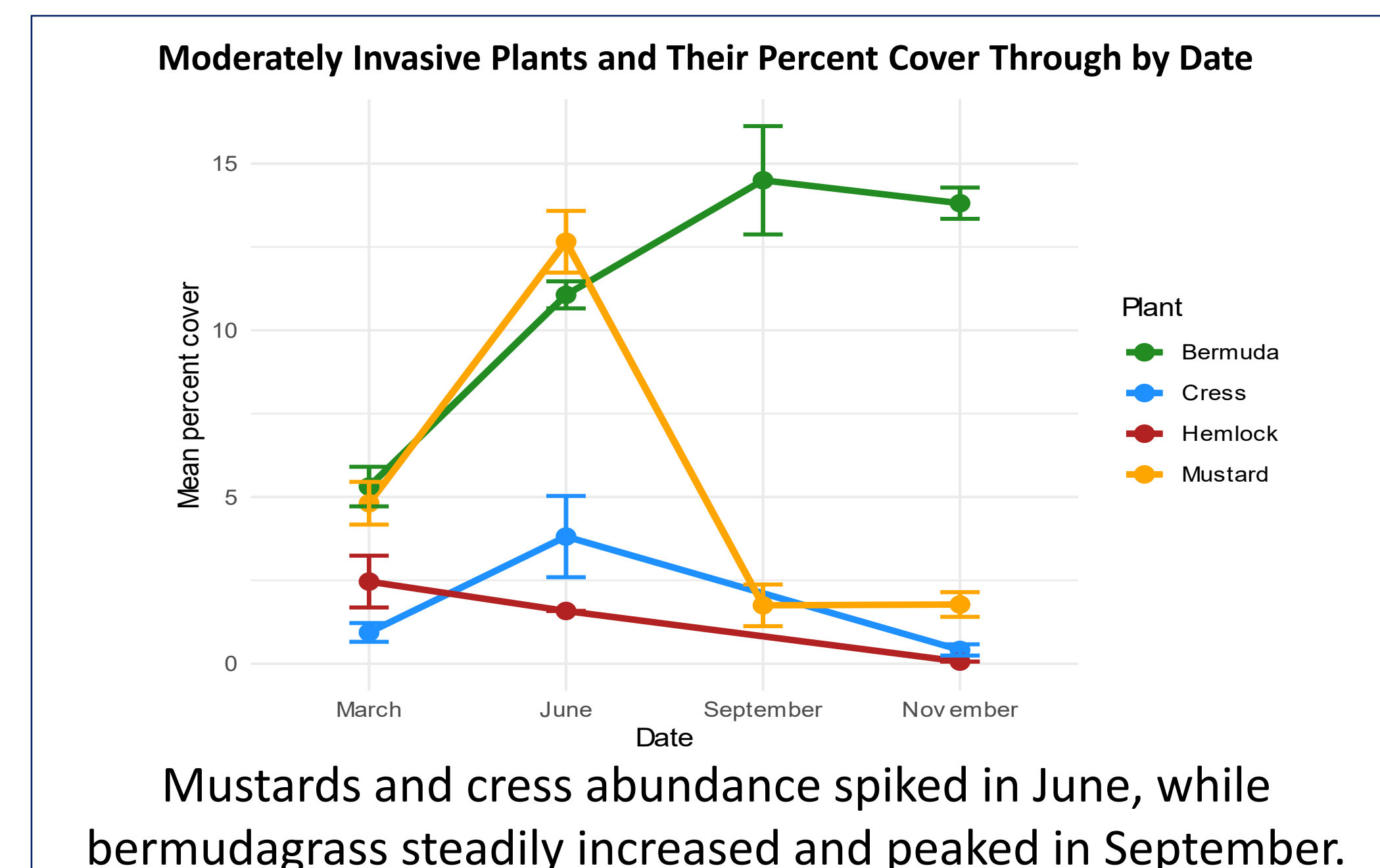
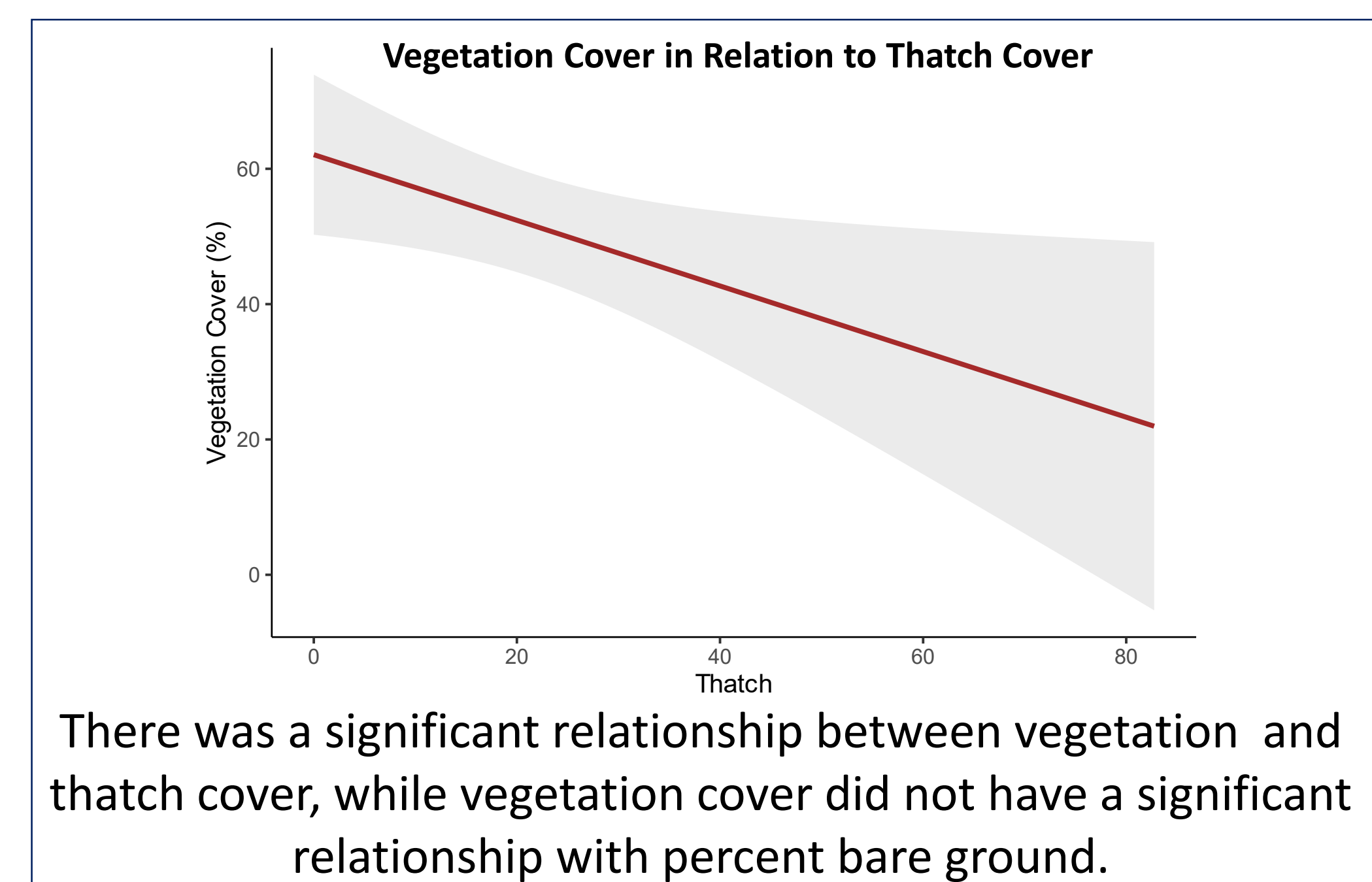
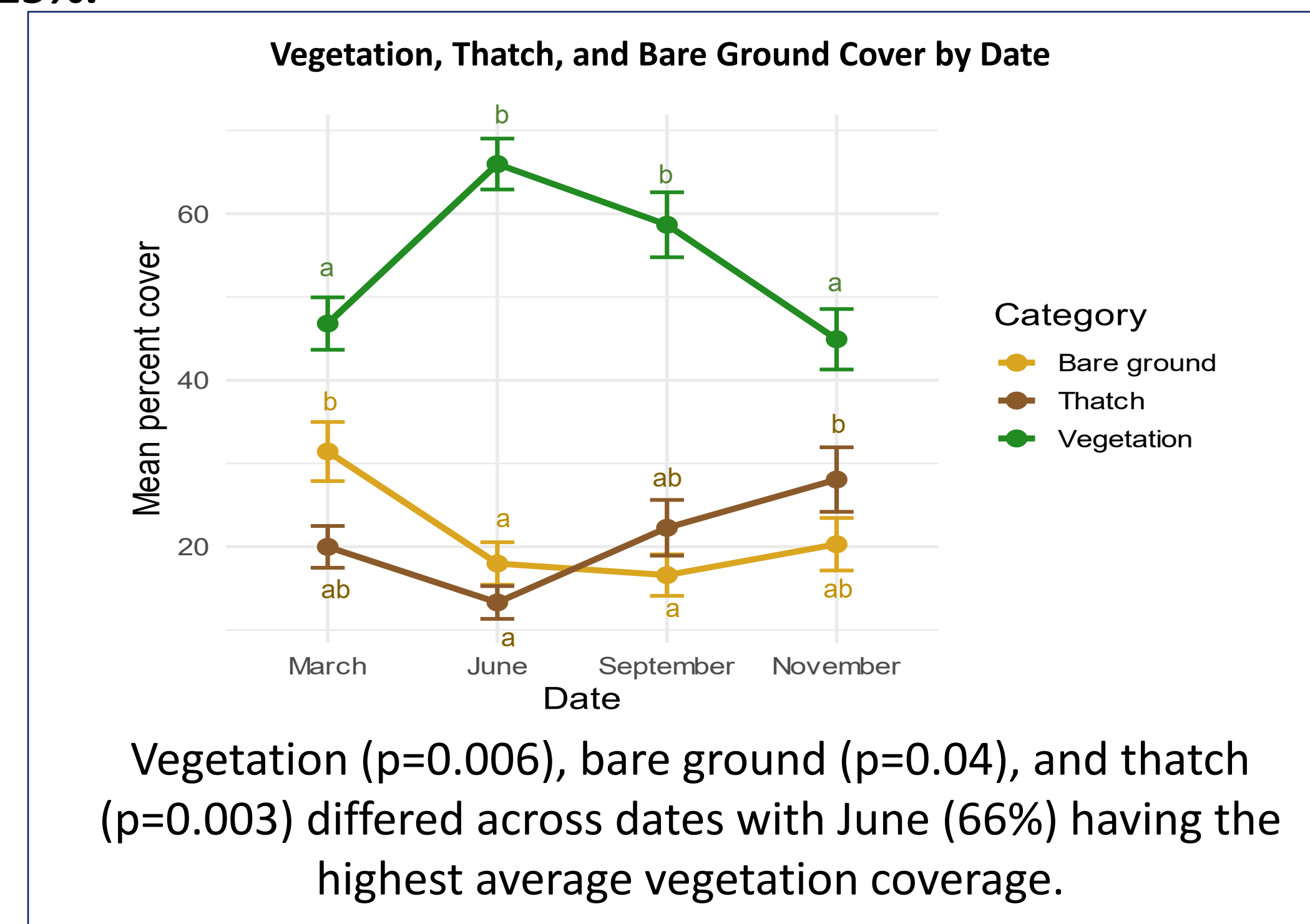
Arthropod Sampling

- Collected **five 15-second vacuum samples per plant species for 2-3 dominant plant species** per site
- Samples were **frozen, cleaned, sorted, and identified** to the lowest possible taxonomic level.

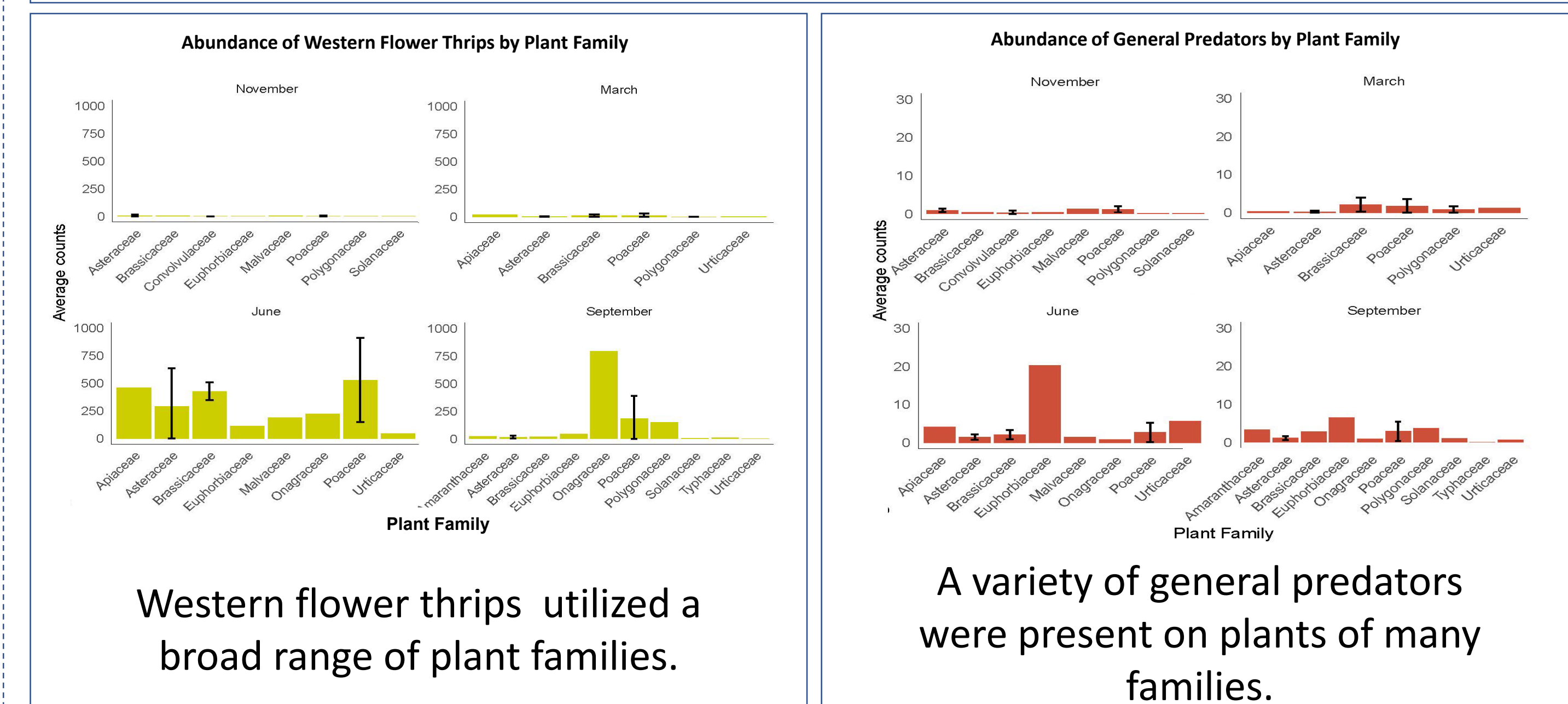
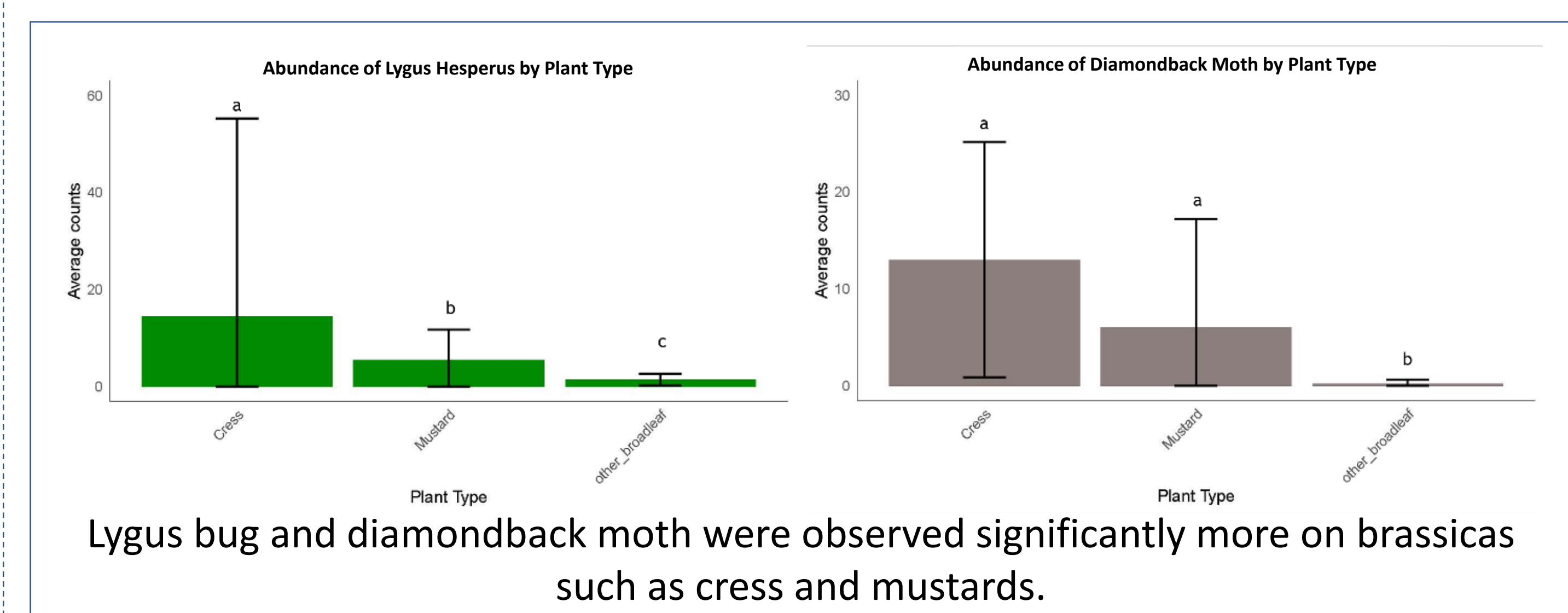


Results

Surveys revealed **higher non-native species counts** than native species counts in every season, with March peaking at **94% non-natives** while September had the **highest native percentage at 25%.**



Results



Discussion



Same ditch a few months apart. Top: March, bottom: June.

- Increased vegetation cover in June coincided with greater pest and general predator abundance, indicating a relationship between arthropod abundance, plant resources, and temperature.
- Seasonal variation in vegetation cover and thatch may have been influenced by the timing of the ditch vegetation management by growers.
- Selective vegetation management in ditches during March and June may reduce the spread of invasive plants into agricultural fields and natural habitats and the abundance of insect pests that use them.
- Effective ditch vegetation management can enhance predator and parasitoid (data not shown) diversity and pest control, but further research is needed to guide plant selection that maximizes benefits and minimizes disservices.

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