back inside

Thinking ~~Outside~~ the Box

old

Applying ~~New~~ Technology to the Eradication of Invasive Species

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Sterile Insect Technique

-Devised by Knipling in 1950's as a means to eradicate pest insects

-Used to control a variety of agricultural insect pests

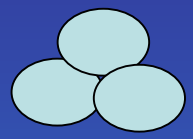
-screw worms eradicated from the island of Curacao and southern USA

-exotic fruit flies in Florida and California

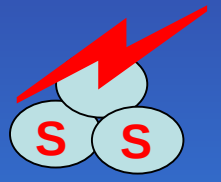
-Requires a dedicated facility for sterile insect production

Sterile Insect Technique

Rear large numbers of insect eggs at a production facility



Irradiate insect eggs at the dose required to induce reproductive sterility



Hatch and distribute an overwhelming number of sterile insects over the target area

♀ x ♂

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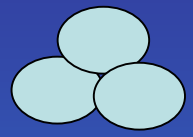

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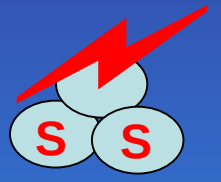
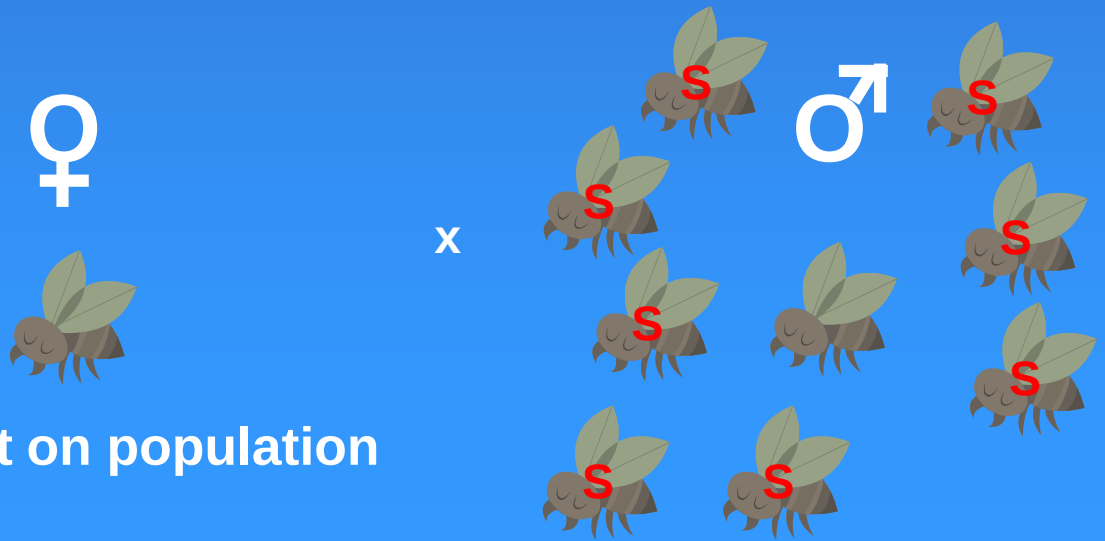


Hatch irradiated insects and distribute an overwhelming number of sterile individuals over the target area

Increase the frequency of nonproductive matings

♀ x ♂



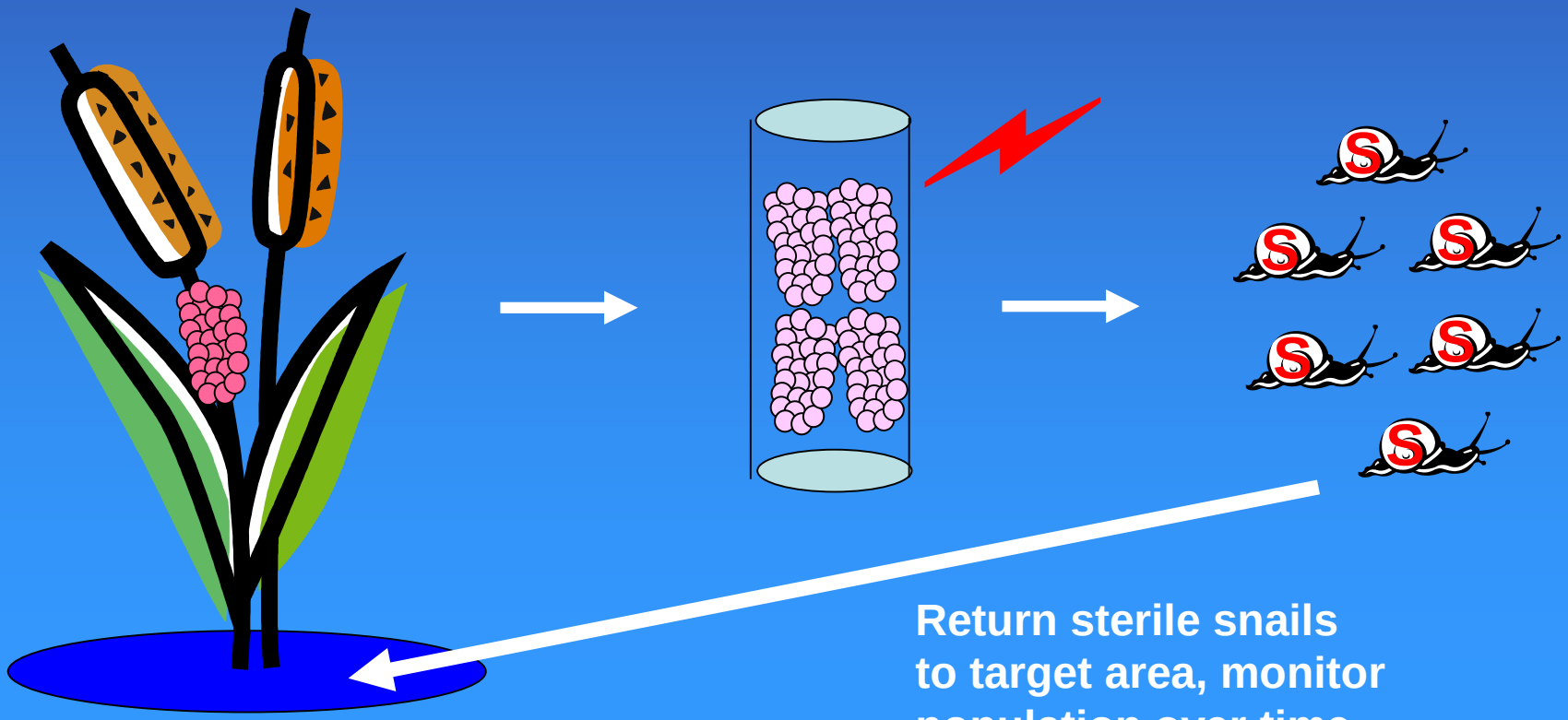
Measure the effect on population

Proposed Sterile-Release Procedure for Channeled Apple Snails

Collect egg masses from target area

Irradiate

Hatch

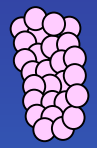


Return sterile snails to target area, monitor population over time

Channeled Apple Snail

Sterile ~~Insect~~ Technique

Collect ~~Rear~~ large numbers of ~~insect~~ snail eggs at ~~a production facility~~ the target site



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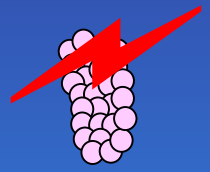


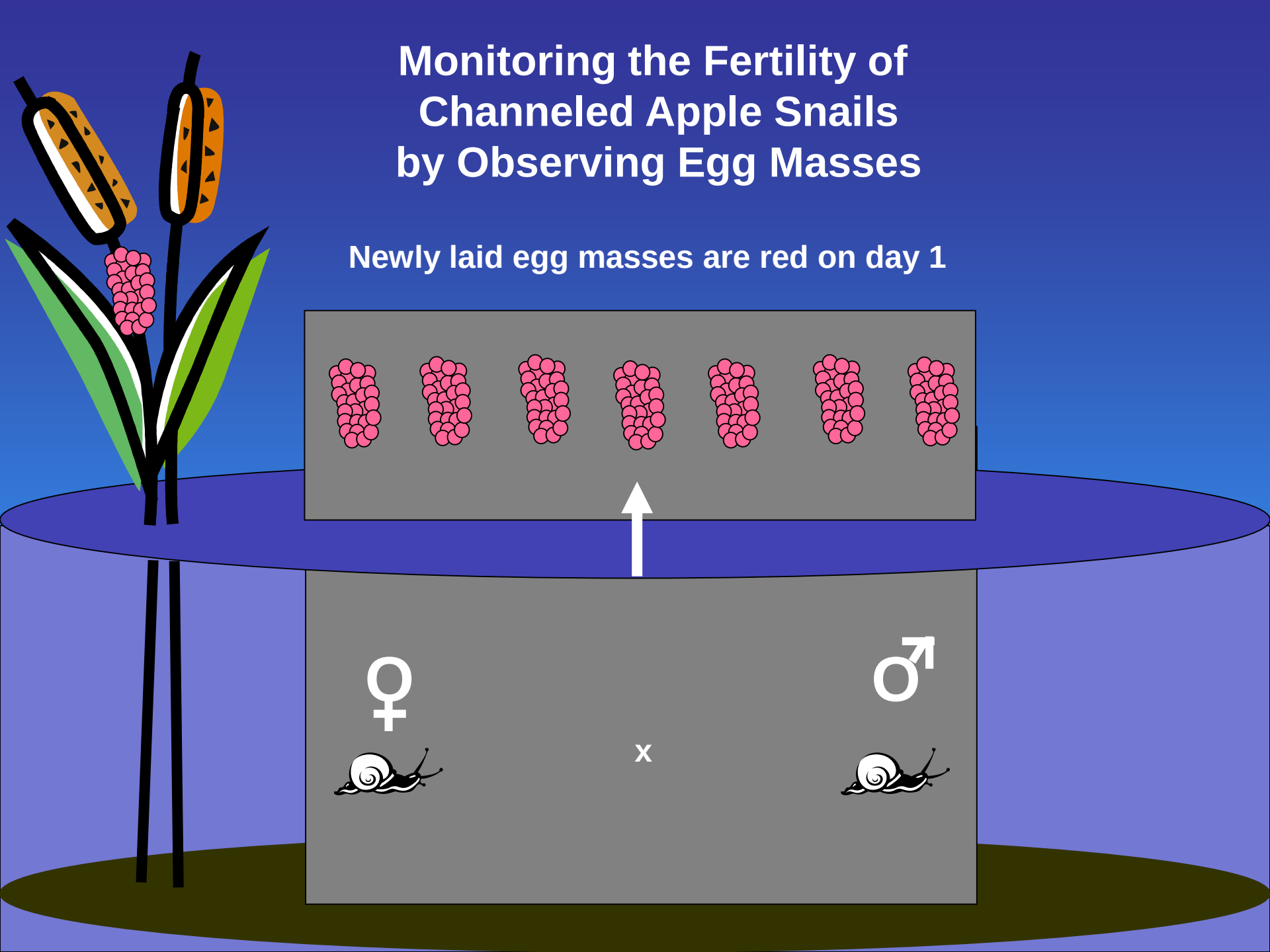
~~Hatch irradiated insects~~ snails and distribute ~~an overwhelming~~ return the same number of sterile individuals over the target area

Increase the frequency of nonproductive matings

Measure the effect on population

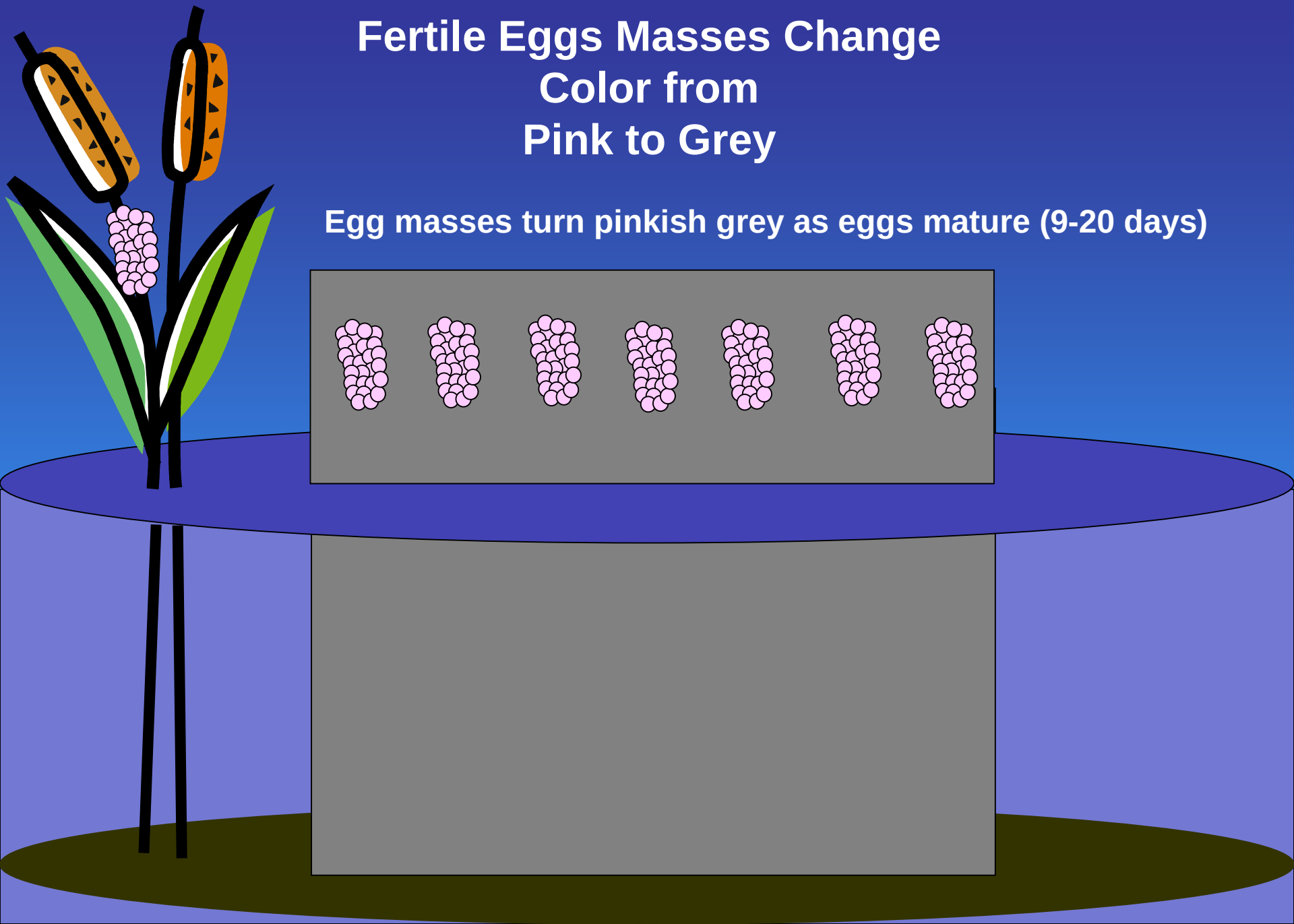
Monitoring the Fertility of Channeled Apple Snails by Observing Egg Masses

Newly laid egg masses are red on day 1

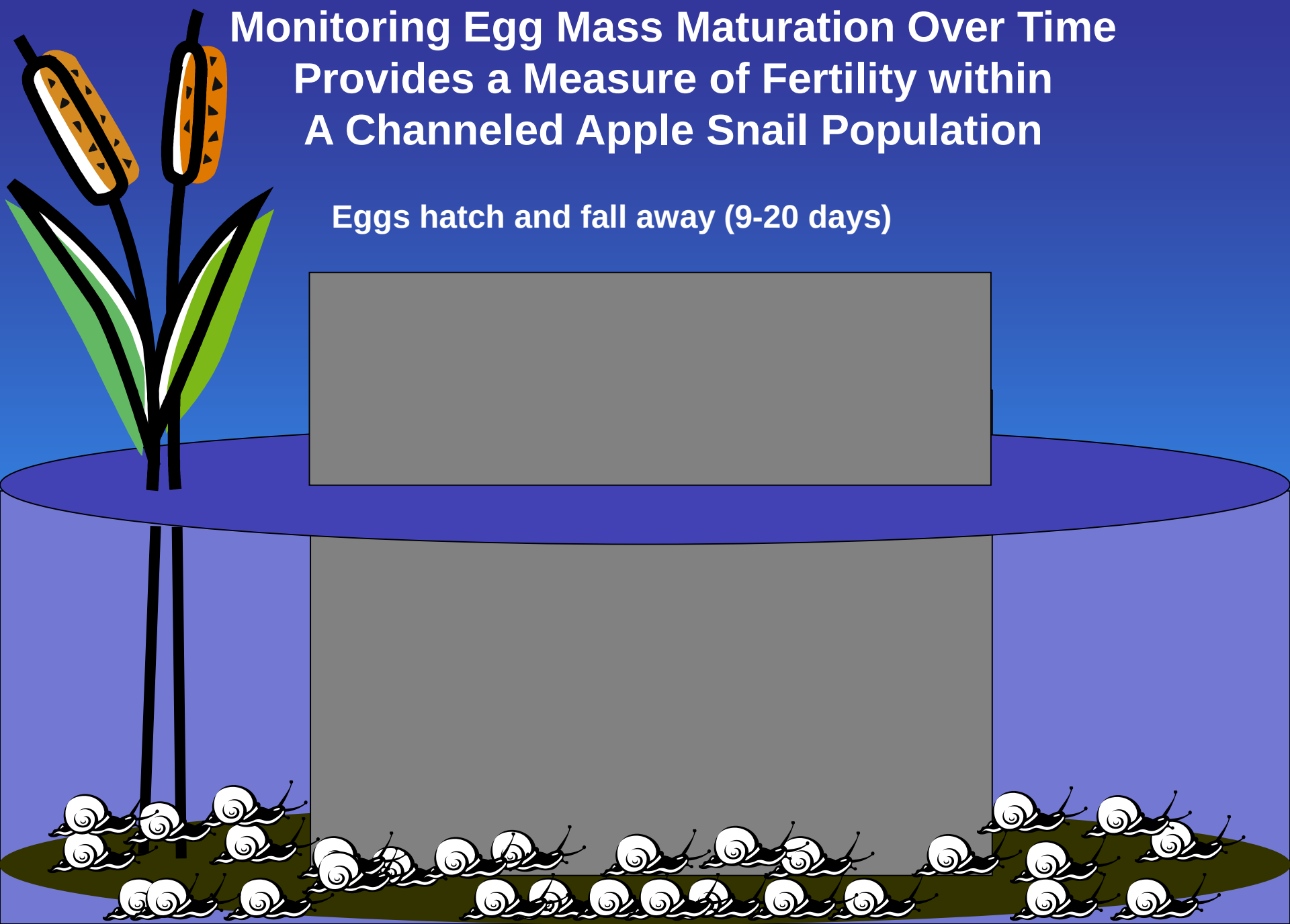


Fertile Eggs Masses Change Color from Pink to Grey

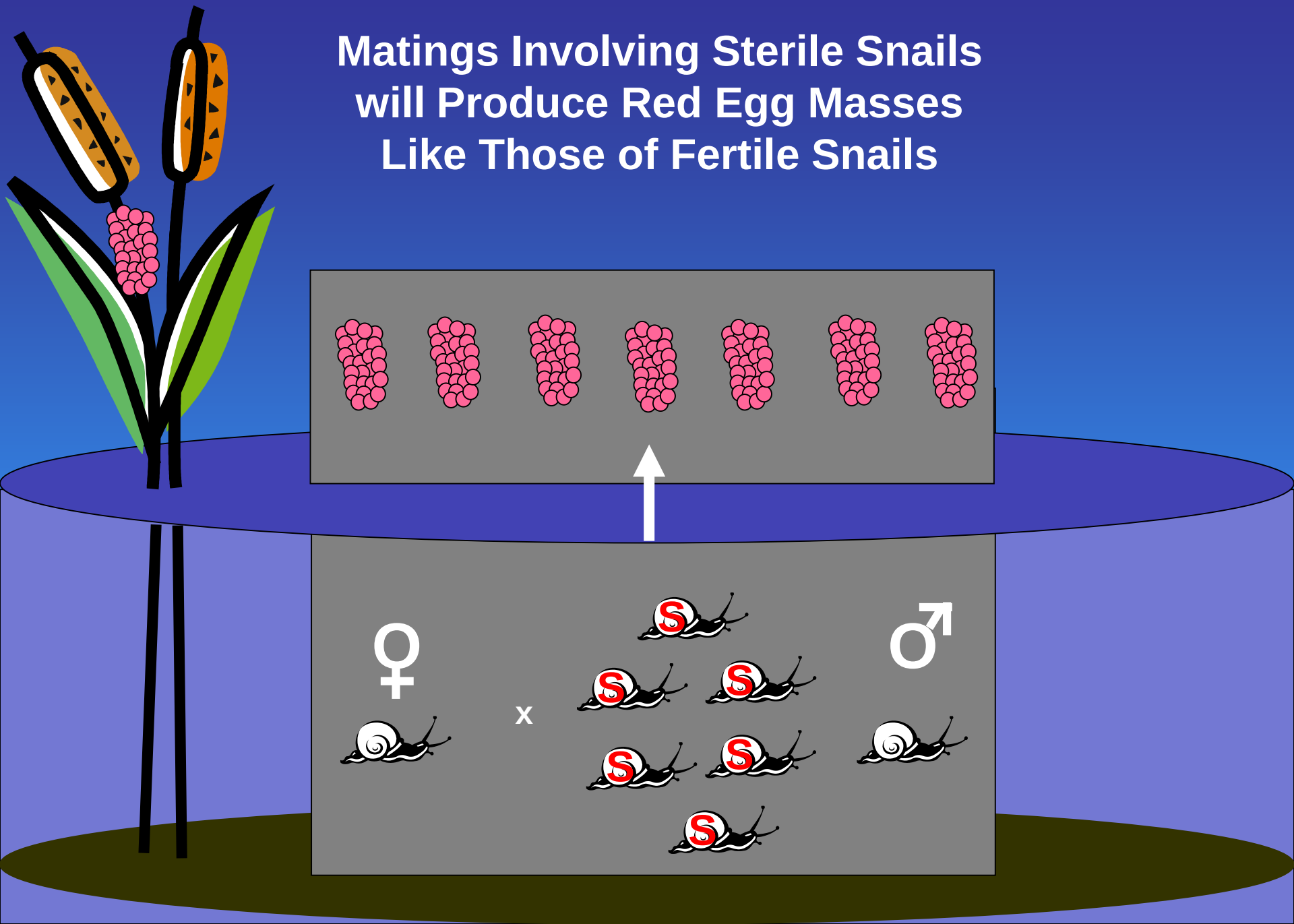
Egg masses turn pinkish grey as eggs mature (9-20 days)



Monitoring Egg Mass Maturation Over Time Provides a Measure of Fertility within A Channeled Apple Snail Population

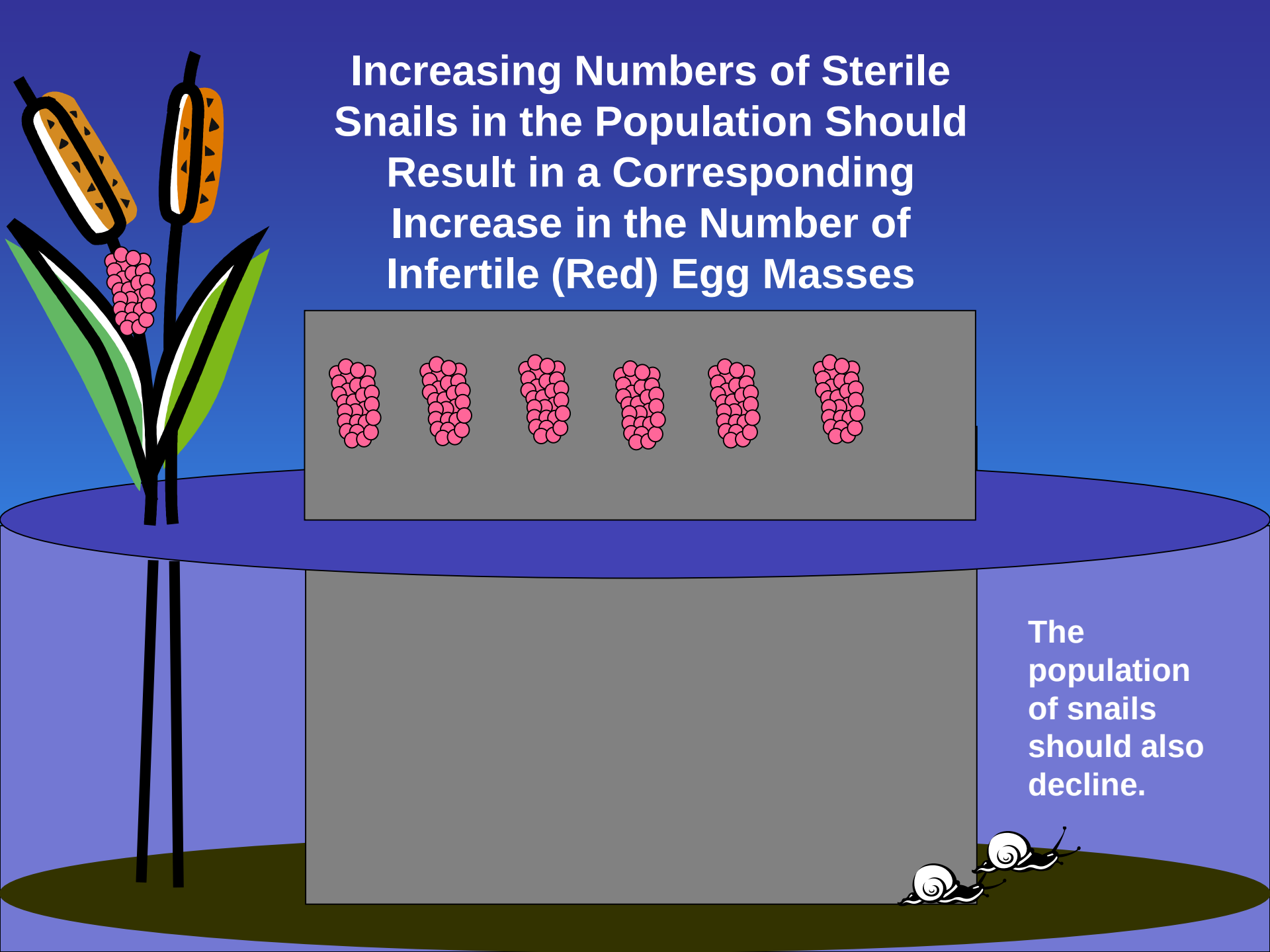


Matings Involving Sterile Snails will Produce Red Egg Masses Like Those of Fertile Snails



Egg Masses from Sterile Snail Matings Will Fail to Mature and Will Not Change Color

Increasing Numbers of Sterile Snails in the Population Should Result in a Corresponding Increase in the Number of Infertile (Red) Egg Masses



The population of snails should also decline.

Possible Site for CAS Sterile-Release

- Small lake, within fifty miles from Okeefenokee Refuge, a priority for USFWS.

- Able and willing collaborators in GA: Department of Natural Resources Lake Lure Homeowners Assoc.

- Egg masses can be sent to FDACS in Gainesville, FL for irradiation, then returned to Lake Lure.

Alma, GA

75

Okeefenokee Refuge

95

Tallahassee

295

Jacksonville

10

RIVER

Alternative Site for CAS Sterile-Release

Advantages:

1. Water quality of the pond is important to several local organizations that may offer funding support:

- **Leon County**
- **Fl. Department of Environmental Protection**
- **Northwest Florida Water Management District**
- **City of Tallahassee**
- **FL. Department of Transportation**

2. Eggs can be collected from barrier wall within pond. The wall additionally allows masses to be easily monitored.

3. Egg collection and population studies can be done by Tallahassee FDACS staff.

Conclusions

A sterile-release strategy for eradication has historically been limited to agricultural pests, but may be appropriate for invasive species in some cases.

A cost-effective sterile release program for channeled apple snails could involve -

- collecting eggs from the target site for irradiation (instead of producing them in a production facility)

- monitoring population decline by observing egg mass production at the target site

- targeting areas where stakeholder involvement contributes effort and support