

Management of Lebbeck mealybug in citrus using biopesticides

Lauren M. Diepenbrock, David O. Olabiyi, and Pasco B. Avery



Citrus Show 2021

Lebbeck/Hibiscus mealybug

- Serious pest around the world in citrus growing regions
- Impacts on citrus production:
 - damage to fruit, leaves, and stems
 - fruit drop
 - death of young trees



Photo Credit: T.R. Weeks, UF/IFAS CREC

Common Names

- Many common names throughout the world
 - Spherical Mealybug
 - Coffee Mealybug
 - Cotton Mealybug
 - Globular Mealybug
 - Lebbeck Mealybug
 - Bolle wolluis
 - Hibiscus Mealybug
 - Karoo Thorn Mealybug
- Scientific name: *Nipaecoccus viridis* (Newstead)



Global Distribution

- Middle East
- Mediterranean
- Southern African regions
- Mexico
- United States
 - Florida
 - Hawaii

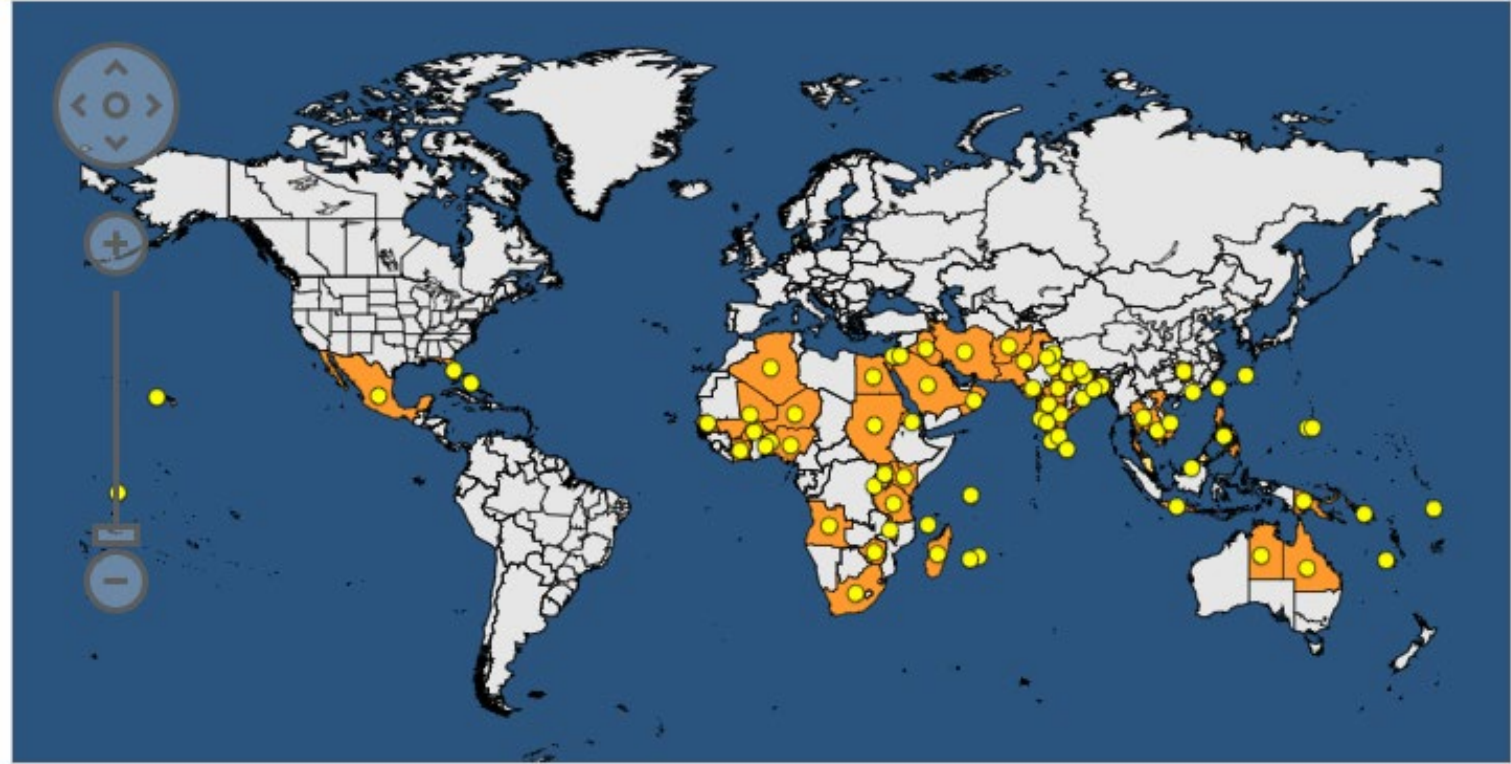
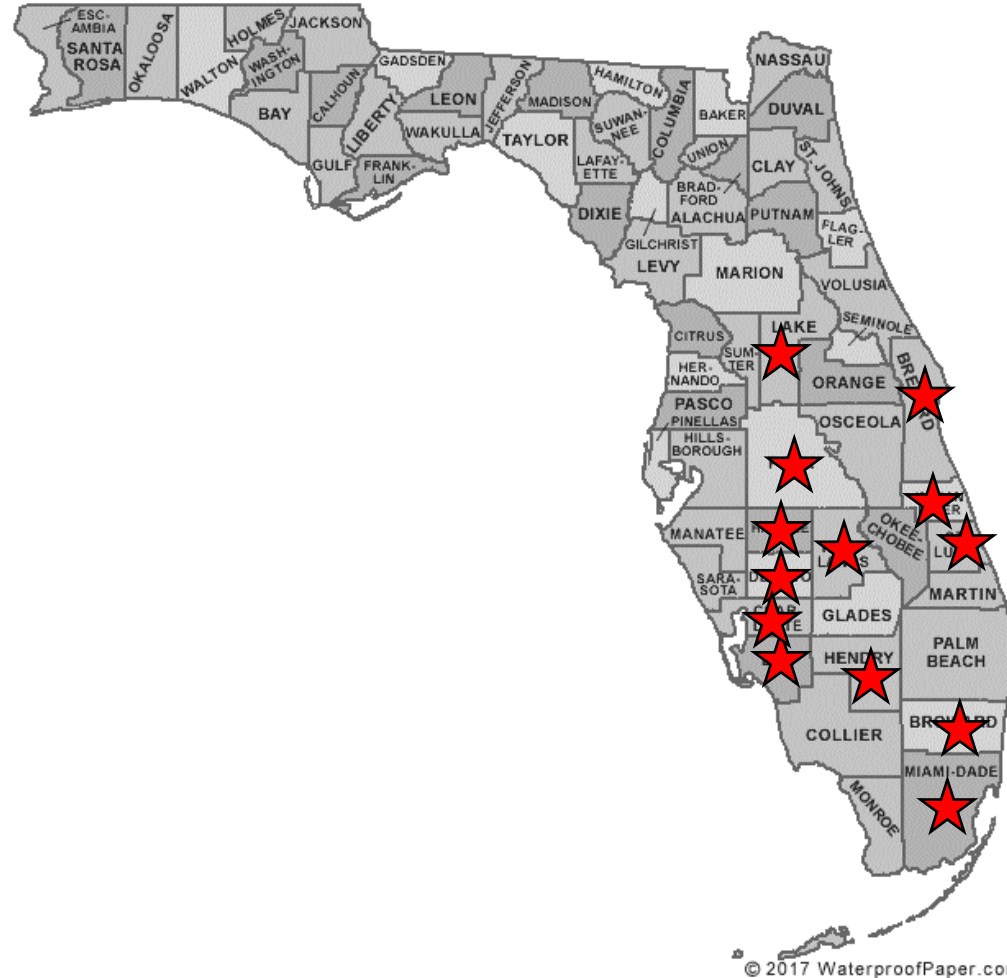


Image Credit: <https://gd.eppo.int/taxon/NIPAVI/distribution>

Distribution in Florida

- Commercial (12 counties)
 - Highlands
 - Hendry
 - DeSoto
 - Hardee
 - Lee
 - Brevard
 - Indian River
 - Polk
 - Miami Dade
 - Charlotte
 - Lake
 - St. Lucie
- Residential (2 counties)
 - Broward
 - Polk



Found on in FL

- Has many host plants such as fruit trees and ornamental plants
- Hosts* Lebbeck mealybug has been collected on in Florida:
 - Citrus
 - Jackfruit
 - Pagoda flower
 - Cannonball tree
 - Tamarind
 - Tabog
 - Star jasmine
 - Laurel fig
 - Cape jasmine
 - Bottle palm
 - Jatropha tree
 - Oleander
 - Brush cherry
 - Succulent sesame
 - Leechee
 - Night-flowering jasmine
 - False 'ohe
 - Common purslane
 - Elephant bush
 - China doll
 - Dwarf umbrella tree
 - Gardenia
 - Other?



Fruit damage

- Fruit damage
 - Damaged fruit will not be marketable for fresh market
 - Quality of juice is okay if fruit make it to harvest



Leaf and stem damage

- Leaves exhibit physical feeding damage
- Excessive sooty mold build up
- May stunt growth on young trees



Damage to overall crop

- Can kill young trees
- Fruit drop
 - Can cause 50% or more crop loss (older literature in other countries)
 - The amount of fruit drop will depend on infestation levels



New growing environments- IPCs

- Individual Protective Covers (IPCs)= exclusion bags for preventing psyllid access, protecting young trees from citrus greening
- BUT IPCs also exclude predators and make a GREAT environment for tiny pests to establish
- How do they get in?
 - Ants
 - Crawlers may be dispersed by wind, on tools
 - Reuse of bags from infested site



How to keep bagged trees clean

- Active area of research
- Insecticides
 - Questionable if sprays penetrate bag
 - Soil drenches as preventative (t.b.d.)
 - Soil drenches as clean up? Not very effective (grower tested)
 - Contact materials? Concern for worker safety
- Keep bottoms open?
 - May allow predators in
 - Challenge in windy areas

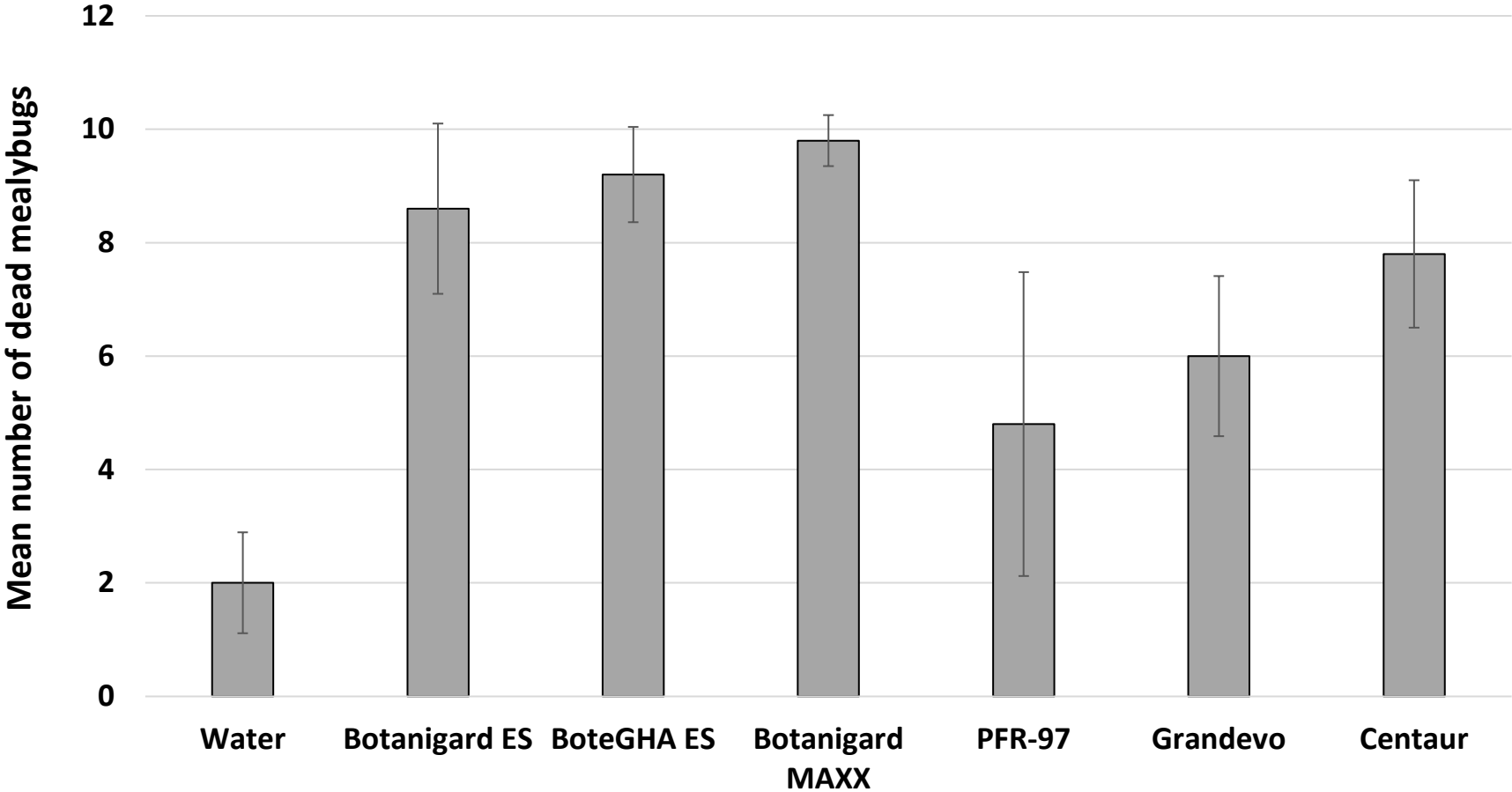


Could biopesticides work in IPCs?

- Tested 6 biopesticides in lab that are labelled for mealybug control in citrus
- Why?
 - EPFs do not last long under normal FL field conditions
 - But this isn't exactly normal for citrus...
 - Bags reduce UV, likelihood of wash off
 - Need an option that will last in IPCs
 - Duration of efficacy

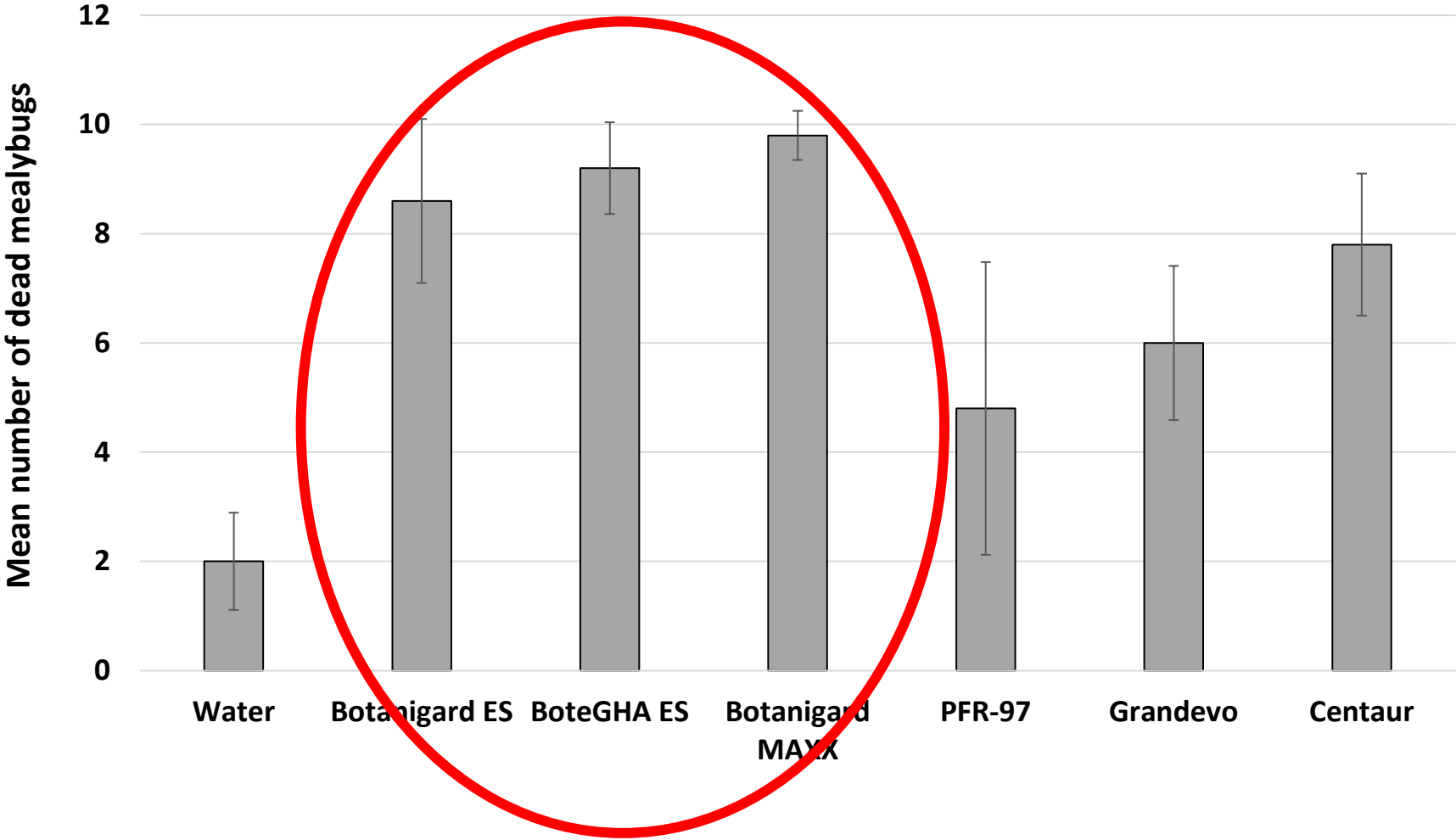


Mortality at 7 Days- EPFs, a Biological Insecticide, and an IGR



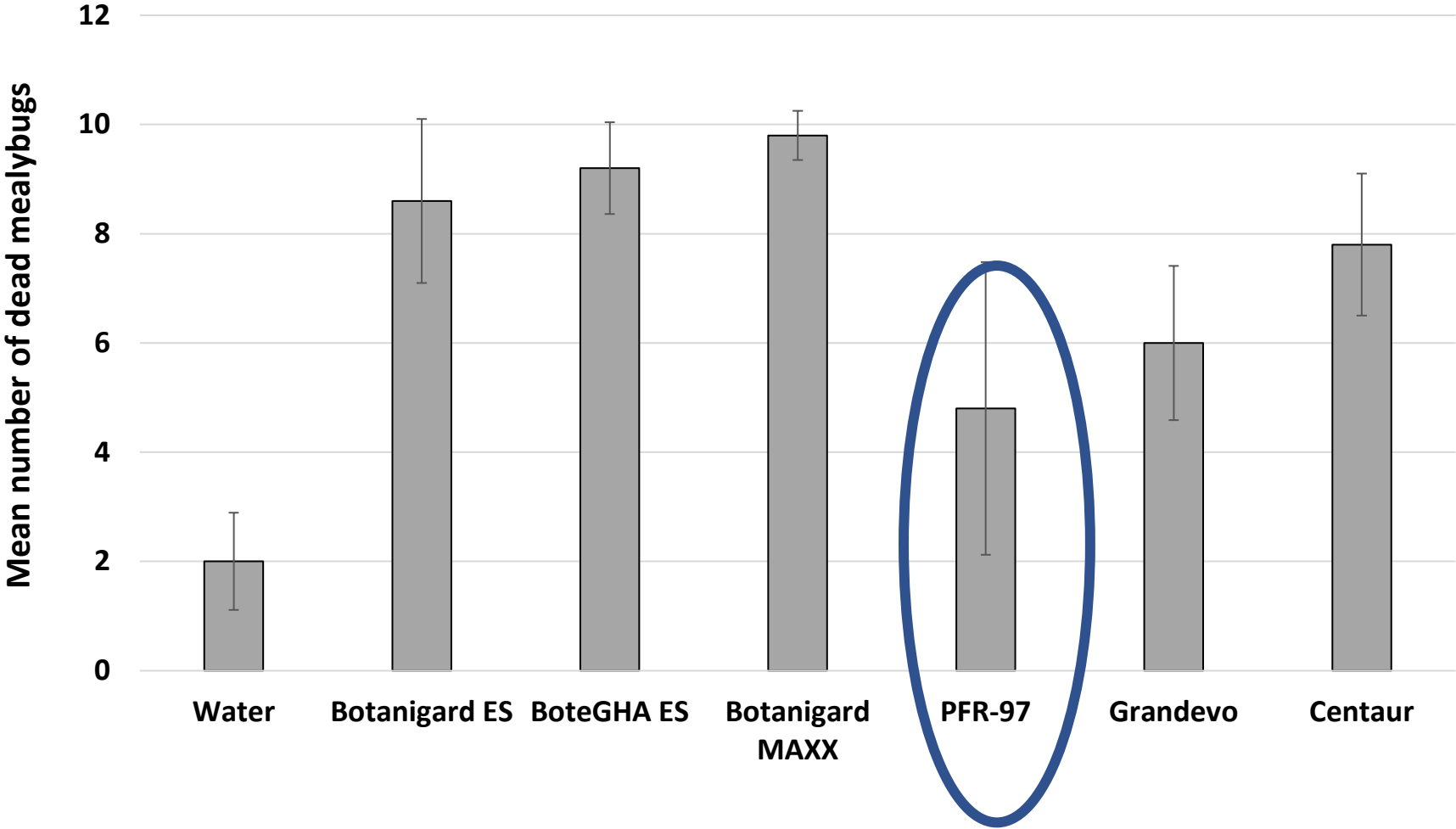
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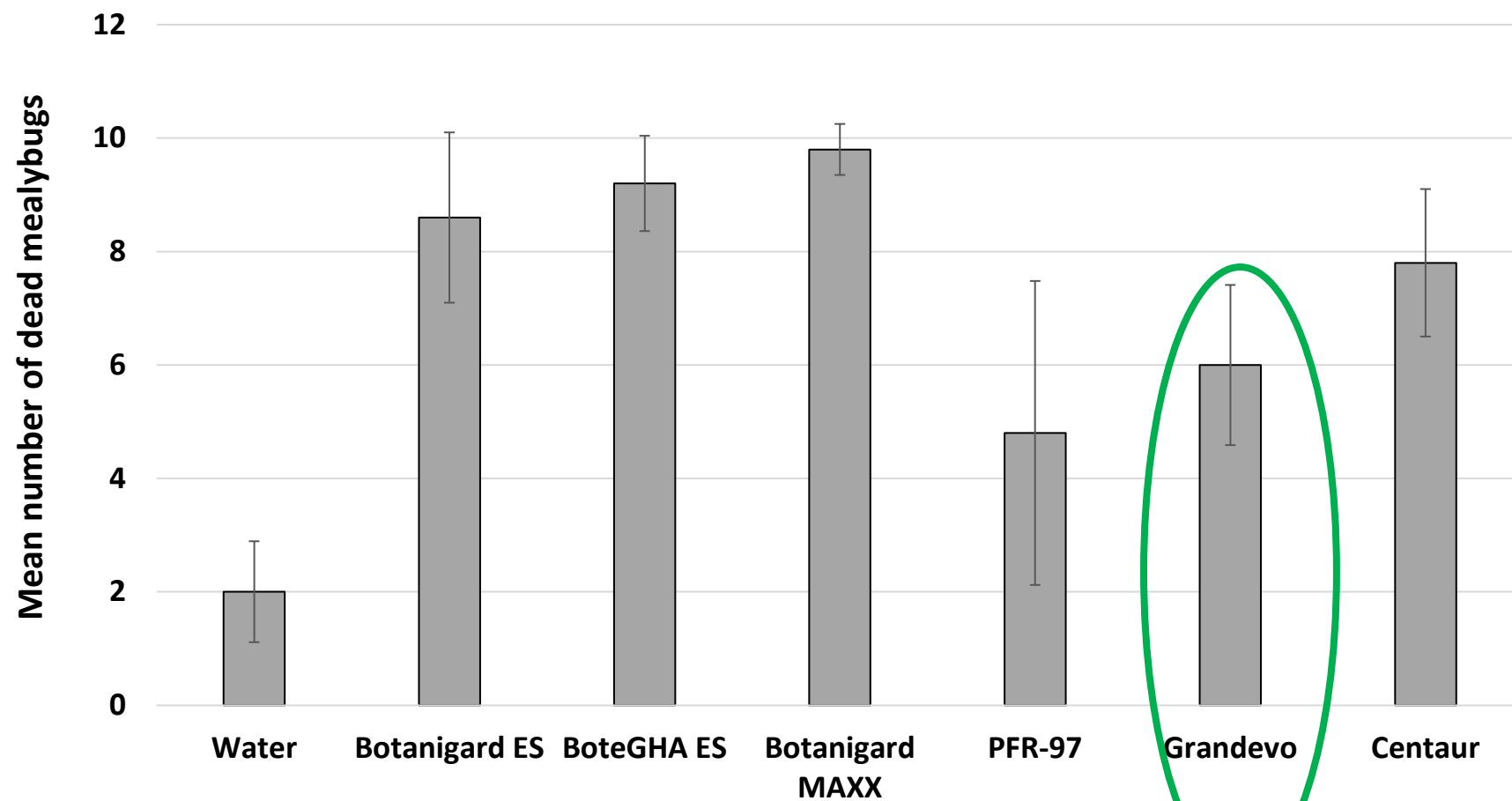
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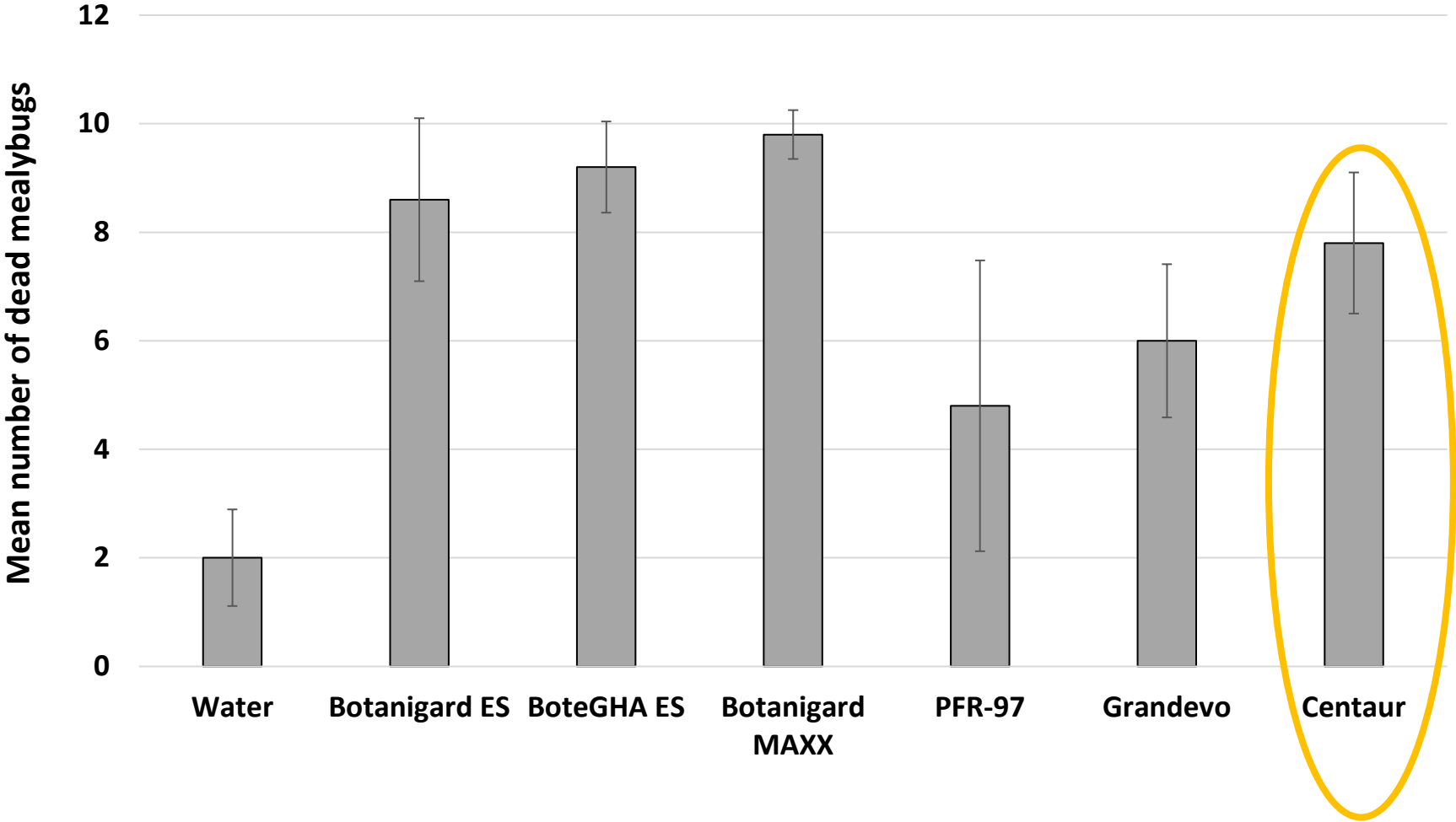
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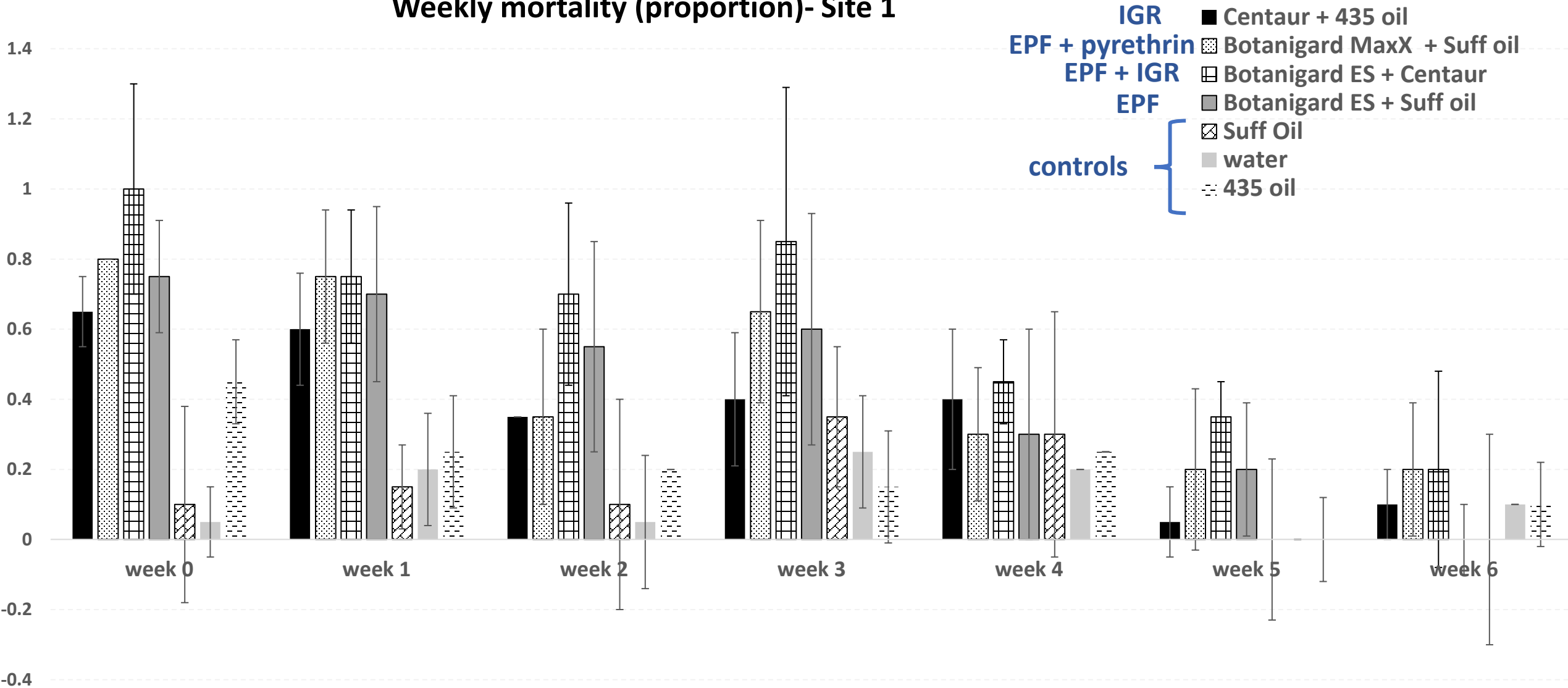
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That's great. Does it work in the field?

- Field tests performed in 2020 (Olabiyi)
- 3 sites, 4 replicates per site
- Tested options from lab that looked likely to work
- Treatments: Botanigard ES, Botanigard MAXX, Centaur
- 20 nymphs tested for mortality in lab weekly

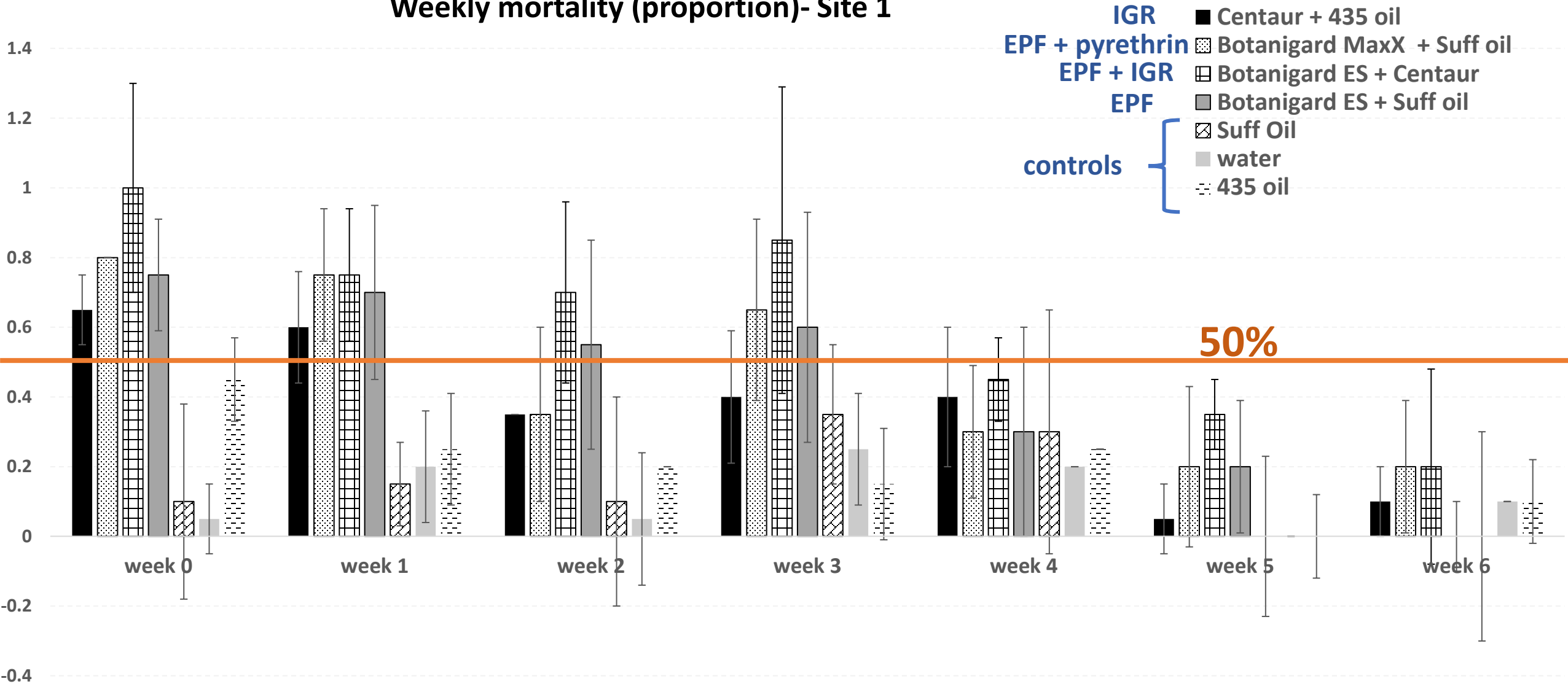


Weekly mortality (proportion)- Site 1



*Malathion efficacy under IPCs declines to 20% at 3 weeks

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Are EPFs a good option for control in IPCs?

- Maybe. The EPF + IGR combination looks promising
- Comparison with Malathion:
 - Malathion sprayed with **handgun** lasts a little over 2 weeks
- Cost of control is important
 - Labor for application
 - Cost of materials
 - Duration of potential control



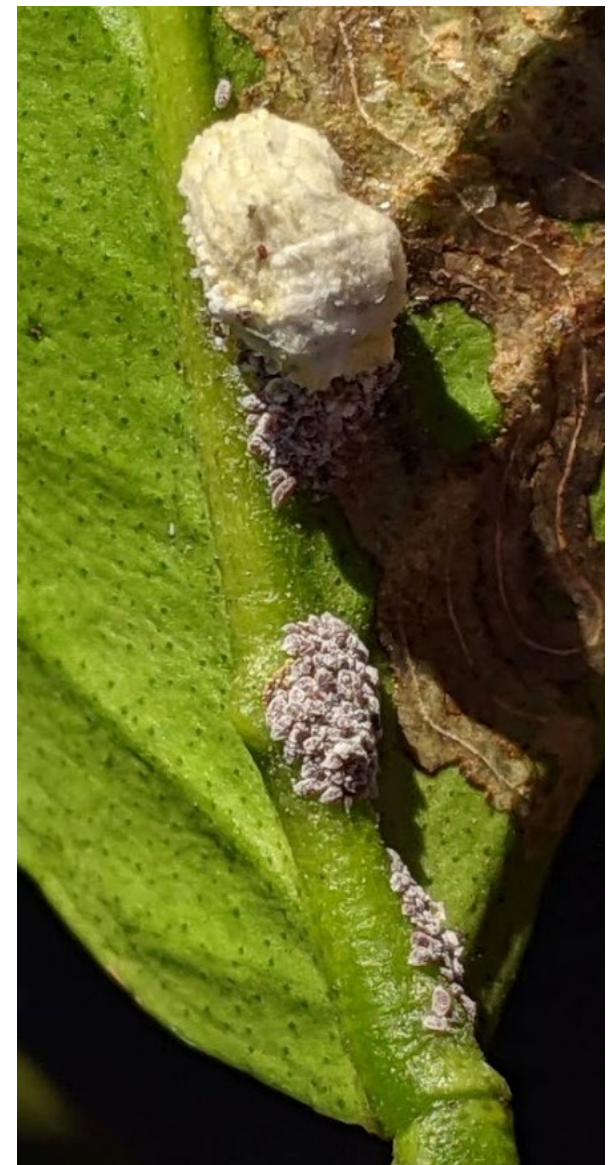
Why should we consider biopesticides vs conventional materials?

- Insecticides alone are unlikely to provide complete control
- Topical materials kill what they contact with minimal residual
- Systemic materials miss any life stages that do not feed
- Biopesticides are generally soft on predators, allowing them to establish
- If spores can persist for several weeks, they can be integral in reducing populations



When to consider using biopesticides:

- Preventing population build up (will require more knowledge of pest life cycle)
- organic production (EPFs)
- In protected areas
 - IPCs
 - greenhouses/screenhouses
- Biopesticides are generally not a clean up material



Acknowledgements

Lab Staff

Guoping Liu
Peaches Mariner
Harry Anderson
Lena Craft
David Olabiyi

Funding

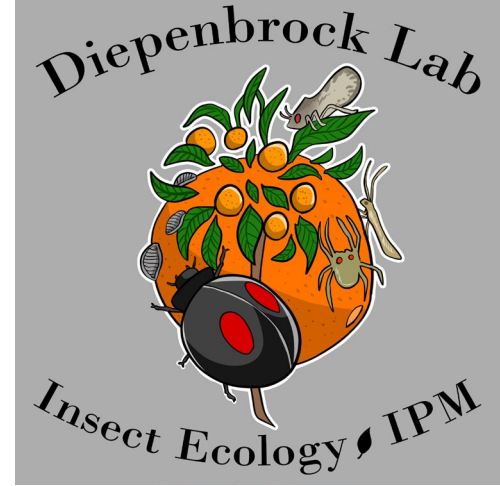
Citrus Research and Development
Foundation (CRDF)

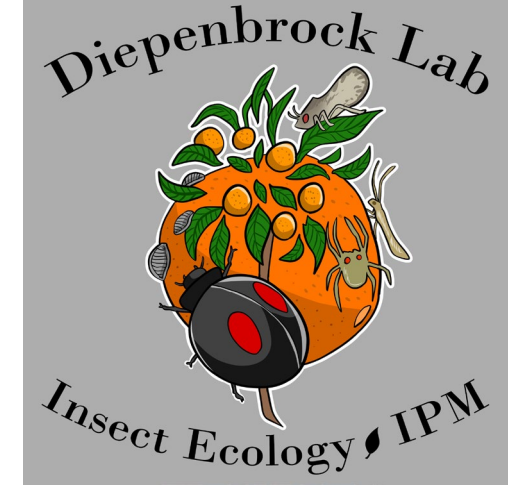
Industry

Certis, Bioworks, Nichino
Growers for use of fields

FDACS & UF collaborators

Zee Ahmed
Lukasz Stelinski
Lance Osborne
Jason Johnson





Contact information

Dr. Lauren Diepenbrock

ldiepenbrock@ufl.edu

863-956-8801

