

Native bees exhibit species- and ecosystem-specific changes in abundance with aridity

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Introduction

- o Despite widespread concern about pollinator declines, evidence of climate change effects on bees is scarce.
- o Short-term extreme drought can differentially influence desert bee species, but no prior work has examined long-term patterns.
- o Nonlinear responses to climate have been documented in some insects but not yet considered for bees, and may have important consequences for pollination of plants and community-wide responses to climate change.

Questions

- 1) How does native bee abundance vary with aridity?
- 2) Do bee abundance relationships with aridity differ among three ecosystem types?
- 3) Are bee abundances better predicted by present or past year's aridity?

Methods

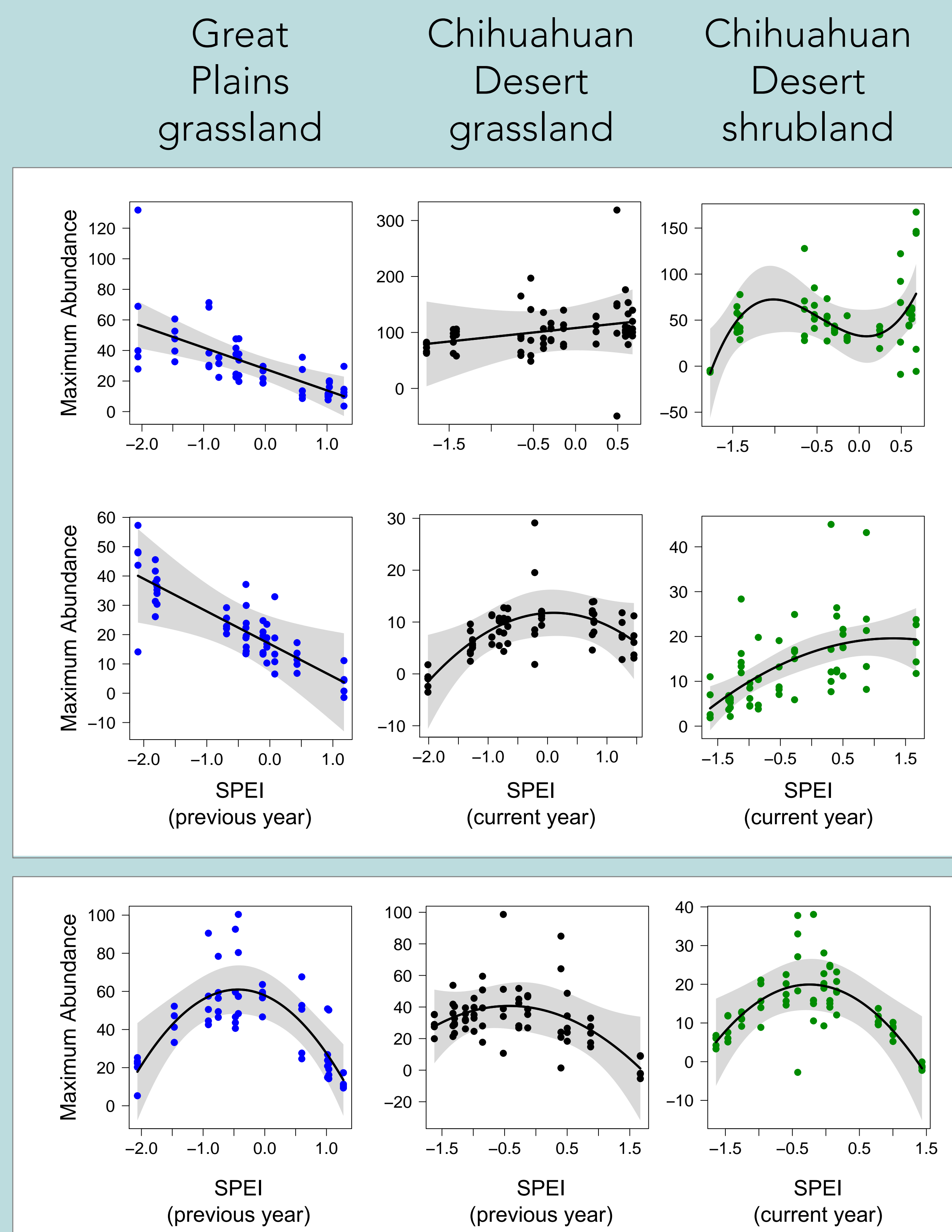
- o Bees were sampled at the Sevilleta National Wildlife Refuge (NM, USA) using Buchmann funnel traps.
 - o 3 sampling sites: Great Plains grassland, Chihuahuan Desert grassland, and Chihuahuan Desert shrubland (5 transects/site, 2 bee traps/transect)
 - o Sampling occurred 2 weeks/month, March-October, 2002-2014.
- o Climate data were acquired from two adjacent meteorological stations.
 - o Standardized Precipitation Evapotranspiration Index (SPEI) was calculated as a measure of aridity.



Results

Bee abundance relationships with aridity:

- o Differed among bee species and ecosystem types.
- o Ranged from linear (positive and negative) to quadratic and cubic.
- o Were predicted by both past and present year's aridity.



Lasioglossum semicaeruleum



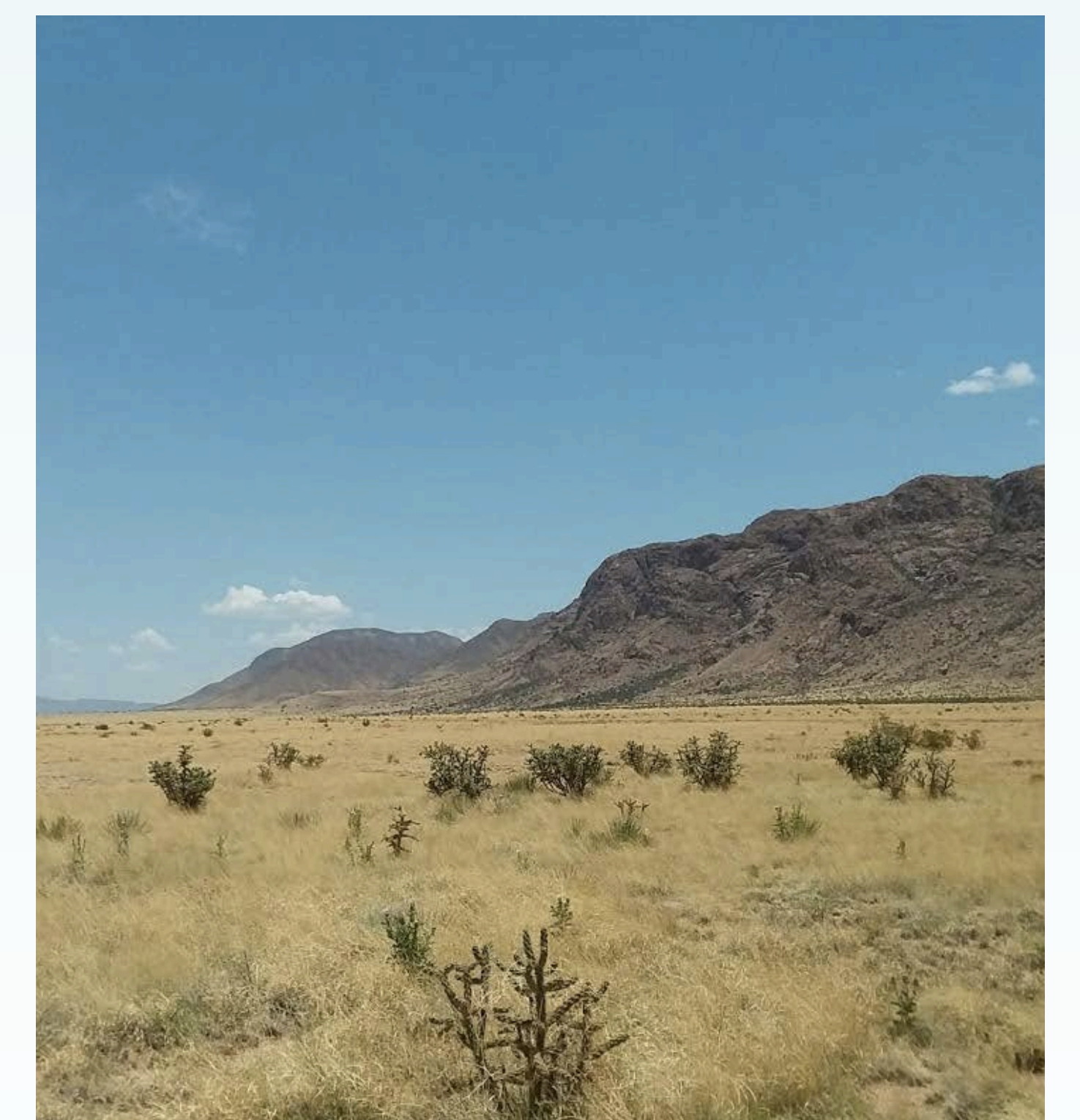
Diadasia rinconis



Agapostemon angelicus

Conclusions

- o Understanding climate effects on bees requires attention to bee species identity, habitat (ecosystem type), past and present climate conditions, and possible nonlinear relationships.
- o Bee species may be differentially affected by changes in climate mean and variance.



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