

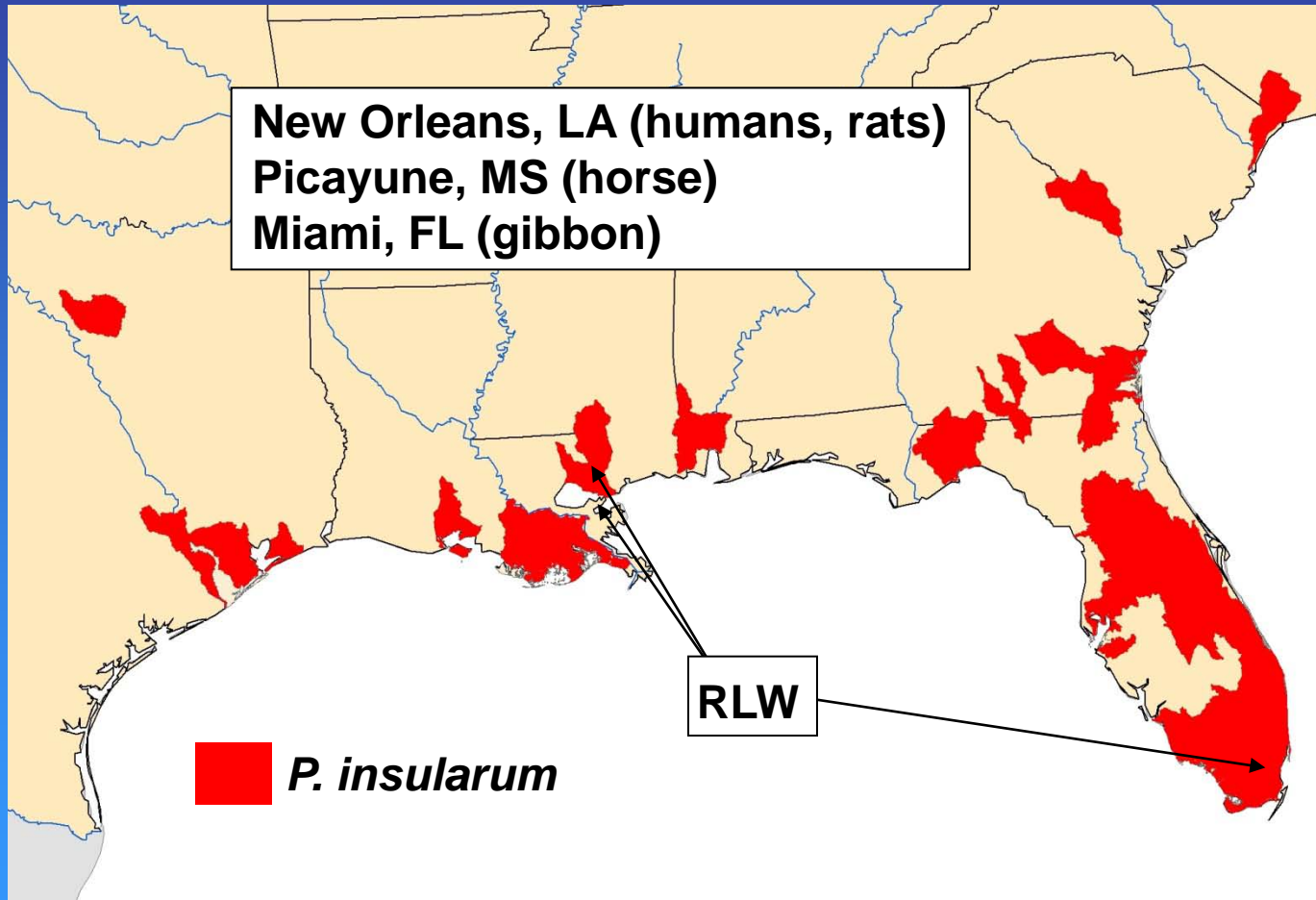
Nonindigenous Apple Snails as a Host for *A. cantonensis* in the Southeastern United States

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The Predominate Nonindigenous Apple Snail in the Region is *Pomacea insularum*

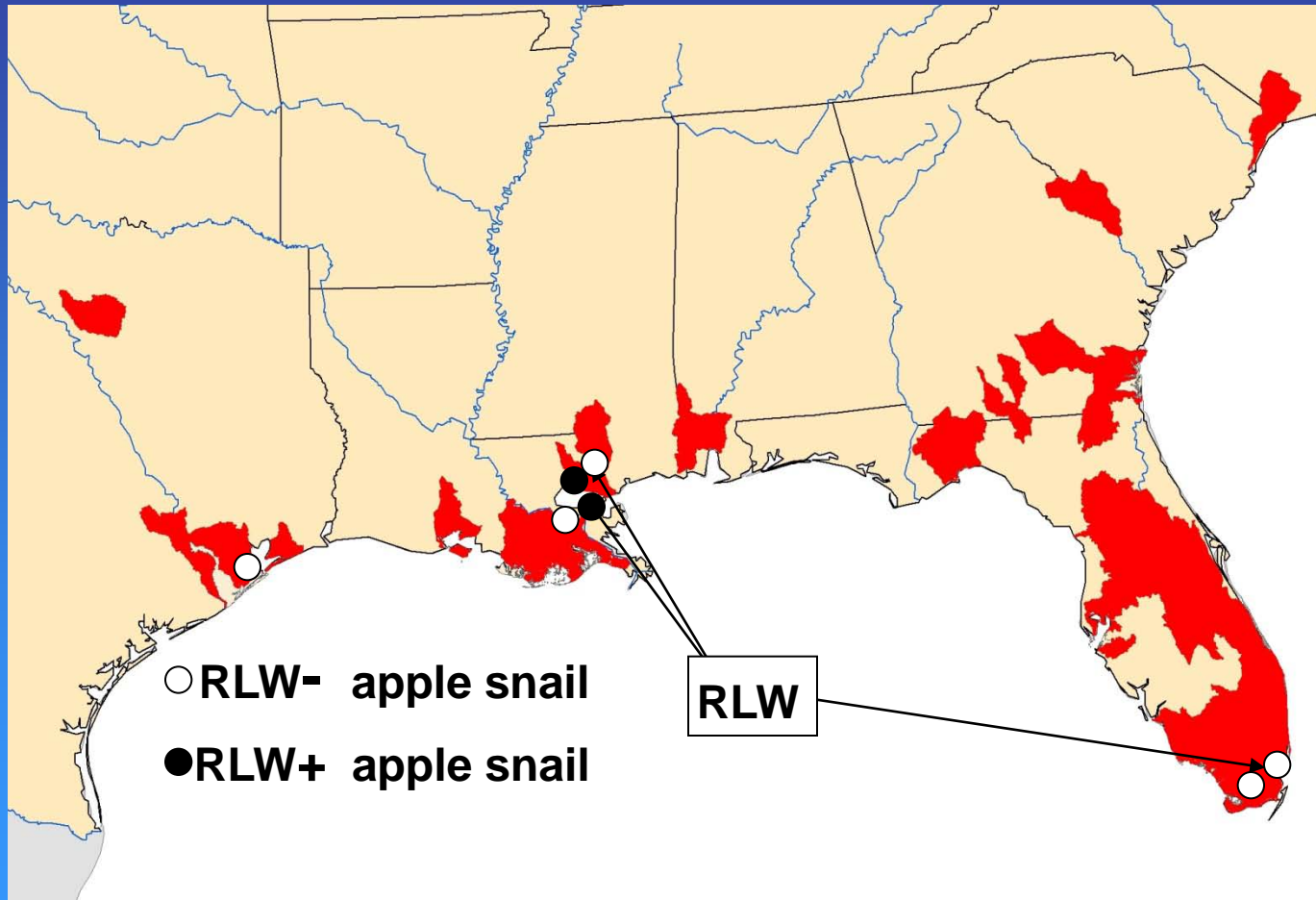


A. cantonensis (RLW) Distribution in Gulf States



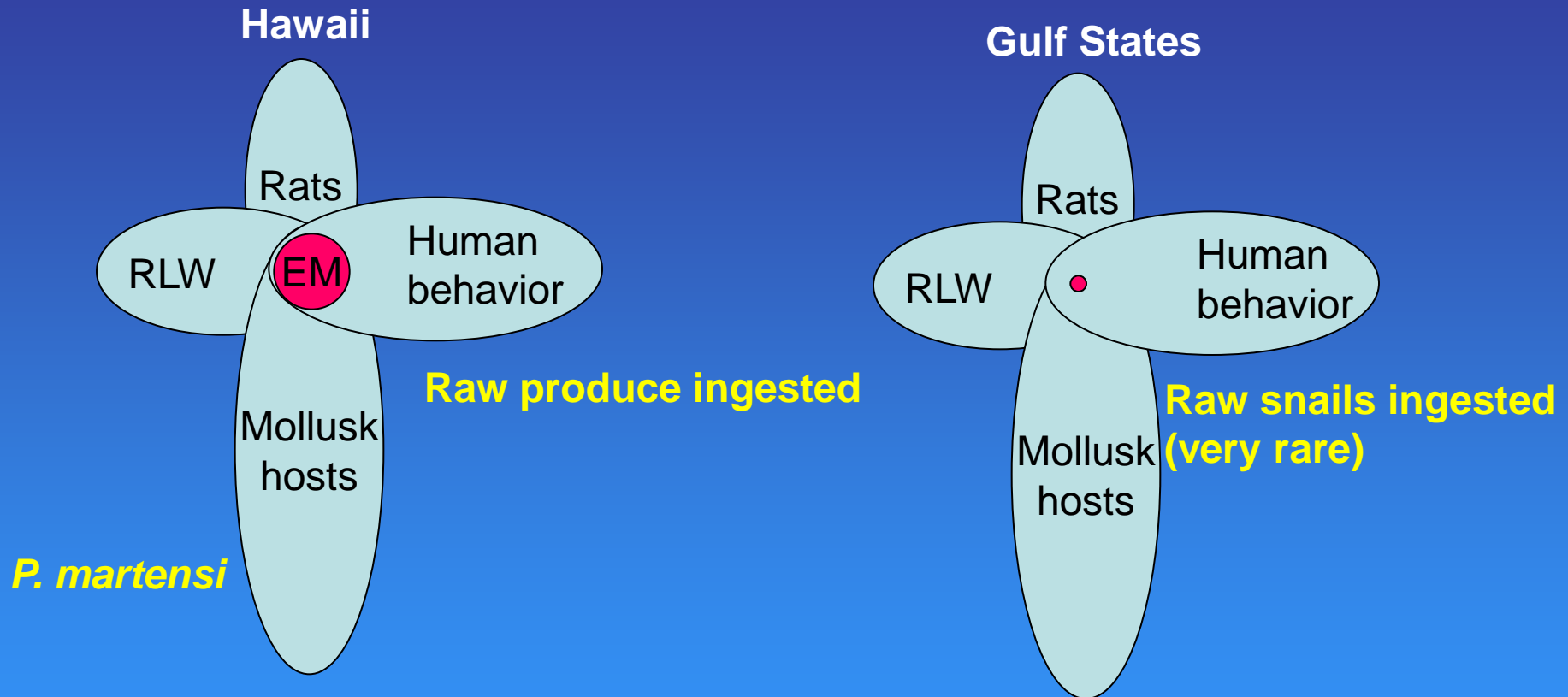
Qvarnstrom Y, da Silva AC, Teem JL, Hollingsworth R, Bishop H, Graeff-Teixeira C, da Silva AJ. (2010)

RLW Only Detected Thus Far in the Gulf States Within Louisiana Populations of *P. insularum*



Qvarnstrom Y, da Silva AC, Teem JL, Hollingsworth R, Bishop H,
Graeff-Teixeira C, da Silva AJ. (2010)

The Incidence of Eosinophilic Meningitis Differs in the Gulf States vs. Hawaii



Disease results from different contributing factors in each region. The presence of *P. martensi* may represent an important factor in the higher incidence of disease in Hawaii relative to the Gulf States.

What are the Options for Eradicating Mollusk Hosts as a Means of Reducing the Incidence of Disease?

Physical

- traps, baits

Chemical

- molluscicides

Biocontrol

- predators or pathogens
- genetic biocontrol
 - sterile-release
 - radiation induced steriles
 - triploid steriles
 - translocation heterozygotes
 - autocidal release
 - sex ratio distortion
 - Daughterless
 - Trojan Y Chromosome

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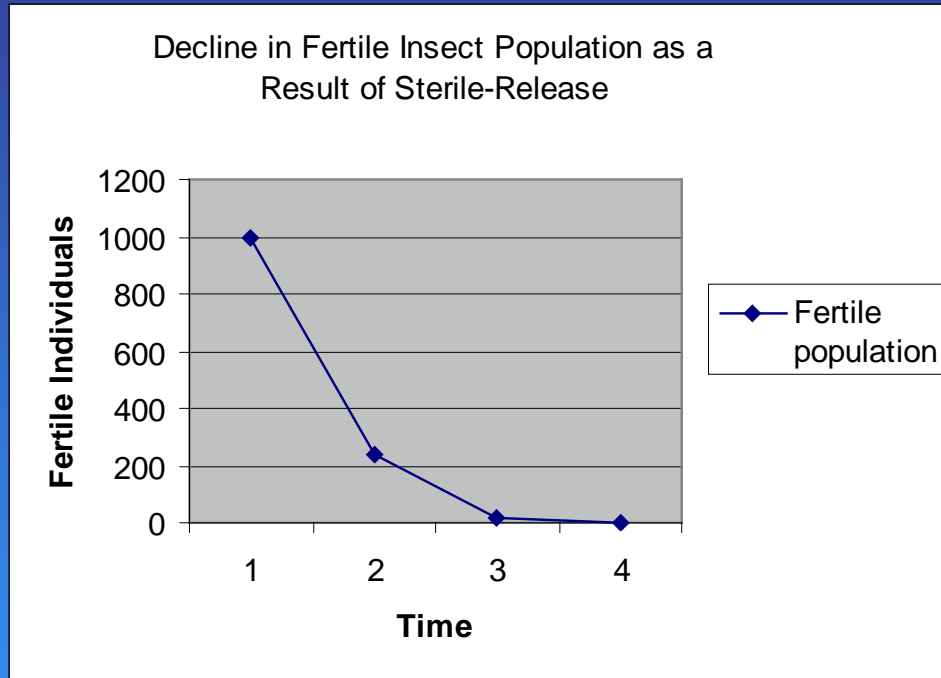
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Currently under development for apple snails (*P. insularum*)

Sterile-Release Technique Requires a 10-fold Excess of Steriles Compared to Fertiles



Initial population= 1,000

Steriles added= 10,000 /gen

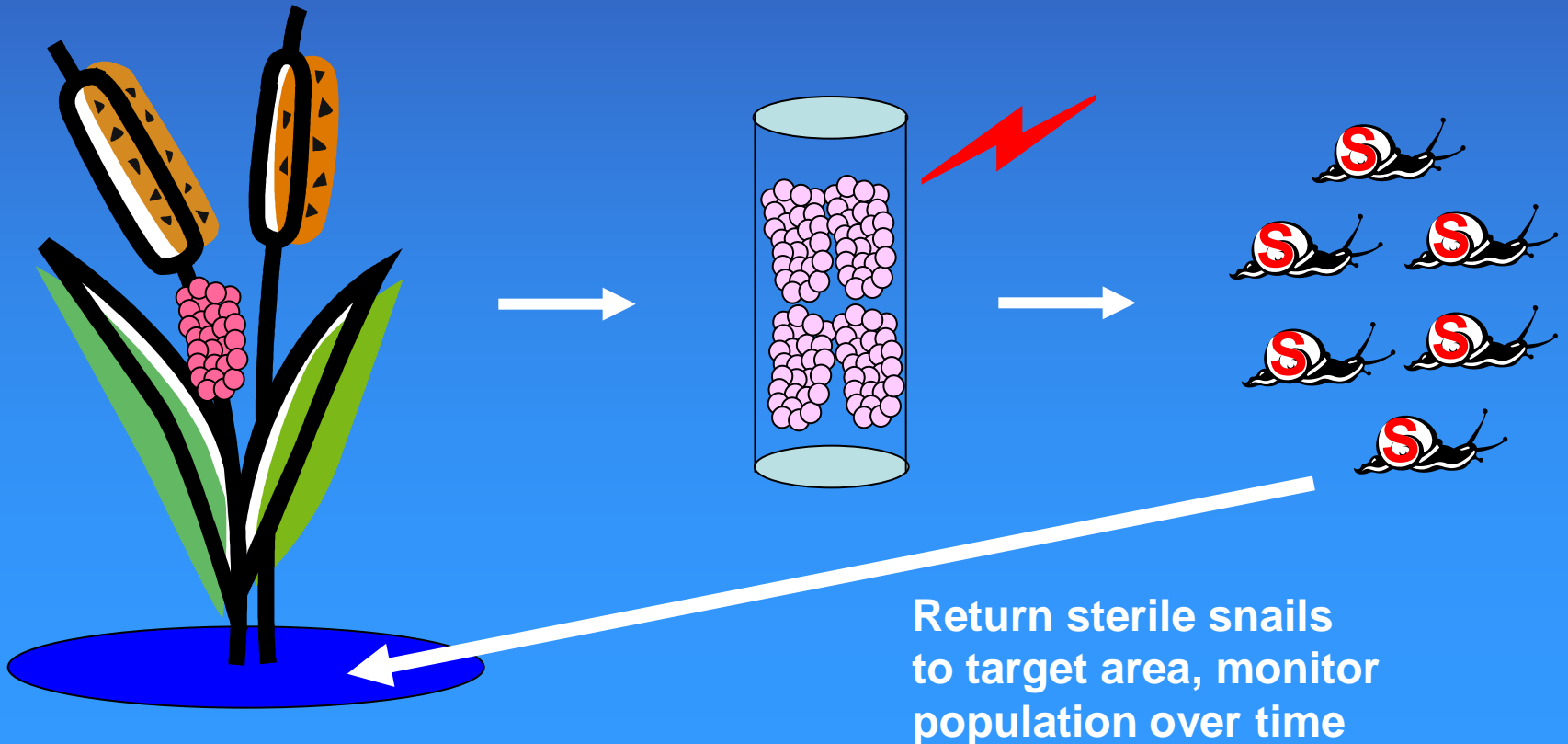
If a 10-fold excess of sterile individuals are released, the Knippling model predicts the population should go to extinction within three generations.

Proposed Sterile-Release Procedure for Channeled Apple Snails

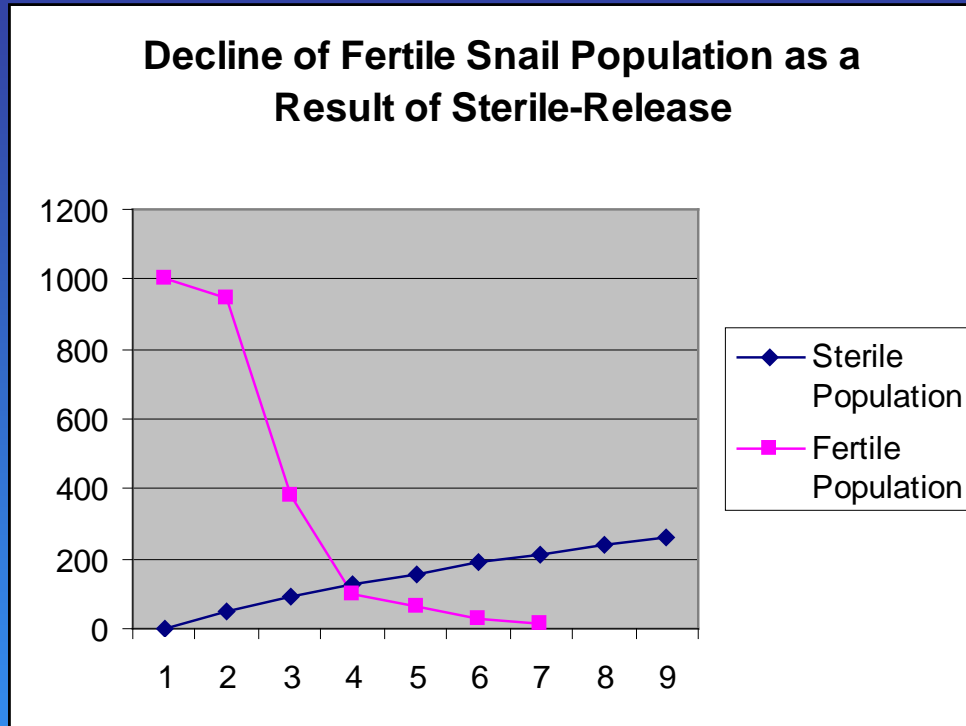
Collect egg masses from target area

Irradiate

Hatch



Egg collection reduces the number of sterile snails required for extinction

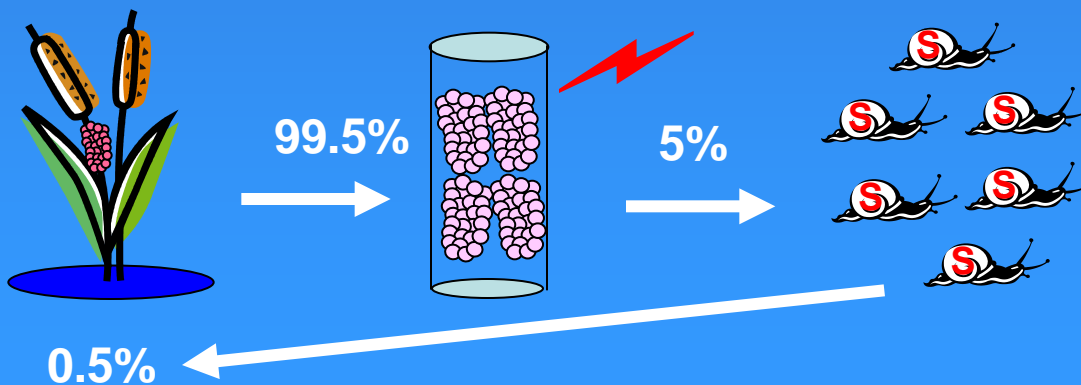


Initial population= 1,000

Steriles added= 50 /gen

New recruitment reduced by egg collection (99.5% efficient)

Survival of irradiated snails is low (~5%). However, extinction will eventually occur as the initial population dies off and is replaced with a 10-fold excess of steriles (assuming equal fitness).



Triploid sterile snails may present an alternative to irradiated snails for sterile-release

Collect egg masses from target area



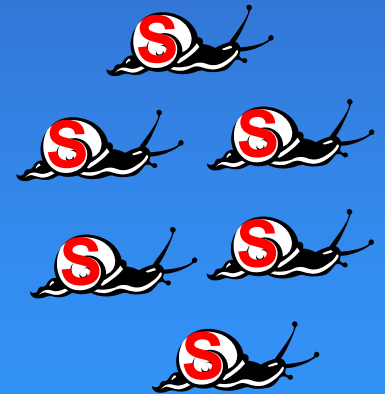
Triploid
 $4n \times 2n$



$3n$



Hatch



Return sterile snails to target area, monitor population over time

Conclusions

- Sterile-release may provide a means to control apple snail populations if
 - the population is relatively well-contained
 - eggs can be collected from the site efficiently
- The development of triploid snails would provide a means to generate sterile snails without the high mortality associated with irradiation.

Conclusions

- RLW is present in *P. insularum* apple snail populations in the Gulf States, but infection is not widespread. Consumption of snails is low, so incidence of disease is low.
- *P. martensi* is not yet present in the Gulf states, but could increase the incidence of disease if introduced and established.
- Future research is needed to understand the reproductive biology of host snails and slugs, and their pathways of introduction to new locations.