



Exotic Apple Snails in Florida

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Topics

- Background
 - *Pomacea* in Florida
 - Introduction/Distribution
 - Morphology
 - Biology
- Impacts
 - Vegetation
 - Native Apple snails
 - Snail kite
- Conclusions/Recommendations

Pomacea spp. in FL

- Florida has 1 native apple snail species and at least 4 introduced species



*Pomacea
paludosa*





Spike top*



Island*



Channeled



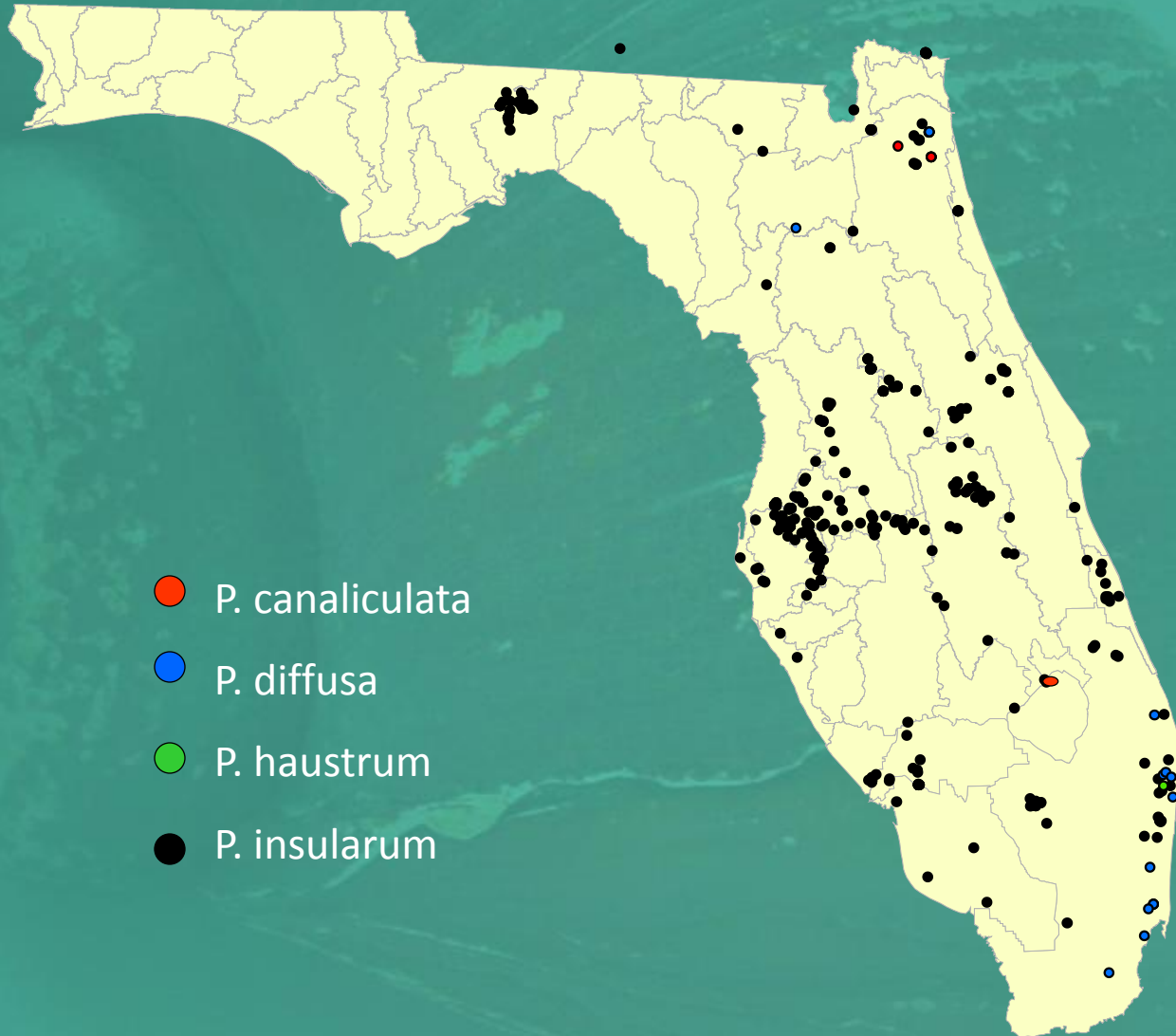
Titan



Introduction/Distribution

- Native to South America
- Introduced globally
 - Aquarium trade
 - Biocontrol
 - Food
- Widely distributed in the southern U.S. and Florida

Florida Distribution

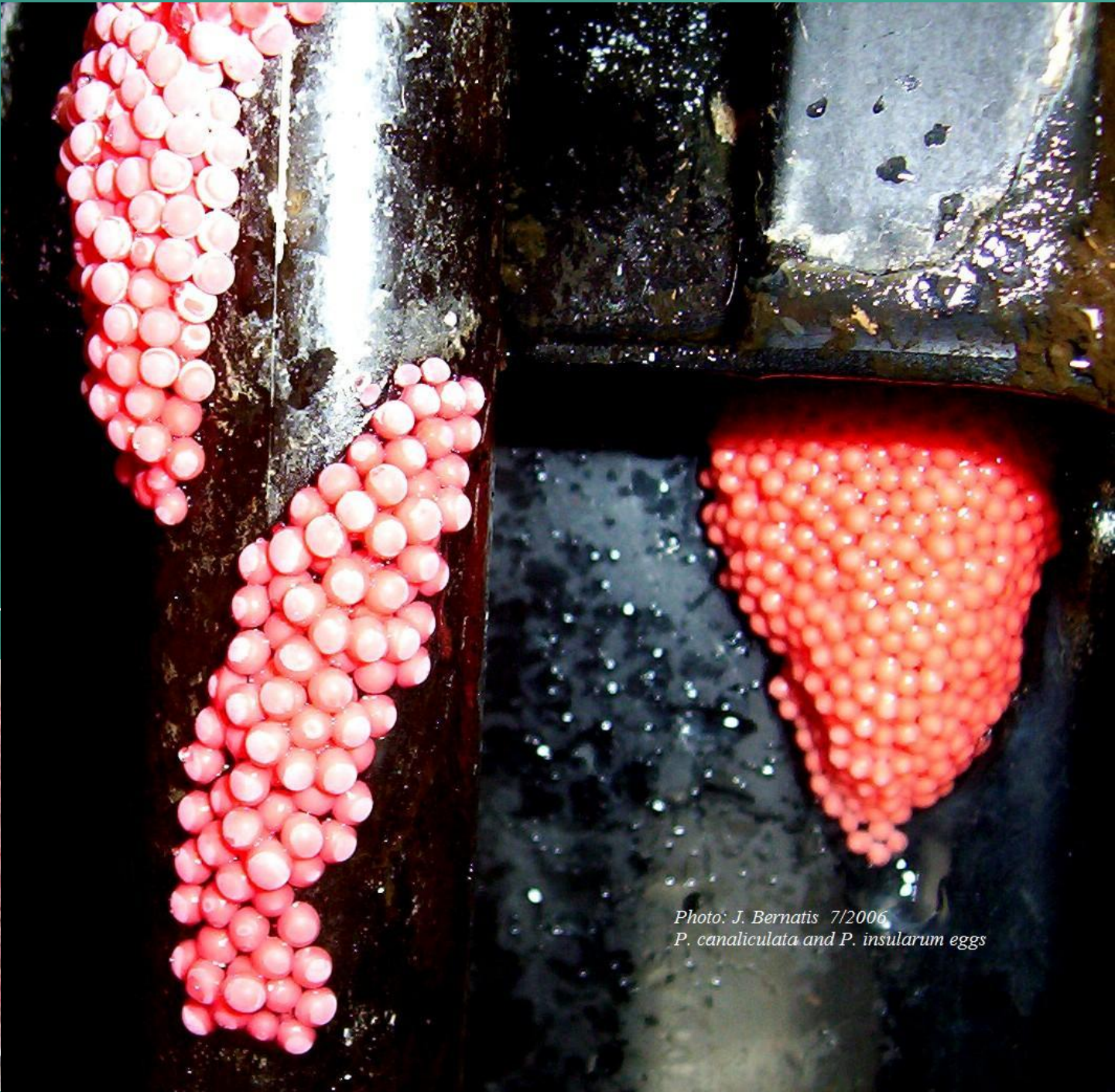


Morphology



SH





Islar

adosa

Photo: J. Bernatis 7/2006
P. canaliculata and *P. insularum* eggs

Biology

	Island (<i>P. insularum</i>)	Channeled (<i>P. canaliculata</i>)	Native (<i>P. paludosa</i>)
Average age	3-4 years	3-4 years	12-18 months
Reproductive age	6 weeks	6 weeks	2-3 months
Eggs per clutch	800 – 1,200	200 – 600	40 -70
Season	> 74° F	> 74° F	March - October
Length to hatch	8 – 24 days	7- 24 days	18-28 days
# clutches/ season	1 per week	1 per week	1 per week
Feeding	Vegetation	Vegetation	Algae
Average size	3.25 – 4 in	2.5 – 3 in	1.5 - 2 in
Environmental Tolerances	medium	highest	lowest

Impacts – Native Apple Snails

- Definitive impacts are currently unknown
- Possible impacts include:
 - Foraging competition
 - Alteration of water quality
 - Predatory behavior
 - Hybridization of the 2 species

Impacts – Snail Kites

- Unknown at this time
- Arguments both pro and con on impacts
 - Lake Okeechobee, possibly a benefit to have the exotic snails
- Snail kites have other “issues”

Impacts - Vegetation

Ranked Feeding Rates of Adult Snails

	Island	Channeled
Hydrilla	1	1
Spatterdock	2	2
Southern Naiad	3	4
Vallisneria	4	3
Bulrush	5*	5*
Pennywort	6	5
Water hyacinth	7	6
Cattail	8	8
Water lettuce	8	7

Impacts - Vegetation

10 Plant Preference Adult and Juvenile Island Apple Snails

	Control	Adult	Juvenile
Hydrilla	509.8 (39.2)	-1835.3 (-141.2)	-1916.3 (-147.4)
Vallisneria	18.3 (1.4)	-1060.2 (-81.6)	-936.1 (-72.1)
Bulltongue Arrowhead	-21.1 (-1.62)	-944.3 (-72.6)	-682.5 (-52.5)
Southern Naiad	153.8 (11.3)	-575.6 (-44.2)	-619.9 (-47.6)
Illinois Pondweed	124.1 (9.55)	-294.4 (-22.6)	-227.6 (-17.5)
Torpedograss	109.1 (8.39)	-181.1 (-13.9)	-116.7 (-8.9)
Bulrush	188.9 (14.5)	-176.6 (-14.0)	-110.6 (-8.5)
Maidencane	30.9 (2.37)	-142.9 (-11.0)	-222.5 (-17.1)
Lemon Bacopa	-50.9 (-3.9)	-137.0 (-11.0)	-76.5 (-5.9)
Spatterdock	678.8 (52.2)	-126.5 (-9.7)	-81.2 (-6.2)
Total growth/consumed	1741.7	5473.9	4989.9
TC per animal		210.5	76.8

All values expressed in grams

Control – is it possible?

Manual Removal of Live Snails and Egg Masses

	Live Snails	Eggs
Year 1	20,961	18,934
Year 2	334	1,260
Year 3 (to date)	28	46
Total	21,323	20,240

Total cost is less than \$15,000 and **NO** chemical environmental impact

Removal of eggs is priority for control

- Submersion is not always effective

If mixed native/exotic populations **ONLY** remove **PINK** egg masses

Conclusions/Recommendations

- The snails are probably here to stay
- Identification between native and exotic is as simple as looking for a “channel” or white vs. pink(green) eggs
- The exotics are tolerant of most waterbody conditions found in FL
- Impacts on native snails, snail kites, and ecosystems are system dependent
- Plant restoration should be polyculture AND “older” plants
- Control is possible in certain systems
- IT IS ILLEGAL TO TRANSPORT/SELL EXOTIC POMACEA ACROSS STATE LINES

**Thank You
and
Questions ?**

