This presentation is based on the Protect U.S. powerpoint on the giant African land snail (*Lissachatina fulica*) found on their website www.protectingusnow.org. It has been adapted and updated for the purposes of these workshops.
The giant African land snail is listed as one of the 100 worst invasive species in the world. These nocturnal snails are native to coastal East Africa from Natal and Mozambique to Kenya and Somaliland. This species inhabits warm tropical climates with high humidity and can be found in agricultural areas, natural forests, riparian zones, wetlands, disturbed areas, and even urban areas.

They have since spread to other parts of Africa, Asia, the Pacific Islands, Australia, New Zealand, South America, the Caribbean and the United States. This pest is already well established in Hawaii (introduced in 1936), but the snail has been found several times on the mainland. The first detection was in San Pedro, California in the 1940s and the population was quickly eradicated. After World War II they were intercepted repeatedly on war material being brought back to in California, Oregon, Louisiana, Texas, and Maryland from snail infested areas. It was also introduced into Arizona in 1958 by a family returning from Hawaii (landing in California) then driving to the east coast. They gave the snails to a wild animal farm in Arizona that they had stopped at along the way. The authorities promptly destroyed those specimens. It was first introduced to Florida in 1966 by a Miami boy that smuggled 3 of them back with him after a trip to Hawaii. These were subsequently released into his grandmother’s garden. Florida eradicated over 18,000 snails from that
introduction by 1973 at a cost of $1 million. So far, they have not become established in the continental U.S.

These snails have many functions, including use as a protein source and as laboratory specimens for use in various experiments in many medical disciplines. However, they are serious pests. This snail can outcompete native species of mollusks, eats both agricultural and native plant species, may be a vector of fungal plant pathogens, and is a known vector for rat lungworm, which is a serious public health concern.

Information citation:

Florida Department of Agriculture and Consumer Services official press release.
accessed 11/14/2011 –

Global Invasive Species Database. 2010.
accessed 10/27/2011 –

Invasive Species Compendium (Beta). 2011.
Accessed 11/18/2011 –
http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data sheet&page=481&site=144


The spread of giant African land snails is due to accidental and intentional introduction by humans. They can come in as small snails or eggs on agricultural and nursery trade products, through international travel, on vehicles, and as human food resource in live the food trade, or in the pet trade. The natural movement of this snail is minimal (up to 50m overnight, 125m per month, and 250m per year), so dispersal to large areas by natural means is limited.

Moisture, temperature, availability of calcium seems to be a limitation on the spread of giant African land snails. They require above freezing temperatures and high humidity (at least part of the year) in order to survive. But they can also survive in temperatures of 35.6°F (2°C) by hibernating and by aestivating in temperatures above 86°F (30°C) and under moisture stress. During these periods, the snail usually buries itself 4 to 6 inches (10-15cm) deep in soft soil for up to 10 months.

Given this, if established on the U.S. mainland, they could survive the climate in non-mountainous regions of the following states: Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Texas, New Mexico, Arizona, California, and potentially parts of Oregon and
Information citation:
Global Invasive Species Database. 2010. accessed 10/27/2011 –
s&lang=EN

http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data
sheet&page=481&site=144


Smith, T., L. Whilby, and A. Derksen. 2010. Florida CAPS/DPI Giant African
number 2010-02-GAS-01. accessed 11/17/2011 –
n_snail_survey_report_03-11-2010.pdf

Snail Pests in the Family Achatinidae. USDA–APHIS–PPQ–Emergency and
http://www.aphis.usda.gov/import_export/plants/manuals/emerge
ncy/downloads/nprg_gas.pdf

These pests feed on both living plant matter and plant detritus, lichens, algae, fungi, and feces. The younger snails seem to prefer live plant material, while older snails seem to prefer plant detritus (though they will also eat live plant material). Plant seedlings are more at risk from this snail than established plants. In areas where they have invaded, these snails can be found in disturbed sites, urban areas (especially refuse piles), forested areas, plant nurseries, and farms. In some areas, this species can be so numerous that locals are forced to plant alternative crops that are not as preferred by giant African land snails.

This snail has many, many host plants (by some published data, well over 500), including plants that are economically important to the United states such as including: cotton (*Gossypium*), banana (*Musa sapientum*), pumpkin (*Cucurbita pepo*), cucumber (*Cucumis sativus*), papaya (*Carica papaya*), and carrot (*Daucus*).

A more complete list of host plants includes the following:

Beet (*Beta vulgaris*), marigold (*Tagetes patula*), brinjal (*Solanum melongena*), cabbage and cauliflower (*Brassica oleracea v. capitata* and *botrytis*), okra
(Abelmoschus esculentus), sponge gourd (Luffa cylindrica), greater and lesser yam (Dioscorea alata and D. esculenta), sweet potato (Ipomoea batatas), lettuce (Lactuca sativa), pear (Pyrus communis), avocado (Persea gratissima), cassava (Manihot esculenta), castor (Ricinus communis), figs (Ficus anomani), and peas (Pisum sativum), amaranth (Amaranthus), basella (Basella), breadfruits (Artocarpus), cacao (Theobroma), coffee (Coffee), erythrina (Erythina), eucalyptus (Eucalyptus), jute (Corchorus), mahogany (Swietenia), mulberries (Morus), onion (Allium), passion-fruit (Passiflora), potato (Solanum), rubber (Hevea), soursop (Annona), spinach (Spinacia), sunflower (Helianthus), taro (Colocasia), tea (Camellia), teak (Tectona), tobacco (Nicotiana), tomato (Solanum), vanilla (Vanilla), peanut (Arachis hypogaea), bougainvillea (Bougainvillea), pigeon pea (Cajanus cajan), periwinkle (Catharanthus roseus), watermelon (Citrullus lanatus), coconut (Cocos nucifera), crotolaria (Crotalaria anagyroides), golden pothos and tongavine (Epipremnum aureum and E. pinnatum), star apple (Eugenia), strawberries (Fragaria), beans (Glycine and Phaseolus), hibiscus (Hibiscus), gourds (Lagenaria), cut-leaf philodendron (Monstera deliciosa), guava (Psidium guajava), radish (Raphanus sativus), and citrus (Citrus).

Blimbi, in the family Oxalidaceae, was also mentioned as being a host as well as chillis and peppers in the Solanaceae family, corm in the Araceae family, drum stick in the family Moringaceae, kokko in the Fabaceae family, palm nuts in the family Arecaceae, and shishu in the family Fabaceae.

Information citation:
Global Invasive Species Database. 2010.
accessed 10/27/2011 –
s&lang=EN

Global Invasive Species Database. 2010.
accessed 11/14/2011 –

Invasive Species Compendium (Beta). 2011.
Accessed 11/18/2011 –
http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data


accessed 11/17/2011 –  


http://www.invasivespeciesinfo.gov/animals/africansnail.shtml

accessed 11/16/2011 –  
The eggs are yellowish-white to yellow and oval in shape, and look similar to reptile eggs. They measure 0.2 in long x 0.16 in wide (5 mm x 4 mm).

Information citation:


Juveniles can be confused with other native snail species. However, “columellar truncation” is a diagnostic characteristic. Located at the opening of the shell, the columella is the part of the shell opposite the outer lip (see red arrow). In this species, the columella forms a straight line and ends abruptly, and rolls in instead of out (see yellow arrow). The shell itself is generally reddish-brown in color with somewhat widely spaced brown to yellow-brown stripes going down the length of the shell.

Information citation:
This snail can reach 8 inches (20 cm) in length and 4.5 inches (12 cm) in diameter, but commonly ranges between 2 - 4 inches (5 -10 cm). Adults weigh 0.07lb (32 grams) on average.

The body has 2 pairs of tentacles (yellow arrows), one short one and a longer one with eye-spots at the tips. Body color varies from mottled brown to pale cream.

The shell is short and pointy, and the outline of the shell varies from slender to moderately obese. The shell is spiraled with 7-9 whorls, though occasionally 10 whorls may occur (see red arrows). The shell varies in color, but is generally reddish-brown with weak, narrowly spaced, yellow-brown stripes running down the length of the shell. The stripes on the shell are parallel to the body plane and the ground, and that they do not wrap around the shell. Diet can alter the coloration of stripes.

Patterns are present only in the conchin laid atop the calcium carbonate shell; when dead and bleached by the sun, these colors will fade and only morphological characters can be used for diagnosis.

Information citation:
Global Invasive Species Database. 2010. 
accessed 10/27/2011 –
s&lang=EN

Invasive Species Compendium (Beta). 2011. 
Accessed 11/18/2011 –
http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data
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Smith, T., L. Whilby, and A. Derksen. 2010. Florida CAPS/DPI Giant African 
number 2010-02-GAS-01. 
accessed 11/17/2011 –
n_snail_survey_report_03-11-2010.pdf

Snail Pests in the Family Achatinidae. USDA–APHIS–PPQ–Emergency and 
Domestic Programs–Emergency Planning, Riverdale, Maryland. 
http://www.aphis.usda.gov/import_export/plants/manuals/emerge
ncy/downloads/nprg_gas.pdf
The columella (see yellow arrow) as well as the inside of the adult shell, is white or bluish-white in color. This characteristic may be harder to see if the snail is still in its shell.

Though the opening of the shell of this species is normally to the right, occasionally you get “left hand mutants”. The current south Florida population has a higher than normal occurrence of these left hand mutants.

Information citation:
Global Invasive Species Database. 2010.
   accessed 10/27/2011 –

Invasive Species Compendium (Beta). 2011.
   Accessed 11/18/2011 –
   http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data sheet&page=481&site=144


accessed 11/17/2011 –


The shell of juveniles is thinner and more translucent than that of adults. The pattern on the shell can vary between adults and between adults and juveniles. Adult shells range from being quite pale to very dark in their markings. As you can see from the image above featuring two adults and a juvenile, the juvenile’s pattern differs from either adult by having wider, more defined stripes. The adults also differ from each other in the amount of striping and the width of these stripes (see red arrows). In addition, the pattern on the second largest whorl is very different between juveniles and adults, and between the adults themselves (see yellow arrows).

Information citation:
Giant African land snails are hermaphrodites, meaning that any two individuals can reproduce together, however they cannot self-fertilize. Instead, they undergo "reciprocal copulation" where the sperm of snail A fertilizes the eggs of snail B, while the sperm of snail B fertilizes the eggs of snail A. Reproduction occurs primarily at night and copulation usually lasts 4.5 hours (range 1.5 to 8 hours). These snails have the ability to store sperm, which means that a single copulation can produce multiple clutches of eggs.

The giant African land snail typically reaches sexual maturity in 12 months (range = 5 to 15 months depending on temperature) and they can live up to 9 years (average = 3-6 years). The typical time frame for maturation may be delayed by hibernation or aestivation.

Clutches, ranging in size from 100-400 eggs, are typically laid in nests 4-6 inches under the soil (and under objects laying on the ground). Egg-laying usually occurs in 3 to 4 batches over many months, depending on the local climate (increasing with the duration of the rainy season). In an average lifetime individuals can lay 1000-1200 eggs.

Clutches are laid 1-25 days after copulation (in a laboratory setting), and eggs
can hatch within a few hours or can take up to 17 days (though in colder climates hatching may take as long as 41 days). Once hatching begins, all eggs in the clutch will hatch within a 24-hour time period. The young remain underground for 5-15 days and will eat their egg-shells before seeking other food sources.

Information citation:


This snail causes plant damage by eating both agricultural and native plant species. They can cause also break stems and leaves of plants due to their sheer weight in areas where they are numerous.

This snail also may be a vector of fungal plant pathogens such as *Phytophthora palmivora* (which affects cacao, black pepper, coconut, papaya, and vanilla), *P. colocasiae* (which affects taro – the potato of the tropics), and *P. parasitica* (which affects eggplant and tangerine).

Additionally, these snails can also disrupt local ecosystems by outcompeting native species of mollusks; by consuming enough biomass to actually affect the nutrient cycle of a local habitat; and by neutralizing the acidity of soils through the introduction of calcium (from their shells) which occurs when they die (and when they eat other mollusks).

It is important for these snails to consume large amounts of calcium to build their shell and to reproduce successfully. Therefore, they use other snails' shells, calcium carbonate in alkaline soils, and even the plaster and stucco used on houses.
Bodies of dead and decaying snail are particularly rancid. Should many of them get hit on the roadways, they can become a road hazard by causing the cars to skid. In addition, the shells of these snails can be so sturdy that they can puncturing car tires if run over and can be the equivalent of shrapnel if these snails hidden in a lawn are run over by a lawnmower.

Outside of the U.S. other predatory snails (i.e. *Euglandina rosea*) have been introduced as biocontrol agents. Unfortunately, these introductions have turned out to be problematic and even catastrophic for populations of native snail species.

Information citation:

Florida Department of Agriculture and Consumer Services video
accessed 11/14/2011 –
http://www.youtube.com/user/fdacsdpi#p/a/u/0/Wc8Dx2HcPgg

Global Invasive Species Database. 2010.
accessed 10/27/2011 –

Global Invasive Species Database. 2010.
accessed 11/14/2011 –

Invasive Species Compendium (Beta). 2011.
Accessed 11/18/2011 –
http://www.cabi.org/isc/?compid=5&dsid=2640&loadmodule=data sheet&page=481&site=144


The giant African snail can be an intermediate host that vectors “rat lungworm” which can cause a rare form of meningitis in humans called “eosinophilic meningitis”. When snails feed on rat droppings, roundworms found in rats (i.e., Angiostrongylus cantonensis, A. costaricensis) move to snails (at the infective third stage of larval development, making the snail an intermediate host). Roundworms are transferred to humans usually through ingestion of the infected intermediate host. This can occur directly when raw or undercooked snails are consumed. Transmission can also occur indirectly by consuming vegetables that have not been washed properly, or by touching our mucous membranes (e.g., eyes, nose, and mouth) after handling snails and their secretions.

Symptoms of the parasitic infection include headaches, stiff neck, vomiting, fatigue, tingling or numbness of the skin, occasional low grade fever, and occasional paralysis of the eye muscles. People usually recover without treatment, but on occasion coma and death can occur. It is important to note that other snails can act as vectors of this same disease.

Giant African land snails also vectors a bacteria (Aeromonas hydrophila) that is present in all freshwater and brackish environments. While, this bacteria
can kill the snail it can also cause gastroenteritis and skin infections in humans if ingested or enters the body through a wound (such as from handling the snail).

In 2010, there were reports of illness by people who ingested the slime of the snail in a religious healing ritual. The priest in charge claimed that it was a part of the Ifa Orisha ritual, a traditional African religion.

Information citation:


Florida Department of Agriculture and Consumer Services video accessed 11/14/2011 – http://www.youtube.com/user/fdacsdpi#p/a/u/0/Wc8Dx2HcPgg


SunSentinal Newspaper. 2010.

These snails are nocturnal, but may become active if the day is overcast and the soil is moist and warm (though this activity usually occurs at twilight).

During the day, they can be found in moist areas such as: heavily vegetated areas, under rocks, logs, branches, and wooden boards, in leaf litter and compost piles, under flower pots and planters, on rock walls or sides of a stucco house, at the base of the plant under leaves or in the “heart of the plant” (for example, in the center of a lettuce plant). They can even be found sheltering in a tree, around the AC unit of a house, or in the housing for the water meter in the ground.

Look for all life stages of this snail, mucus trails (especially big ones), and plant damage due to chewing.

Information citation:
accessed 11/17/2011 –
There are several species of snails in the United States that can be confused with the giant African land snail.

*Drymaeus dormani* (manatee treesnail) can be found in Florida. It measures 32mm (1.25in) long as an adult and has 6 to 6.5 whorls. Its shell color is pale to white and glossy with 3 to 5 spiral rows of red-brown patches that are not continuous.

*Drymaeus multilineatus* (lines treesnail) can be found in Florida. It measures 24mm (less than 1in) in length as an adult and has between 6 and 7 whorls. Its shell color is ivory-yellow in color, but is not glossy. The shell also has many transverse, dark red-brown stripes and spiral bands.

*Euglandina rosea* (rosy wolfsnail) can be found in the southeastern United States. It measures 70 to 100mm (2.75 to 4in) in length, up to 76 mm in height and 27.5mm (1in) in diameter as an adult. The shell shape is fusiform with a narrow ovate-lunate aperture and truncated columella. The shell color is brownish pink with no pattern on it.

*Orthalicus floridensis* (banded tree snail) is also found in Florida. It measures 71mm (2.75in) in length as an adult and has 6 whorls. The shell color is white to cream with chestnut-brown stripes. The apex of the shell is dark, while the
inside opening of the shell is also white with the bands showing through to the other side. Its columella is white and straight.

Information citation:


The Terrestrial Mollusc Tool created by Jodi White-McLean's is a LUCID field screening key that was specifically designed to assist in the identification of adult terrestrial slugs and snails of agricultural importance.
Florida Department of Agriculture and Consumer Services- Division of Plant Industry provides a giant African land snail management program for 5th graders in Miami-Dade County. They are called ‘Junior Detectives’.

Information citation:
$10.8 million from discovery in 2011-July 2015
Data as of January 1, 2016: 160,695 collected to date from 680 positive properties in 30 cores.
Updated data as of June 17, 2016: 161,928 collected to date from 682 properties in 30 cores.
As of January 6, 2017: 166,842 snails have been collected on 719 properties in 32 core areas.
UF Extension Products for Florida Snail Management

• FDACS-Division of Plant Industry
  http://www.freshfromflorida.com/pi/gals/

• UF Featured Creatures
  http://entomology.ifas.ufl.edu/creatures/misc/gastro/terrestrial_snails.htm

Much more information, including videos and photos can be found at these sites.
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• Cooperative Agricultural Pest Survey Program (CAPS)
• Florida Department of Agriculture and Consumer Services (FDACS)
• National Plant Diagnostic Network (NPDN)
• Sentinel Plant Network (SPN)
• Protect U.S.
• University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)
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