Functional strategy for conservation biological control and integrated psyllid management

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Take home message

- Management of Asian citrus psyllid is an ongoing need.
- Psyllids are prevalent in the perimeter than in the interior of citrus blocks.
- Predators and parasitoids cause significant psyllid mortality.
- Perimeter sprays kill psyllids while untreated interior refuge natural enemies.
- Integrated and sustainable psyllid management at reduced cost.

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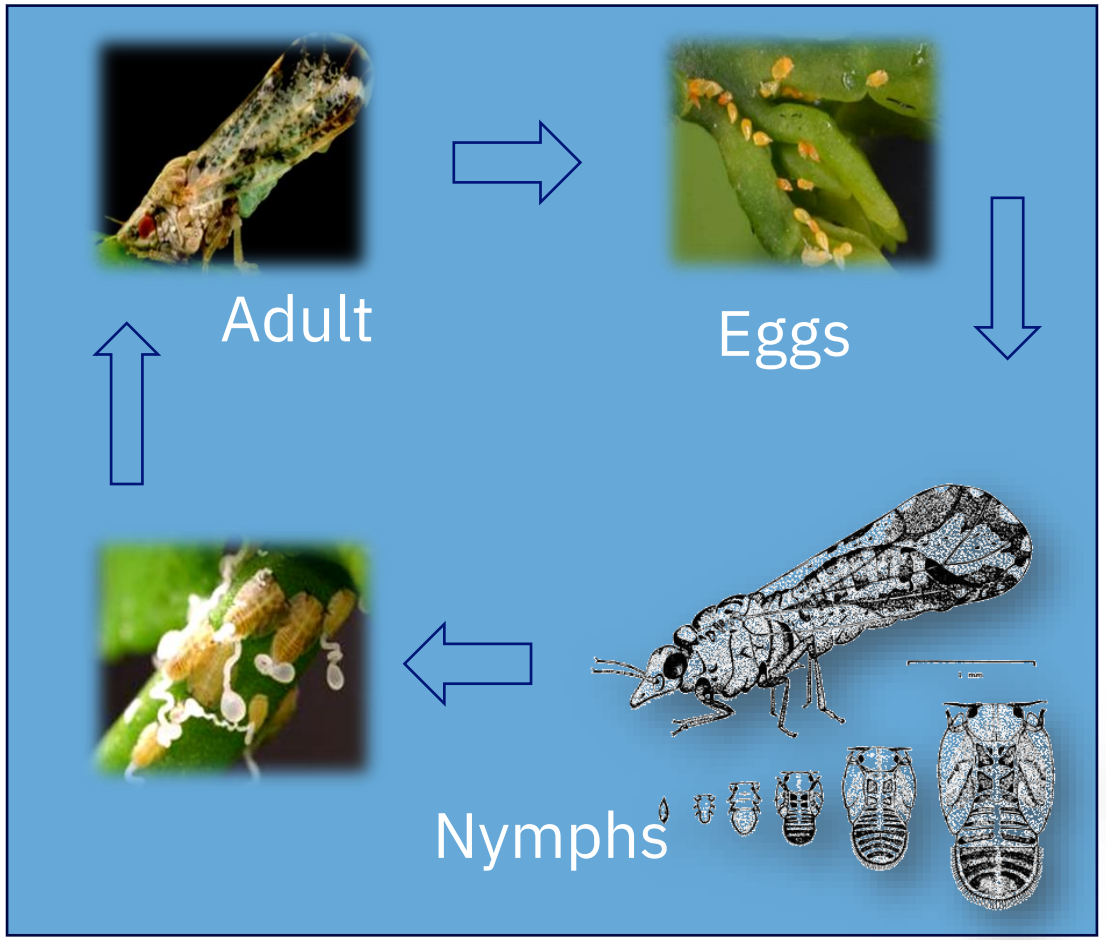
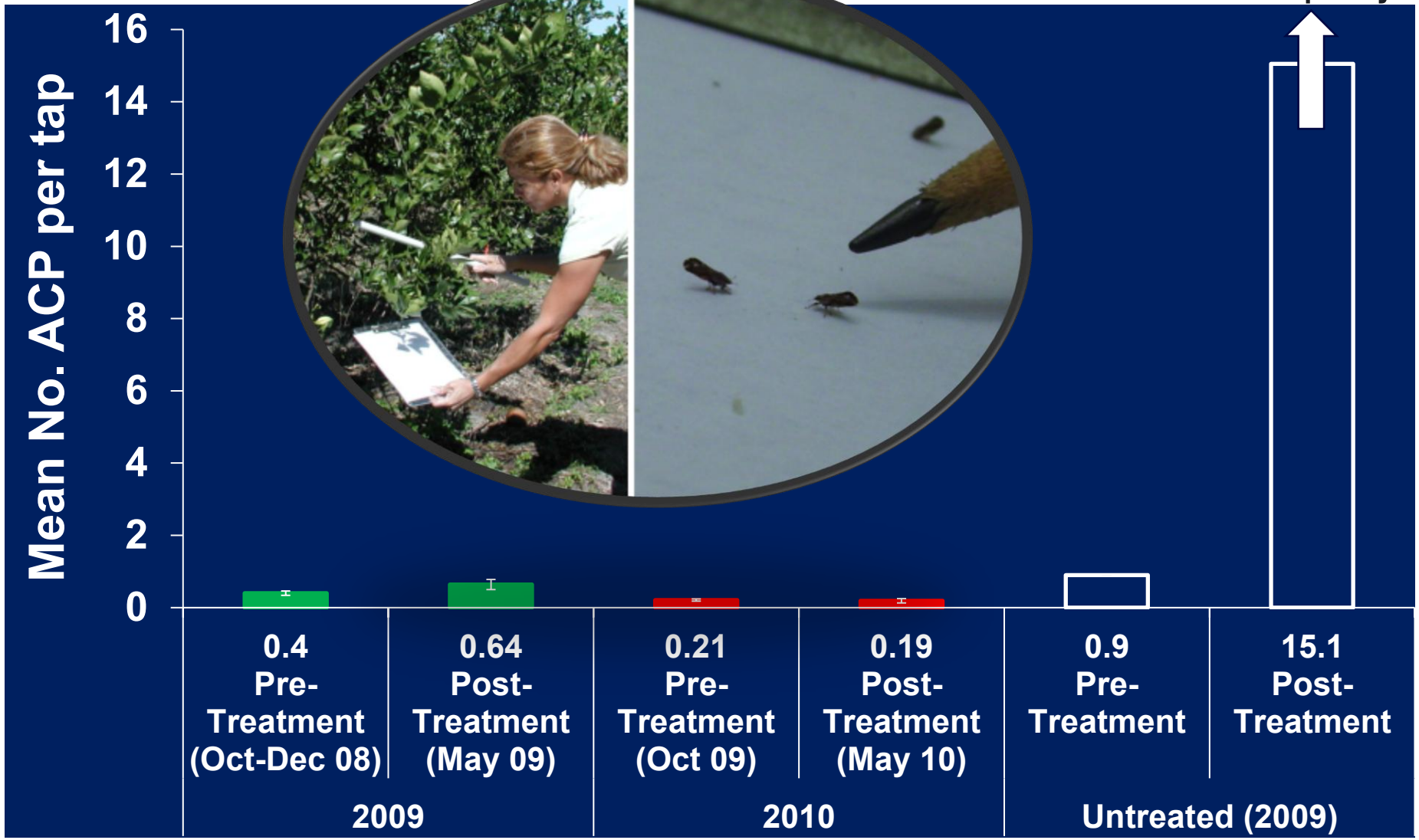
Taking advantage of psyllid biology and tree phenology

- Adults overwinter.
- Most young shoots are produced starting spring.
- Psyllid reproduction and all life stages are common in the growing season.



Impact of dormant sprays

- Dormant winter sprays reduce psyllids significantly.
- Additional sprays are needed to manage psyllids in the growing season.



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Growing season

Ladybeetles attacking psyllids

Additional pest targets

→ Aphids, Mites, Leafminers

→ Aphids, Mites, Scales, Mealybugs, Leafminers

→ Aphids, Mites, Scales, Mealybugs

→ Scales, Aphids

Natural enemies target multiple pests and warrant conservation.

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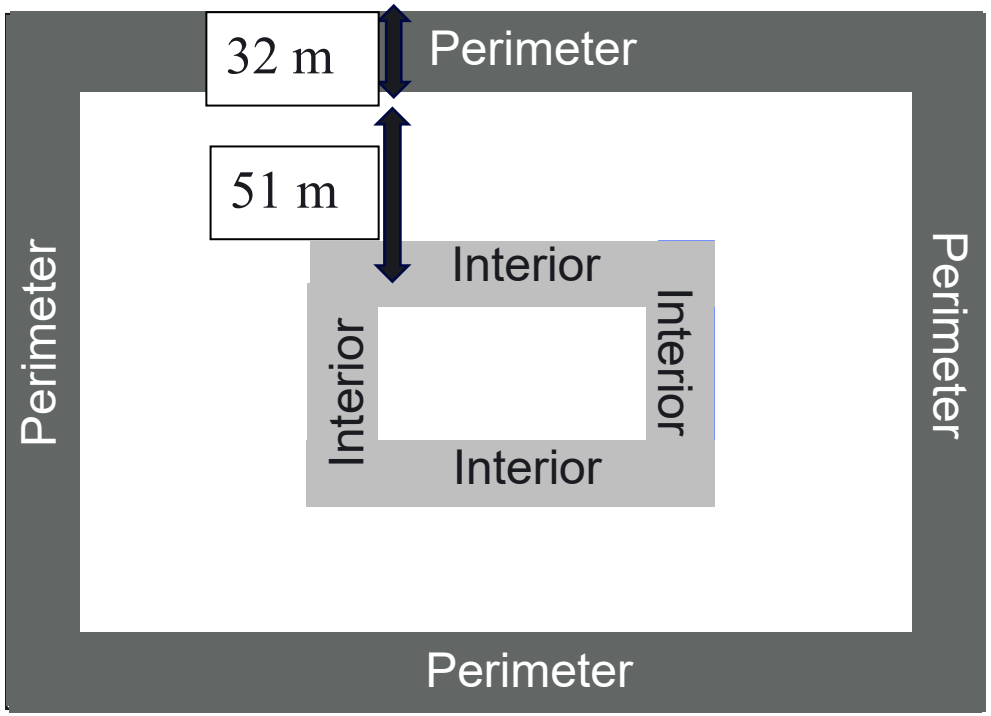
Psyllid distribution and the impact of natural enemies on its populations

Evaluation of psyllid populations and its natural suppression in citrus blocks



Orchard	Acreage	Surrounding vegetation			
		North	South	East	West
Collier 1	102	Citrus	Citrus	Citrus	Empty land
Collier 2	31	Empty land	Vegetation	Vegetation	Empty land
Hendry 1	126	Citrus	Citrus	Citrus	Empty land
Hendry 2	65	Citrus	Vegetation and citrus	Vegetation	Citrus

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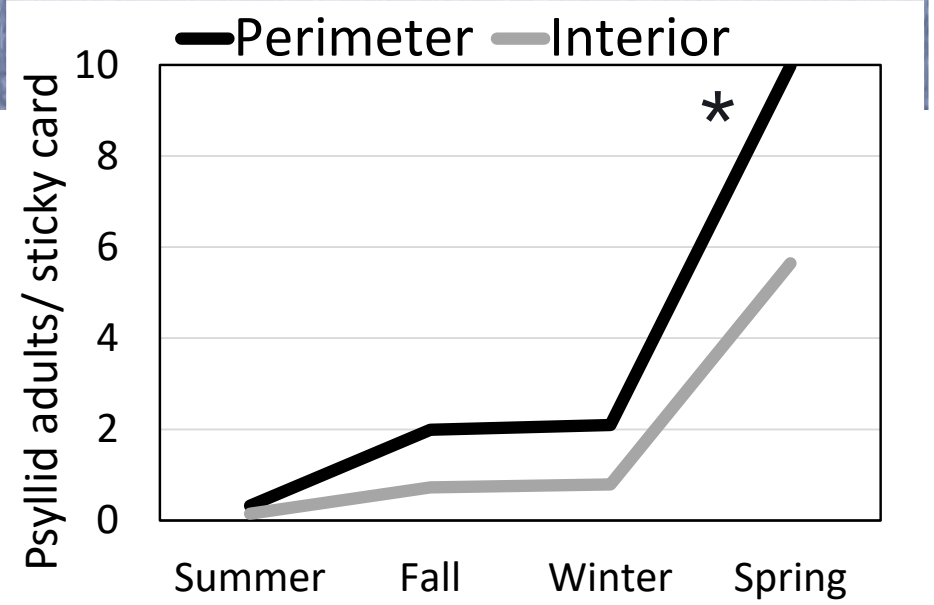
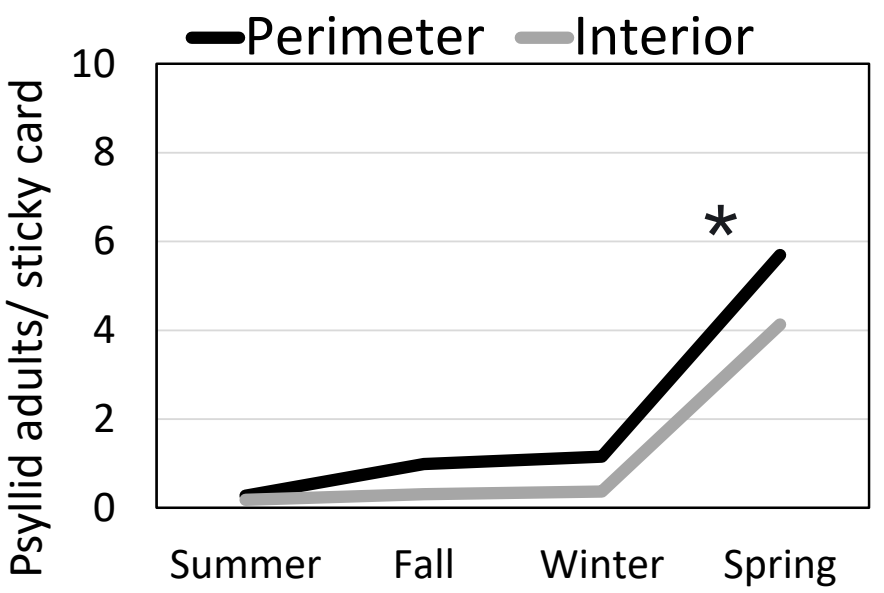
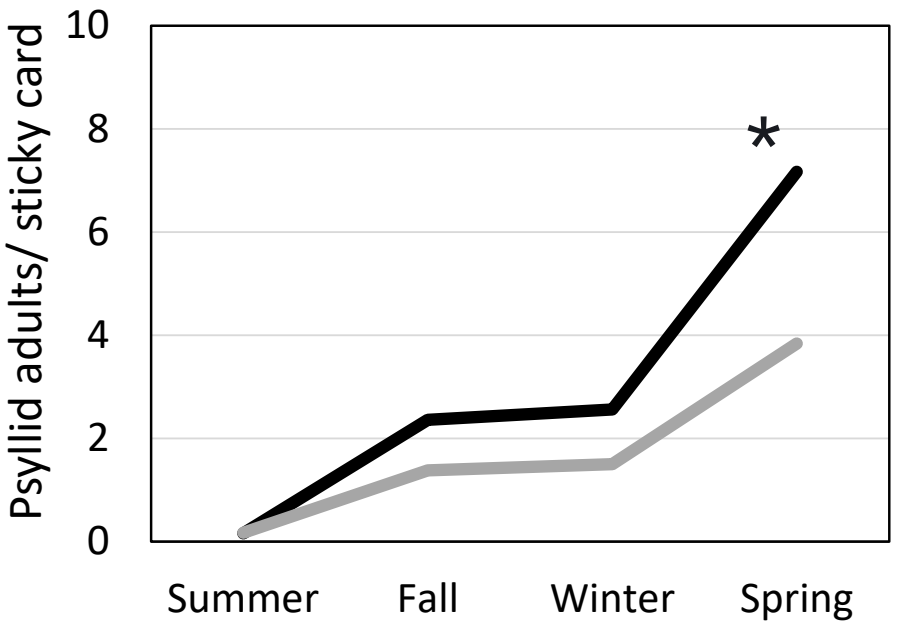
Cumulative captures of psyllid adults

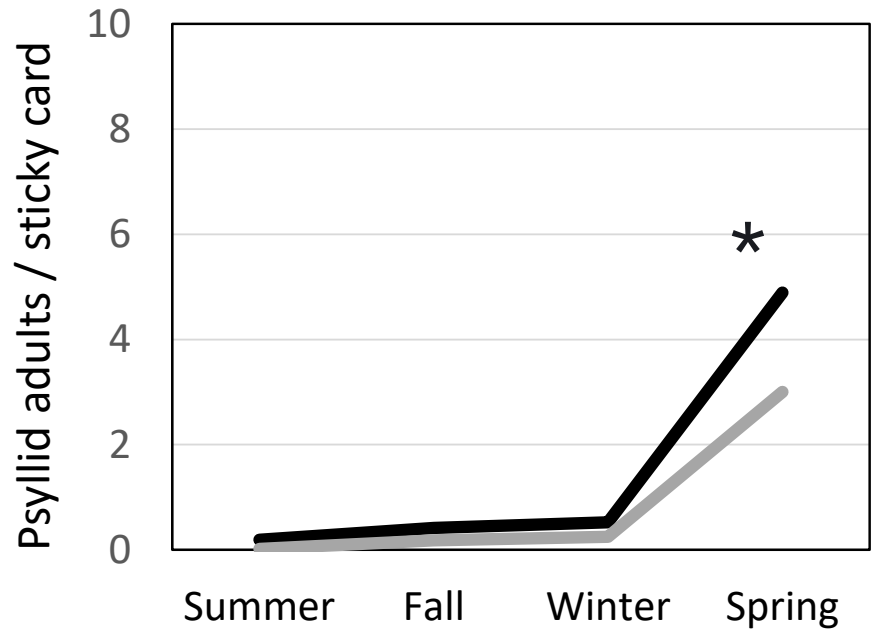
*Significantly more adults captured in the perimeter than in the interior of the blocks.







Collier



Hendry

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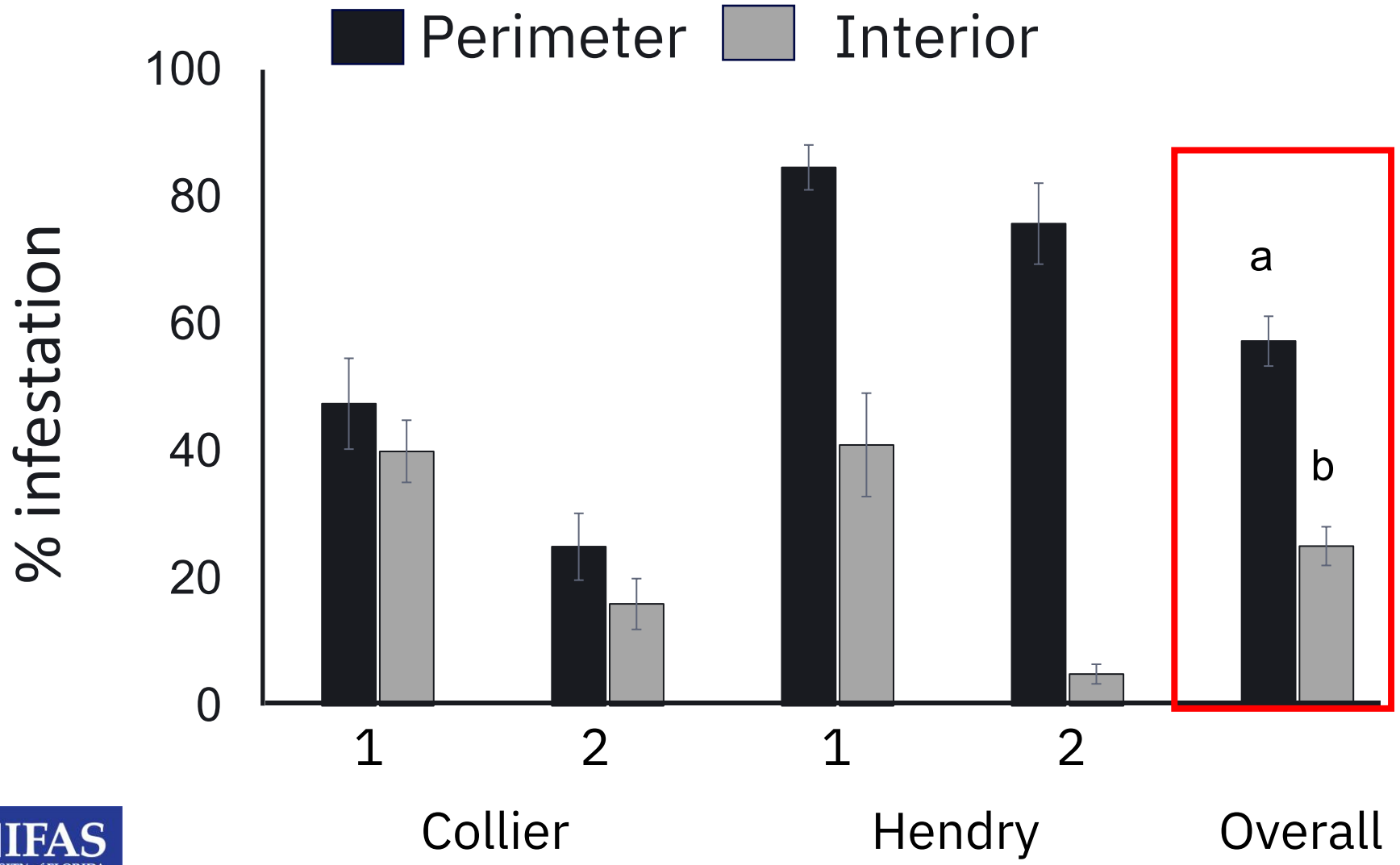
Shoots infested with psyllid immatures



More infested shoots in the perimeter than interior.

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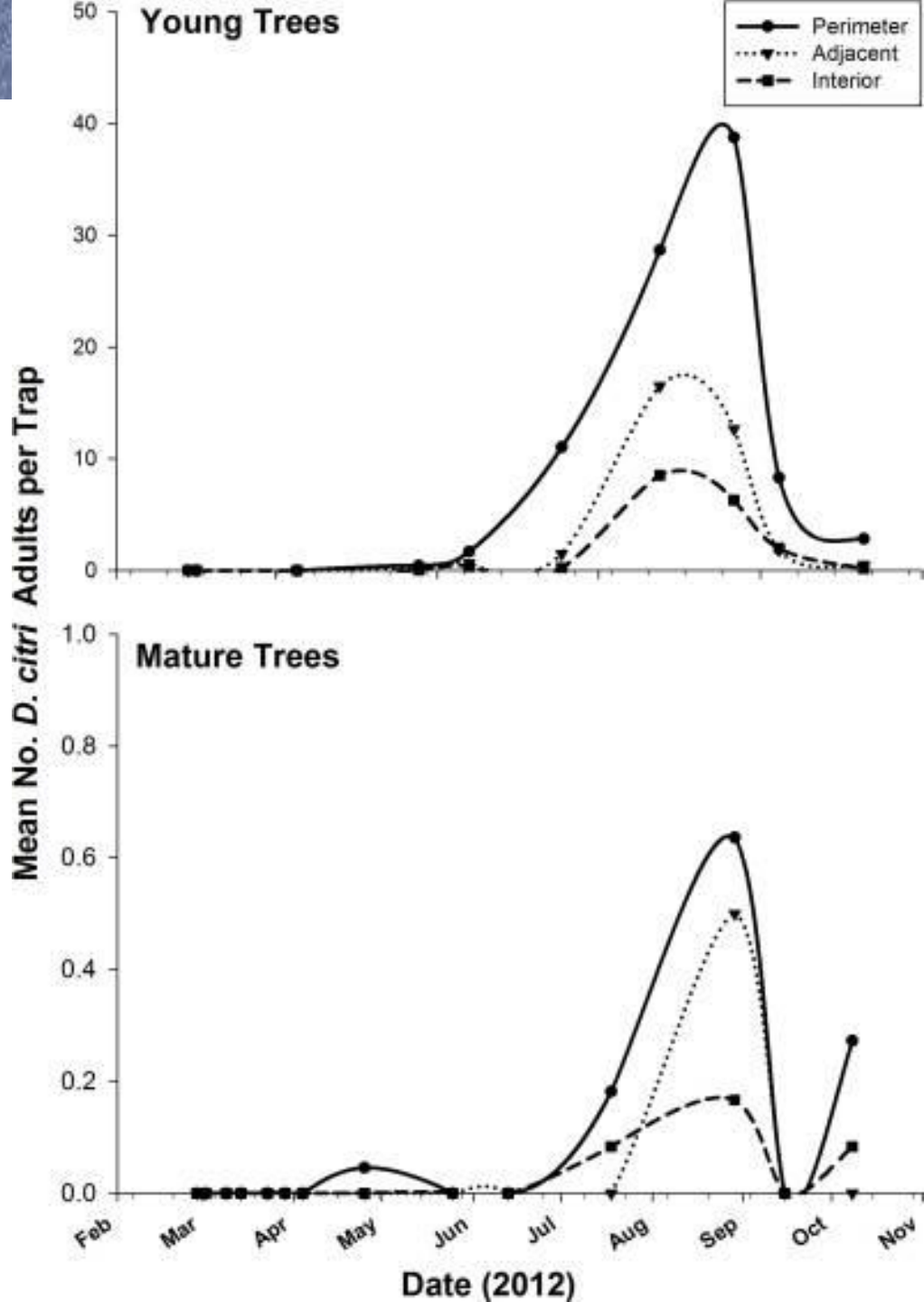
Evidence of spatial niche occupation from Texas citrus

- Significantly more psyllid infestation in the perimeter.
- Infestation started from border trees, where possibly one generation is completed before inner trees become infested.
- Psyllid densities decreased significantly with increasing distance from the grove edge.



(Sétamou and Bartles, 2015)

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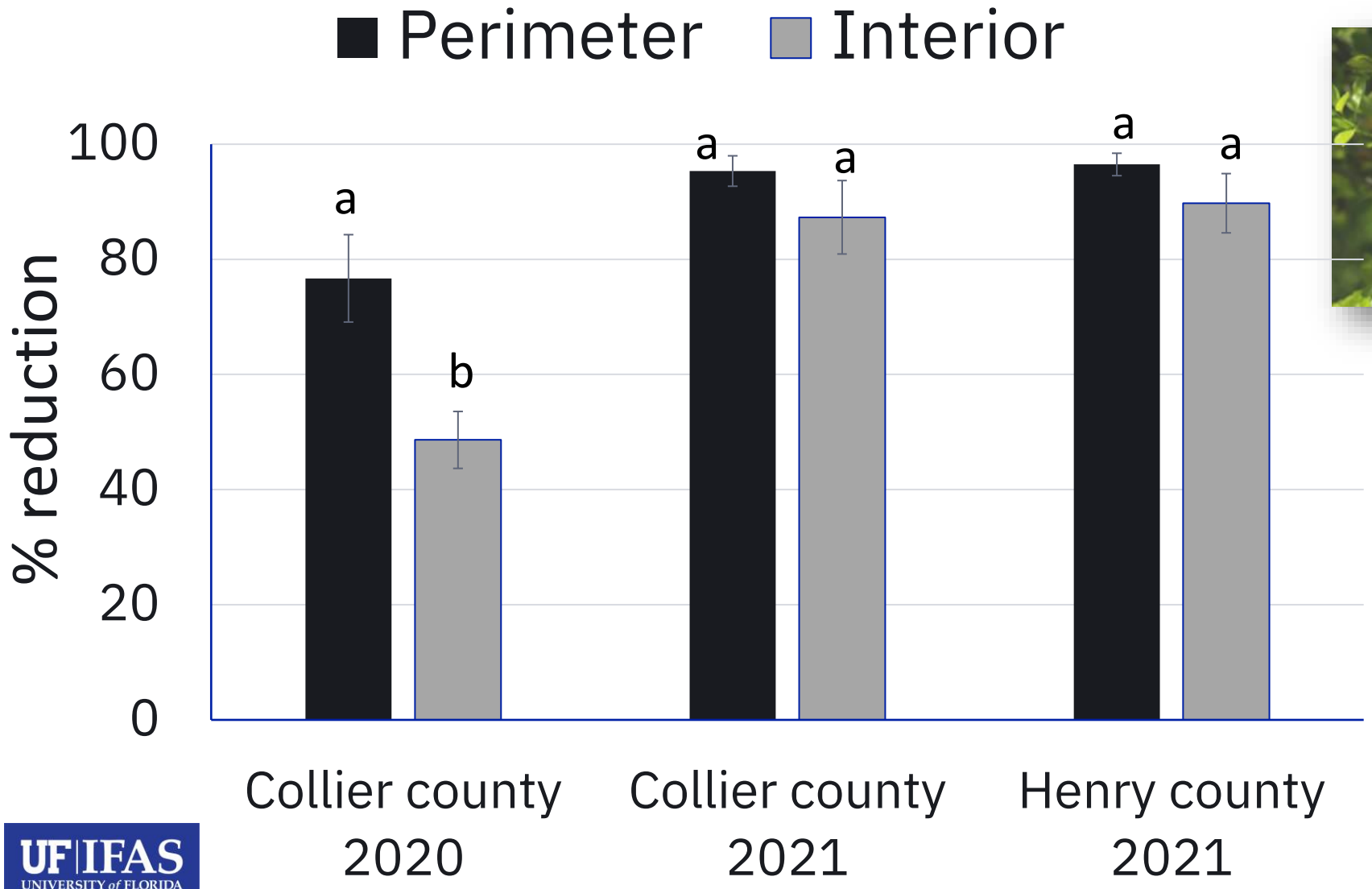
Natural suppression in cohorts of psyllid immatures initiated from eggs



77-96% reduction in perimeter immatures

49-90% reduction in interior immatures

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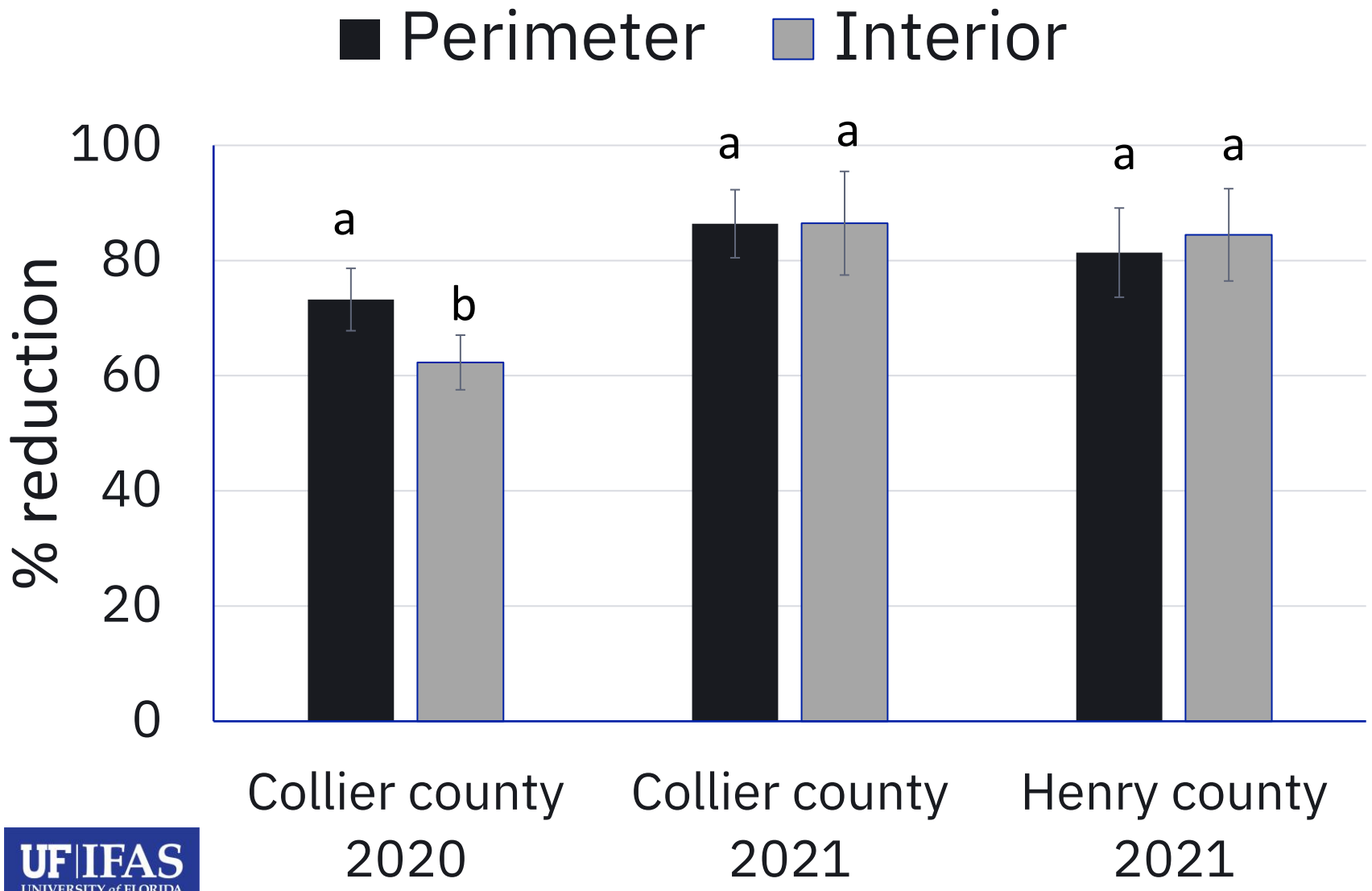
Natural suppression in cohorts of psyllid immatures initiated from nymphs



73-86% reduction in perimeter immatures

62-86% reduction in interior immatures

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Predator abundance in the perimeter and interior of a citrus block

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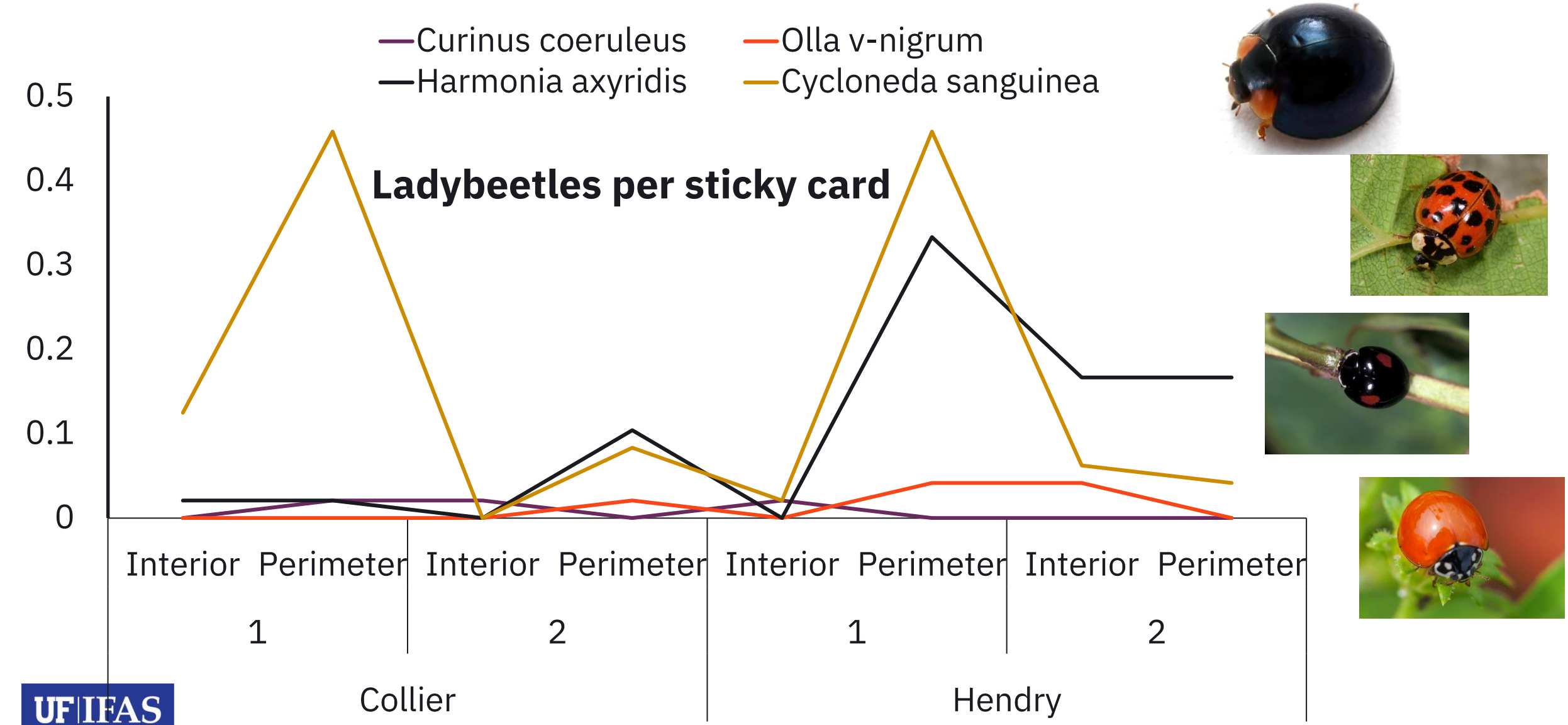
Ladybeetles abundance in the perimeter and interior of a citrus block



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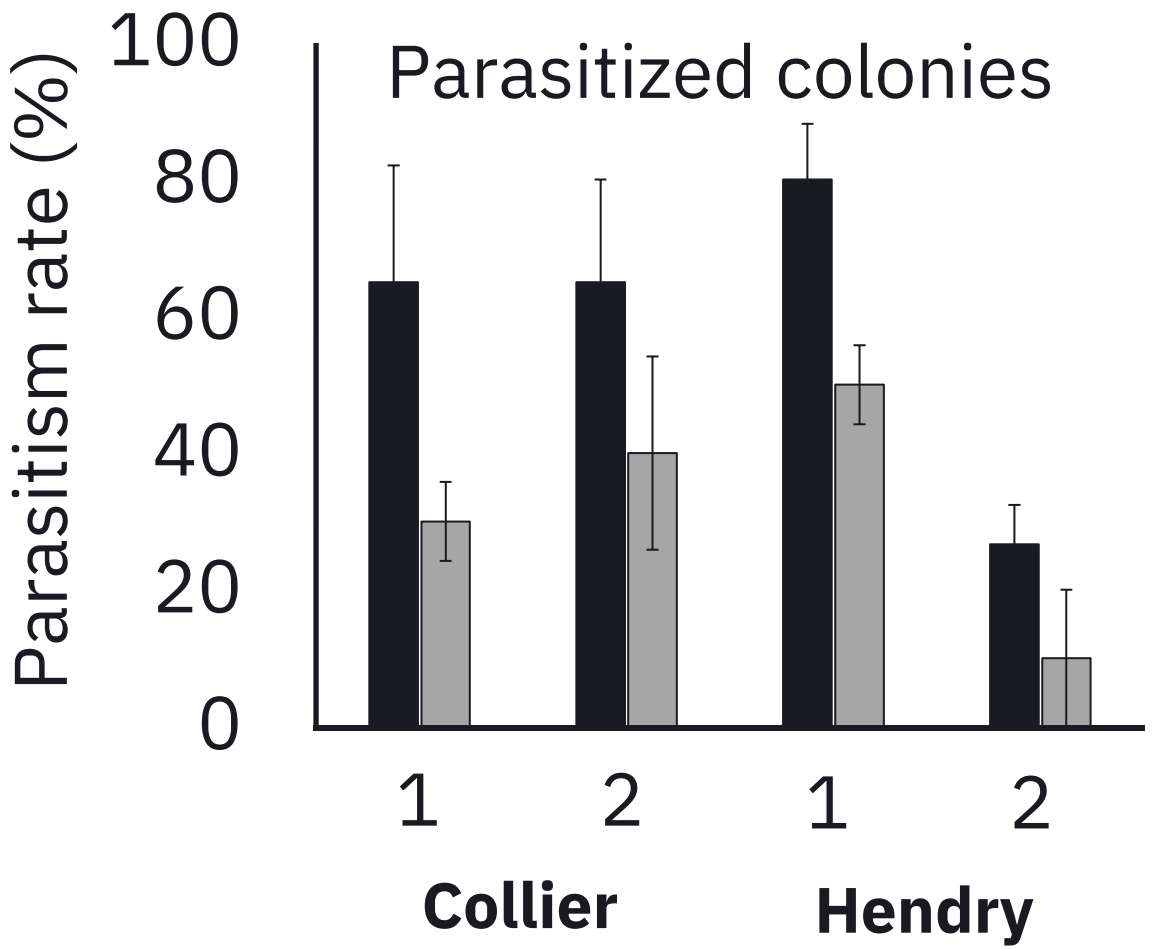
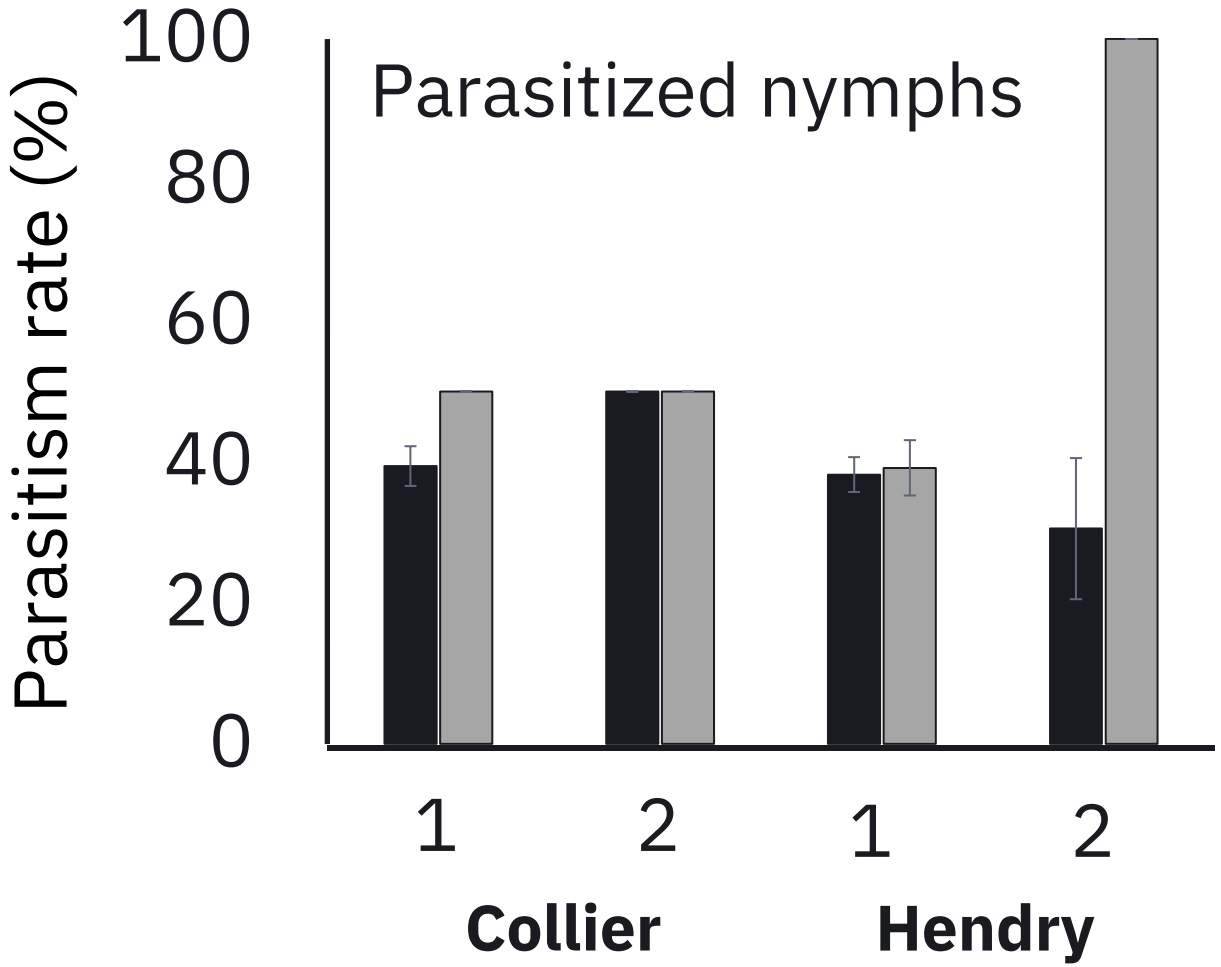
Psyllid nymphs parasitized by *Tamarixia radiata* in the perimeter and interior





Perimeter Interior

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Conclusions and Implications

- Asian citrus psyllid showed a strong preference for perimeter trees.
- Predators and parasitoids were common in the perimeter and interior of blocks.
- Psyllid suffered similar levels of natural suppression in the perimeter and interior.
- The high concentration of psyllids in the perimeter than the interior of the blocks and the influence of biological control in both zones suggest that spraying the perimeter will be a useful tactic for suppressing psyllids while sparing the interior as a refuge for the beneficial organisms.

THANK YOU

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