

Reproductive Sterility as a Tool for Prevention and Control of Invasive Aquatics

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**USDA currently allows only *P. brigesii* to be sold
and shipped in the US**



Pomacea brigesii

Will leave aquatic plants intact

Produced in Florida

**Some established populations
recorded in USGS database**



Asolene spixi

Will eat aquatic plants

No longer in trade

**No established populations
recorded in USGS database**

Can reproductively sterile *P. brigesii* and *A. spixi* be produced as new ornamental snail products?



Pomacea brigesii

Sterile *P. brigesii* could be sold without any requirement for USDA approval.

Is there a potential market for sterile *P. brigesii*?

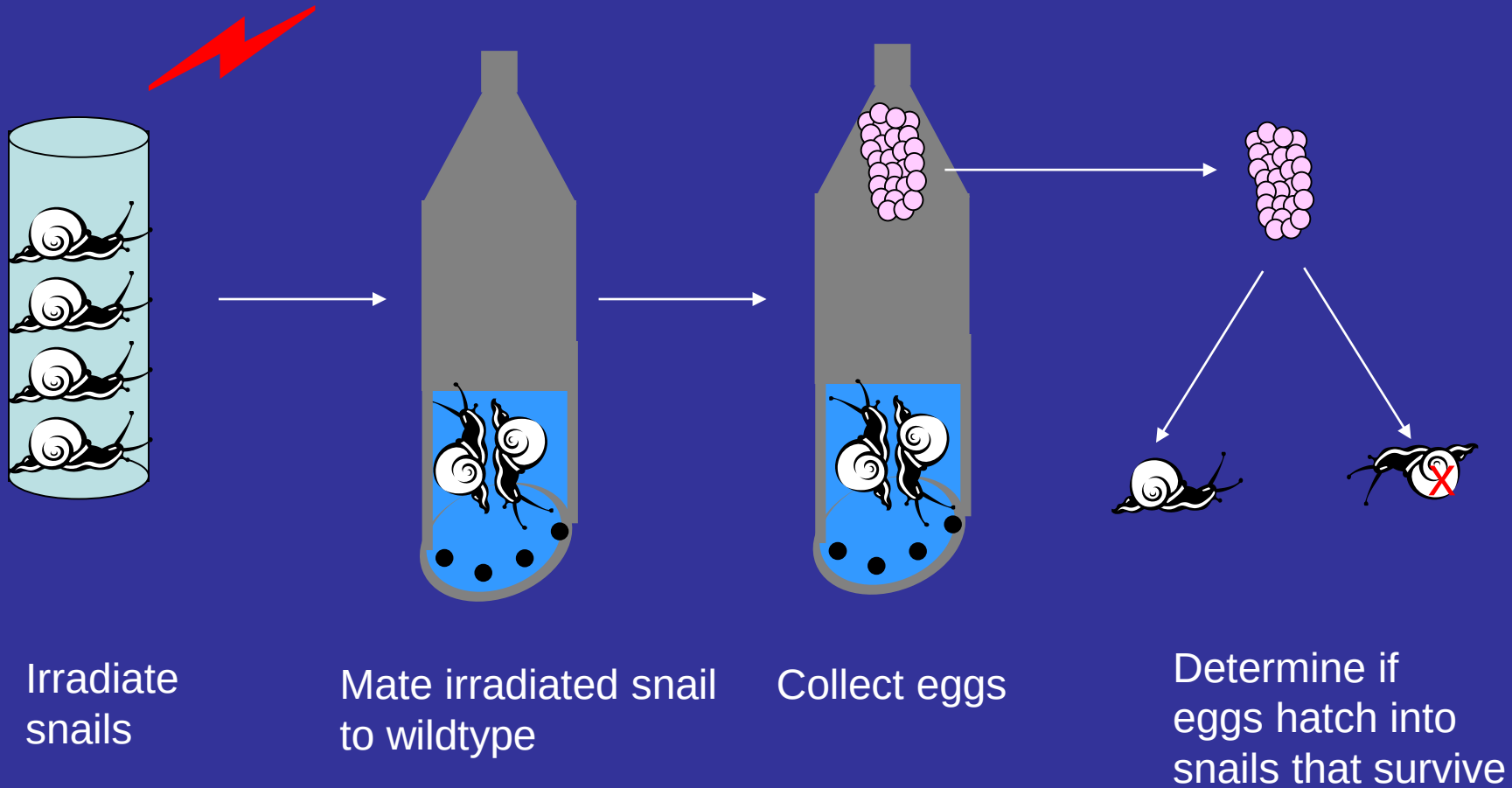


Asolene spixi

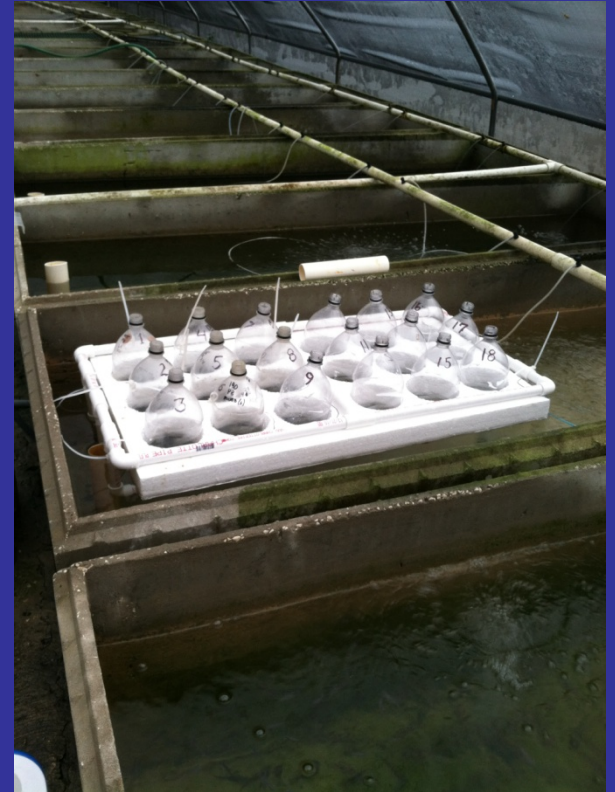
Sterile *A. spixi* cannot be sold without USDA approval.

Is there a potential market for sterile *A. spixi*?

What dose of radiation (x-rays) will render snails reproductively sterile?

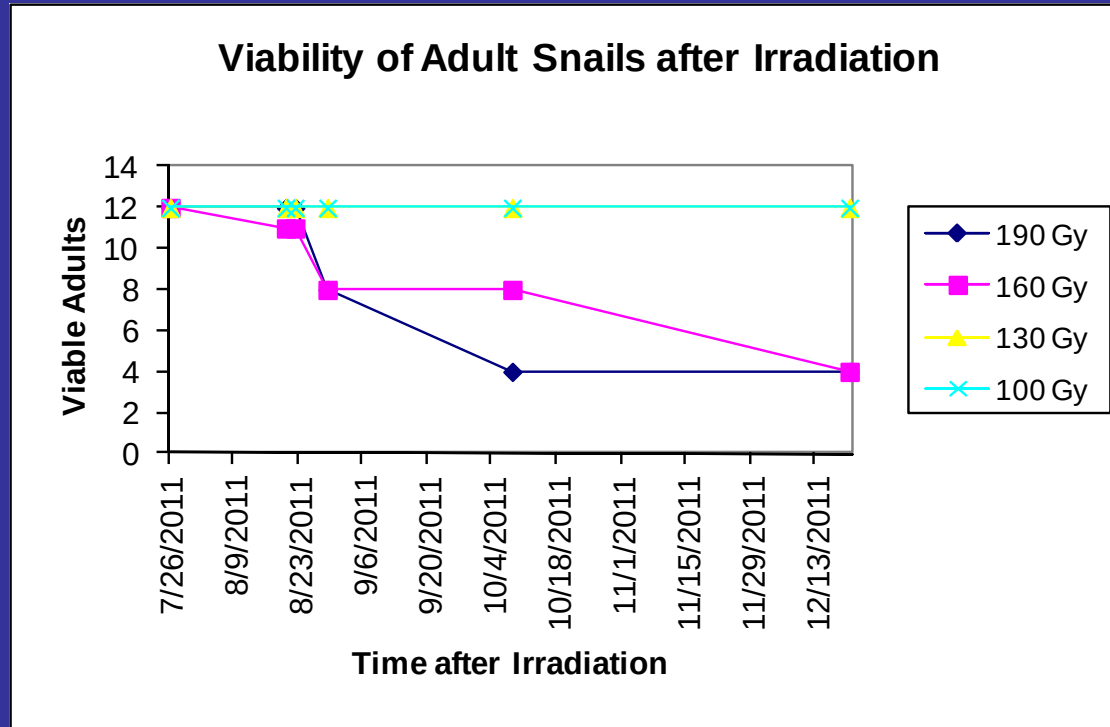


Aquaculture Industry Participation



Dave Rawlins of Rawlins Tropical Fish Farm monitors the snail mating chambers and makes fertility assessments.

Viability of Irradiated *P. brigesii* Adults Decreases at Doses of Radiation Above 130 Gy.



Fertility is reduced in irradiated snails in two ways:

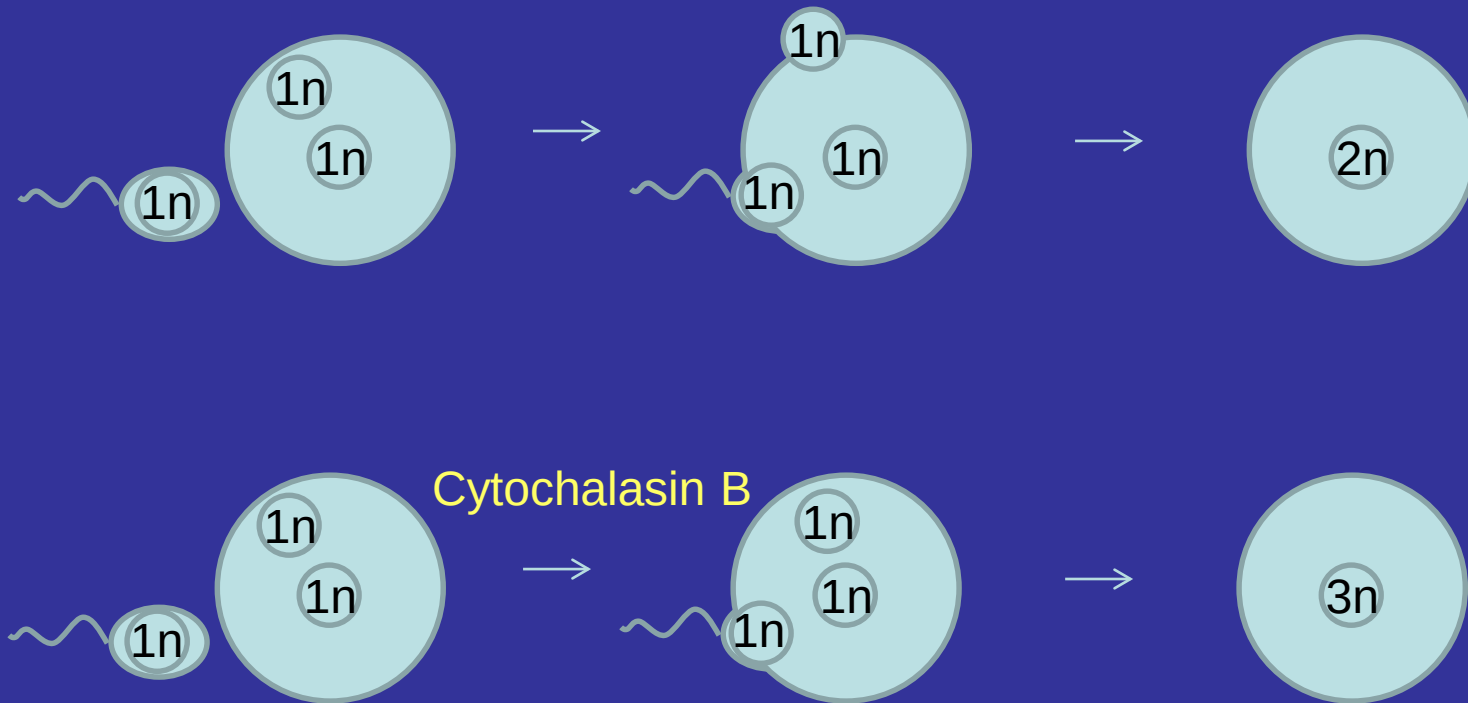
1. Egg production is decreased
2. Fertility of eggs is reduced

Genetic Alternatives to Radiation to Produce Sterile Snails

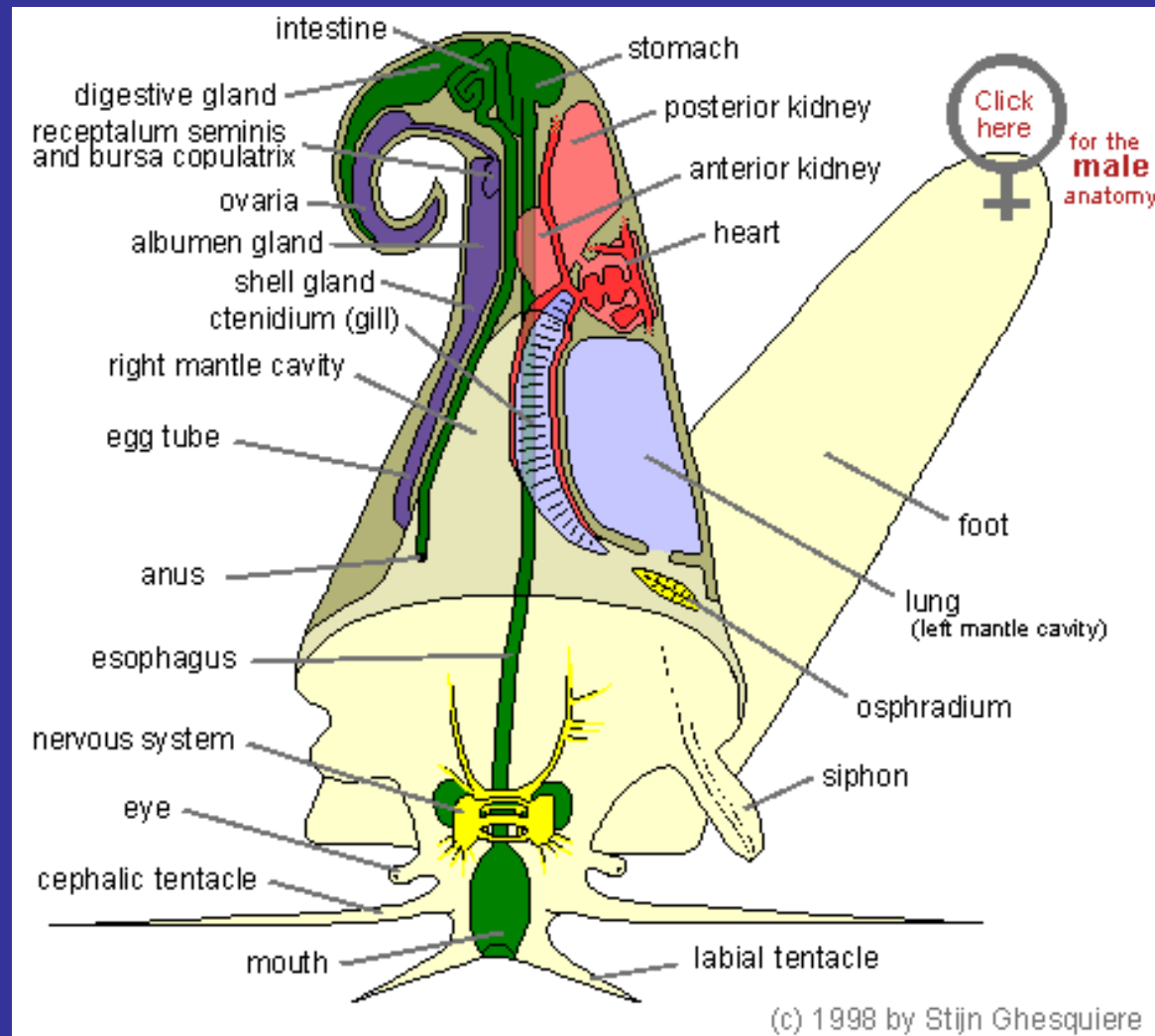
1. Triploidy

2. Chromosomal Translocations

Drug Intervention During Fertilization to Produce Triploids



Fertilization is Internal In Apple Snails, Complicating the Use of Drug Treatments to Produce Triploids.



Mating Snails Provide a Source of Zygotes for Drug Intervention to Induce Triploidy



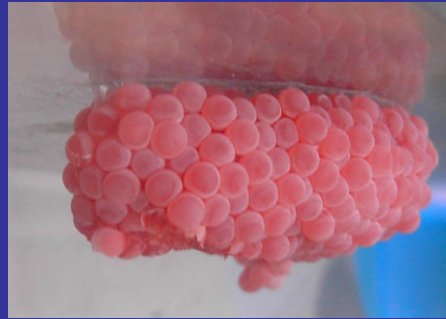
Photo Jess Van Dyke

If Triploids are Produced Following Fertilization, They Should be Detectable in the Egg Mass

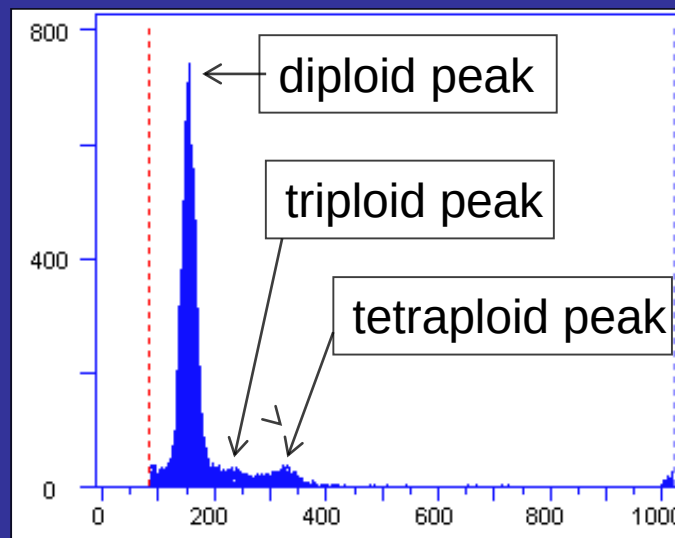
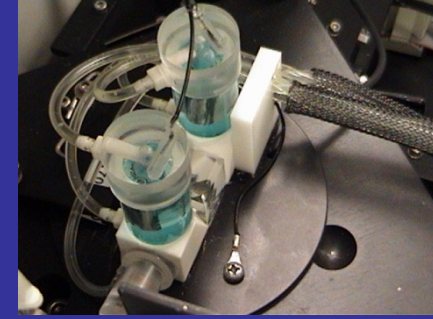
Drug treat
mating snails



Harvest eggs



Analyze eggs
by flow cytometry

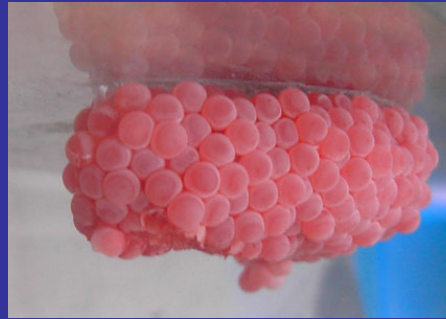


Can Triploids be Induced by Drug Treatment of Post-fertilization Zygotes within Mating Snails?

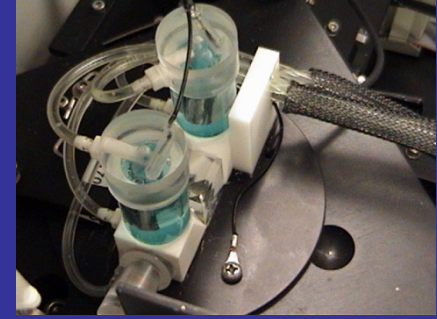
Drug treat
mating snails



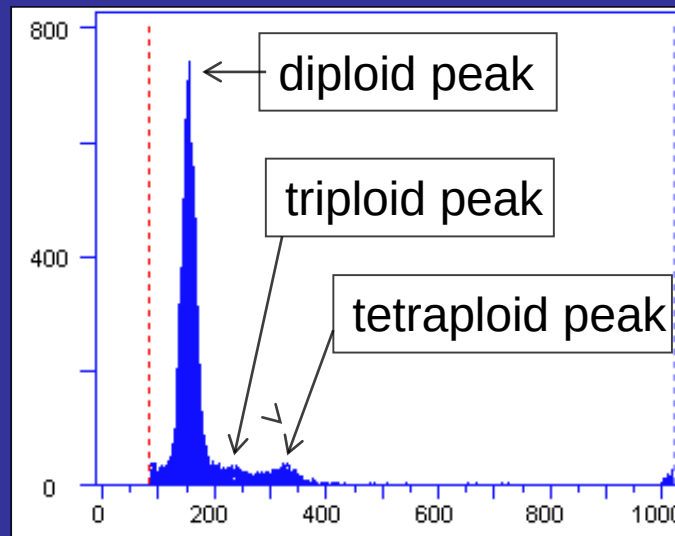
Harvest eggs



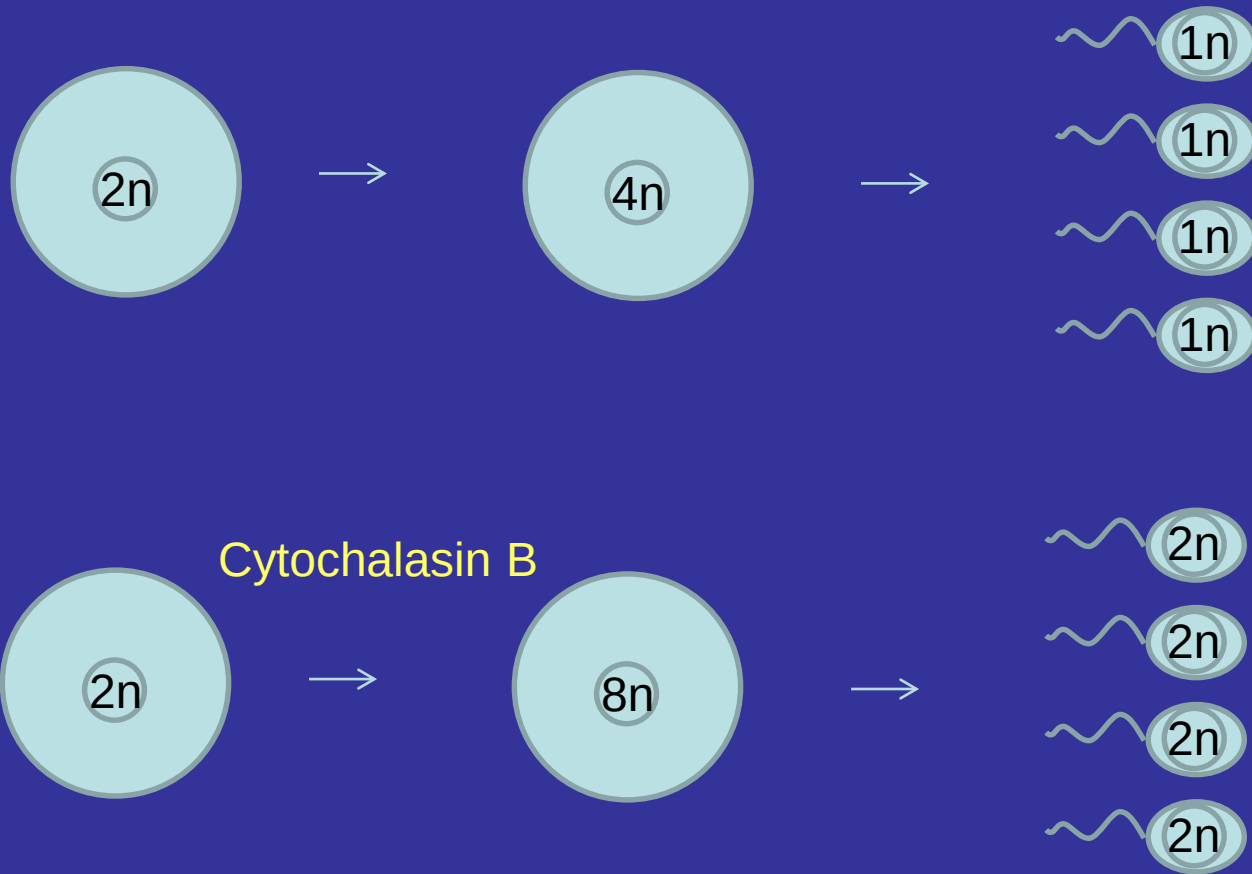
Analyze eggs
by flow cytometry



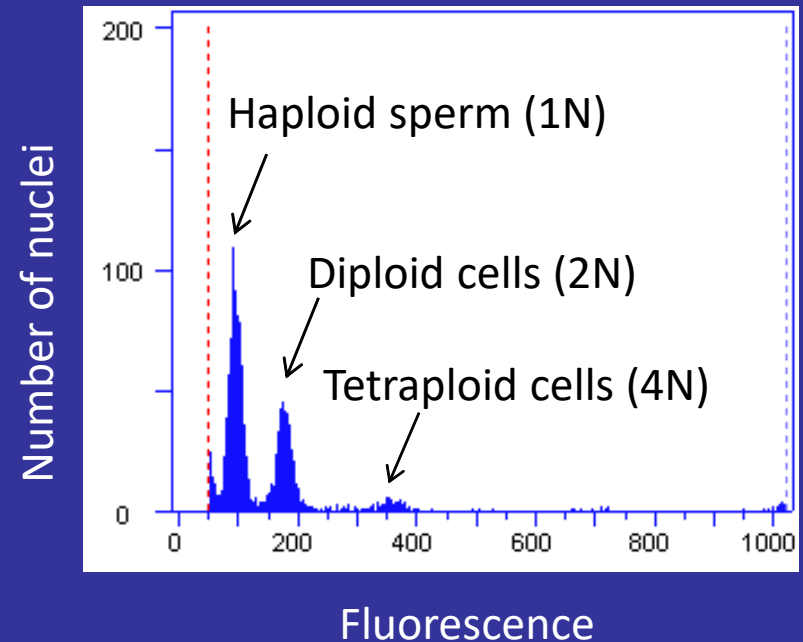
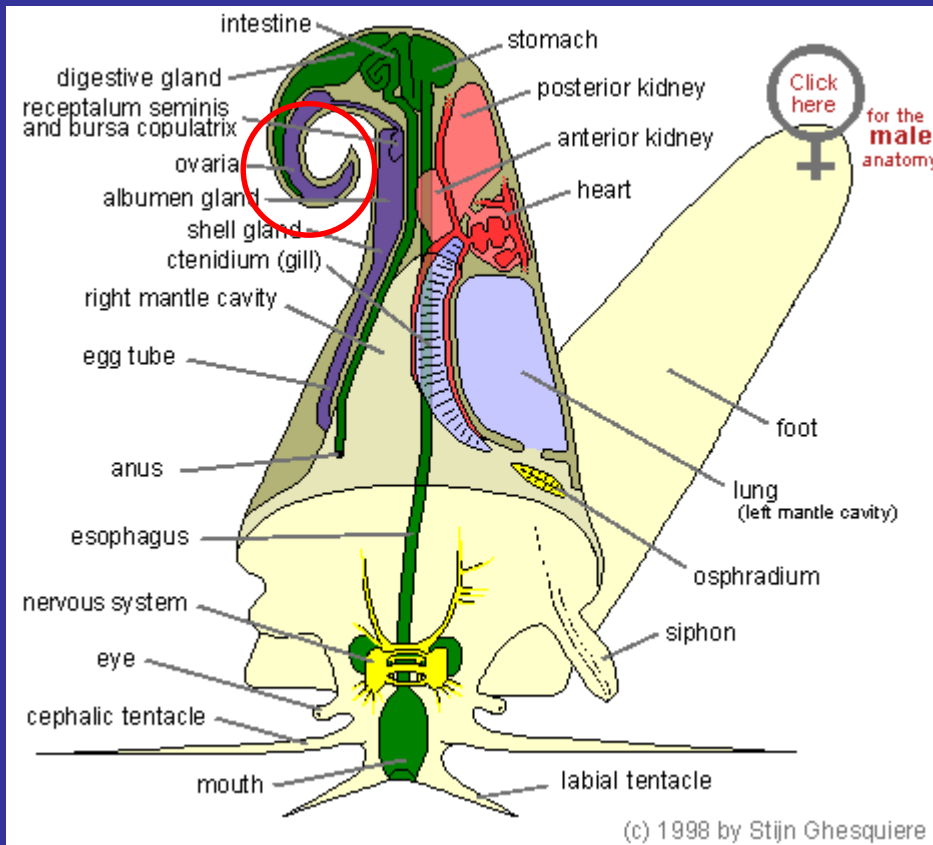
No triploids
observed in
egg masses



Drug Intervention During Gametogenesis to Increase Ploidy

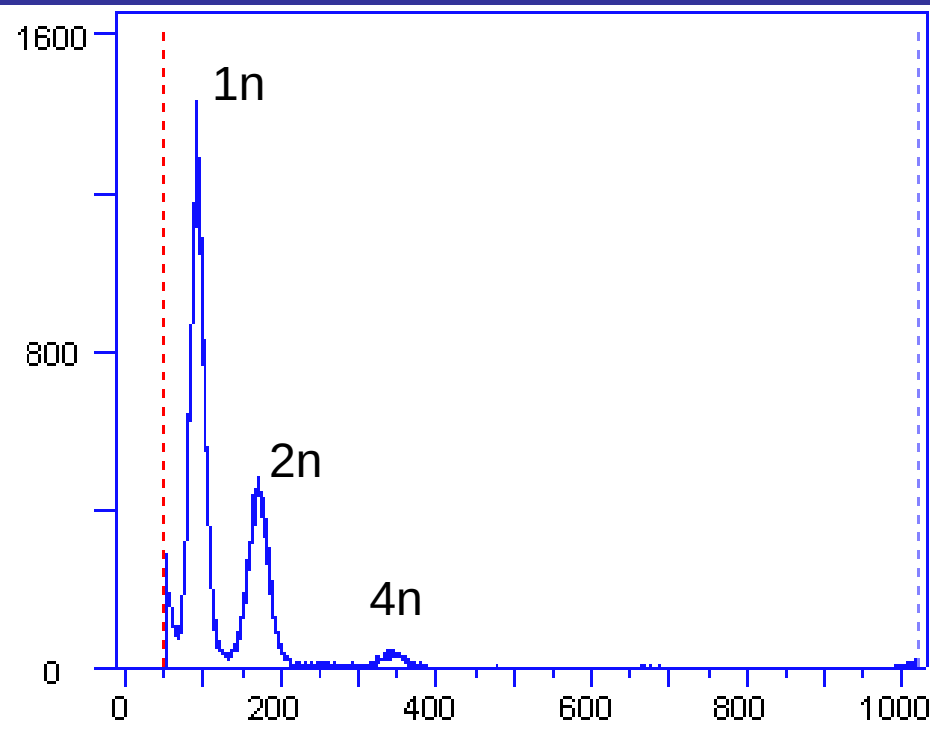


Can the Cells in the Gonad be Treated with Drugs to Induce Ploidy Changes in Gametes?

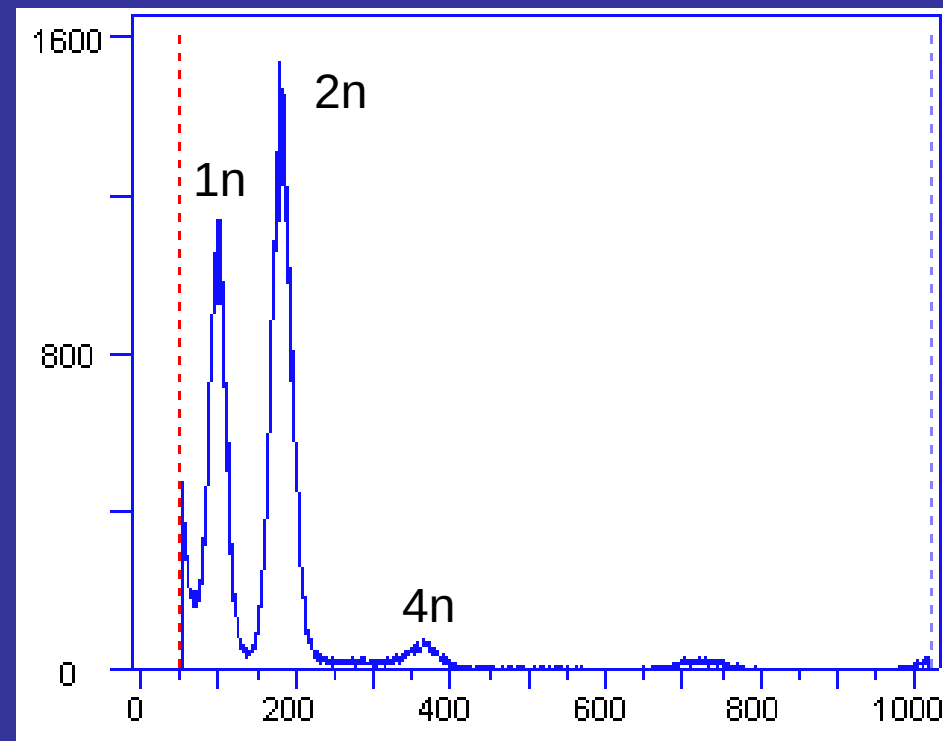


Drug Intervention Results in Detectable Changes in the Ploidy Distribution of Cells In the Gonad

Before drug treatment



After drug treatment



Additional work is required to determine whether these changes reflect a change in the ploidy of sperm

Conclusions

No triploids have been generated yet, however more work is needed to determine whether gonadal drug treatment could be a potential route to produce triploid apple snails.

Fertility and viability is being assessed in irradiated *P. brigesii* .

A. spixi irradiation dose determination experiments are underway.