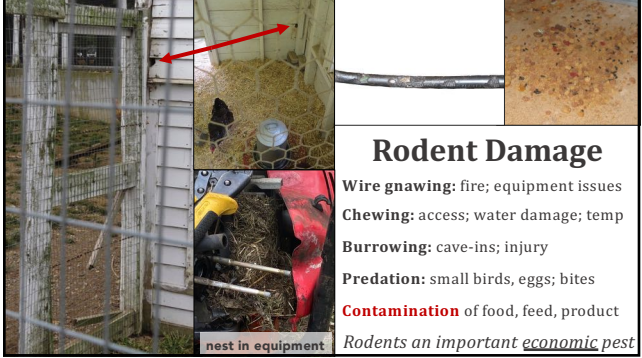


Rodent Management in Grain Processing Facilities

Matt Frye
NYSIPM Program
mjf267@cornell.edu




1



Rodent Damage


- Wire gnawing:** fire; equipment issues
- Chewing:** access; water damage; temp
- Burrowing:** cave-ins; injury
- Predation:** small birds, eggs; bites
- Contamination** of food, feed, product

Rodents an important economic pest

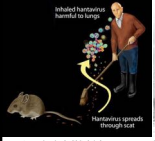
2

Pathogens: People, Pets, & Livestock

Direct Transmission

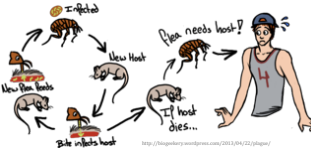


- bites
- feces
- urine
- membranes
- blood contact



Hamster spreads germs

Indirect Transmission



Use host? Flea needs host? Tick host dies... Rat infects host?

Ectoparasites: fleas, ticks, lice, mites

3



Exposure Risks


- Confined spaces
- Removing feces
- Handling carcass
- Handling traps

4



Rodenticide Concerns

- non-target effects
- secondary poisoning



5



May 2021

First bald eagle death in Massachusetts from rodenticides confirmed

News
MassWildlife officials recently confirmed that a bald eagle has died from second-generation anticoagulant rodenticide (SGAR) poisoning. While documented elsewhere, this is the first confirmed case of an eagle dying from rodenticide poisoning in MA.

6

Changing Regulations: Bans & Restrictions

California Legislature Passes Bill Banning Most Rodenticide Uses

California is one step closer to prohibiting most uses of second-generation anticoagulant rodenticides (SGARs) after the California Legislature passed AB 1788, "The California Ecosystems Protection Act," on Aug. 31.



Second-generation anticoagulant rodenticide ban

To reduce the risk of wildlife poisoning, an 18-month ban on second-generation anticoagulant rodenticides (SGARs) starts on July 21, 2021.

7



Misinformation & Lack of Information

Products on the shelf are not equally effective.

Home remedies and DIY information can be unsafe, harmful, and ineffective.

8

Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
 - Short term
 - Long term
- 4 Monitor
- 5 Evaluate

10

Rodent Inspection

A thorough inspection is key to pest management

- Defines the scope/extent of pest problems
- Identify structural deficiencies (entry points, damage)
- Identify pest species (specimens or evidence)
- Identify sanitation or water issues
- Establishes treatment method
- Determines what materials to use and where
- Performed at dusk or just before dawn for commensal rodents

Situational Pest Management: Stoy Hedges [PCT Magazine, NOV 2015]

11

Inspection Checklist

<u>Rodent Evidence</u>	<u>Attractive Elements</u>
<input type="checkbox"/> droppings	<input type="checkbox"/> shadows
<input type="checkbox"/> sebum marks	<input type="checkbox"/> warmth
<input type="checkbox"/> gnaw marks	<input type="checkbox"/> water
<input type="checkbox"/> footprints	<input type="checkbox"/> food
<input type="checkbox"/> burrows	
<input type="checkbox"/> nest material	
<input type="checkbox"/> caches	

12

Don't be fooled by the stool: Droppings



fly pupae
horizontal lines

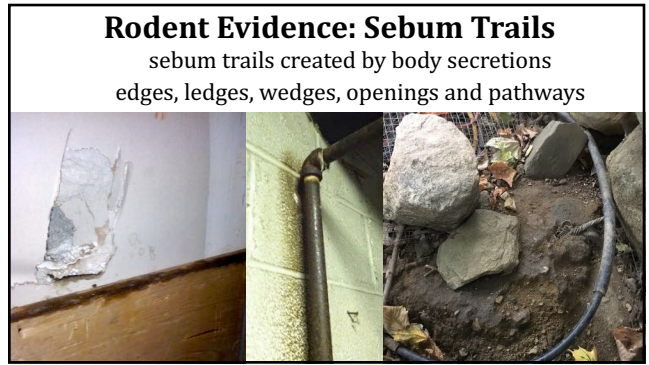
rodent poop
pointed end
hair mixed in

roach poop
vertical lines
blunt ends

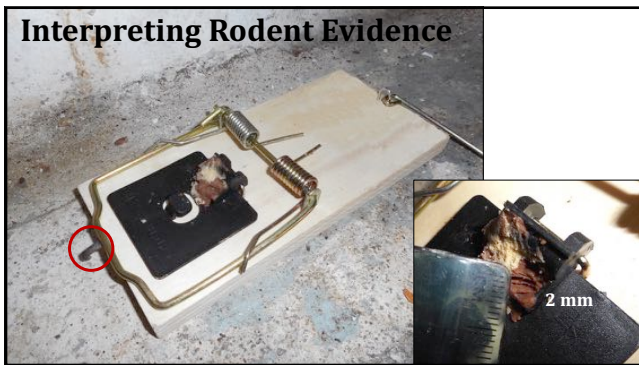
13



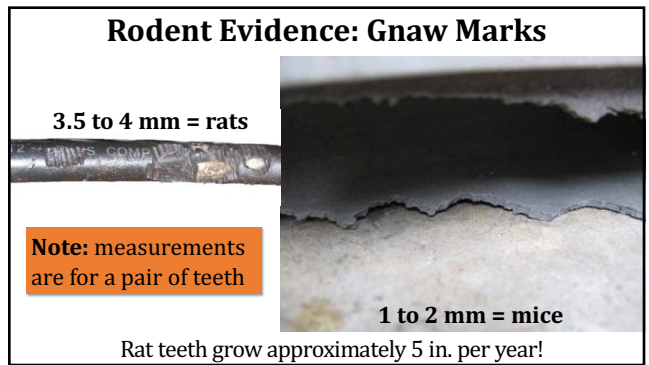
14



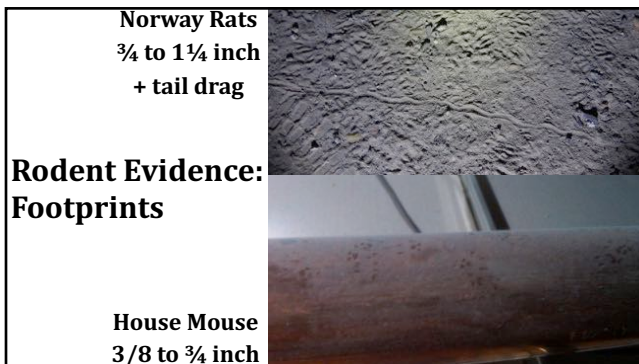
15



16



17



18



19

Rodent Evidence: Burrows, Nests & Caches



Norway Rats
3 openings per burrow,
with nest in the middle

Peromyscus Mice
protected, quiet spaces

20

Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
 - Short term
 - Long term
- 4 Monitor
- 5 Evaluate

21

Accurate Identification Essential target pest influences management plan



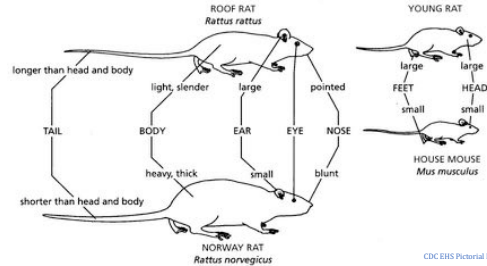
House mouse: permanent resident
interior trapping and exclusion



Peromyscus mice: seasonal visitor
exterior exclusion

22

Basic Commensal Rodent Identification



Identification = info about nest sites, seasonal activity, food sources, reproductive capacity, foraging habits

23

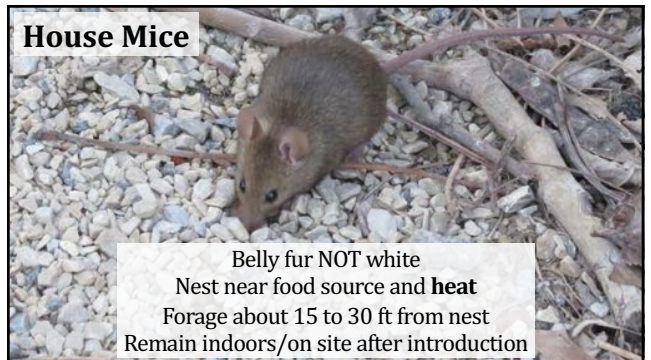
Norway Rat



Outdoor earthen burrows preferred
Entry points for food & water
Forage 100-500 ft from nest *

24

House Mice



Belly fur NOT white
Nest near food source and heat
Forage about 15 to 30 ft from nest
Remain indoors/on site after introduction

25



26

Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
 - Short term
 - Long term
- 4 Monitor
- 5 Evaluate

27

Without a comprehensive plan, the result is harvest, not management.

trapping

rodenticides

asphyxiation burrow treatments

28

Rodenticide Baits

Most economic approach, but requires caution and planning
Variety of size, shape, consistency, texture, ingredients, color...

Trade names used herein are for convenience only; no endorsement of products is intended, nor is criticism of unnamed products implied.

29

Different formulations have different uses and restrictions

CONTRAC

Trade names used herein are for convenience only; no endorsement of products is intended, nor is criticism of unnamed products implied.

30

Applications and the Label

Outdoor, above-ground applications require a tamper-resistant bait station

Label requirements for using tamper-resistant bait stations apply to applicators, not to bait station manufacturers.

31



35

On-Farm Site	Certification Required to Apply:	
	General-Use Rodenticide	Restricted-Use Rodenticide
Crop production area (e.g., field, orchard, vineyard, greenhouse, nursery, Christmas tree farm)	None	Private
Retail greenhouse/nursery	None	Private
Produce-packing facility	None	Private
Storage of: planting material, harvested crop, livestock feed/bedding	None	Private
Livestock buildings/feedlots/pastures	None	Private
Manure handling areas for farm use	None	Private
Farm equipment storage	None	Commercial
Farm residence (including household-related sites)	None	Commercial
Farmworker housing	Commercial	Commercial

Created by Dan Wixted, Cornell Cooperative Extension Pesticide Safety Education Program

36



37

A Tail of Trap Types

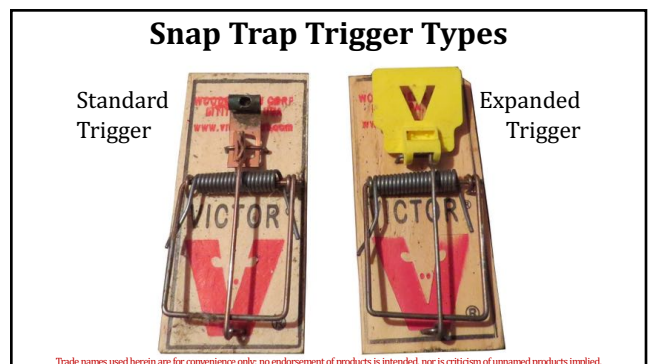
numerous trap types for different applications
traps differ in ways that can impact management program based on observations, multiple-kill traps might be best

Trade names used herein are for convenience only, no endorsement of products is intended, nor is criticism of unnamed products implied.

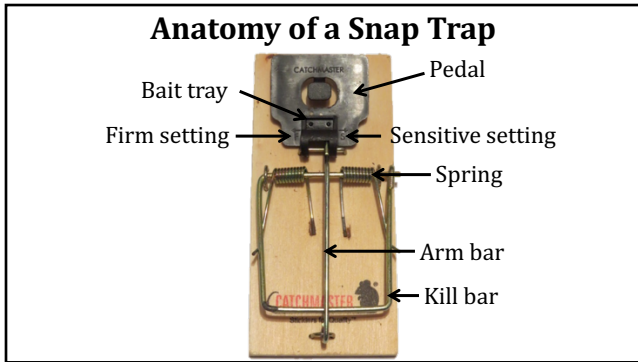
38



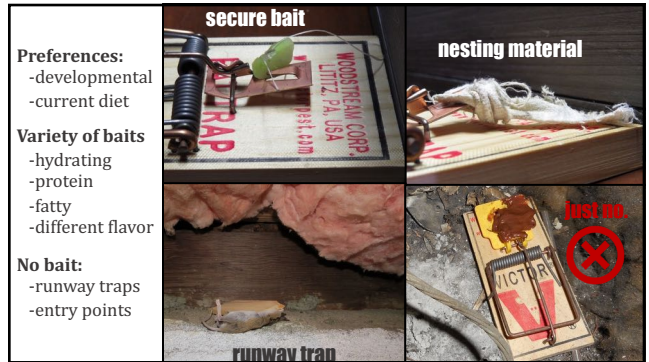
39



40



41



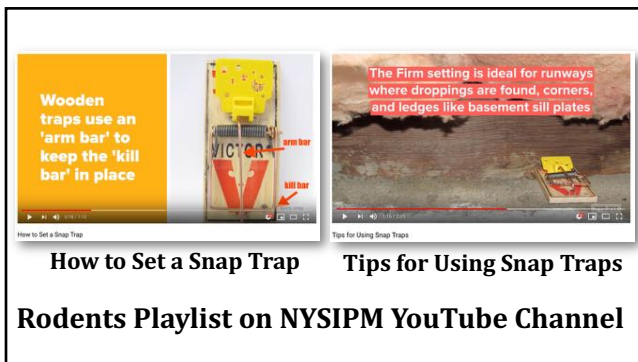
42



43



44




45




46

Trapping Rats



traps can be reused



failed trapping events can create "smart" rats

47

Smart Rats Require Smart Traps

Trap and bait covered in sawdust, newspaper, etc.



48


Device Fatigue if Not Moved




49

Asphyxiation: CO and CO₂ Gas burrow treatments


Rat Ice



BurrowRx



Inert gas injection system



50

Lack of Efficacy and/or Scientific Support



Repellents
Sonic emitters
Predators

Plant Secondary Metabolites as Rodent Repellents: a Systematic Review

non-target species or in both sexes. Although plant metabolites have potential as a tool for ecologically-based rodent management, this review demonstrates inconsistent success across laboratory, enclosure, and field studies, which ultimately has led to a small number of currently registered FSM-based rodent repellents.

expectation ←

→ reality

51

Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
 - Short term
 - Long term
- 4 Monitor
- 5 Evaluate

52



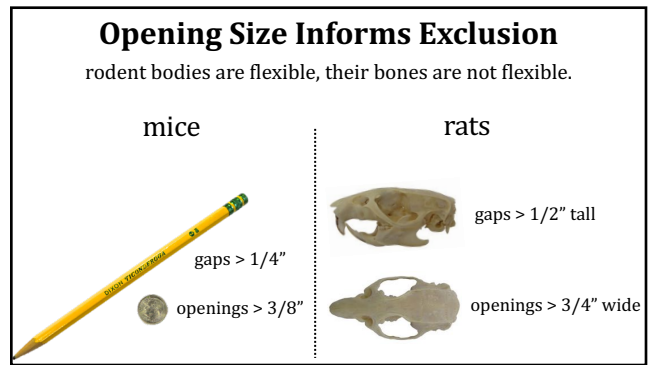
53



54



55



56



57



58

Less than 1 inch opening

- metal mesh fibers
- elastomeric sealants [not caulk]
- escutcheon plates


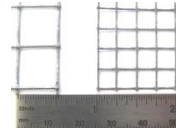
1 to 4 inch openings; doors:

- hardware cloth
- door sweeps & astragal (vertical) seals

4+ inch openings, soffits/roofs, chimneys:

- masonry & associated tools/supplies
- sheet metal & associated tools/supplies
- carpentry & associated tools/supplies

Stainless steel metal mesh fibers are abrasive for chewing rodents and do not rust

exclude rats 1/2 inch exclude mice 1/4 inch

59

1/4 inch hardware cloth excludes mice



60

Foundation Burrowing Issues



61

Vegetation Free Zone

~1 inch diameter stone
2 foot wide band
6 inches deep



62

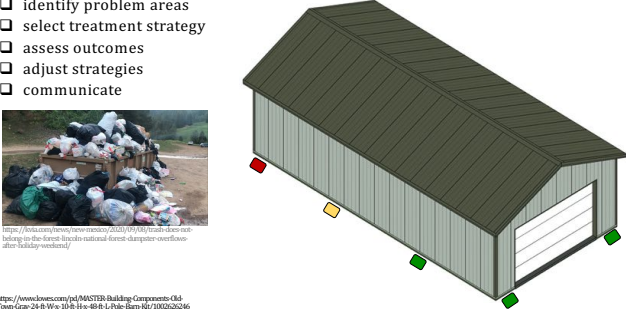
Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
 - Short term
 - Long term
- 4 Monitor
- 5 Evaluate

63

Monitoring track populations over time to determine impact

- identify problem areas
- select treatment strategy
- assess outcomes
- adjust strategies
- communicate



<https://www.homes.com/real-estate/9403739-Building-Components-Gid-Town-Crew-248-Wis-315-31-89-3-1-Dis-Best-RG-100002626>

64

Confirming Active Burrows: Monitoring

1. Look for active burrow [smooth with hair; 3.5"]
2. Fill with soil, leaves, paper
3. Inspect burrow next day for activity

65

Rodent Management Plan

- 1 Inspect
- 2 Identify
- 3 Pest Reduction
-Short term
-Long term
- 4 Monitor
- 5 Evaluate

Rodent problems are unique, and often require unique solutions

Was it effective?
Did we achieve our goals?
How can we improve?

66

67

Resources

70

Questions?

Comments?

Matt Frey
mjf267@cornell.edu
@MateoFrito

71