

Everglades Cooperative Invasive Species Management Area



Biological Control Updates

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Classical Biological Control

- **Management** tactic that re-establishes some degree of top-down regulation of invasive plants
- **Reunites** invasive plants with coevolved, specialized insect herbivores or plant pathogens
- **Goal** is to reduce the plant to levels that require reduced or no management. Invasive plants are never eradicated.



At IPRL, we discover, develop, deploy, and evaluate highly specific, co-evolved natural enemies of target weeds.



Overview

1. Brazilian peppertree (*Schinus terebinthifolia*)
2. Air potato (*Dioscorea bulbifera*)
3. Waterhyacinth (*Eichhornia crassipes*)
4. Earleaf Acacia (*Acacia auriculiformis*)
5. Old World climbing fern (*Lygodium microphyllum*)



Brazilian peppertree



More information: Dale Halbritter, Min Rayamajhi, Greg Wheeler



Brazilian peppertree

Brazilian peppertree thrips, *Pseudophilothrips ichini*



NEWS > PROTECTING PARADISE



Insects to be used to control invasive Brazilian pepper tree in Everglades





Brazilian peppertree

Brazilian peppertree thrips, *Pseudophilothrips ichini*

- Permission to release granted May 2019!
 - Along with leaf galling psyllid *Calophya latiforceps*
- Thrips release ceremony July 16, 2019
- Currently, building up colonies to meet demand using ~15,000 from quarantine



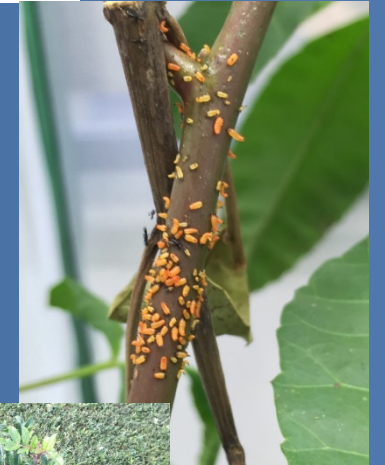


Brazilian peppertree

Brazilian peppertree thrips, *Pseudophilothrips ichini*



- What do the thrips do to BP?
 - Kill and prevents leaf development
 - Kill growing branch tips
 - Decrease growth by 80%





Brazilian peppertree

Brazilian peppertree thrips, *Pseudophilothrips ichini*



- First releases (July 2019)
 - Canaveral AFB (300)
 - Tree Tops Broward Co Park (1000)
- Planned releases:
 - July 2019 - ~10,000 at USDA plot in Davie
 - mid-August 2019 – releases in Big Cypress





Brazilian peppertree

Brazilian peppertree thrips, *Pseudophilothrips ichini*

Will thrips have indirect effects on arthropod food webs?

Ongoing food web study in Big Cypress National Preserve/St. Lucie Co.

- Four sites each with 30 marked peppertrees along 200-m transect
- Monthly arthropod surveys for past 10 months
- Plant demography with and without (pesticide) thrips





Air Potato





Air Potato

Air potato leaf beetle, *Lilioceris cheni*



June 2012



August 2013



August 2014



September 2016

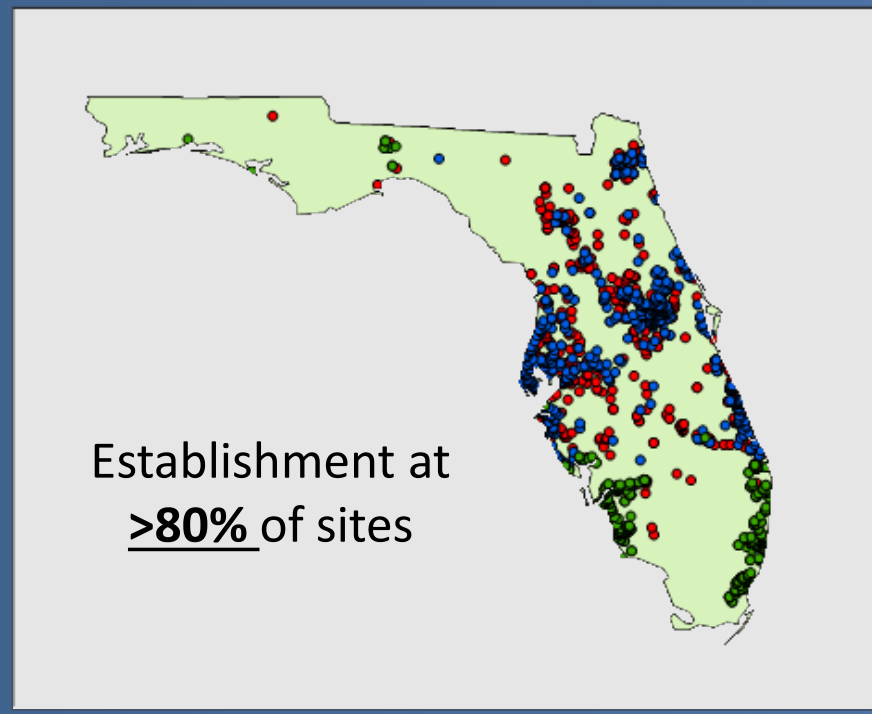
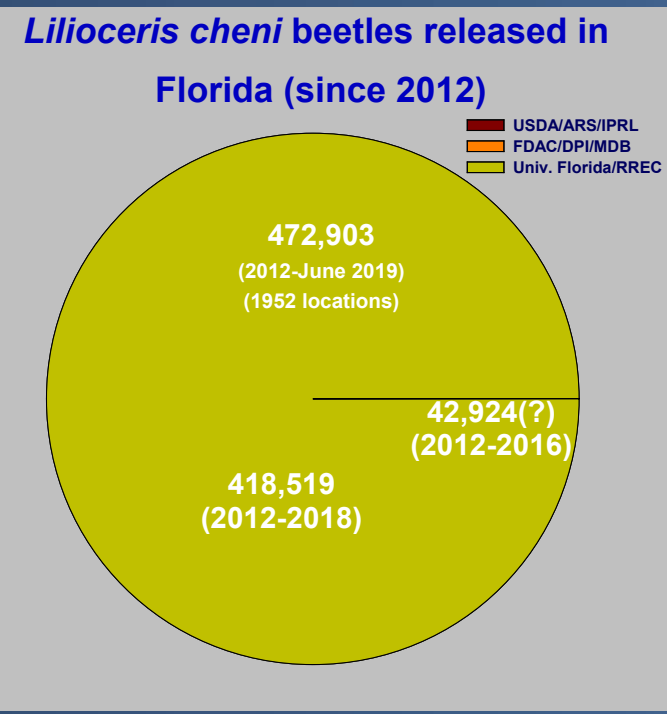
Research Highlights

- Reduced weed cover
- Reduced bulbil production



Air Potato

Air potato leaf beetle, *Lilioceris cheni*



~ 1 million total



Air Potato

Lilioceris egena

- Adults and larvae feed on bulbils
- Received TAG approval in 2018
- Awaiting approval from federal agencies



More information: Allen Dray



Waterhyacinth

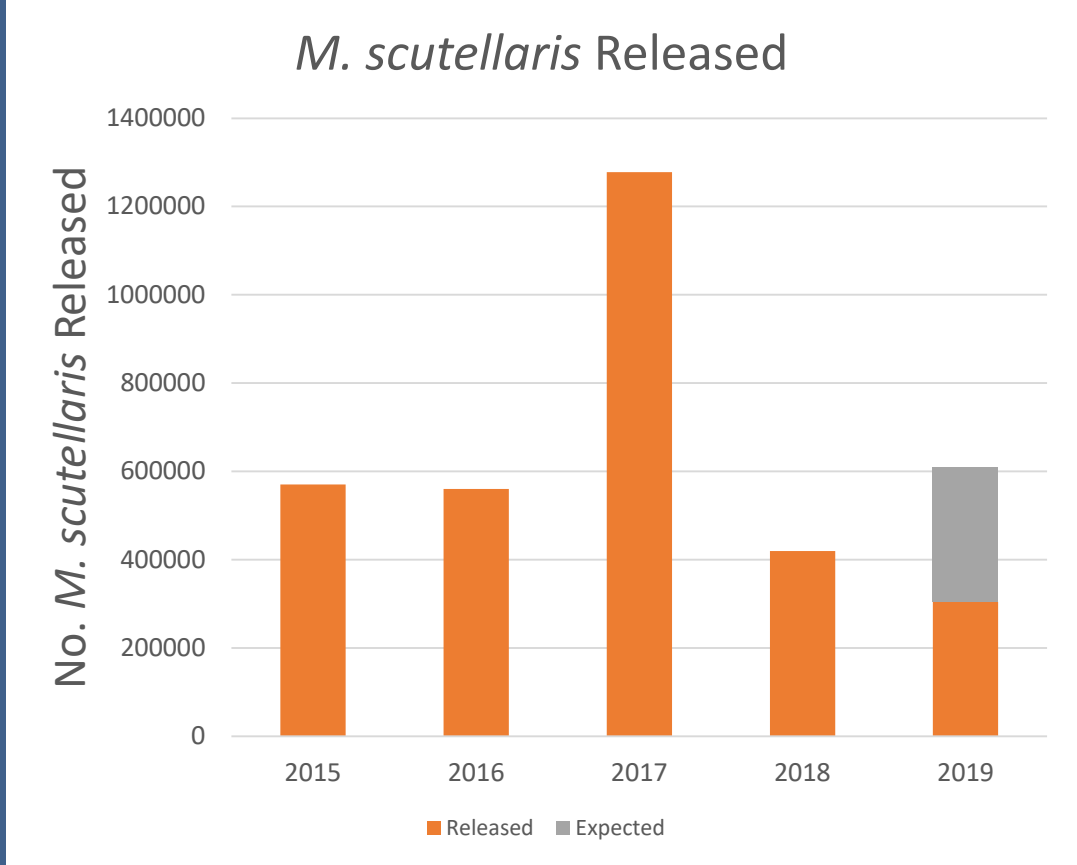
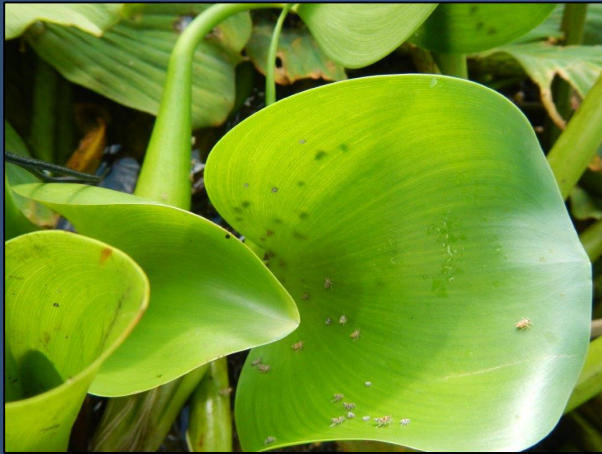


More information: Ashley Goode, Phil Tipping



Waterhyacinth

Waterhyacinth planthopper, *Megamelus scutellaris*





Waterhyacinth

Waterhyacinth planthopper, *Megamelus scutellaris*



- Impressive dispersal ability
 - Macropterous (flighted) individuals found at most sites
 - >6 km from nearest release sites
 - New population found 1 km from Lake O release site
- Effective integration with herbicide
 - Fast recolonization by agents after regrowth following herbicide
- No negative effects on natives
 - No increase in parasitism of native planthopper (*M. davisii*)



Earleaf Acacia



More information: [Melissa Smith](#)



Earleaf Acacia

Calomela intemerata



Calomela intemerata
Foliage feeding chrysomelid beetle

Initial host range test show
it is Acacia-specific



Old World Climbing Fern



More information: Aaron David, Ellen Lake

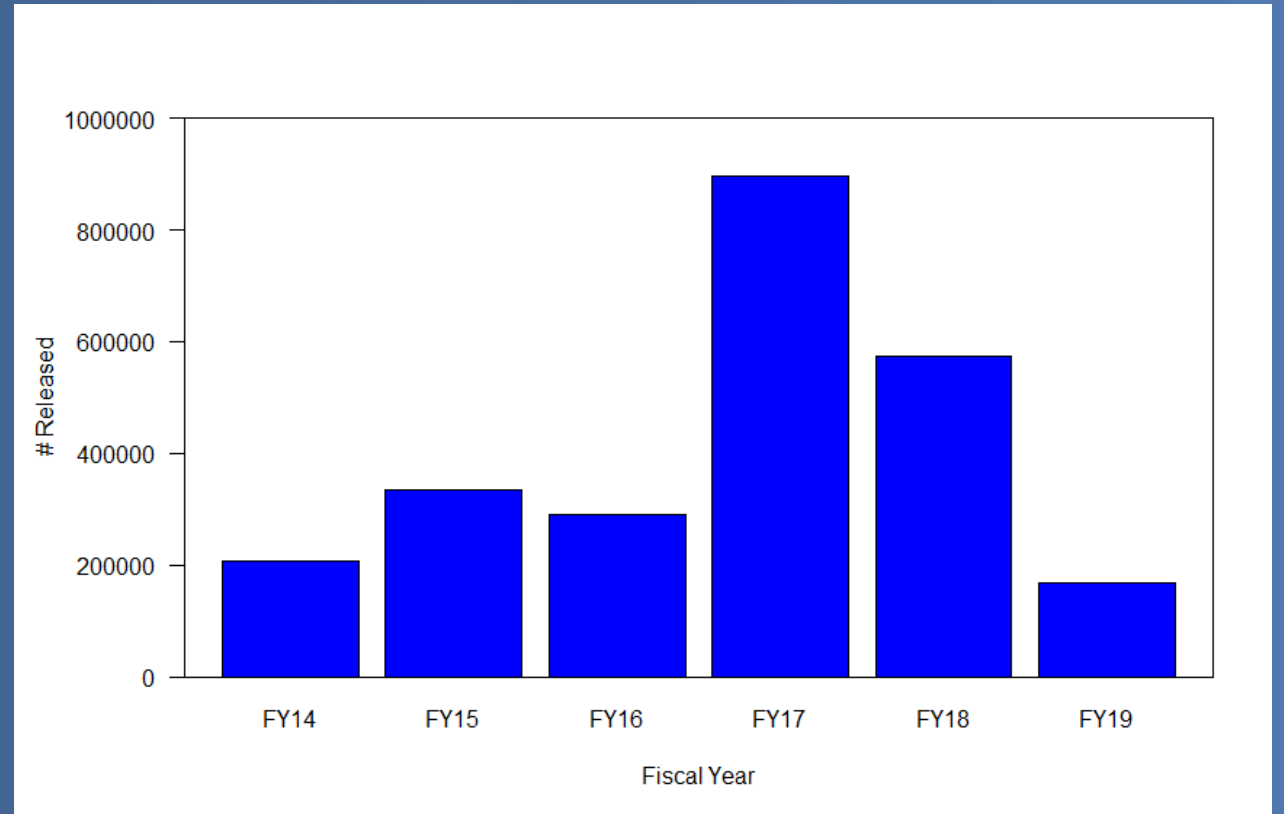


Old World Climbing Fern

Brown Lygodium Moth, *Neomusotima conspurcatalis*



Christen Mason, SFWMD



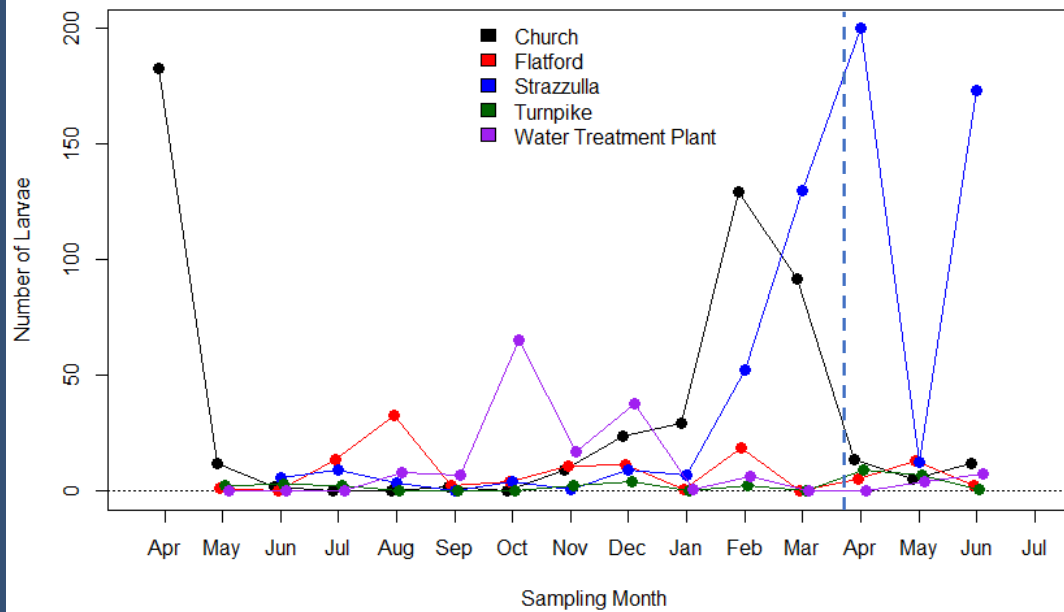


Old World Climbing Fern

Neomusotima conspurcatalis



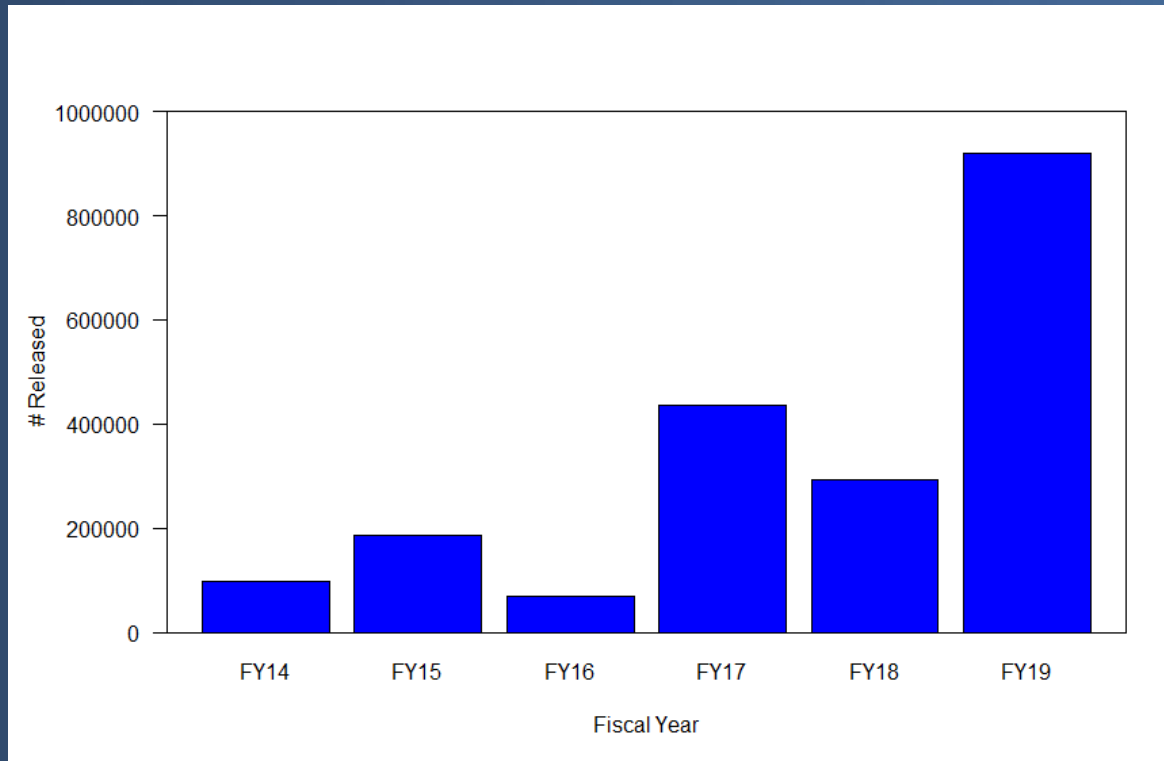
Monthly monitoring at 5 sites





Old World Climbing Fern

Lygodium mite, *Floracarus perrapae*



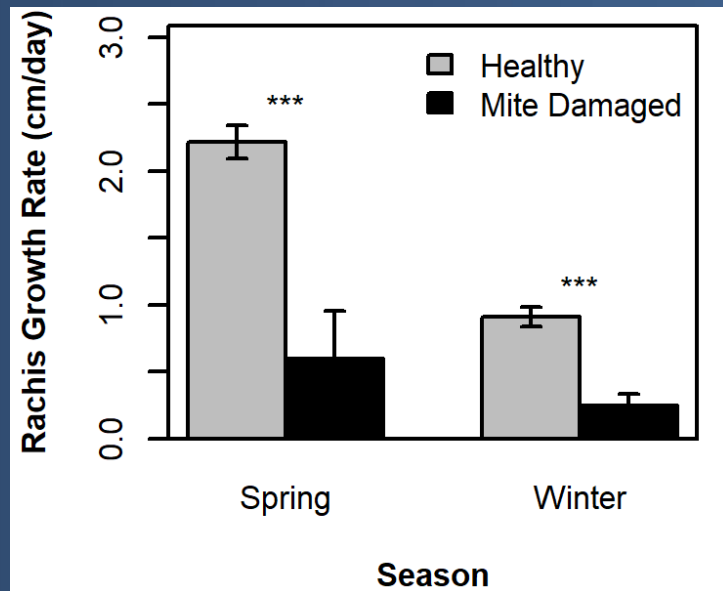


Old World Climbing Fern

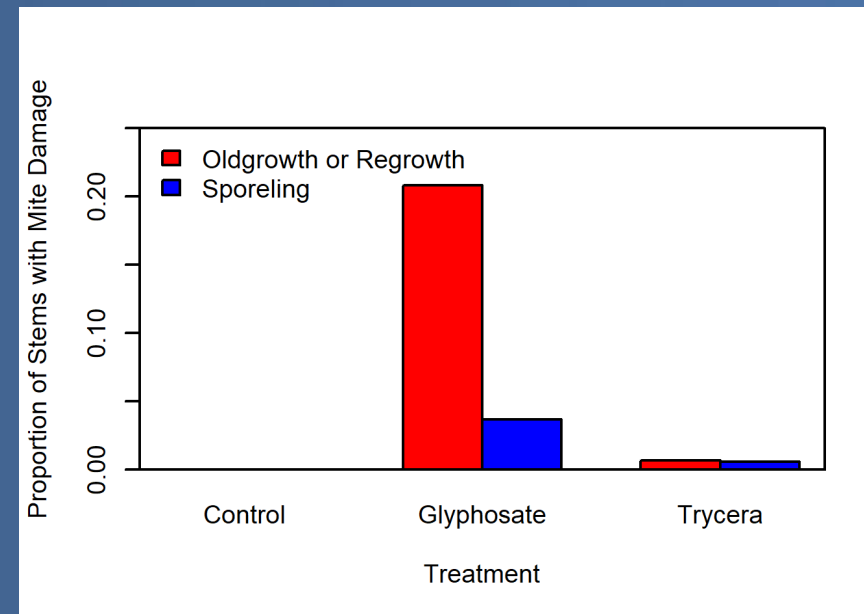
Floracarus perrapae



Reduced rachis growth rate 4x



Preferentially attacks regrowth and sporelings





Old World Climbing Fern

New agents in development



Lygomusotima stria

- Defoliating moth
- Working on potential range in SE USA
- ~1 more year



Neostrombocerus albicomus

- Defoliating sawfly
- ~1-2 more years

Callopietria exotica

- Defoliating moth
- ~2-3 more years



Siamusotima disrupta
(+3 other species)

- Stem boring moth
- Difficulty colonizing
- ~3-4 more years





Brazilian peppertree



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Waterhyacinth



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Earleaf Acacia



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Air potato



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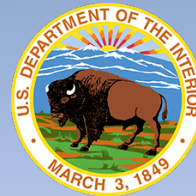
Old World Climbing Fern



Aaron David, Ellen Lake



Acknowledgements & Questions



Think locally, Act neighborly
invasive species know no boundaries!





Brazilian peppertree

New agents discovered



Spes schinella
Tip-feeding moth



Telphusa sp.



Heteroperreyia n. sp.
Defoliating sawfly
Potential toxicity to livestock