NON-NATIVE APPLESNAILS IN FLORIDA

Florida Fish and Wildlife Conservation Commission (FWC)

Four non-native applesnail species have been observed in Florida. There is one species native to Florida. All are in the genus *Pomacea*.

Pomacea paludosa	Florida applesnail (native)
P. insularum	Island applesnail
P. canaliculata	Channeled applesnail
P. diffusa	Spike-topped applesnail
P. haustrum	Titan applesnail

Photo by Gary Warren, FWC

Non-native *Pomacea* are indigenous to South America, while *P. paludosa* is native to Florida, Cuba, and Hispaniola. All are tropical/subtropical species, not known to withstand water temperatures below 10^{o}C.

Photo by Gary Warren, FWC

The most common introduced species is *P. insularum*. Originally thought to be the channeled applesnail, the Island applesnail (IAS) was most likely released in the southern region of the state in the early 1980s by persons in the tropical pet industry. FWC biologists first observed IAS in 1987 in the canal systems south of Lake Okeechobee. Within the past ten years populations have expanded rapidly throughout the state. The Florida Department of Agriculture and Consumer Services (DOACS) has documented the spread of the snail from south Florida to as far north and west as Tallahassee. Large populations have been found near urban centers including Tampa, Orlando, Jacksonville, and Tallahassee. Populations can be established due to releases or escapes from aquariums and culture tanks; in addition, large scale relocation of adults and juveniles can occur through flooding associated with seasonal storm events and hurricanes. In addition to Florida, introductions have occurred in Alabama, Georgia, North Carolina, Texas, Arizona, California, and Hawaii.

Photo by Gary Warren, FWC

The channeled applesnail (CAS) has been documented from only one site in north Florida.

Photo by Jeffrey Lotz, FDACS

The spike-topped applesnail is marketed as an aquarium species (“golden applesnail”) and is locally abundant in south Florida.

The titan applesnail is rare in Florida.

Potential Impacts

Because they eat aquatic plants, IAS are a potential threat to Florida aquatic ecosystems, although serious impacts have yet to be documented. Significant damage from CAS to rice and taro crops in the Pacific islands and southeast Asia has been documented. It is not known if IAS and CAS have similar feeding preferences; however, no damage attributable solely to IAS has been noted in Florida, even with their presence in-state stretching back over 20 years. FWC and the Florida Department of Environmental Protection are sponsoring research to assess these potential effects, as well as potential competition with the native applesnail.

Control

Eradication using chemicals has been researched and attempted; however, no effective chemical treatment has been developed to-date. Currently, the most effective control methods are hand or mechanical removal of snails and egg masses. Predators in Florida include limpkins, Everglades (snail) kites, raccoons, turtles and alligators. In addition, redear sunfish and certain ducks most likely consume smaller immature snails.

Egg masses can be scraped off and allowed to fall into the water since inundated eggs will not hatch. Only pink egg masses should be scraped or removed. The larger white egg masses of the native Florida applesnail should be left undisturbed. At no time should applesnails from aquaria be released in the wild.

Federal Regulation

Effective April 5, 2006, USDA APHIS requires permits for importation or interstate shipment of all marine and freshwater snails. Permits are not being issued for members of the genus *Pomacea*, with the exception of the spike-topped applesnail, *P. diffusa*.

Biology

ISLAND APPLESNAIL EGGS

The primary diet of IAS and CAS consists of rooted aquatic vegetation, whereas native applesnails feed heavily on periphyton. In the lab, CAS will eat water lettuce, but IAS refuse it. Both IAS and CAS have rapid growth rates and live 2-4 years. Mating and egg laying begins in March and can continue through October. Females emerge from the water, usually at night, to lay bright pink egg masses on stable substrates such as tree trunks, pilings, or seawalls. In response to adverse conditions, IAS may burrow into sediments, seal their shells with a large operculum, and remain isolated from their surroundings in this condition for several months. Adult CAS may survive dessication for up to one year; juveniles up to 5 months.

Identification

ISLAND APPLESNAILS LAKE COUNTY

Photo by David Douglas, FWC

IAS and CAS are distinguished from the native applesnail by deeply incised grooves on the shell. Adult IAS are the largest of the introduced *Pomacea*, reaching 85 mm (shell width); CAS are somewhat smaller with a shell width of 60 mm, while an adult Florida applesnail reaches 40-55 mm. Golden specimens have been bred for aquarium use, while shell color is variable in the field, with banding and bleaching common.

Photo by Tim Collins, FIU

Photo by Jenn Bernatis, UF

FLORIDA APPLESNAIL

Photo by Ross Dickerson, Hillsborough Co.,

ISLAND APPLESNAIL

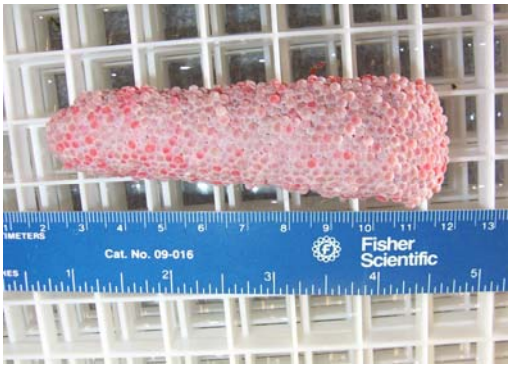

Photo by Jenn Bernatis, UF

CHANNELED

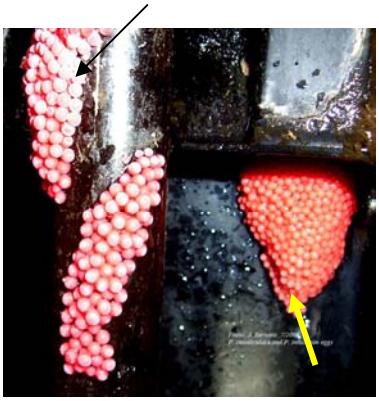

Photo by Jenn Bernatis, UF

ISLAND

It is much easier to distinguish native and non-native applesnails by the color and size of their eggs. The Florida applesnail has white relatively large eggs, typically deposited on aquatic vegetation; clutch size is <100. IAS egg clutches may have over 1000 pink eggs in a clutch, although egg color fades closer to hatching (2-3 weeks). CAS eggs are also pink but slightly larger than IAS' and with smaller clutches (300+ eggs).

Five Applesnail egg clutches

a – Titan applesnail
b – Spike-topped applesnail
c – Channeled applesnail
d – Florida applesnail
e – Island applesnail

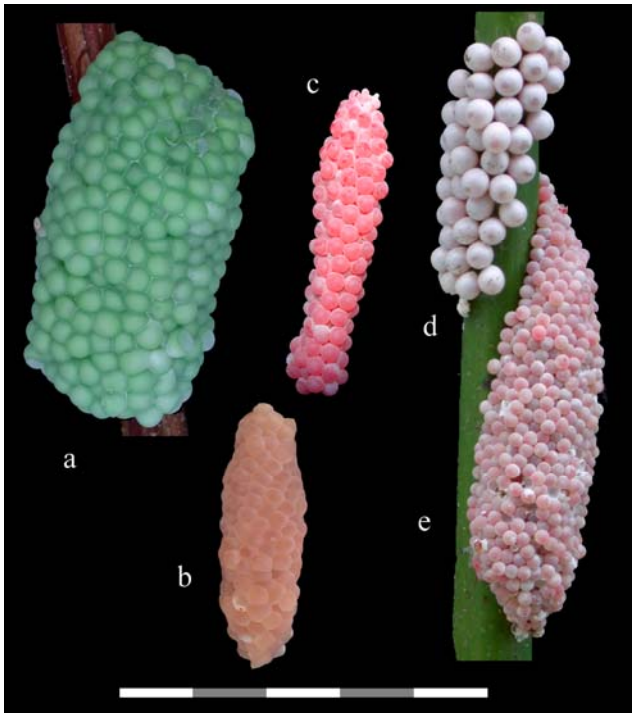

Photo by Tim Collins, FIU

FWC Contact

Questions regarding channeled applesnails or requests for assistance with snail identification should be directed to:

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Florida Fish and Wildlife Conservation Commission
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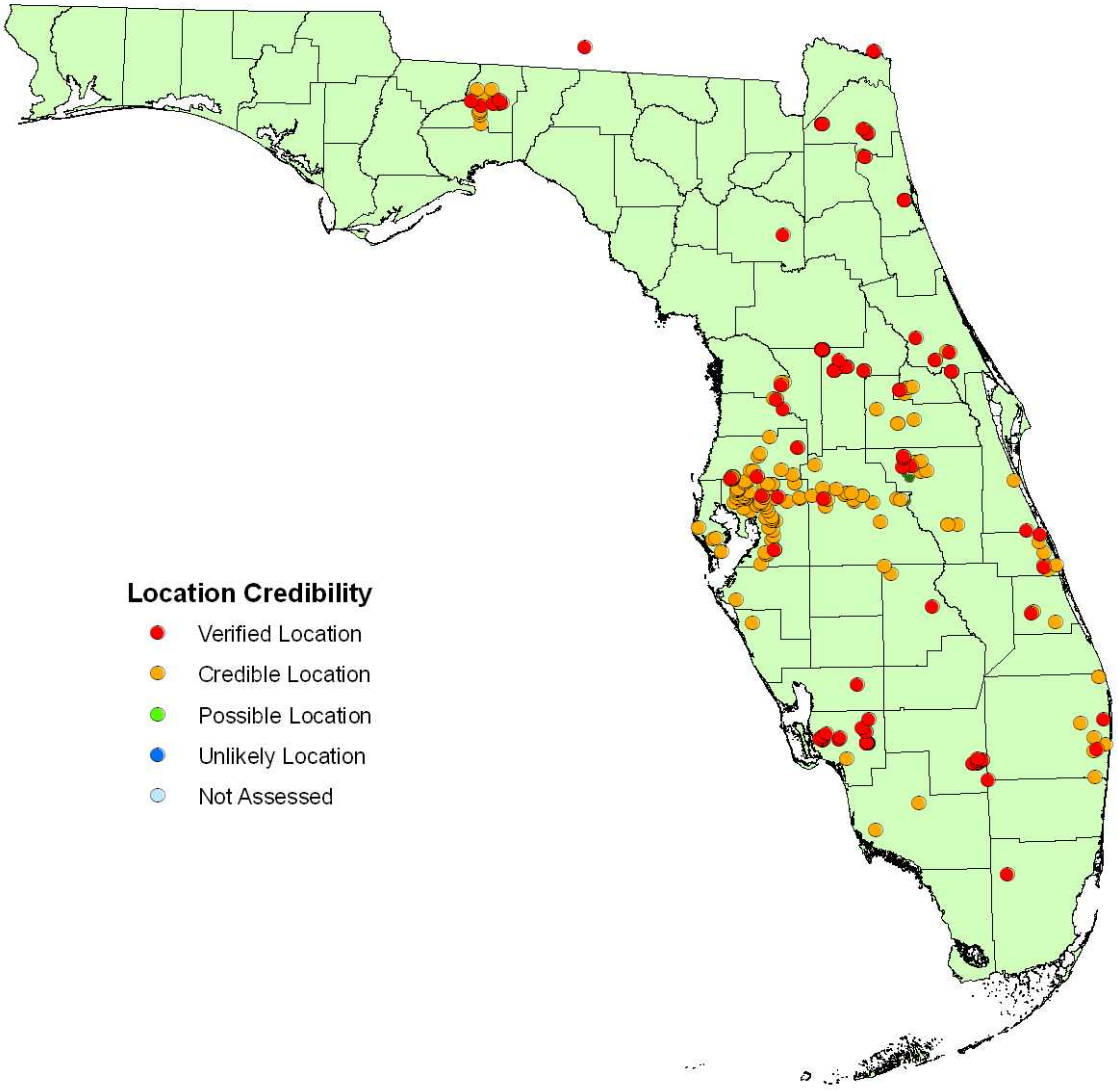
Island Applesnail (*Pomacea insularum*)
FWC Non-Native Species Database
31 March 2008



Florida Fish and Wildlife Conservation Commission
Channeled Apple Snail
Rapid Surveillance Report

Observer: _____ Observation Date: _____
Address: _____ Observation No.: _____
_____
Phone: _____
E-Mail: _____

Water Body: _____
County: _____

Coordinates/Location
Datum: ☐ WGS 84 ☐ NAD 83 ☐ Other Specify: _____
Format: ☐ DMS (dd° mm' ss.ss") ☐ DM (dd° mm.mmm') ☐ DD (dd.dddddd°) ☐ UTM
☐ Other Specify: _____
Point Occurrence:
Longitude/UTM Easting: _____ Latitude/UTM Northing: _____
☐ Entire Water Body – OR – Extent: _____

Linear Occurrence:
Starting Point:
Longitude/UTM Easting: _____ Latitude/UTM Northing: _____
Ending Point:
Longitude/UTM Easting: _____ Latitude/UTM Northing: _____
– OR –
Shoreline Distance: _____
☐ Coordinates unavailable. Map and/or description of location provided.

Observations
Egg Masses (check all that apply):
☐ Pink ☐ Green ☐ Salmon ☐ White (native apple snail)
(See Identification Sheet for Photographs)
Approximate Number of Egg Masses: ☐ Very Abundant ☐ Common ☐ Occasional
If you observed egg masses, did you also observe? ☐ Live Snails ☐ Shells
General Habitat: _____
Aquatic Vegetation:
Species (if known): _____

☐ Photographs
☐ Film ☐ Digital File Name(s): _____

Notes:

Instructions

Observer:	Please enter your name or the name or the person making the observation.
Observation Date:	Please record the date of the observation.
Observation No.:	Please assign a sequential number to each observation you make during a day. Restart the numbering at 1 for each day, e.g. 10/31/2005 No.1, 10/31/2005 No. 2, 11/1/2005 No. 1.
Contact Info:	Please enter the appropriate contact information. At the minimum please provide a contact phone or e-mail.
Water Body:	Please record the name of the water body, or, if unnamed, provide a brief description, e.g. Retention Pond in Happy Acres Subdivision, Drainage Canal from orange grove.
County:	Please record the county.

Coordinates/Location

Datum:	Please check the datum used to obtain the coordinates. Most GPS units default to WGS 84 unless changed from the factory settings.
Format:	Please check the format of the coordinates.
Point Occurrence:	You should use this section to record the coordinates of occurrences that can be identified by a point. This includes small lakes and occurrences in streams, canals, or shorelines of large lakes where the snails are generally confined to a small section of the shoreline. You can also use this section to record the coordinates of an occurrence that covers a large area of a water body but is not limited to the shoreline. You can record the approximate center of the area and indicate the extent of the occurrence. You can use the check box to indicate that snails occur in the entire water body or record the approximate extent of the occurrence, e.g. 500 acres, all of Goblet's Cove.
Linear Occurrence:	You should use this section to record observations that extend some distance along a stream, canal, or shoreline of a large lake and are generally limited to the shoreline. You should record the starting coordinates and either the ending coordinates of the observation or the approximate shoreline distance, e.g. 1 kilometer.
Coordinates unavailable:	Please check this box if you are unable to provide coordinates for the location. Please provide a map and/or description of the location, e.g. Mill Creek 3.5 miles upstream from the mouth, retention pond on the southwest corner of the intersection of 4th St. and Texas Ave., Smallville. You can use the notes section or attach a separate sheet. Any additional sheets should be identified with your name, the observation date, and the observation number.

Observations

Egg Masses:	The identification sheet has photographs of the egg masses of the native and exotic apple snails for reference. Check the appropriate box or boxes for the egg masses you observe.
Approximate Number:	Check the box that best describes the number or density of the egg masses.
Live Snails or Shells:	You can indicate that you observed live snails and/or shells in addition to egg masses by checking these boxes.
General Habitat:	Provide a brief description or the habitat conditions.
Aquatic Vegetation:	Please record the species of aquatic vegetation present if known.

Photographs

Film:	Check this box if you took traditional print or slide photographs of the observation. Slides and prints should be identified with your name, the observation date, and observation number.
Digital:	Check this box if you took digital photographs of the observation. Please record the file names of the digital images.

Please fax surveillance forms and any additional pages to Larry Connor at (352) 357-2941, and e-mail digital images to larry.connor@myfwc.com. Mail any photographic prints or slides to Larry Connor, FWC, 601 W Woodward Ave, Eustis, FL 32726. You may copy the digital images to disk and mail the disk and the surveillance forms to the above address if you are unable to fax or e-mail the information.