

Introduction:

Bee local: A comparison of productivity and pathogen load
in local vs. Claifornia re-queened colonies

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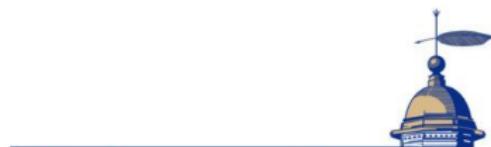
Acknowledgments

Co-Authors:

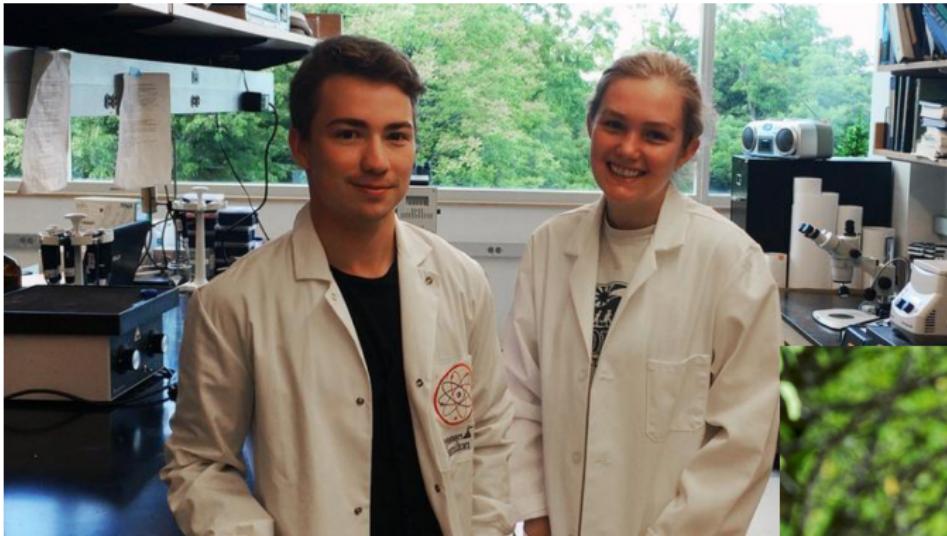
- ▶ Andre Burnham
- ▶ Fiona McLaughlin
- ▶ Dr. Herman Lehman

Thank you to:

- ▶ The Casstevens Family
- ▶ Nancy Thompson
- ▶ Samantha Alger



The Bee Team

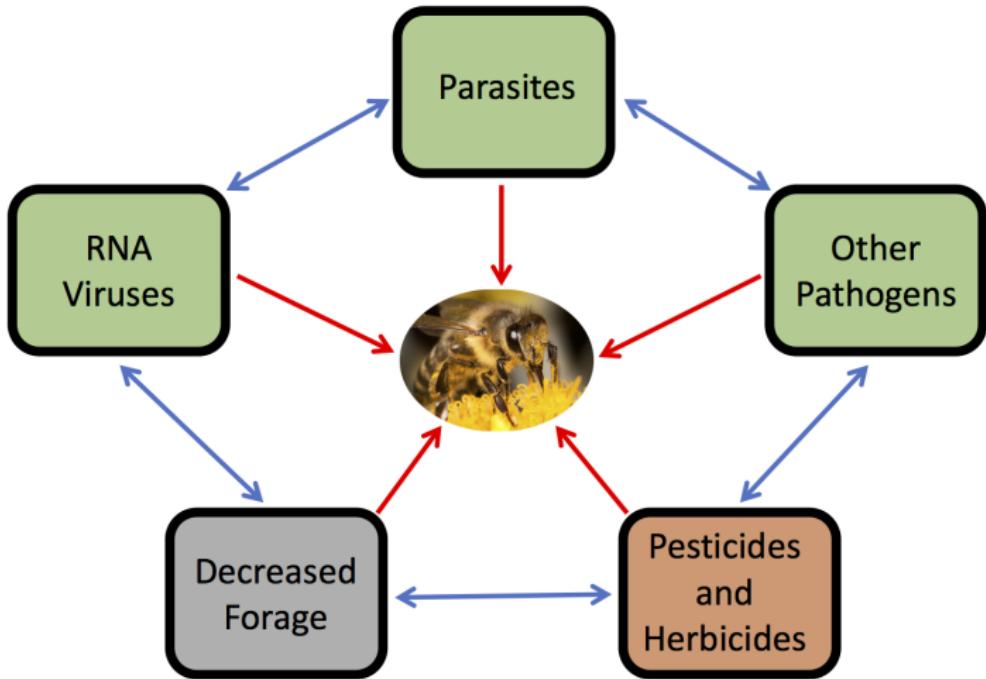


Honey Bees are Important

- ▶ 30% of the world's food is derived from pollination (Aizen et al., 2009)
- ▶ Pollinators are responsible for between \$235-577 billion (Gallai et al., 2009)
- ▶ Honeybees are responsible for \$14 Billion in the USA (Morse & Calderone, 2000)



Threats to Bees:



Honey Bee Pathogens

VIRUSES:

- ▶ Deformed Wing
- ▶ Black Queen Cell
- ▶ Israeli Acute Paralysis



Deformed wing Virus
University of Florida,
Entomology Dept.

PARASITES:

- ▶ Nosema (ceranae/apis)
- ▶ Varroa Mite



Varroa destructor
North Carolina State University,
Cooperative Extension



American Foulbrood
Bee Informed Partnership

Troubles for Beekeepers (re-queening)



The basic premises behind this study

- ▶ Imported VS Local
- ▶ Local Adapation



The basic premises behind this study

- ▶ Mass-Produced VS Handmade
- ▶ Selection by the Breeder



The question:

“Are locally-bred queens more successful than imported queens?”

Experimental Design

- ▶ 20 colonies re-queened with Californian-bred queens
- ▶ 20 colonies re-queened local-bred (Vermont) queens
- ▶ 2 sites, 10 Local and 10 California for each
- ▶ Sampled for pathogens and productivity measures
- ▶ Sampled at different time points for 3 months

Pictures of the Yards



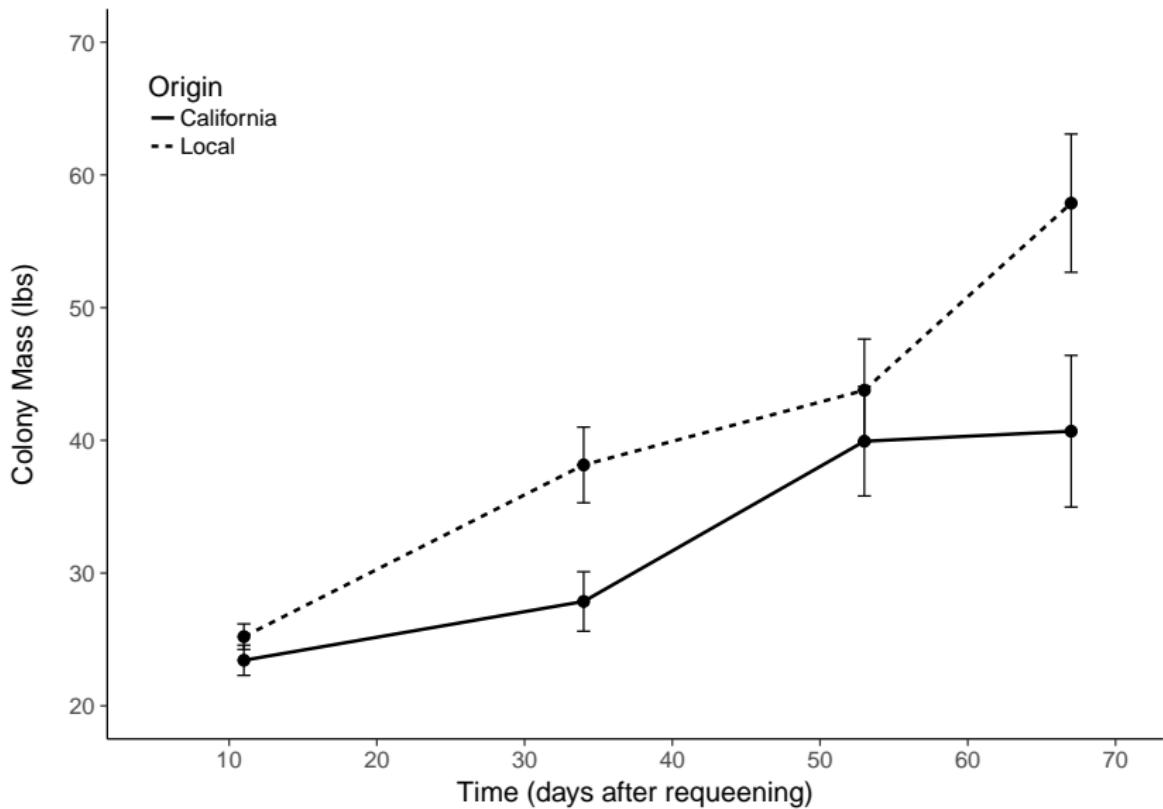
What we sampled

- ▶ Growth:
 - ▶ Colony Mass
 - ▶ Brood Production
- ▶ Foraging:
 - ▶ Pollen Production
- ▶ Pathogens:
 - ▶ Varroa
 - ▶ Nosema spp.
 - ▶ RNA Viruses

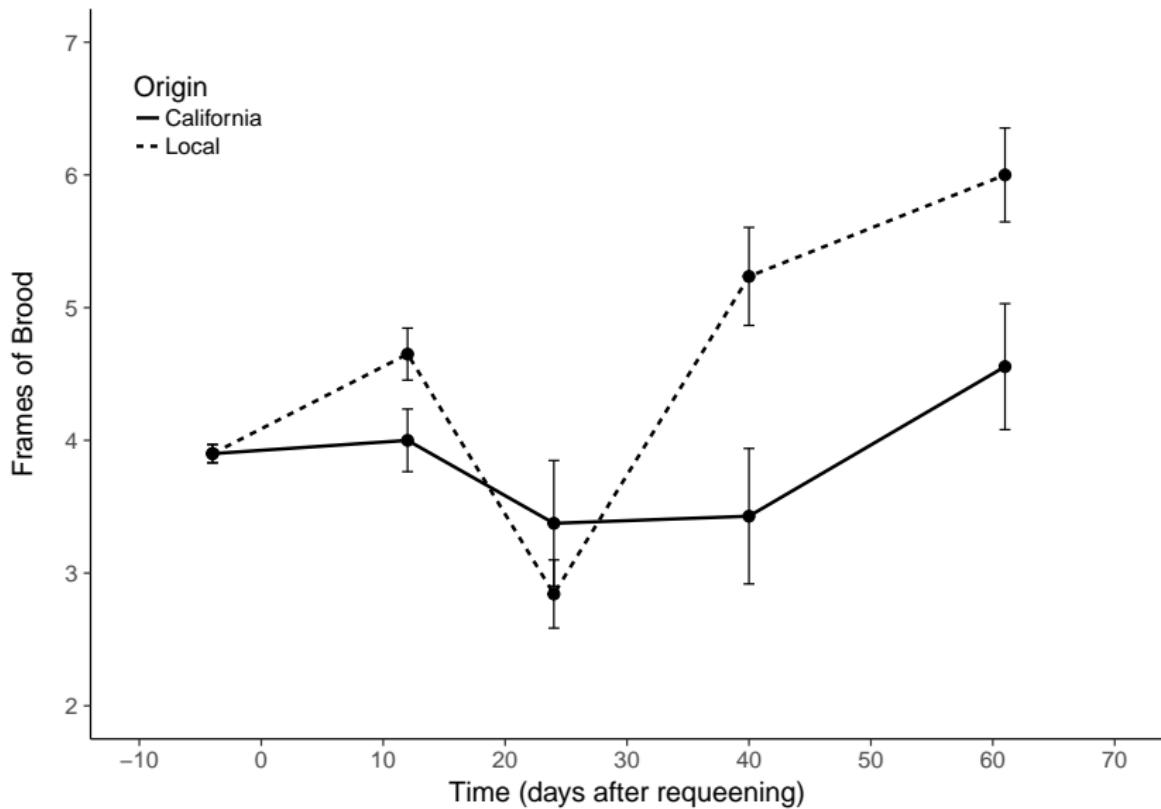
Our Predictions

- ▶ Local queens (colonies) will have higher growth through the season
- ▶ Local queens will be better foragers
- ▶ Local queens (colonies) will have lower pathogen loads

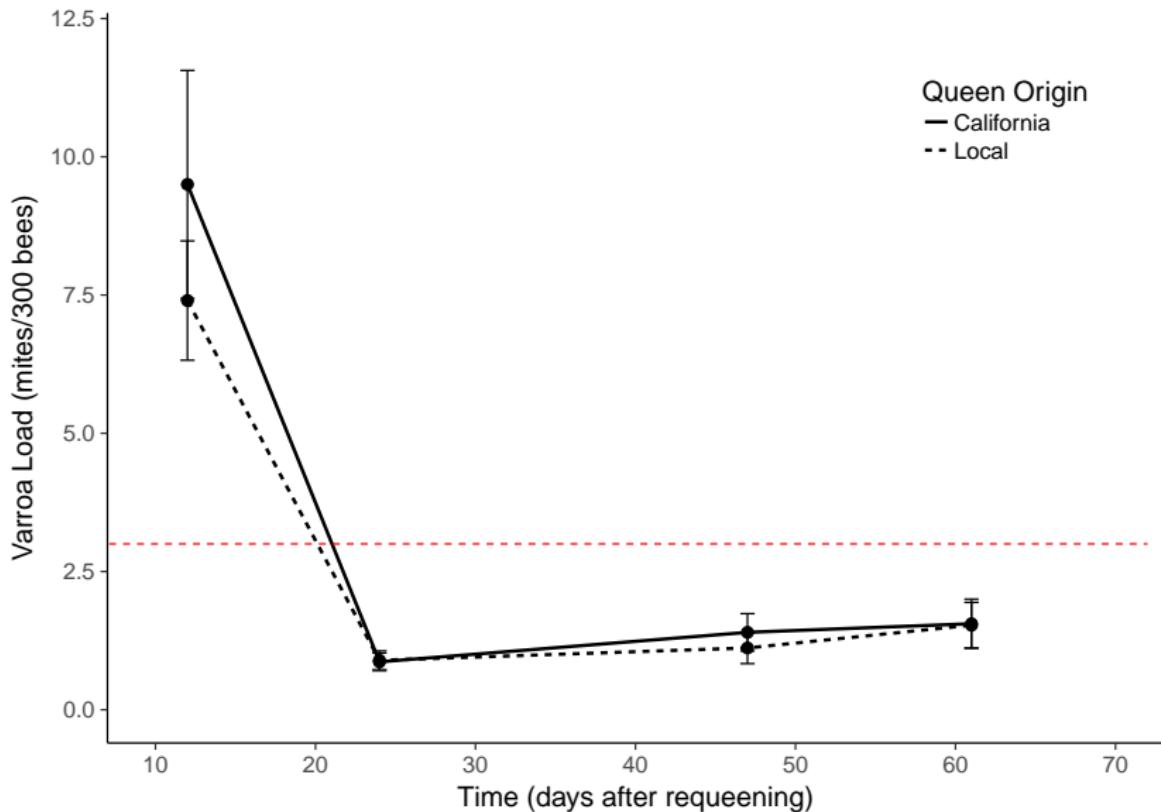
Colony Mass (growth)



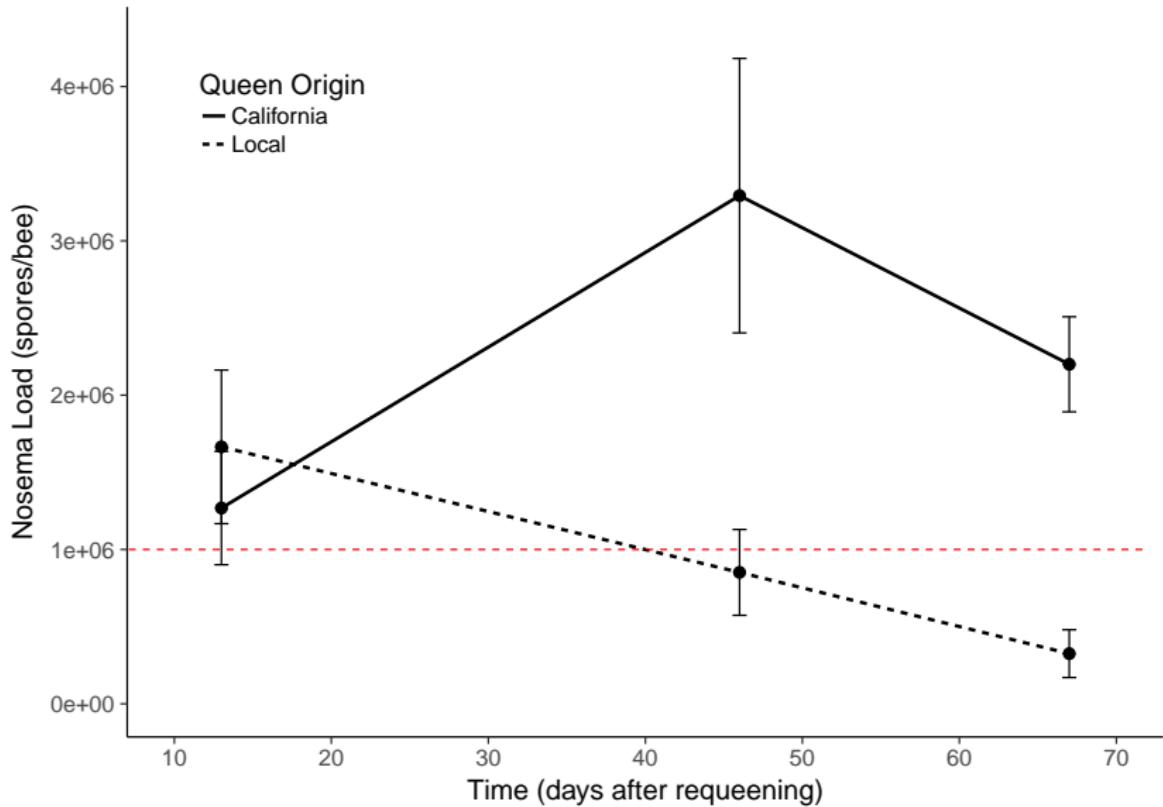
Frames of Brood (growth)



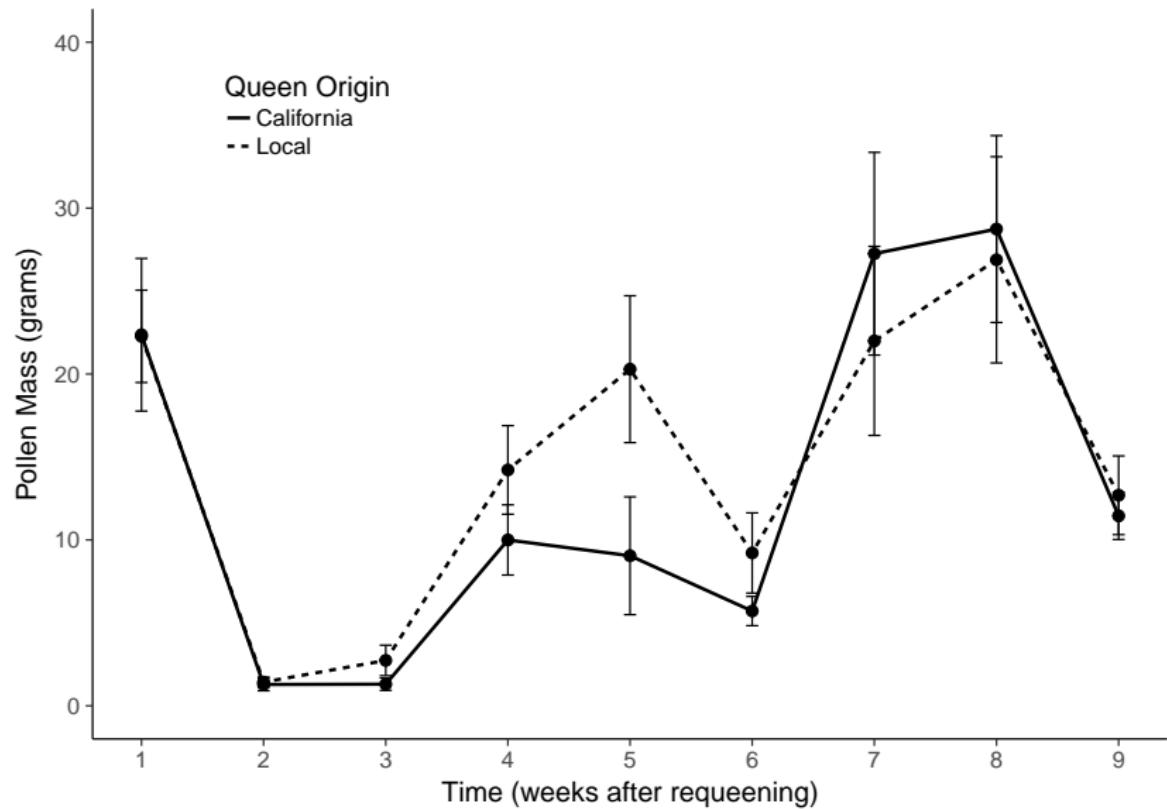
Pollen Collection (foraging)



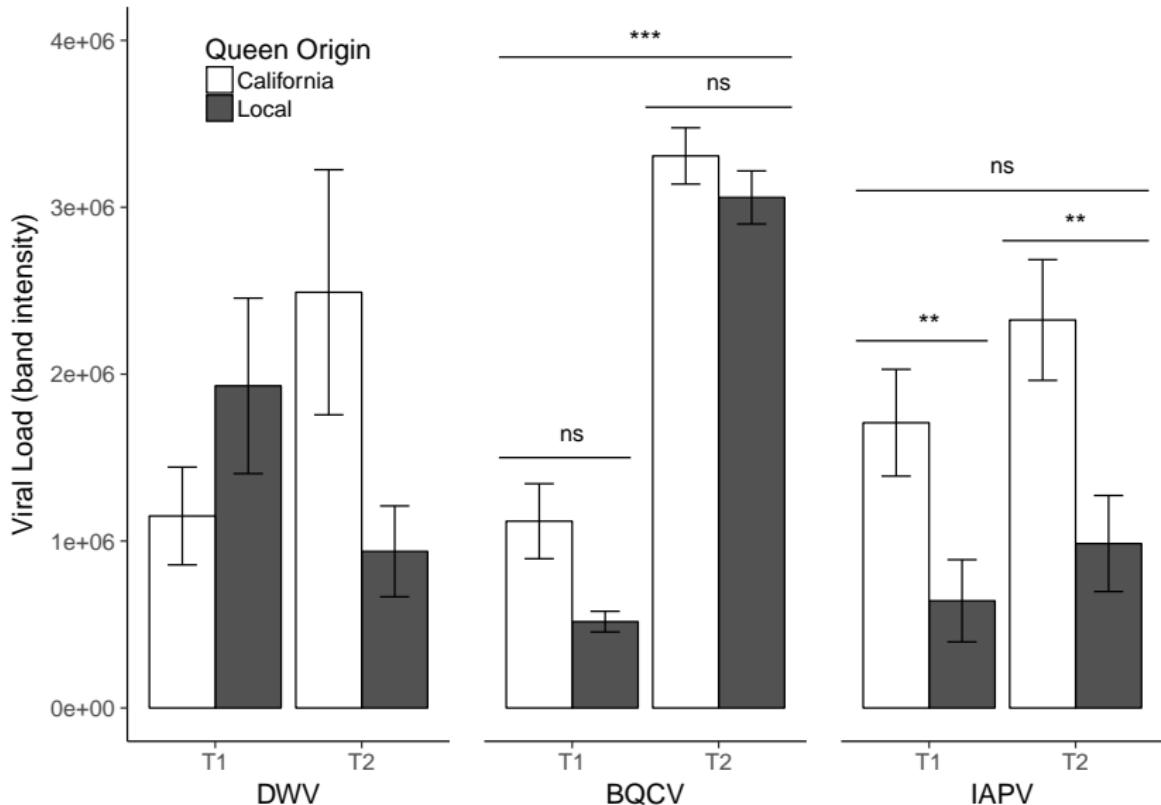
Varroa Load (pathogens)



Nosema Load (pathogens)



Viral Load (pathogens)



In Summary

- ▶ Colony Mass = **Higher in Local**
- ▶ Amount of Brood = **Higher in Local**
- ▶ Pollen Collection = **No Difference**
- ▶ Varroa Load = **No Difference**
- ▶ Nosema Load = **Lower in Local**
- ▶ RNA Viruses = **Mixed Results**

In Summary

- ▶ Overall, colonies re-queened with locally raised queens had higher growth
- ▶ Pollen collection did not seem to be involved in this growth
- ▶ Some pathogens seemed to have less of an effect on local honeybees and others had similar effects across both groups

Implications

- ▶ Locally-raised queens outperform mass-produced, California queens in their northern environment.
- ▶ This could be evidence for the importance of care in breeding stocks (mass produced vs handmade)
- ▶ **And/Or** This could be evidence for local (genetic) adaptation (imported vs. local)

Thank you!



Questions?

