



Monitoring, Prevention and Management of Snails

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Snails

- Snails can be found in many habitats
- In Florida there are numerous native and introduced species
- Most land snails are not pests
 - Feed on algae and fungi; few are predatory
 - Some snails are protected (unlawful to kill them)
 - Hermaphroditic so all can lay eggs after mating
 - Generally prefer more succulent foliage and flowers
- Snail ID is important before management



Snail Behavior

- Active at night and on cloudy, rainy days
- Seek shaded, sheltered resting locations with high humidity including soil
- During the dryer months, snails may seek irrigated areas
- When conditions are unfavorable, snails can become inactive and withdraw into their shell





Snail Management

- Monitoring
 - Establish a snail identification program for employees
 - Visual observations
 - Trapping
 - Prevention
 - Plant segregation and inspection
 - Create unfavorable snail environments
 - Treat as necessary
 - Report new/unusual snails
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Monitoring

- At night, search for presence of the snails.
 - During the day, search for snail trails and damage which may be the only evidence of snail activity
 - Pay particular attention to moist areas or very susceptible plants such as seedlings or more succulent plants.
 - Monitor areas shared with other environments where snails could be moving from
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Monitoring

- ▶ While monitoring, handpicking snails will help. If done thoroughly and on a regular basis it can be an effective control method.
 - ▶ NOTE: snails can carry human pathogens so wear gloves or be sure to wash hands after handling
- ▶ Trapping - various types of traps or attractive items can be used to lure snails.
 - ▶ For example, banana and papaya are particularly attractive to the GAL snail. Most traps only work for snails in the immediate vicinity. Many snails are attracted to starches i.e. potato chips or fermenting products such as beer or rotting fruit



Unfriendly Environments

- Remove hiding places such as boards, stones, debris, weedy areas, leafy branches growing close to the ground, dense ground covers, etc.
- If possible, create a less humid environment (i.e. less irrigation; drip irrigation versus sprinkler)
- Place copper foil or screening on benches or around areas as barriers for protection
- Dry, abrasive materials such as diatomaceous earth can also be used as a barrier, however, once wet it no longer works.



Treatments

- **Iron Phosphate** (i.e. Sluggo; Bug-N-Sluggo; Ferroxx AQ)
 - Product must be ingested; snails are sensitive to iron toxicity
 - Causes snails to stop feeding.
 - Safe for use around animals.
- **Sulfur** (Bio-Sul)
 - Generally do not work as well as iron phosphate
- **Sodium ferric EDTA** (Ferroxx)
 - Works similarly to iron phosphate but usually faster

Treatments

- **Metalddehyde** baits (i.e. Durham; Slugfest; Deadline; Slugger) - Probably most widely used and has been shown to be efficacious against many snail pests.
 - Toxic both by contact and ingestion
 - Breaks down rapidly in moisture and sunlight
 - Poisonous to pets and wildlife, but not restricted use; available in professional and over-the-counter products.
 - Different formulations (pellets, mini-pellets, coarse meal, and liquids).



Treatments

- **Metaldehyde** baits
 - Most effective under warm temperatures; low humidity.
 - Sometimes snails can recover after ingestion particularly if they can get to water or moist conditions
 - Some products are combined with carbaryl to increase the spectrum of pests controlled. Toxic to many beneficial organisms therefore best not to use when just targeting snails.

Snail Test – Cuban Land Snail

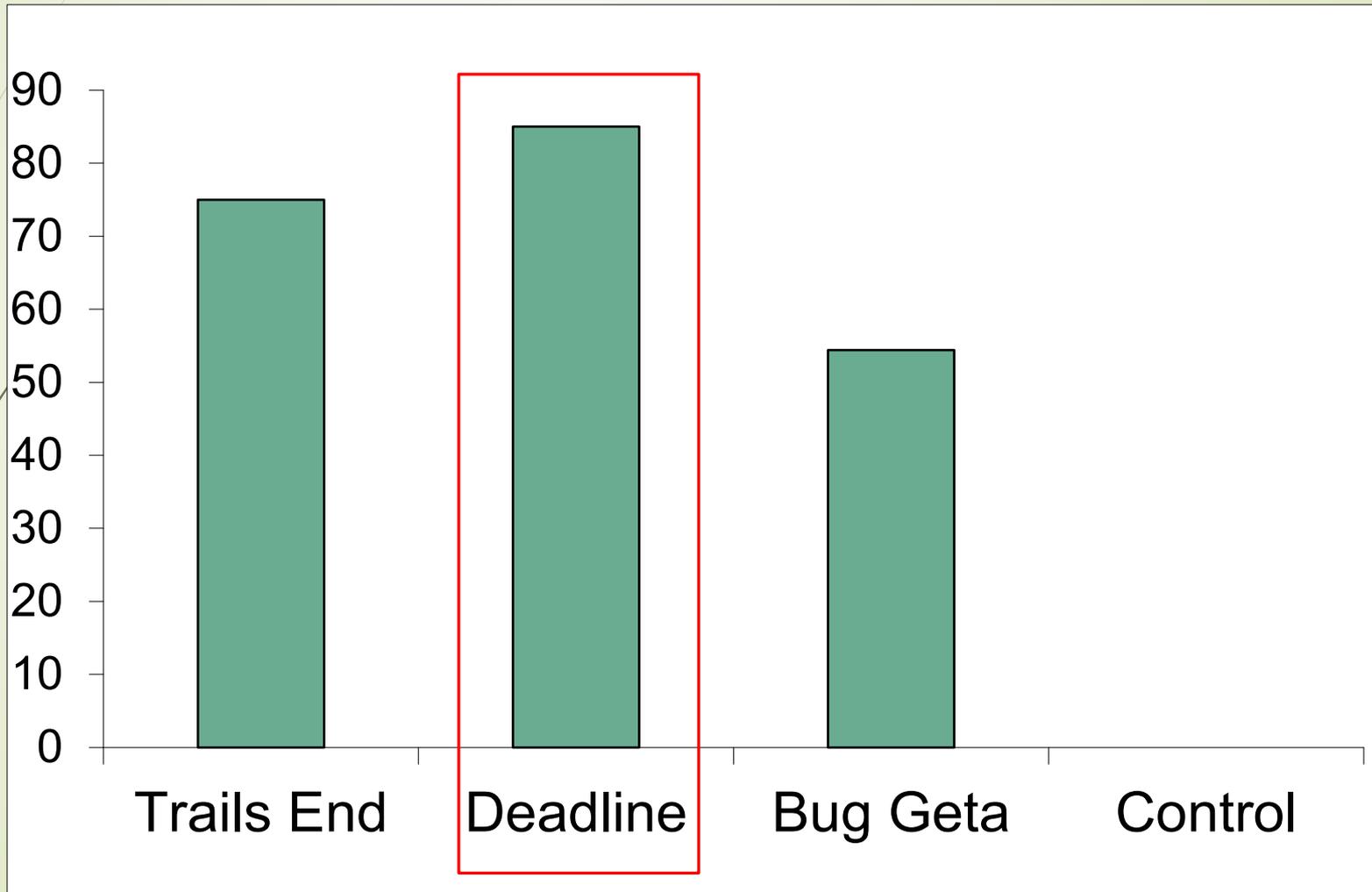
Treatment	Cumulative Mean Dead Snails		
	2 DAT	5 DAT	7 DAT
Iron phosphate 20 lb/ac	2.75 b	6.75 b	6.75 bc
Iron Phosphate 30 lb/ac	3.50 b	5.50 b	6.25 b
Metaldehyde 30 lb/ac	4.25 b	7.00 b	7.50 c
Untreated control	0.00 a	0.25 a	0.50 a

Snail Test – Cuban Land Snail

Treatment	Cumulative Mean Dead				
	3 DAT	5 DAT	7 DAT	11 DAT	14 DAT
Iron phosphate	4.5 ab	5.5 b	6.0 b	6.0 b	6.0 b
Metaldehyde	8.0 a	9.0 a	9.3 a	9.3 a	9.3 a
Control	0.0 b	0.0 c	0.0 c	0.3 c	0.3 c

Snail Test – *Bradybaena similaris*

Percent Mortality after 10 Days





Treatments

- **Methiocarb** (Carbamate)
 - Mesurol 75WP
 - Sometimes used in combination with metaldehyde.
 - Less effective under cool, wet conditions.
 - Fast acting; stomach and contact poison
 - Restricted use pesticide.
- **Phosmet** (Organophosphate)
 - Imidan 70-W
 - Broad spectrum insecticide labeled for snails and slugs in ornamentals and nonbearing fruit and nut trees



Treatments

- Borates – Baits containing boric acid.
 - Inhibit respiration.
 - No resistance to these products is likely to occur.
 - More effective against slugs than snails
- Repellents
 - These products do not control the pest but help to keep them out of certain areas much the same as placing copper barriers.
 - Examples include garlic extract, cinnamon oil and Bordeaux mixture (copper sulfate and lime).



Treatments

- Natural enemies
 - Numerous natural enemies that feed on snails include ground beetles, pathogens, snakes, toads, turtles, and birds
 - Most do not usually provide satisfactory control.
- In California, a successful snail management program for brown citrus snail included the release of a predatory snail, use of copper bands, pruning, applications of copper sulfate and iron phosphate, metaldehyde and a foliar application of phosmet which was allowed under a special exemption



Snail Management

- Often several snail species in an area, differing in behavior and feeding habits
- Large species are generally more resistant than smaller species; darker specimens are more resistant than light-colored ones
- Gastropods in the reproductive stage are more resistant than younger or older specimens of the same species
- Snails have inactive periods in which they are less likely to come into contact with a bait
- Baits must compete with attractive host food plants; high concentrations of molluscides can be repellent



Snail Management

- Snail management is an integrated approach
- Monitoring/Prevention
 - Direct observation
 - Trapping
 - Barriers
 - Environmental manipulation
- Identification
 - Invasive snails
 - Florida has many endangered and protected snails



Snail Management

- Treatment when necessary
 - When using baits, it is best to use after watering or irrigation, however, try to place the bait in drier areas. Do not water or irrigate after applying a bait.
 - Place baits near but not on attractive plants
 - Repeat application in same areas maximizes control – snails tend to return to food sources
 - Do not pile up baits in mounds
 - Use of molluscides should be in accordance with the label instructions.
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