

The Horntail Snail: Latest Updates



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PEST ALERT

FDACS-P-01925

Pest Alert created August 2020.

**Florida Department of Agriculture and Consumer Services
Division of Plant Industry**

The Horntail Snail, *Macrochlamys indica* Benson, detected in South Florida

Detected in August
2020, in Miami-Dade
County



Photo FDACS-DPI

India, Nepal, Pakistan, Bangladesh, Sri Lanka, and Brazil





Photo: Amy Roda USDA-APHIS



Photo FDACS-DPI





Photo FDACS-DPI



Photo FDACS-DPI

Horntail snail
(*Macrochlamys indica*)
vs
Cuban Brown Land snail
(*Zachrysia provisoria*)



Photo: Amy Roda, USDA-APHIS

Horntail snail
(*M. indica*)
vs
Jumping snail
(*Ovachlamys fulgens*)



Photo FDACS-DPI



Photo from the web

Host Range

- Seedlings, fallen, decomposed leaves
- Vegetables:
Beans, lettuce, cabbage, cauliflower, cucurbits
- Fruit crops:
Papaya, banana, guava
- Ornamentals:
Marigold, chrysanthemum, hibiscus, roses



Environmental Conditions

- Optimum temperature:

max T = 82.4- 87.8 F (28-31 °C) and min T = 66.2 F (19 °C)

- Optimum relative humidity:

85-100%





Aestivation

- A type of dormancy occurring due to low humidity in the environment
- Common in temperate and tropical zones
- Aestivation period: 2-8 months depending on geographical latitude
- During aestivation: hide, inactive and lose weight

Biology

When aestivation is 8 months and snails are active 4 months:

- Life span: 4 years
- Young snails require 130 days (4.3 months) to reach sexual maturity
- Copulation usually takes place after a rain event
- Gestation period 10-17 days
- Eggs are laid in clutches under loose soil
- Egg hatch within 8-12 days

Snail age	Shell diameter (mm)	Number of egg clutches/ breeding season	Av. Number of eggs per clutch
1 st year 	10 - 11 (0.39-0.43 in.)	NA	NA
2 nd year 	10-14 (0.39-0.55 in.)	4	36
3 rd year 	14-18 (0.55-0.71 in.)	6	69
4 th year 	18-21 (0.71-0.83 in.)	4	89

Behavior

- Active at night
- Slow moving comparing to insects
- Scavengers
- Mating: after rain
- During aestivation: hide, inactive and lose weight



Photo: Amy Roda
USDA-APHIS



Florida Department of Agriculture and Consumer Services
Division of Plant Industry

COMPLIANCE AGREEMENT / PHYTOPHAGOUS SNAILS

NICOLE "NIKKI" FRIED
COMMISSIONER

Section 581.031(26), F.S.

P.O. Box 147100, Gainesville, FL 32614-7100 / Phone: (352) 395-4700

1. NAME AND MAILING ADDRESS OF PERSON OR FIRM	2. LOCATION ADDRESS
Registration #	Location #
3. REGULATED ARTICLE(S): All life stages of the phytophagous snails, plants, plant parts, yard waste and any article capable of transporting or harboring plant feeding snails including debris, compost, and building materials (bricks, tiles, concrete).	
4. APPLICABLE STATE QUARANTINE(S) OR REGULATIONS: 570.32, 581.031 (1) (7), 581.091(1)(2)(3), 581.101, Florida Statutes, and Chapter 5B-43, Florida Administrative Code.	

I / we agree to handle, pack, process and move regulated articles in accordance with applicable plant quarantines; use all permits and certificates in accordance with instructions; maintain and offer for inspection such records as may be required; and abide by the following stipulations:

In order to limit the artificial spread of phytophagous snails, (plant feeding snails), regulated establishments agree to abide by the following conditions as required by the Florida Department of Agriculture and Consumer Services (FDACS):

1. Maintain regulated articles and areas where they are kept free of weeds, debris, or other material which are good habitats for, and may harbor, plant feeding snails.
2. Establishment will educate and train appropriate personnel on recognizing signs and symptoms of phytophagous snails and basic visual identification to include but not limited to homtail snail, giant African land snail and brown garden snail.
3. Apply a labeled molluscicide containing metaldehyde at a minimum of 3.25% active ingredient to the premises including containers at the recommended rate and frequency.
4. Regulated debris and articles of refuse removed from the property will be disposed of at an approved solid waste facility. Approved solid waste disposal facilities will be made available via the FDACS Helpline at 888-397-1517, or on the division's website: <https://www.fdacs.gov/Divisions-Offices/Plant-Industry/Pests-Diseases/Giant-African-Land-Snail/Eradication-Updates-and-Information>
5. Provide written records upon request of incoming and outgoing plant material, training records, pesticide records, and scouting records and allow authorized representatives of the FDACS to conduct site inspections of regulated articles.
6. Violation of any stipulation of this agreement may result in prosecution as provided by sections 581.141 and 581.211, F.S.

5. SIGNATURE	6. TITLE	7. DATE SIGNED
The affixing of the signatures below will validate this agreement, which shall remain in effect until canceled, but may be revised as necessary or revoked for noncompliance.		8. AGREEMENT NO.
		9. DATE OF AGREEMENT
10. OFFICIAL (Name and Title)	11. ADDRESS	
12. SIGNATURE		

FDACS-08080 09/20



Florida Department of
Agriculture and Consumer Services
Adam H. Putnam, Commissioner

Nursery Protocol for Positive Nursery

- Hold Order and Quarantine issued on nursery stock for 30 days
- Complete compliance agreement
- 15-day compliance inspection
- Full nursery inspection and witnessing treatment/review of treatment records
- No snail detection, final inspection date set
- Live snail detection, reset 30-day Hold Order and Quarantine

Nursery Protocol ½ Mile Radius of Positive Find

- Complete Phytophagous Snail compliance agreement
- 30-day compliance inspections
- Review treatment records

Latest Update from FDACS-DPI (06/14/21)

- 6 total positive nursery locations
- 2,798 nurseries inspected
- 2,088 compliance agreements signed
- 790 total treatments

Monitoring and Detection

- Search at night!
- Search in debris piles, bricks, pots, wall crevices and underground cloth
- Search in shaded, moist and humid places
- Inspect incoming plant shipments and segregate plants into a holding area



Monitor: Traps

- Snailer[®] traps
- One-way slatted door on each side
- Can be combined with baits and lures




Photo from Veasey et al., Insects 2021, 12, 328
<https://doi.org/10.3390/insects12040328>

Monitor: Lures



Article

Fermenting Bread Dough as a Cheap, Effective, Nontoxic, and Generic Attractant for Pest Snails and Slugs

Robin Veasey ¹, Maria Cordoba ^{2,†}, Andrew Colton ², Leonard Fujimoto ³, Christine Dodge ², Ian Foley ⁴, Gary Adams ⁵, Taelor Anderson ⁵, Richard Merenz ⁵, Arnold Hara ³, Amy Roda ⁶, Jocelyn Millar ¹ and Rory Mc Donnell ^{2,*} 

Lures: Fermenting Bread Dough



500ml (1 pint) All Purpose Enriched
Kroger® bleached flour

+



500 ml (1 pint) Water

+



2 packets (0.25 oz) of Red Star®
Active Dry Yeast

Lures: Fermenting Bread Dough

- Mix ingredients in a bowl
- Hold the mixture in room temperature
- Use small containers/dishes

Attraction of Horntail Snail to Lure



Snailer[®] trap vs Bucket trap



Metaldehyde Application

Before the application

Sanitize (remove debris, algae, decomposed leaves)

Irrigate (making sure the soil is wet)

During the application

Apply metaldehyde only to the soil not on the plants

Apply in between rows and/or at the base of the plants

Apply metaldehyde to all fence lines and borders, compost and refuse piles

After the application

Avoid irrigation for 48h after the treatment

Inspect for dead horntail snails

Metaldehyde Warnings

- Harmful to human and animals!
- Children and dogs may be attracted
- Do NOT mix metaldehyde with the lure
- Always follow the label, it is the LAW

Metaldehyde Labels

- Minimum 3.25% metaldehyde
- Used by FDACS-DPI:
 - Snail & Slug Bait, 3.25% Metaldehyde, by Southern Ag
 - Deadline Bullets® Metaldehyde 4%, by AMVAC
 - Durham® Metaldehyde Granules 7.5%, by AMVAC
 - Slug-fest All weather Formula, 25% Metaldehyde, by OR-CAL Inc.

Reduce/Prevent Snail Establishment

- Improve sanitation and remove hiding places
- Clear fence lines and borders for easier inspections and treatments
- Create a less humid environment



Additional Resources

- <https://trec.ifas.ufl.edu/faculty/the-horntail-snail--dr-revynti/horntail-snail-page-2/>
- UF fact sheet
- Guide for monitoring and metaldehyde application
- Webinar presentations and recording

If you Find the Horntail Snail

- Call DPI Helpline: 1-888-397-1517
- Contact Vanessa Campoverde: (305) 248-3311 ext. 241 or evcampoverde@ufl.edu

Thank you!

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