




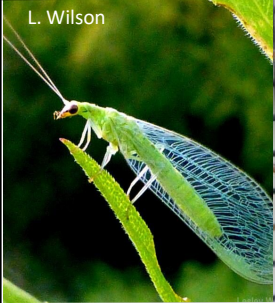



Improving Habitats for Citrus Grove Predators

Angela Chuang, UF/IFAS CREC

Diverse predators in citrus

	Minute pirate bugs	Predatory mites	Lady bugs	Hover flies	Long-legged flies	Lacewings	Spiders
Predator	<small>Biobloomed.ca</small> 	<small>anatisbioprotection.com/</small> 	<small>S. Justis</small> 	<small>K. Warner</small> 	<small>P. Choate</small> 	<small>L. Wilson</small> 	<small>A. Pelegrin</small> 
Egg	✓	✓		✓		✓	
Nymph			✓	✓		✓	✓
Adult			✓	✓	✓		✓



A diverse arthropod community has diverse needs





**More complex habitats can better
serve these diverse needs**



More complex habitats can better serve these diverse needs



We want to provide a buffet of choices



**Much of this boils down to increasing
plant and plant structural diversity**

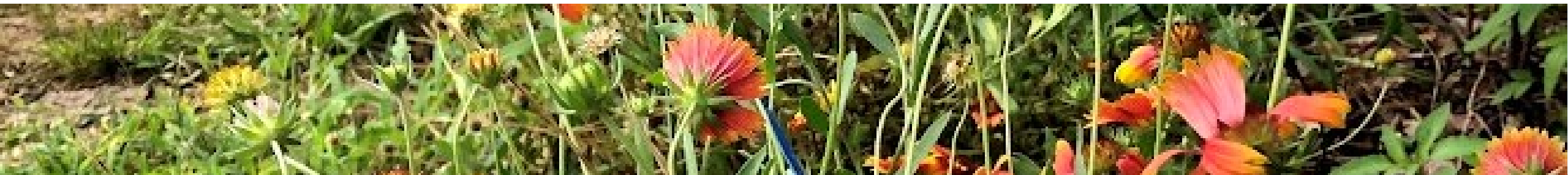


Important habitat factors



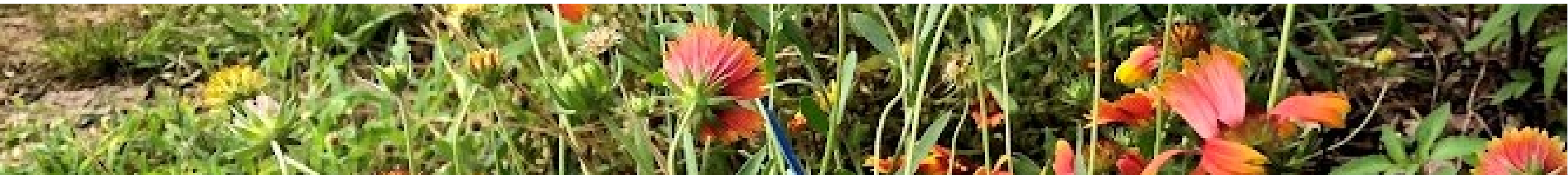
Important habitat factors

- Food resources
 - How much pollen/nectar is available?
 - When is it available?
 - Should attract predators to the grove prior to pest outbreaks
- Shelter/refuge
- Microclimate



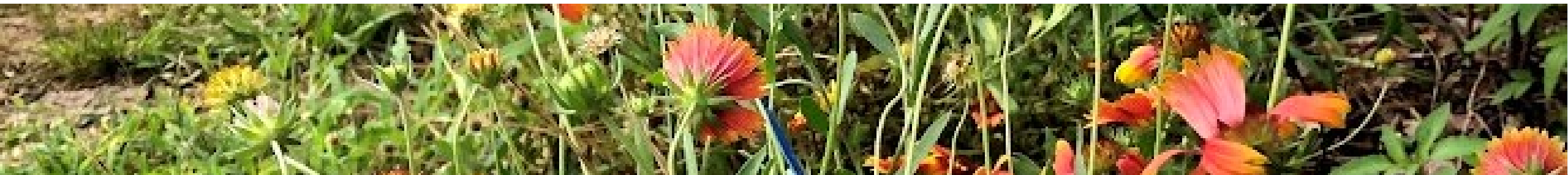
Important habitat factors

- Food resources
- Shelter/refuge
 - Weather
 - Pesticide sprays
 - Other predators
- Microclimate



Important habitat factors

- Food resources
- Shelter/refuge
- Microclimate
 - Shade
 - Proximity to water sources

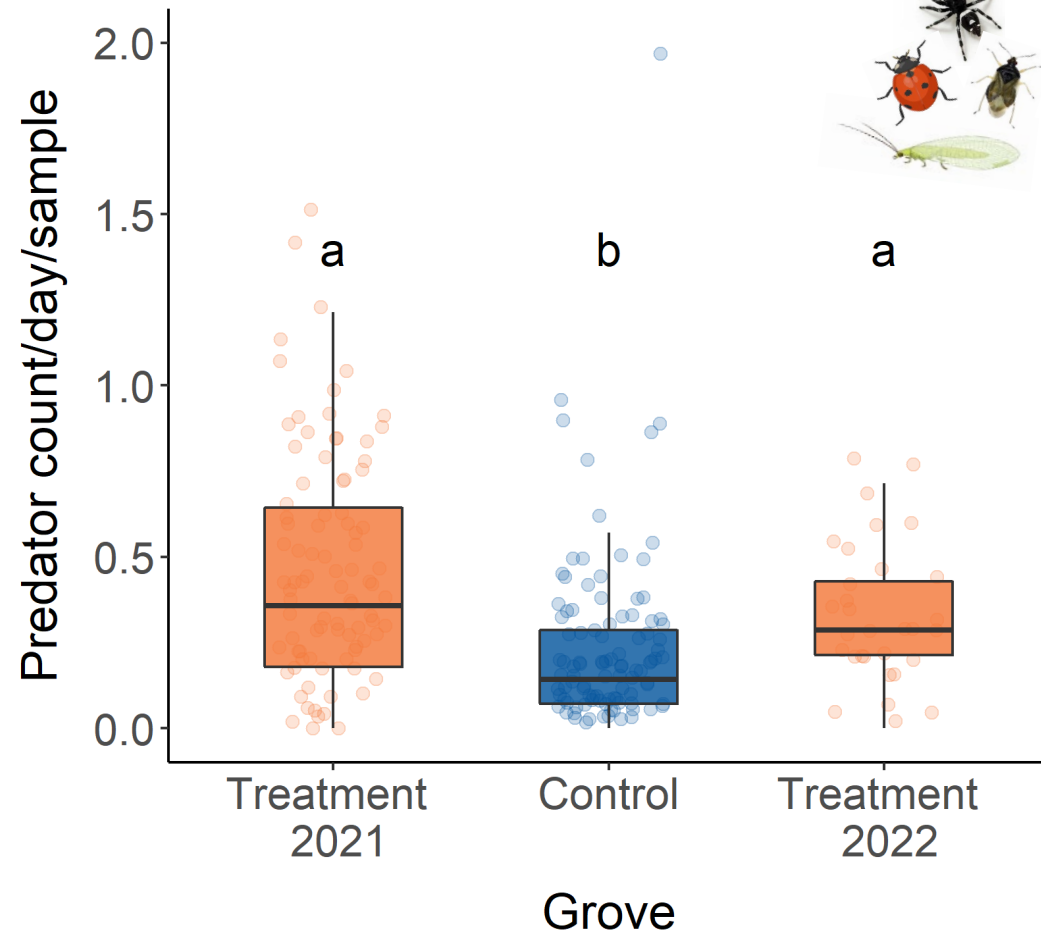




What have we found in Florida citrus groves?



Flower plantings support predator abundance and diversity



***Gallardia* sp., blanket flower
AKA brown-eyed Susan**

3 main predator groups identified



Spiders



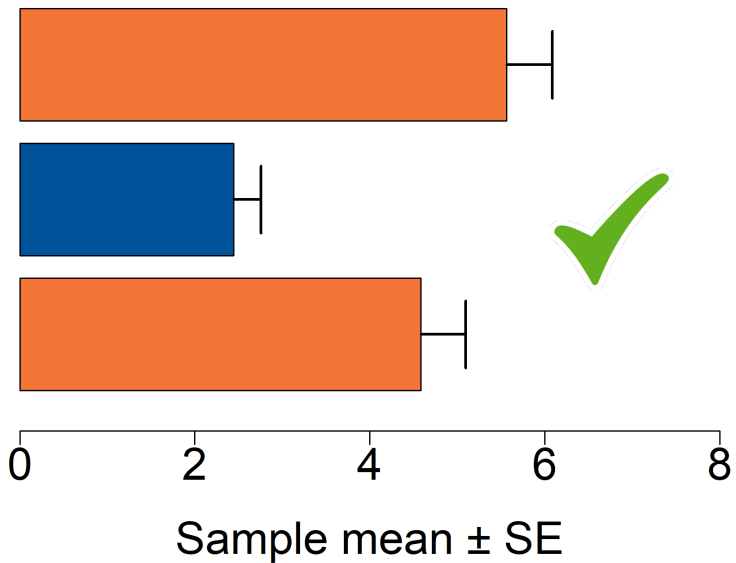
Minute Pirate Bugs



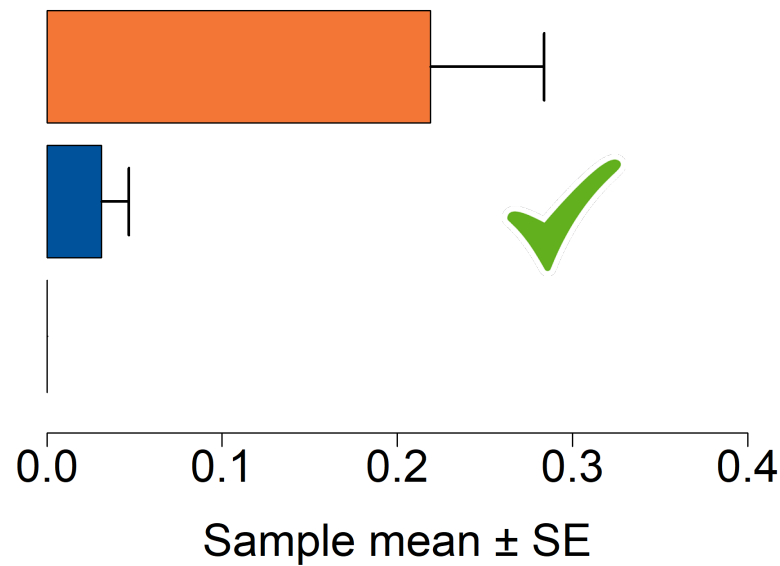
Lady bugs

3 main predator groups identified

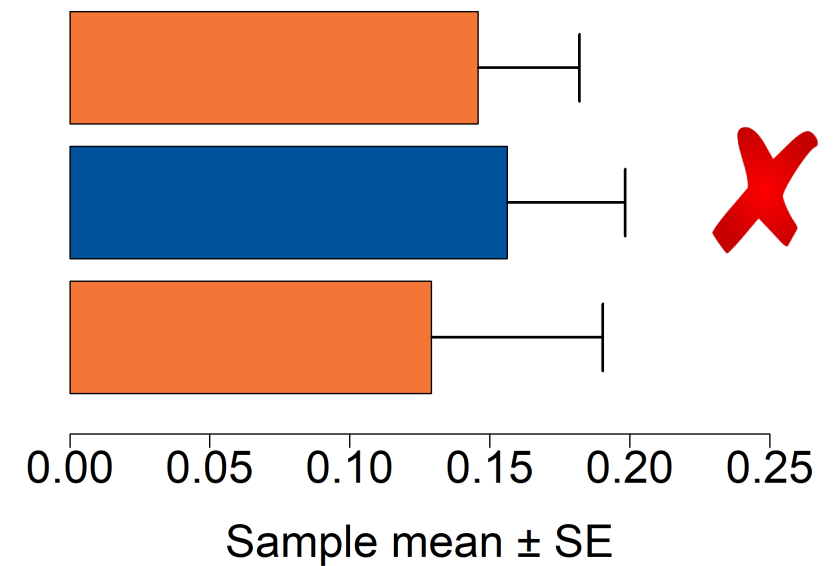
Spiders



Minute Pirate Bugs



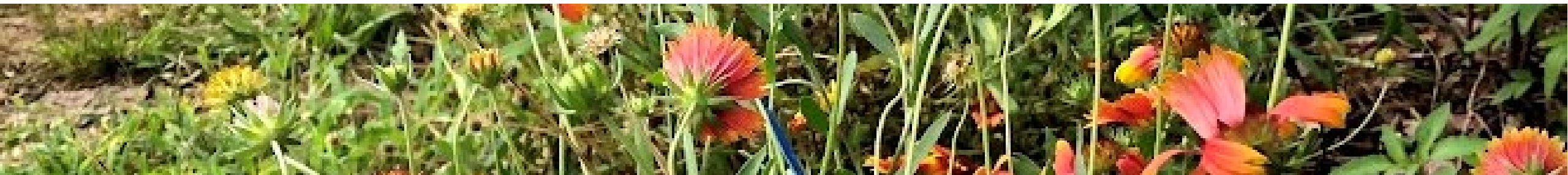
Lady bugs





Why does blanket flower work?

**Factors to consider when choosing plants
to add to groves and gardens**





Why blanketflower?

- Native to the southern US, including Florida
- Perennial
- Thrives with full sun exposure and sandy, well-drained soils
- Large, open flowers allow access to many arthropods
- Provides a lot of nectar and pollen
- Flowers year-round in Florida, once established
- Tolerant to some disturbance, like occasional mowing
- Added bonus: attractive to native bees



Supporting habitat complexity

- If possible, add floral resources by planting native flowers
- Also support naturally occurring plants
- Reduce mowing and tilling frequency
- Avoid mowing at times of the year when flowers are in full bloom
- Dried vegetation can be overwintering habitat so avoid clearing



References

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Thank you!