Bulimulus Snails: An Emerging Citrus Pest

Lauren Diepenbrock, UF/IFAS CREC

- Uncertain if we have *Bulimulus sporadicus* or *Bulimulus bonariensis*
- Snails in this genus are native to Central & South America and the Caribbean
- Known to be “tree-dwelling” snails
  - Also climb microjets, barns, equipment, CUPS walls, houses, playground equipment…

Photo credit: L. Diepenbrock

Identification

- Common name (?) Ghost snail
- Key features
  - Larger snails are ¾-1 inch
  - Conical
  - Light brown to tan
  - Aggregation behavior
- Origin of US populations uncertain
  - Native to Argentina, Bolivia, Brazil, Paraguay, and Uruguay
  - Likely multiple introductions from several locations

Photo credit: S. Paula-Moraes

Look-alikes

Amber snail

A typical amber snail with its eye tentacles extended.

Photo by David Cappaert, Bugwood.org

Giant African Land Snail

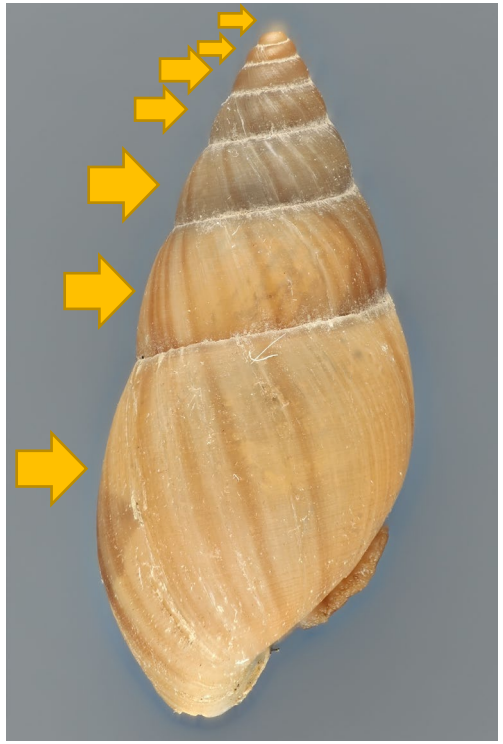
Photo credit: D. Cappaert- Bugwood, and Derkson- Bugwood

Look-alikes

Amber snail

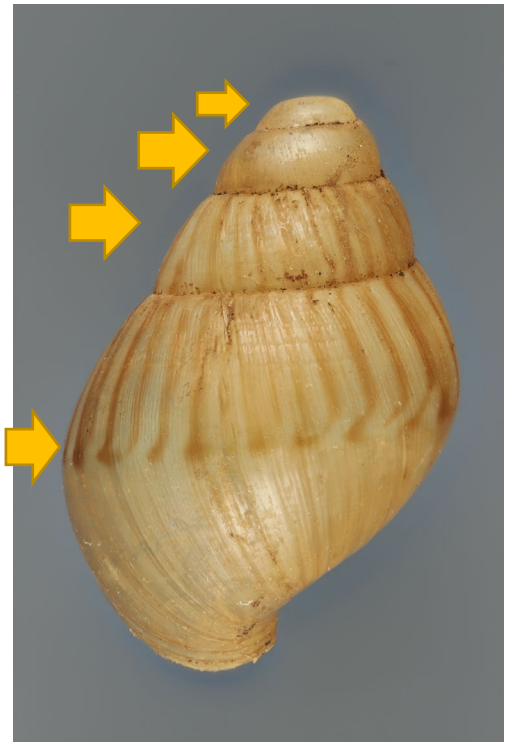
- Large body whorl

Bulimulus "sporadicus"



- ½-1 in long = Adult
- Many whorls
- Narrow

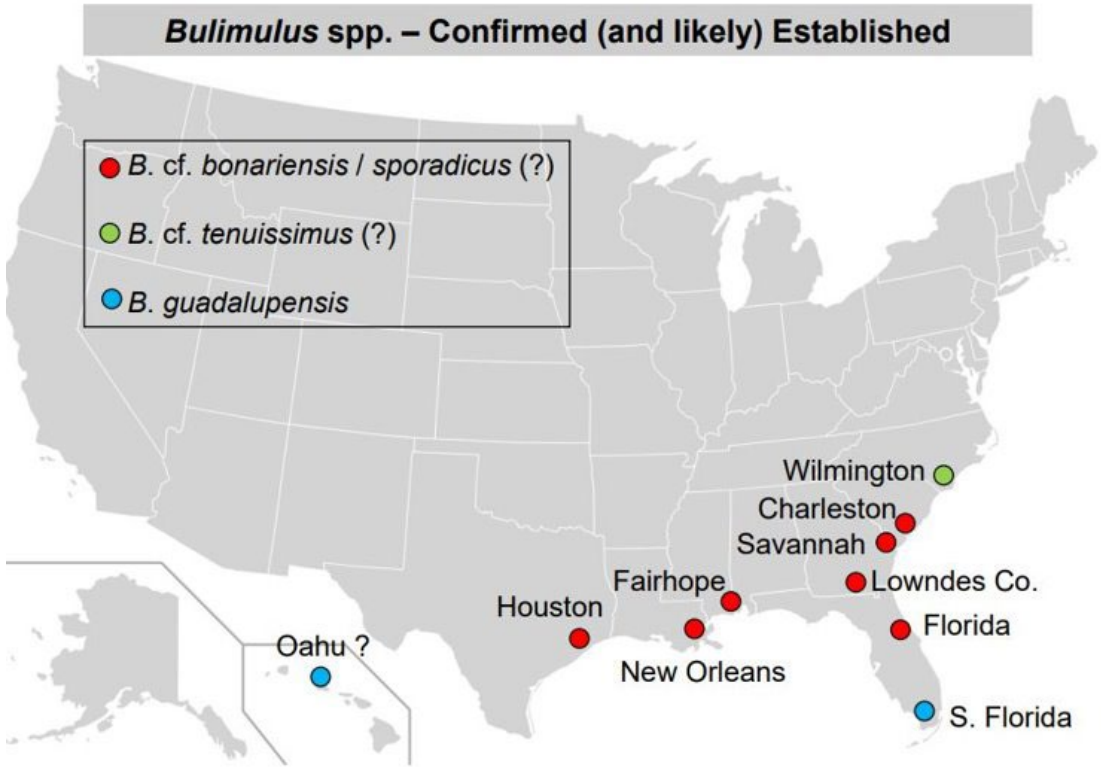
Giant African Land Snail



- ½-1 in long = juvenile
- Few whorls
- Less narrow

Photo credit: Jon Bremer

Distribution in the US/Florida



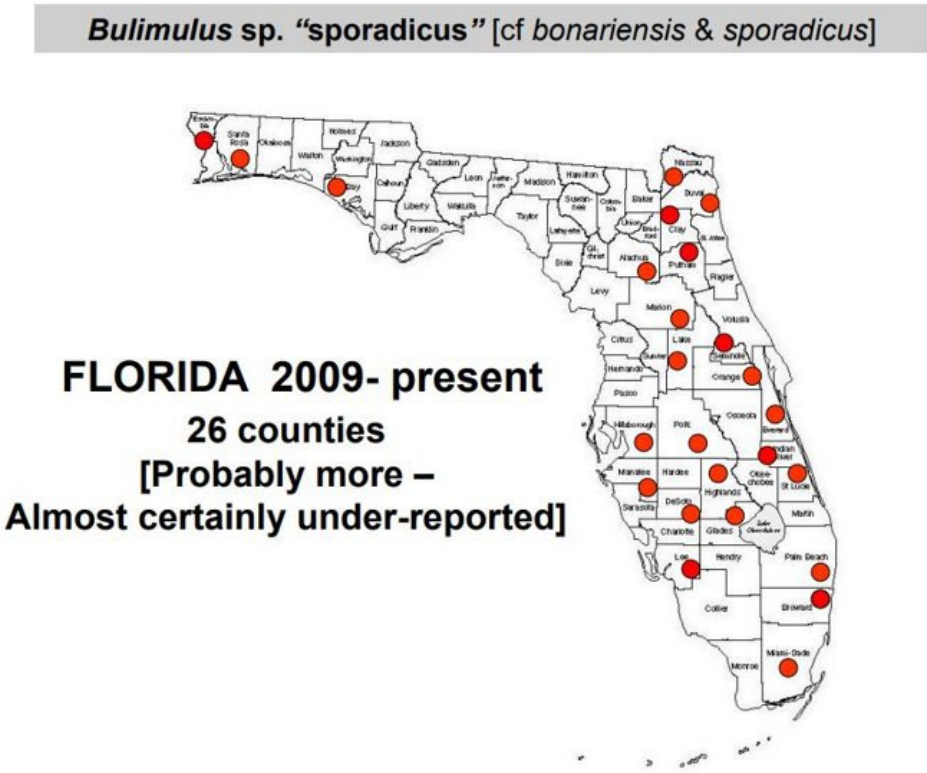


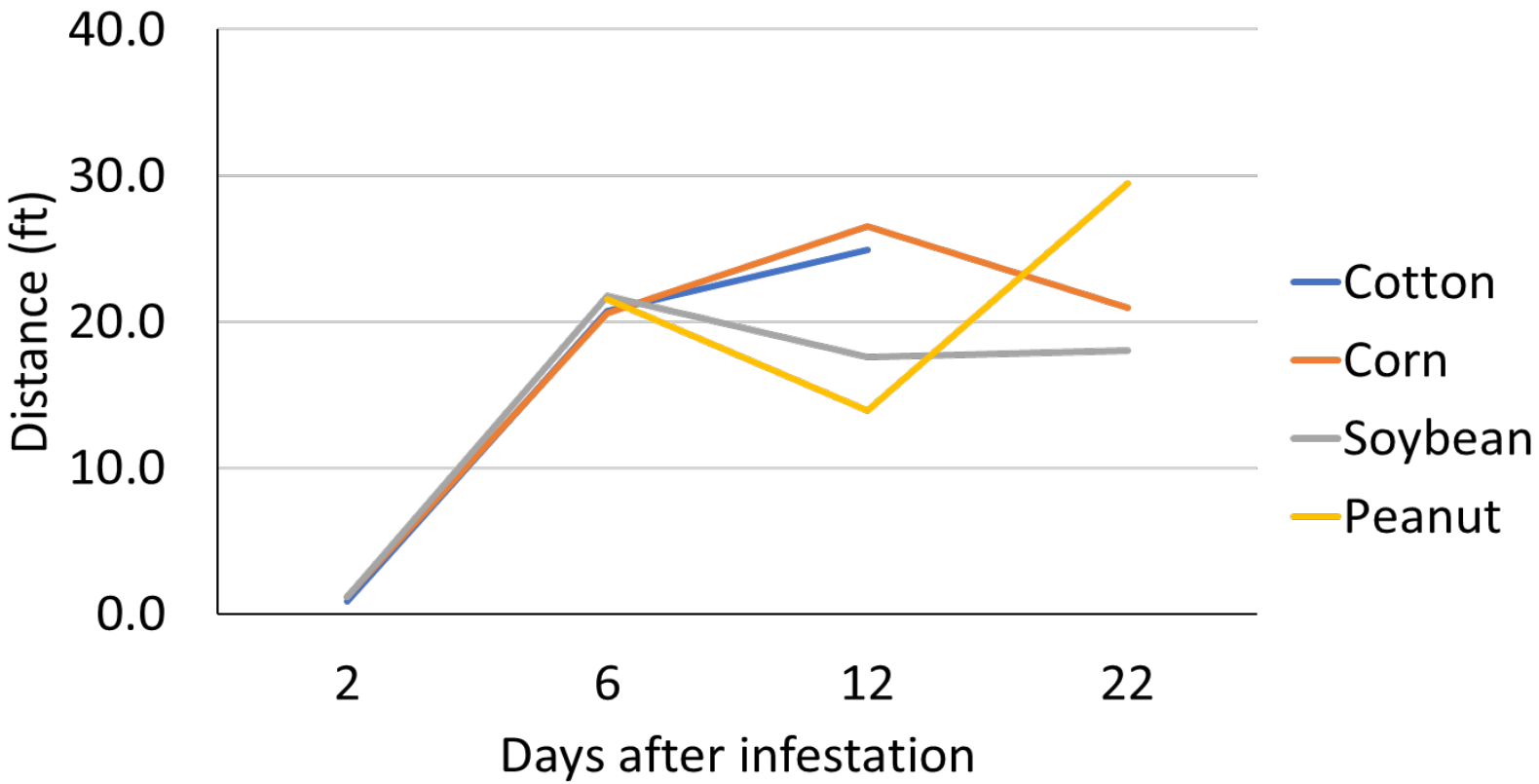
Photo credit: J. Borrero

How did they get here and how do they get around?

- Unsure- first found in Duval County in 2009 by a shell club
- Specimens have been found moving on cargo
- Move onto farm equipment and can be moved with equipment
- Can move on people
- Now found in wide variety of habitats

Photo credit: K. Dickens, L. Diepenbrock

Dispersal in row crops



Studies from agricultural sites

Traveled distance: 30ft
Maximum distance: 80ft

Paula-Moraes, unpublished data

Basic biology – life stages

- Eggs buried under the surface of soil
- Juvenile born with a soft shell
- Needs to consume calcium to grow hardened shells
- Shell displays spiral growth pattern
- Adults are hermaphrodites
- Require sexual reproduction
- Multiyear lifespan

Photo credit: S. Paula-Moraes

Basic biology – feeding

- Grazers, generally feed on “films on surface
- Prefer dead or decaying plant material
- Appear to be attracted to moisture
- Thought to not directly feed on plants until Spring 2021:
  - Late freeze damage made cracks to trunks
  - Snails found consuming into the phloem and cambium layers of damaged trees

Photo credit: L. Diepenbrock

Basic biology – survival tools

- Most snails can withstand a wide array of inhospitable environments
- Snails have an operculum (“door”):
  - Close off this membrane and can avoid periods of drought and other unwanted conditions
- Detoxifying chemistries
  - Snail mucus is able to detoxify a wide arrange of chemistries- makes them hard to kill

Photo credit: L. Diepenbrock

Efficacy of snail baits- lab study

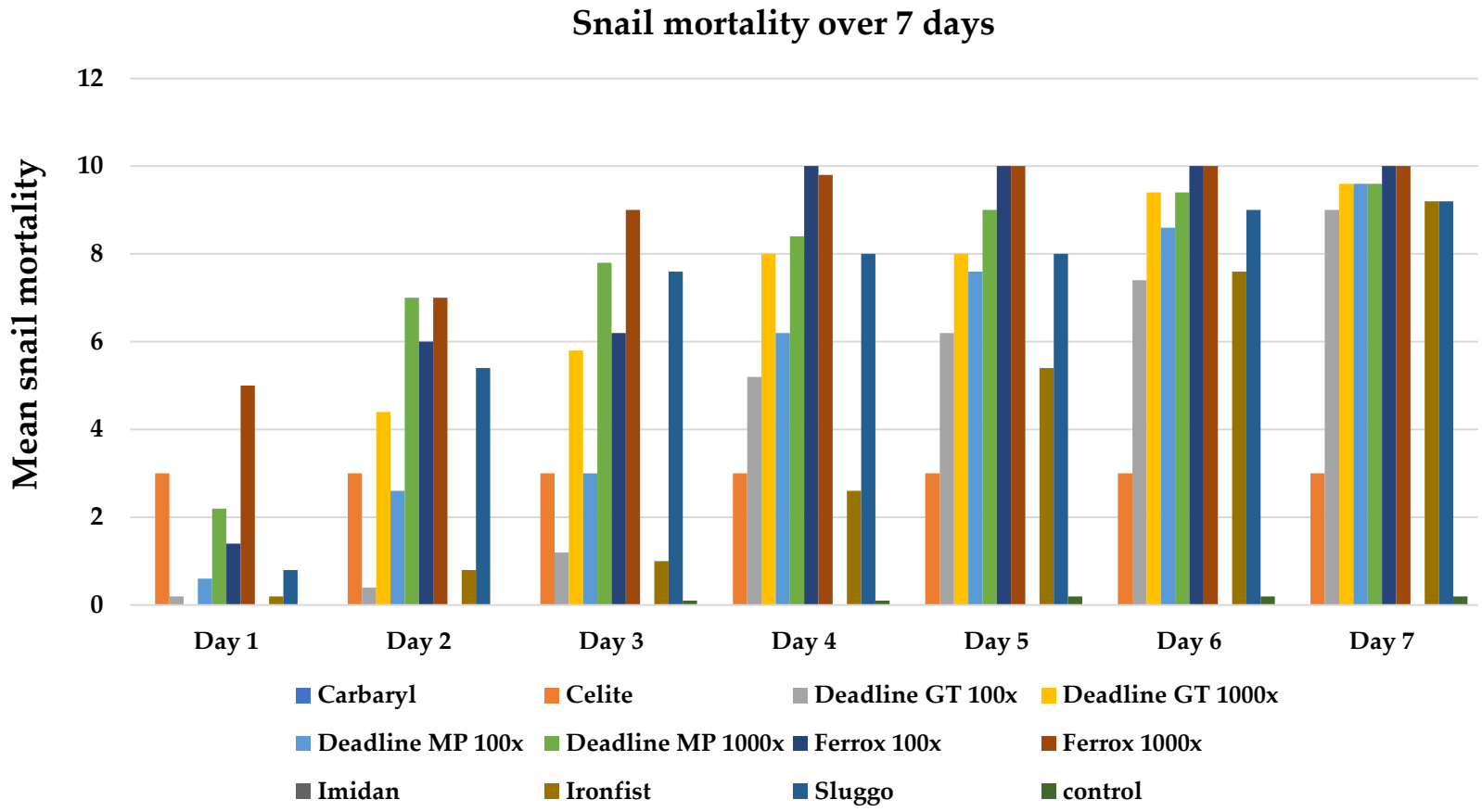


Photo credit: L. Diepenbrock

Interpreting snail mortality data

- All testing done in lab assays- need a lab follow up
- Topical insecticide treatments DO NOT KILL SNAILS
  - Snails will appear to be declining for 1-2 days (foaming, etc), but they bounce right back
- Most baits work well in the confines of a container
- Need to understand population development to determine optimal times to treat

Upcoming research- looking for growers!

- Population monitoring – minimum of 1 year Jan 2022-Dec 2023
- Bait testing once populations build
- Alternative methods for control
  - Copper mesh is effective but not cost efficient at keeping snails off trees, need to evaluate other coppers
- Camera trapping for predators
- Interested: Email me!

Photo credit: L. Diepenbrock

Acknowledgements

People- lab

- Lena Craft
- Peaches Mariner
- Diana Estrada

Growers- preliminary testing

Funding

- USDA CRIS FLA-CRC-005788
- CRDF starting January 2023

Photo credit: L. Diepenbrock

Questions?

Want to work with us? ldiepenbrock@ufl.edu

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