3. IDENTIFICATION

Importance Accurate identifications of snails are important for assessing potential pest risk, developing survey strategies, and to determine the most appropriate control measures to be used. Accurate identification of snails in the Giant African snails group is important if eradication efforts are to be successful. Persons that are not able to properly identify these snails may be responsible for control of other non-target snails that may be protected by local, State, or Federal laws and/or snails beneficial in the environment.

Authorities A USDA-recognized national authority for the submitted taxon must positively identify the suspected pest(s) before destruction or eradication procedures are taken.

Identification Some pre-identification and screening can be performed by field personnel assigned to the program. A description of Giant African snails, with pictures and drawings, should be prepared for the program. These may be in the form of pocket ID cards, fact sheets, pamphlets, posters, etc. These should include distinctive features that separate the target species from any local species that resemble them.

Two genera of Achatinidae, *Achatina* and *Archachatina*, fall under the broader term "Giant African Snails". In this section three members will be described, starting with *Achatina fulica,* which is arguably one of the greatest threats to agriculture and the environment worldwide, due to its reproductive capacity, destructiveness to a range of plants and buildings, threat to human health and overall relative size.

Taxonomic name: *Achatina fulica* Bowdich, 1822
Common name(s): Giant African Snail, Giant African Land Snail, Escargot Géant

Achatina fulica is a protandrous hermaphrodite. Adults have male and female sexual organs, with the male organs maturing earlier. Male sexual maturity occurs within less than a year, sometimes as young as five months. After copulation they are able to store sperm, making successive egg-laying possible after just a single mating. Several hundred eggs per clutch may be laid making its timely eradication even more critical. Their egg color is yellowish-white to yellow, with a somewhat oval shape and measures 4

to 5.5 mm (approximately ¼ inch) in length and approximately 4 mm in width.

Shell size may be up to 20 cm (8 inches) in length and 12 cm (almost 5 inches) in maximum diameter. Generally there are seven to nine whorls and rarely as many as ten whorls. *Achatina fulica* prefers environments that are rich in calcium carbonate, such as limestone, marl, and built up areas where there is an abundance of cement or concrete. In these calcium-rich areas the shells of the adults tend to be thicker and opaque. Juveniles generally have a thinner, more translucent shell and are more brittle. Note that even in this post-embryonic juvenile the characteristic truncated columella is already evident. Upon emerging from its egg shell the length of the post-embryonic juvenile shell measures approximately 4 mm (approximately 1/6 inch).

Though shell coloration may be variable due to environmental conditions and diet, generally it is reddish-brown with light yellowish, vertical (axial) streaks. The two shell colors are not distinct from each other and are somewhat streaked or smudged in appearance. Another shell color variation resembles a light coffee color. The colors fade with age in the earliest whorls appearing lighter or less intense, becoming darker and more vibrant nearest the body whorl.

The body of the live animal has two pairs of tentacles, one short lower pair that are tactile and chemotactic, and one longer upper pair with eye spots at the tips. The body itself is moist, slimy and rubbery. Body coloration can be either mottled brown or more rarely a pale cream color. The footsole is flat, with coarse tubercles most evident laterally on the upper surface of the extended body.

The outline of the shell may vary somewhat, even within the same colony, from slender to moderately obese. The broader specimens with the same number of whorls tend to be shorter in shell length. The shell is generally conically spired and distinctly narrowed but barely drawn out at the apex. The whorls are rounded with moderately impressed sutures between the whorls. The aperture is relatively short and has an ovate-lunate shape. The lip is sharp, convex, thin and evenly curved into a regular semi-ellipse. The shell surface is relatively smooth, with faint axial growth lines.

One of the most important identification features of *Achatina fulica* is the columella which truncates or ends abruptly, a feature remaining evident throughout the lifespan of the snail. The columella is generally concave; lesser concaved columella tend to be somewhat twisted. The broader shells tend to have a more concave columella. The columella and the parietal callus are white or bluish-white with no trace of pink.

Similar Species of Quarantine Importance

Taxonomic name: *Achatina achatina* (Linné, 1758)
Common name(s): Giant African Snail, Giant African Land Snail, Escargot Géant

The shell of *Achatina achatina* differs from that of *Achatina fulica* in that it possesses some spiral sculpture, particularly close to the suture, crossing the axial growth lines, resulting in a somewhat reticulated surface. The columella and parietal wall is always a vinaceous red color though the columella is still truncated like *A. fulica*. A full grown *A. achatina* usually has no more than seven to eight whorls.

Taxonomic name: *Archachatina marginata* (Swainson, 1821)
Common name(s): Giant African Snail, Giant African Land Snail, Banana Rasp Snail

This species tends to be quite large reaching a maximum length of 21 cm (8¼ inches) and a maximum diameter of 13 cm (5 inches). It has a very large bulbous protoconch making it easily differentiated from *Achatina* species. Typically the shell is large and broad with a truncated columella and has a white or bluish-white parietal wall and outer lip, although some subspecies may have an apricot-yellow or vinaceous red columella and parietal wall.

Similar Species Not of Quarantine Importance

Apart from the achatinid species there are species from other families that may sometimes be mistaken for *Achatina fulica*. Of these, the *Orthalicus spp*., belong to the Orthalicidae family and will be described here.

Taxonomic name: *Orthalicus spp.*
Common name(s): Tree snails

In North America the various *Orthalicus spp.* are found only in the warmer areas of South Florida. The *Orthalicus spp*. have been confused with immature *Achatina fulica* due to their similar color patterns and shape. *Orthalicus spp*. never have a truncated columella. The columella connects smoothly with the lip. They tend not to be as large as *A. fulica* of the same age, with some species only reaching 7 cm (2¾ inches) in height and 40 mm (1½ inches) maximum width. Adult *Orthalicus spp.* may be brightly colored with spiral stripes and axial bands. The lip will be black or dark brown. The aperture shows blackish bands and streaks on a lighter background.

Note that these native species do not require quarantine action, and in fact some are considered endangered or threatened species.

Collection and Preparation of Specimens

When Giant African Land Snails are encountered in the United States steps must be taken immediately to safeguard the pest to eliminate any pest risk, until a positive identification can be provided. Some mollusks can be disease carriers. Use rubber or latex gloves to protect yourself when handling Giant African Land Snails, other mollusks, or associated soil, excrement or other materials that may have come in contact with the snails. Since the potential for continued dissemination of snail pests is possible after their initial detection, all suspected Giant African Land Snails, eggs, and soil where eggs may be located, should be gathered and safeguarded first to eliminate the escape or removal from their container, continued sale or distribution. Juvenile snails can be the size of their egg shells and may escape through holes of the same size.

Secondly, gather as much information about this snail detection. Since this may be the only opportunity where a potential violator may fully cooperate or divulge useful information ask who, what, where, when, why, how, and retrieve any useful documentation to substantiate claims. Digital images may also be useful. Be very careful not to alienate the interviewee. They may be called upon in the future for more information or assistance. Prepare a report to document information gathered when necessary.

Third, local quarantine procedures may include issuing an Emergency Action Notification Form (PPQ Form 523), issuing a “stop order” normally issued by the State agriculture department, sealing the container to prevent removal or escape and/or relocating the safeguarded container used to house the snails, until a positive identification is received. Be sure to use approved PPQ guidelines when attempting to safeguard suspected pests. If you are in doubt consult with your supervisor.

Collect as many suspected pest specimens as possible. Please note that when perishable materials are held under quarantine, intercepted pests should be considered “urgent”. Use a completed Specimens for Determination Form (PPQ Form 391) marked "Urgent" to accompany specimens sent to the USDA-recognized national authority. To submit specimens for identification use the following procedures.

Routine Interceptions of Giant African Snails (*Achatina* and *Archachatina* spp.), Aquatic Snails, and Tropical Slugs (Veronicellidae)

CAUTION

Because of snail-borne parasitic diseases, wash your hands in hot soapy water or rinse them in a standard disinfectant after handling these mollusks.

Use the following procedures for routine interceptions of Giant African Snails (*Achatina*) and (*Archachantina spp*), Aquatic Snails, and Tropical Slugs (Veronicellidae):

1. Place the mollusk directly in a vial or specimen bottle with 70% ethanol.
2. Submit the specimen for identification as follows:

URGENT Interceptions of Terrestrial Snails Except for Giant African Snails (*Achatina* and *Archachatina* spp.), Aquatic Snails, and Slugs Except for Tropical Slugs (Veronicellidae)

- When shipping Monday through Thursday:
  - i. Place the mollusk in a vial or specimen bottle of water.
  - ii. Hold the vial or specimen bottle under water and seal, making sure that no air bubbles remain inside the container.
  - iii. **Overnight** the urgent interception for identification (the snail will have drowned in transit, hence, there is no pest risk).
- When shipping Friday through Sunday
  - i. Place the mollusk directly in a vial or specimen bottle 70% ethanol. If there is time (12-24 hours), relax the specimen in water as described for routine interceptions. (Place the mollusk in a vial or specimen bottle and hold the vial or bottle under water and seal, making sure that no air bubbles remain inside the container. Put the vial or bottle containing the specimen in a cool place until the mollusk has relaxed—has died and is fully extended.)
  - ii. **Overnight** the urgent interception for identification.

URGENT Interceptions of Giant African Snails (*Achatina* and *Archachatina* spp.), Aquatic Snails, and Tropical Slugs (Veronicellidae)

CAUTION

Because of snail-borne parasitic diseases, wash your hands in hot soapy water or rinse them in a standard disinfectant after handling these mollusks.

Prepare the URGENT interception for shipment as follows:

1. Place the mollusk directly in a vial or specimen bottle 70% ethanol.
2. **Overnight** the URGENT interception for identification.

The manual procedures above are current as of the date of this action plan but are subject to future changes. Please refer to the latest version of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Airport and Maritime Operations Manual, for updated information.

Identification by the national USDA malacologist is required. A USDA-recognized national authority for the submitted taxon must positively identify the suspected pests before destruction or eradication procedures are taken. Use the following address to forward specimens for identification to the USDA-recognized national authority:

Dr. David Robinson
USDA National Malacology Specialist
Academy of Natural Sciences
1900 Ben Franklin Parkway
Philadelphia, PA 19103
Phone: 215-299-1175
Fax: 215-567-7229
Email: David G Robinson/PA/APHIS/USDA (Call to notify after digital images have been sent)

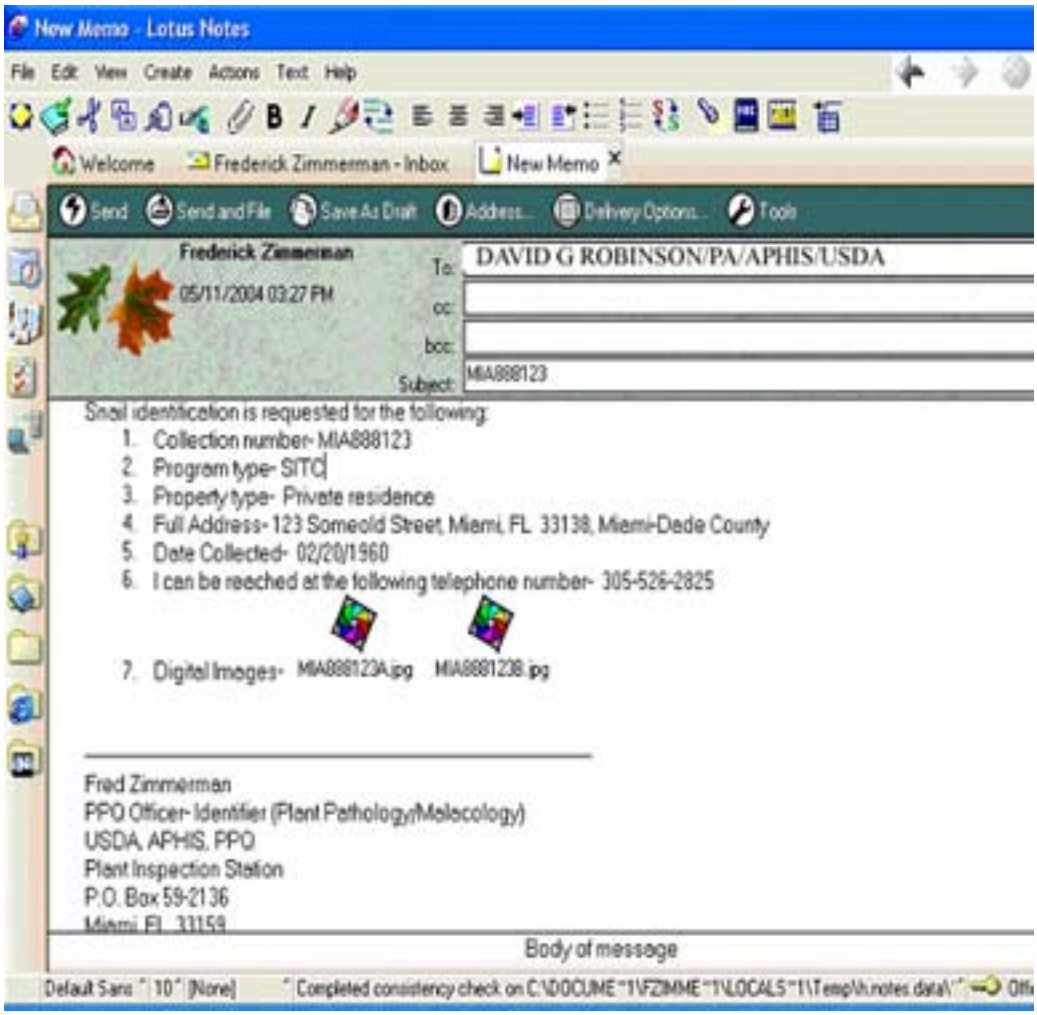
In ports where digital imaging is available digital images may be sent to the USDA National Malacology Specialist. Try to take two or more good digital images. Ideally digital images will clearly reflect the color patterns, size and shape of shells of various life stages, especially for the adults from various angles, and show the truncated columella which may be easiest to see on like specimens from the same lot that are dead, retracted or estivating. See sample digital images on pages 3.2 and 3.3.

Send digital images to the national identifier, at the email address above, using the following format.

1. Collection number- Port Identifiers generally issue the interception or collection number. If this number is available report it in the email to the National USDA Malacology Specialist. Assign a number for each collection. SITC- uses the three-letter port code followed by the designated collection number 888### (i.e. MIA888123). For otherwise domestic interceptions, assign a number for each collection beginning with year, followed by collector's initials and collector's number. Example (collector, John J. Dingle): 04-JJD-001. The assigned interception/collection number should appear in the subject line of the email for digital images.
2. Indicate the blitz or program type- SITC, CAPS, AQI, etc.
3. Indicate the property type: warehouse, market, nursery, rail, barge, weigh station checkpoint, farm, private residence, school, etc.

4. Indicate the full address where the snails were collected.
5. Record your current telephone number where you can be reached if additional information is required.
6. Attach digital images- Attach all digital images here.

The following is a sample email format to send digital images to the USDA National Malacology Specialist by email.



In some instances, though rare, you may be asked to forward specimens to the USDA National Malacology Specialist for further examination.

Final identifications may be reported to the requesting officer, supervisor(s), the State Plant Health Director, other USDA officials and agencies, and State and territory agricultural regulatory officials.