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Rodent ID, Biology and Behavior

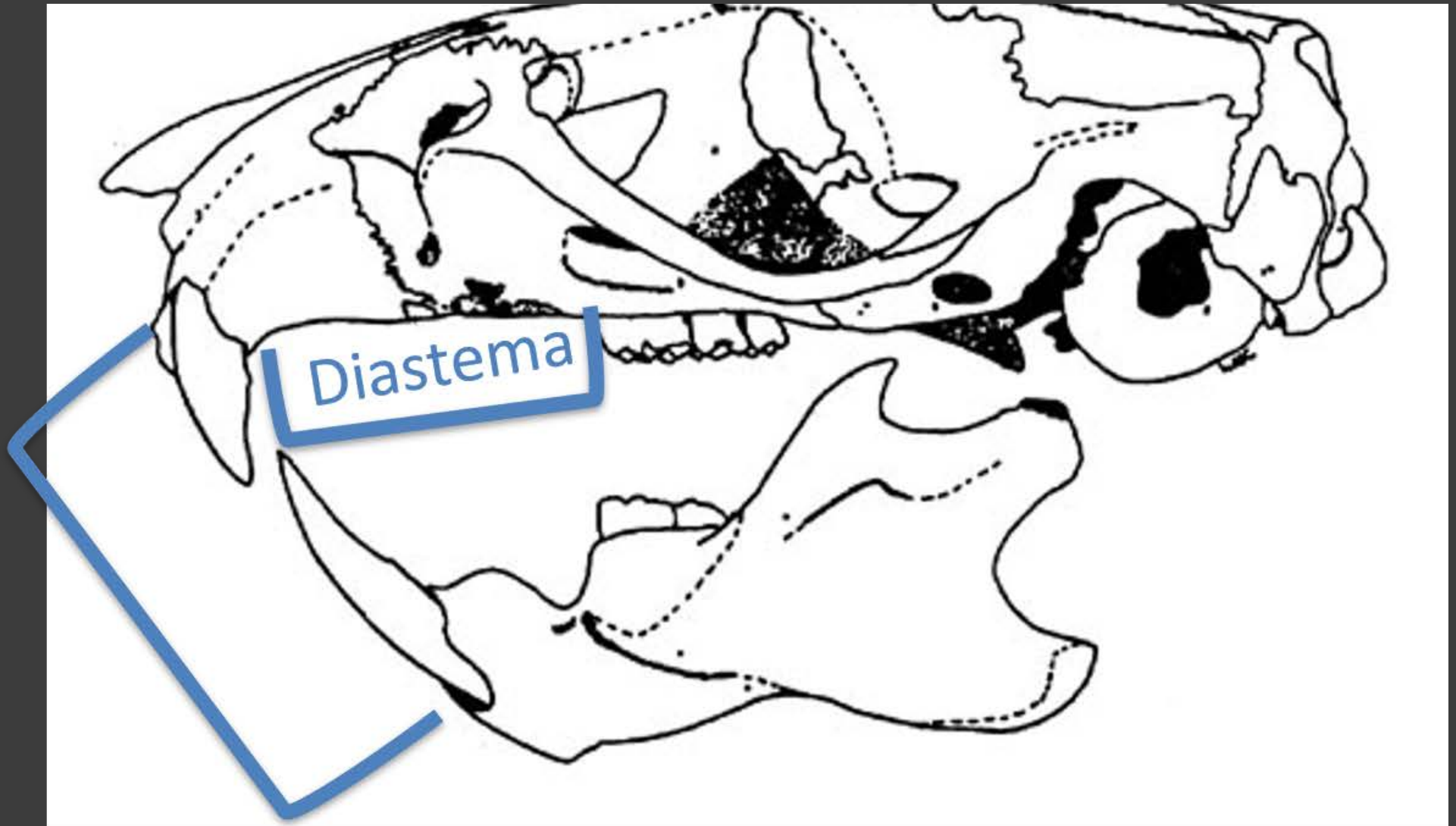




What's a rodent?

noun

any of the relatively small placental mammals that constitute the order Rodentia, having constantly growing incisor teeth specialized for gnawing.



Continually growing incisors

Why do we need
to control
commensal
rodents?



A close-up photograph of a young girl with dark hair and eyes, looking upwards and to the right. She is holding a teal-colored inhaler in her right hand, with the mouthpiece inserted into her open mouth. The background is a plain, light blue-grey color. The word "Allergens" is overlaid in white text on the teal part of the inhaler.

Allergens



Food contamination



Damage to wires



Identifying rodent signs

- Scats
- Tracks and runs
- Urine stains
- Rub marks
- Gnawing

Rodent droppings





Roof rat

- $\frac{1}{8}$ - $\frac{1}{4}$ in. diameter
 - $\frac{1}{4}$ -~1 in. long
- Generally have at least one pointed end



Norway rat

- $\frac{1}{8}$ - $\frac{1}{4}$ in. diameter
- $\frac{1}{4}$ -~1 in. long
- Generally capsule shape
- Rounded ends



House mice



Deer mice

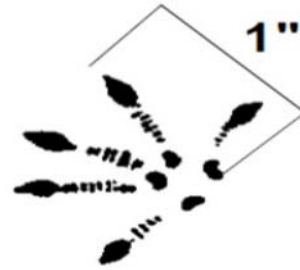


Voles



Scat Chat





hind feet: 5 toe



MOUSE Tracks—

Rodent tracks and runs



Urine stains



Photo by Greg Fox - Hearts Pest Management



Rub marks



Gnawing



Gnawing



Commensal rodents



Roof Rats

- Range
 - along the lower half of the East Coast and
 - throughout the Gulf States
 - upward into Arkansas
 - along the Pacific Coast
 - Hawaiian Islands
- More at home in warm climates



Roof rat appearance



- Sleek and agile
- 5-10 ounces
- Very large ears
- Small black eyes
- Light brownish to grey (highly variable!)

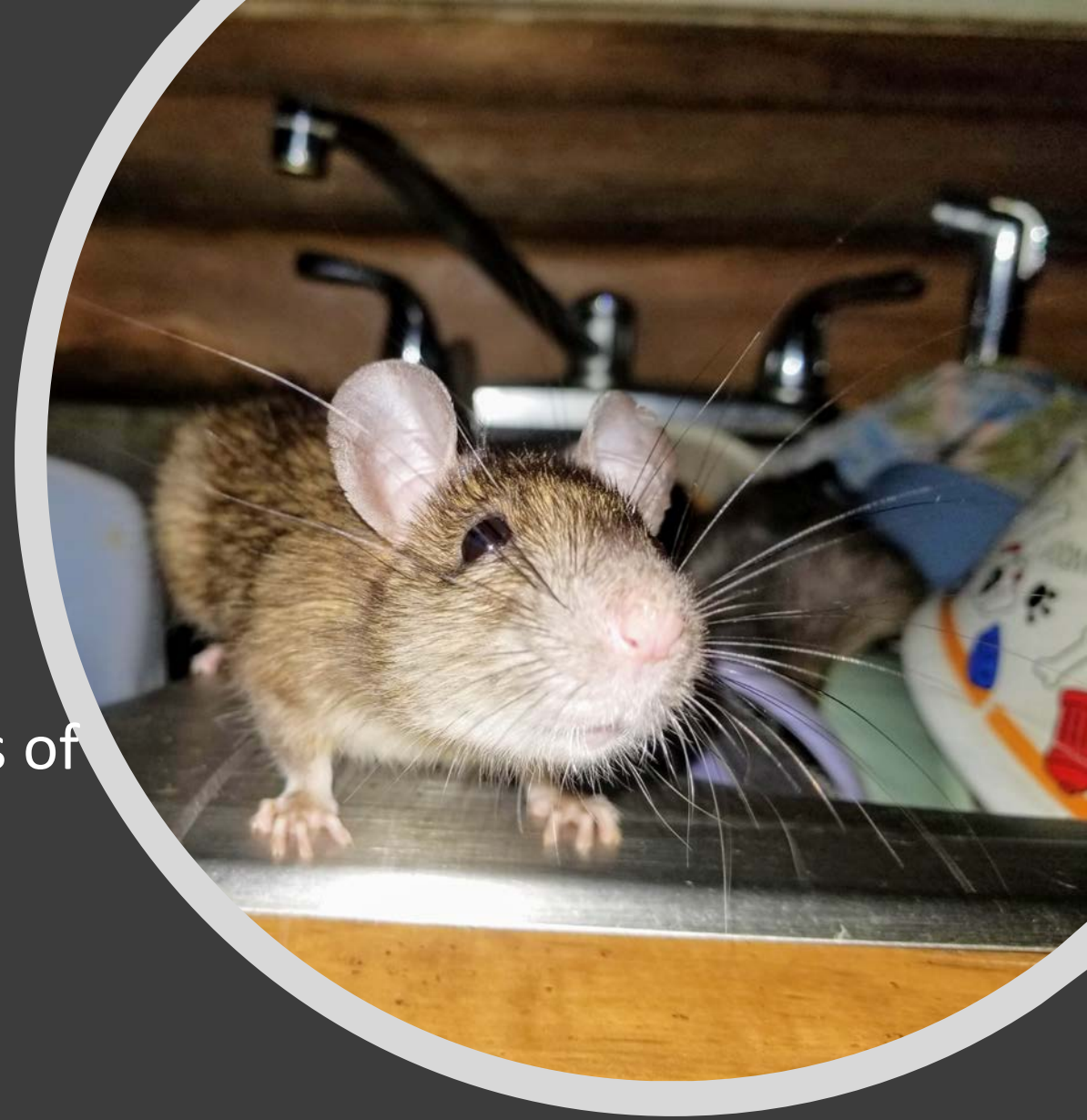
Roof Rat Appearance

- Uniformly dark tail with fine scales
- An adult is ~ 6-8 inches long
- Tail is 7.5- 8.5 inches long
- Tail as long, or longer than head and body
- Roof rats are actually similar in length to the Norway rat



Roof Rat Behavior

- Nocturnal
- Secretive and elusive
- Outside, they like to establish nests in dense shrubs, bushes and other types of lush vegetation
- Utilize vegetation for movement
- Use overgrown vegetation
- Property fences and walls
- Utility lines



Nest and Resting

- Accumulating dead fronds of unmanaged palm trees
- Fence ledges behind thick overgrown vines and vegetation (ivy, other creeping plants)
- Under cavities of garden sheds
- Within thick brush
- Behind or within yard trash piles
- Wood piles
- Lumber stacks

Nest and Resting

- In buildings
 - Attics
 - Soffits
 - Ceilings and wall voids
 - Corners of car port roof
 - Storage boxes and racks
 - Overhead electrical junction boxes
 - On or behind large structural beams
 - Silos
- In high rise buildings, roof rats can be from the basement to the penthouse!

Diet



- Natural foods
 - All types of seeds
 - Nuts, fruits, berries
 - Slugs and snails
 - Cockroaches
 - Fish and shellfish

Diet

- Anthropogenic food
- Dog food
- Trash cans
- Citrus and nuts from backyard fruit trees/orchard
- Bird feeders
- Grain in livestock pens/lots



Roof Rat Behavior

- Mostly forage at dawn and dusk
- Typically forage in family groups (10)
- Feed in areas that afford good protection
- Can carry food back to more secluded area or nest
- Roof rats tend to eat small amounts of food in several places



Neophobia
or avoidance





- Most average home range for commensal rodents is 25-100 feet
- Roof rats can commonly travel up to 300ft
- Some roof rats have been observed travelling 1,000 ft but this is uncommon



House Mice

“Mammalian weeds”

House Mice

- Relatively small
- 0.5 ounces
- Skull height is $\frac{1}{4}$ inch
- Moderately large ears
- Small black eyes



- House mice do not hibernate.
- In temperate parts of the world, winter can have an effect on food supply and hamper reproductive output



- Light brownish to grey
- Almost hairless tail
- An adult is ~ 5-7 inches long (including tail)

Diet

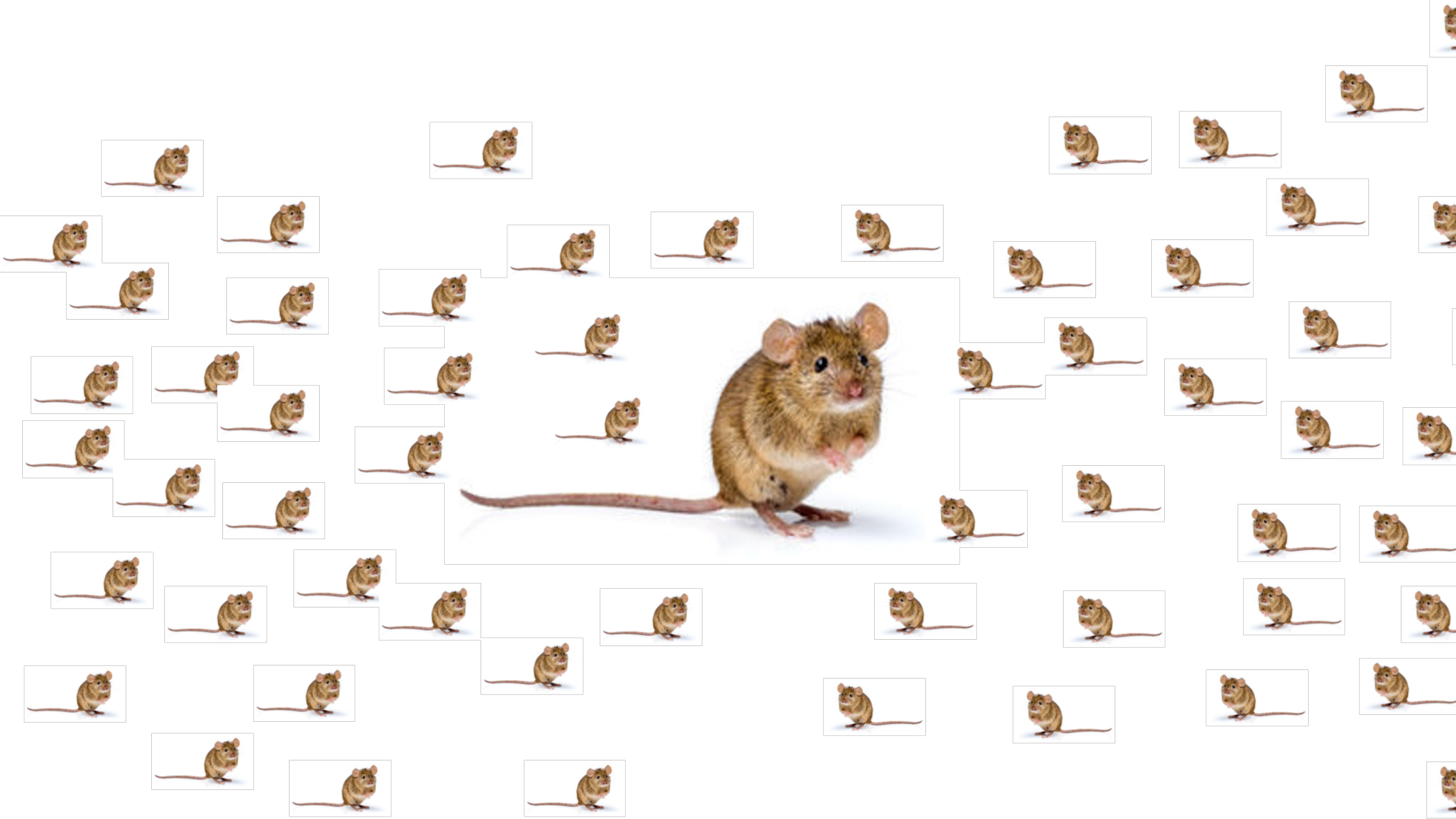


- Omnivorous
 - Prefer seeds and grain
 - Often consumes dog food in urban areas
- Not neophobic about new foods
- May prefer foods that are
 - Fat
 - Protein
 - Sugar
- Survive with very little water

House mouse reproduction

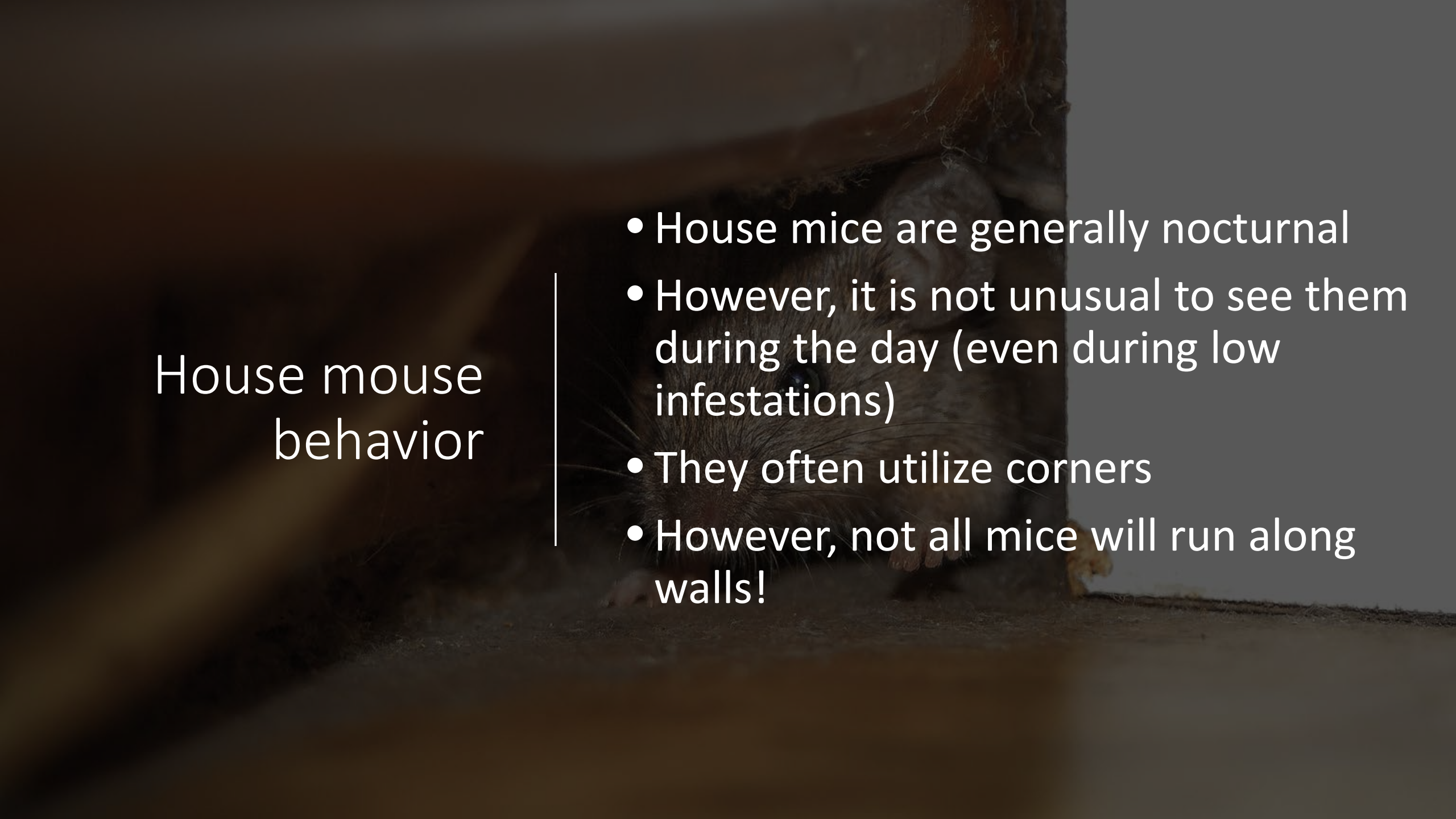


- Breed year round when conditions are favorable
- Outside mice are seasonal breeders
- Litters
 - 5-6 young
 - 19-21 days after conception
 - Sexually mature at 6-10 weeks
 - 5-10 litters a year



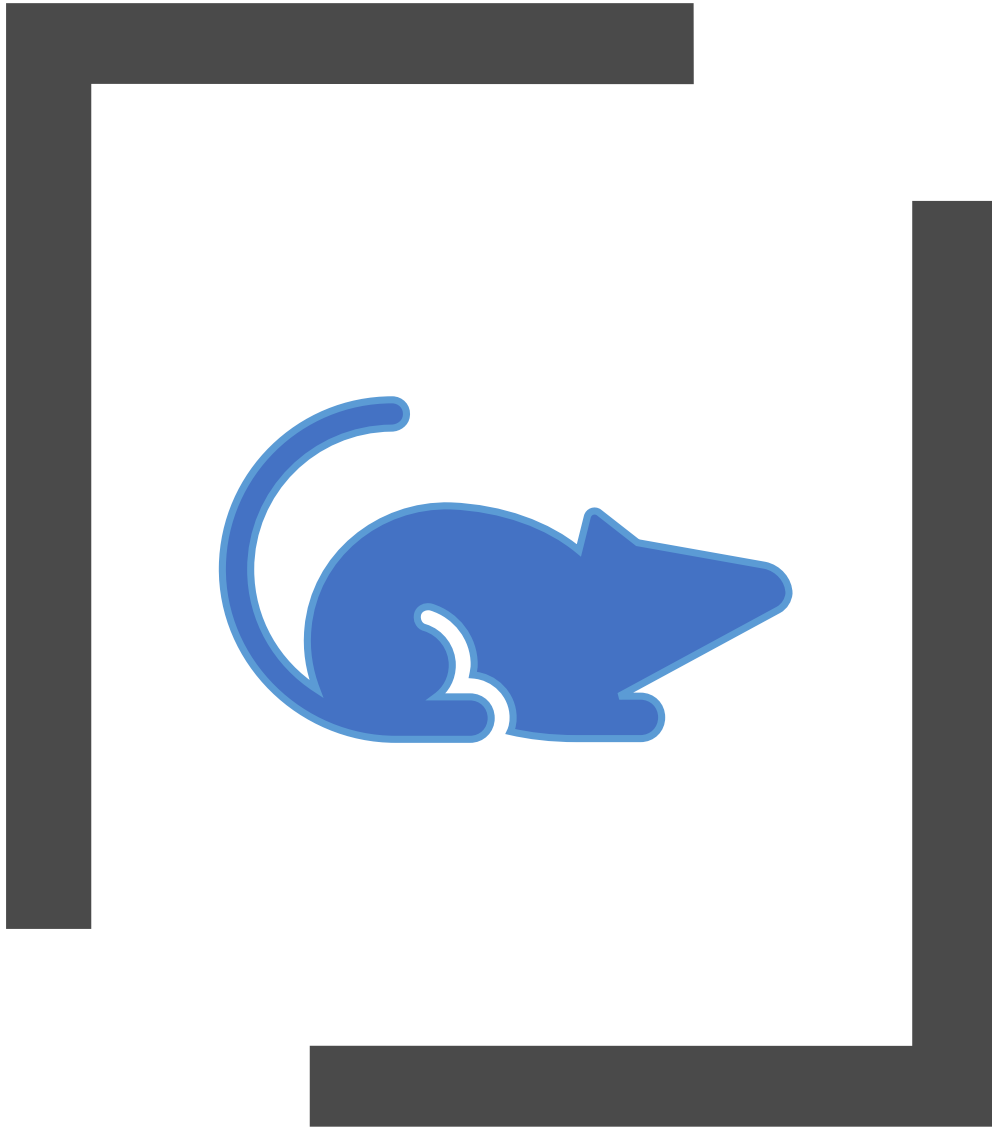


- House mice do not hibernate.
- In temperate parts of the world, winter can have an effect on food supply and hamper reproductive output

A close-up photograph of a house mouse in a corner. The mouse is dark brown with lighter patches on its face and chest. It is positioned in the corner where a wall meets the floor, with its body pressed against the wall. The lighting is dim, highlighting the mouse's features against the dark background.

House mouse behavior

- House mice are generally nocturnal
- However, it is not unusual to see them during the day (even during low infestations)
- They often utilize corners
- However, not all mice will run along walls!



House mouse behavior

- House mice generally make very short excursions from their nests
- 10-30 ft
- However, in very tidy environments, they can travel 75 ft or more

House mouse behavior

- House mice are not neophobic and are generally curious and very active explorers
 - This doesn't mean that you are going to catch mice out in the open. You still need to be strategic
- House mice can travel at speeds of up to 12 feet per second.
 - This is often the reason why house mouse traps are often triggered and have no mice in them.





Norway Rat

“King Rat”

Norway rat

- The Norway rat is the most widely distributed and predominant rat species in the United States
- They can exist independently of people and structures and exist in natural and semi-natural environments
- Populations not associated with humans tend to be smaller



Norway rat

- Large and robust
- 7-18 ounces
- Small ears
- Small eyes
- Brownish or reddish gray above
- Whitish gray on the belly
- Adult is ~ 8-10 inches long
- Tail-7-10 inches long
- Shorter than body, dark above and pale below, scaly



Norway rat

- Large and robust
- 7-18 ounces
- Small ears
- Small eyes



Diet

- Urban
 - Garbage
 - Bird seed from feeders
 - Dog food
 - Vegetable garden
 - Compost
 - Backyard livestock

- Natural and semi-natural
 - Insects
 - Birds (nestlings and eggs)
 - Carrion
 - Nuts
 - Berries
 - Fruits
 - Seeds
 - Cereals and corns
 - Aquatic animals



Burrowing and nesting

- Burrowing is related to protection
- Norway rats often burrow underneath hardscape like
 - Roads
 - Pavements/footpaths
 - Walls
 - Permanent junk



Burrowing and nesting

- In the absence of these they will use dense vegetation
- Burrows are
 - 2-3 inches in diameter
 - 1.5-6.5 ft long
 - Contain nest chamber and additional exists that are less regularly used



Burrowing and nesting

- Active burrows have entrances with very smooth edges that have a well-worn appearance
- Inactive burrows can be covered in vegetation and have cobwebs covering them



Burrowing and nesting

- In structures
 - Wall voids
 - Ceiling voids
 - Attics
 - Crawl spaces
 - Equipment/appliance voids
 - Furniture
- Alleyways that are full of trash and clutter
 - Live in cavities in wall and bricks

- Peak foraging and feeding periods occur
 - Dusk
 - Prior to dawn
- May forage for food several times over the course of 24-hour period



Norway Rat Behavior

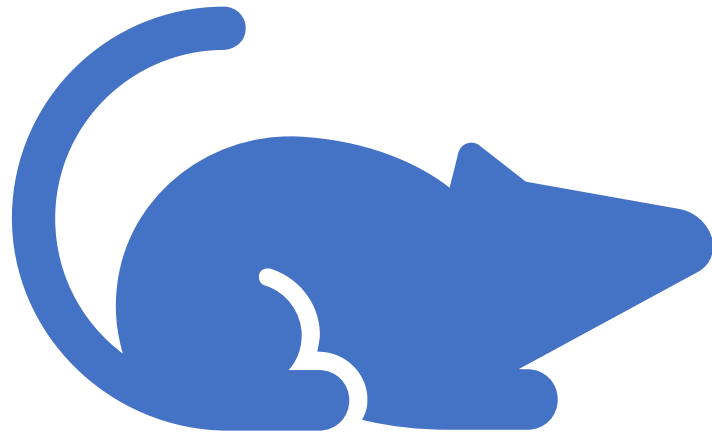
- Norway rats commonly hoard and can carry off and store food in other “safer” locations
- Norway rats often feed in one place when a good food source is present





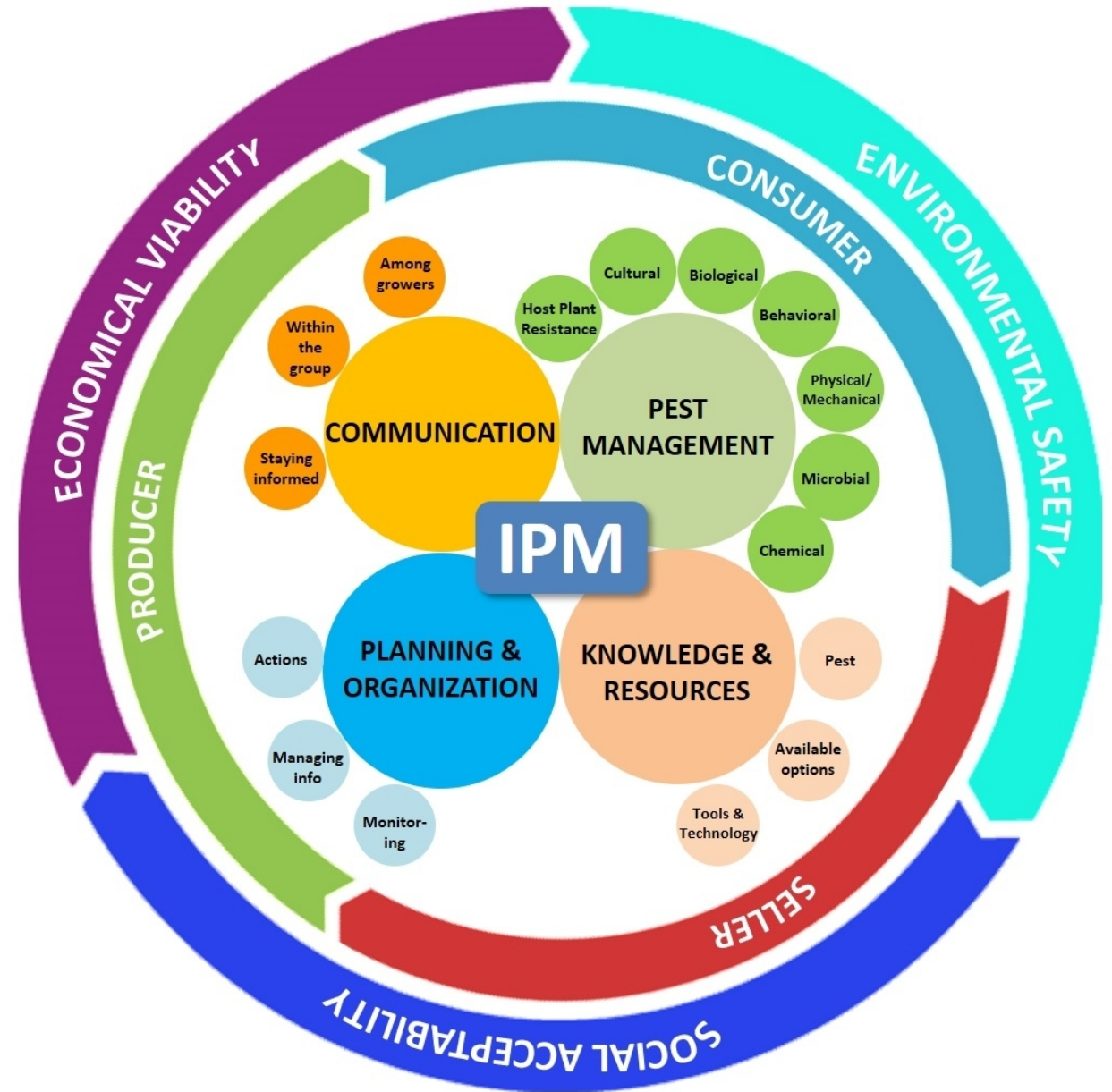
Norway Rat Home Range

- Home range is between 25-100ft
- Generally much less than roof rat but can be very variable
- Greatest when there is less resources
- When resources are plentiful, home range is closer to 25ft
- This can differ with season, sex, and population density

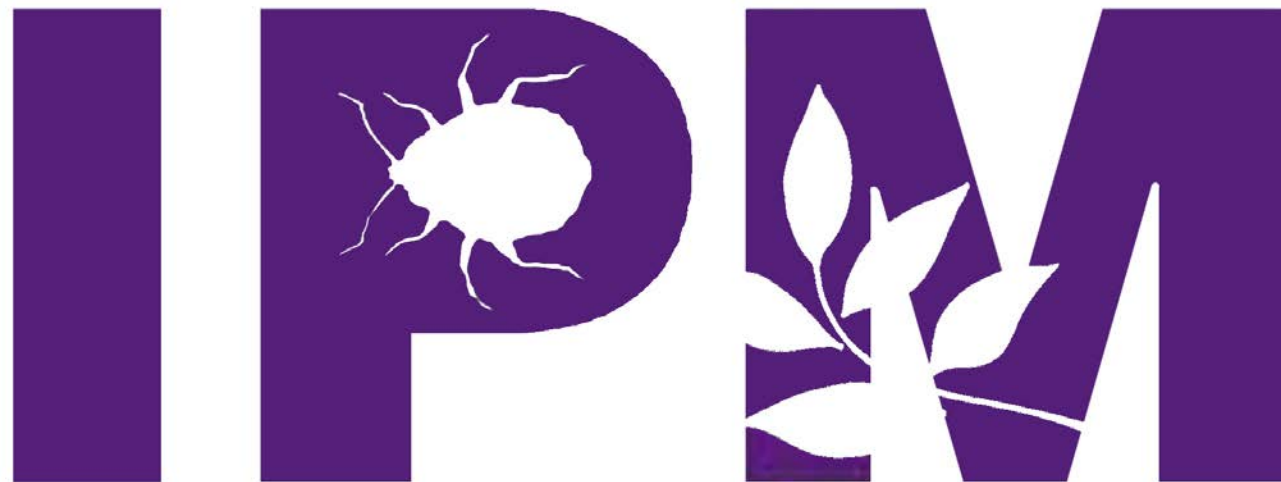


Managing Rats

Remember there are multiple options for rodent management and we encourage an integrated approach



Integrated approach



- Monitoring
- Sanitation and habitat modification
- Exclusion
- Trapping
- Repellents
- Fumigants
 - CO and CO₂
- Toxicants
 - Anticoagulant rodenticides
 - Bromethalin
 - Cholecalciferol
 - Tracking powder

Exclusion

- Many options
- https://sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf



Pest Prevention by Design

Authoritative guidelines for
designing pests out of structures



SF Environment
Our home. Our city. Our planet.
A Department of the City and County of San Francisco





Habitat modification did not alter use of site



Roof rats may have very strong affinity for their nesting sites



More study needed



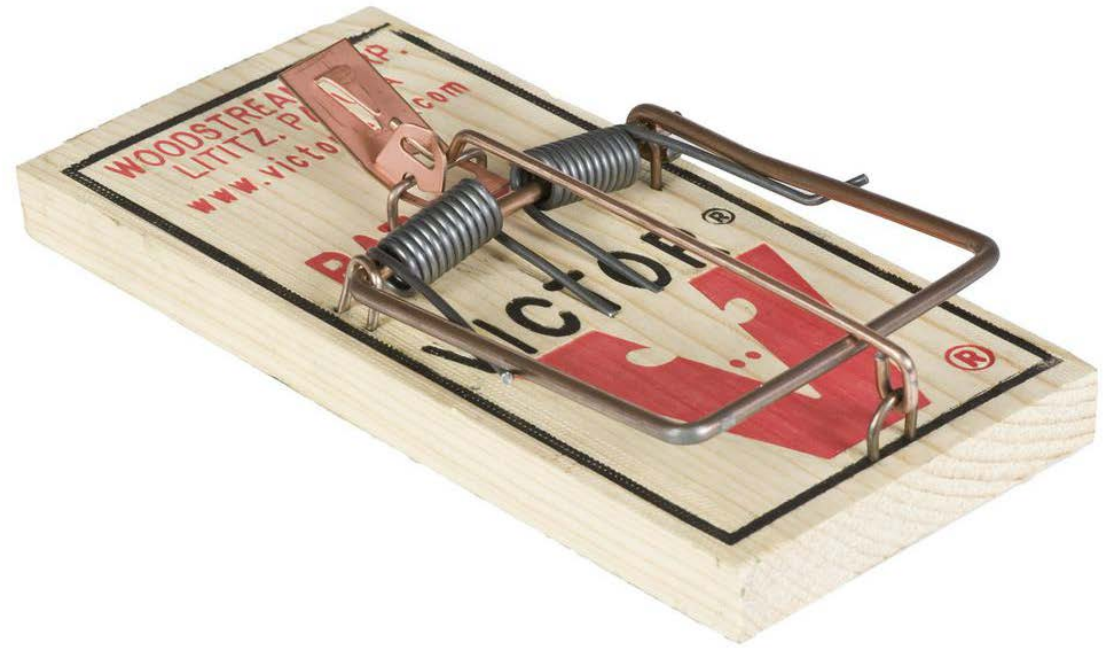
Selecting the correct trap



Size matters!



Expanded trigger



Easy to set



Electric Trap



- Be careful
 - Outside
 - Areas with high fire risk
- Still need to prebait

Choose the right attractant



MOULTRIE

77°F

MOULTRIECAM

16 FEB 2015 12:51 am

Rats can learn from their mothers' milk what foods are safe to eat.

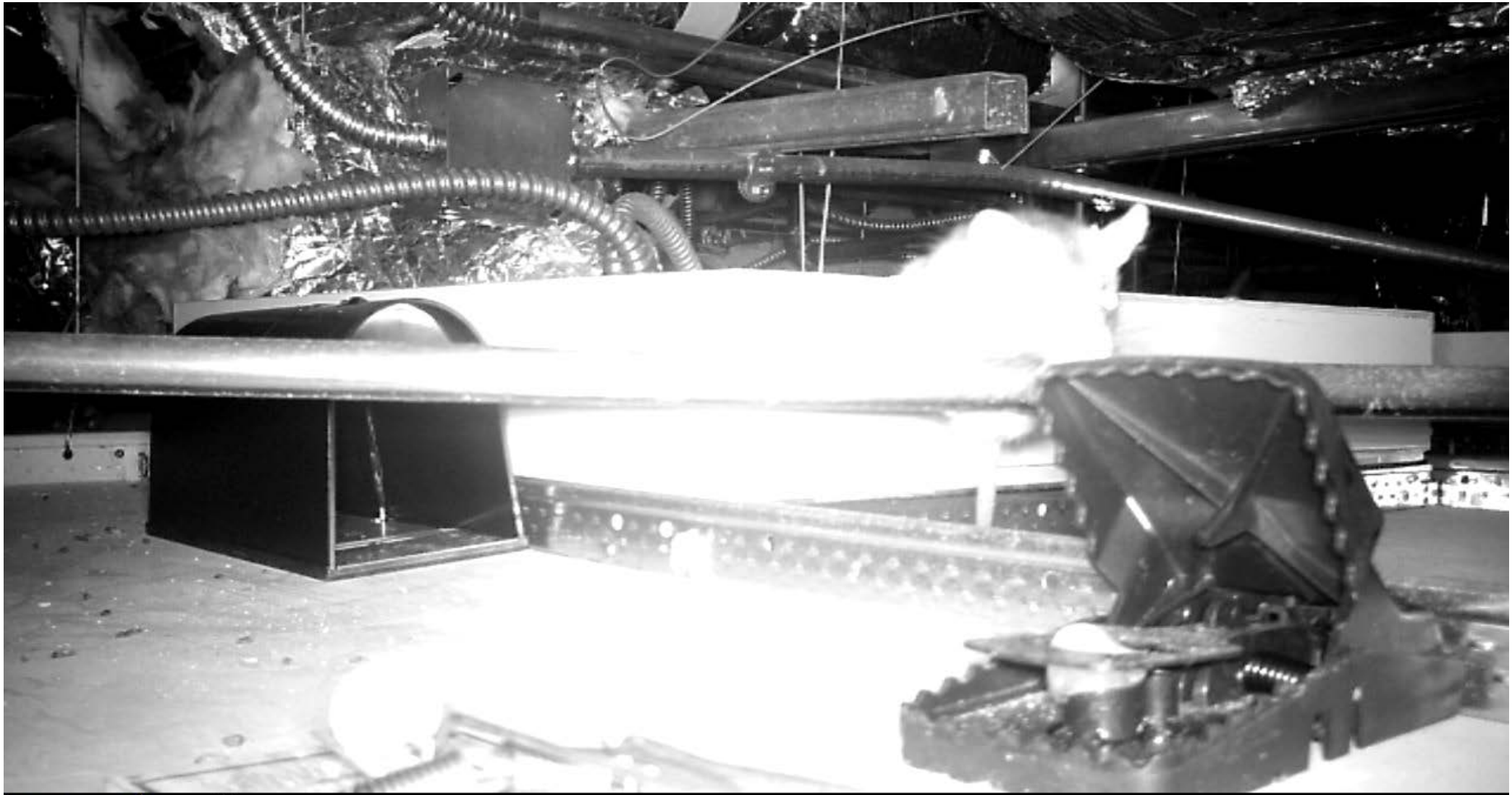
This is important to consider when choosing rodenticides and attractants for traps



Locally available resources

Don't over
bait





MOULTRIE

71°F

MOULTRIECAM

07 NOV 2015 12:24 am



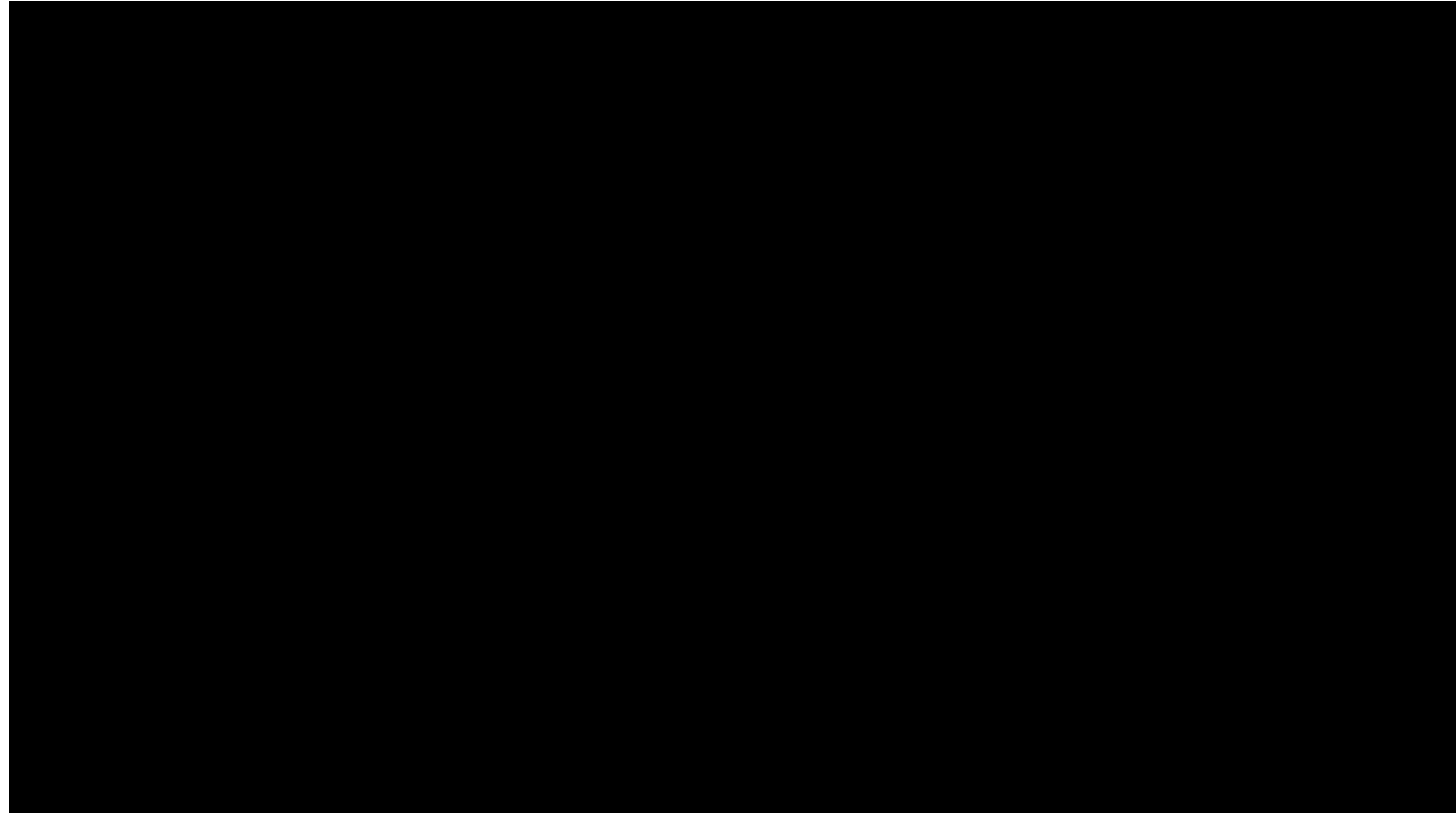
Cluster!



Cluster!!

SOOOOO
many traps!







Prebait

- This is essentially the most important thing you can do to ensure you are successful in managing your rat population and your rodent problem!







Catching the
right rat



For best success-catch the adults first!

Reproductively active male

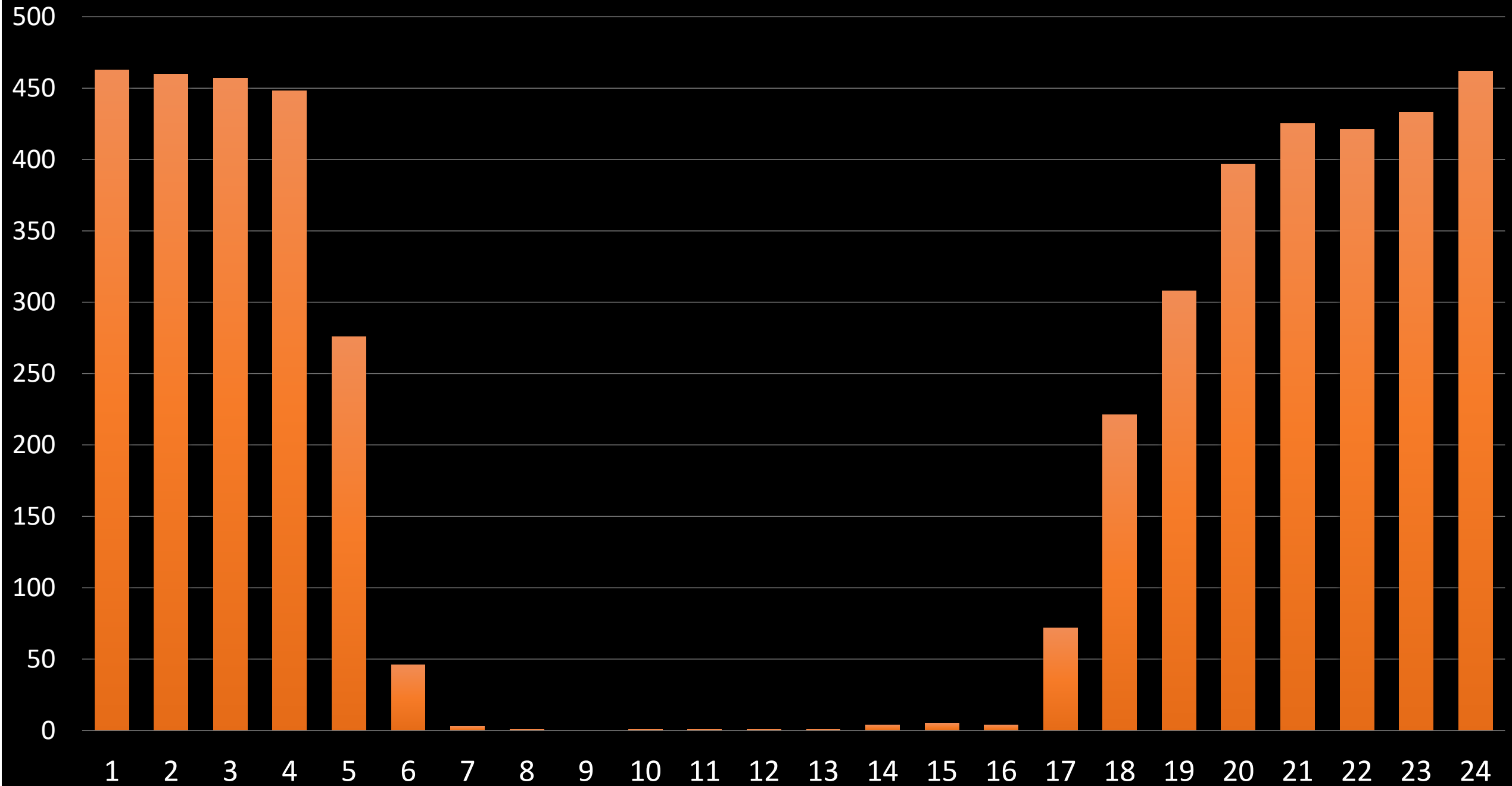
Reproductively
active female



Be mindful of nontarget wildlife



Number of rat detections per hour



Active ingredients and rodent management



Formulations

| Active ingredients | Product examples | Formulation |
|--------------------|--|---|
| Chlorophacinone | BorderLine, Flatline, Rozol, CDFA baits | Pellet, soft, powder, grain, treated artichoke bracts |
| Diphacinone | Ditrac, Liqua-Tox, CDFA baits, PCQ | Block, powder, liquid, pellet |
| Brodifacoum | Weatherblok, Talon, Final | Block, soft, pellet |
| Bromadiolone | Resolv, Maki, Nectus, Contrac | Block, soft, pellet, grain |
| Difethialone | Generation, FirstStrike | Block, soft |
| Bromethalin | TakeDown, TopGun, Cykill | Block, soft, gummy worms* |
| Cholecalciferol | Selontra, Terad | Soft block, block |
| Strychnine | Omega, Avalon | Grain |
| Zinc Phosphide | ZP Rodent Bait, Wilco Zinc, ZP Tracking Powder | Pellets, grain, powder |

Formulations

| Active ingredients | Product examples | Formulation |
|--|-----------------------------------|----------------------|
| Aluminum phosphide | Phostoxin, Fumitoxin | Pellets, tablets |
| Carbon dioxide | Eliminator, rat ice | Gas, dry ice |
| Carbon monoxide* | BurrowRx, Cheetah, CO-Jack, PERC | Device generated gas |
| Carbon, potassium nitrate, sulphur, carbon, sodium nitrate, charcoal | Gopher Gasser, USDA Gas Cartridge | Gas cartridge |
| 4-Vinylcyclohexene diepoxide, Triptolide | Contrapest | Liquid |
| Methylmercaptan | Protec-T | Irrigation |

Rodenticide Formulations

Blocks

Soft Bait

Soft Block

Grain

Pellets

Tracking Powder

Liquids

Rodenticides registered In California



| Type | Active ingredient |
|---|-------------------|
| First generation anticoagulant rodenticide | Chlorophacinone |
| | Diphacinone |
| | Warfarin |
| Second generation anticoagulant rodenticide | Brodifacoum |
| | Bromodiolone |
| | Difenacoum** |
| | Difethialone |
| Non anticoagulant rodenticide | Bromethalin |
| | Cholecalciferol |
| | Strychnine |
| | Zinc Phosphide |

Illegal applications



Contra pest

- In female rats
 - Interferes with ovarian function so that there are few to no ovulations
- In male rats
 - Inhibits the production and maturation of sperm.





It is important to check
the label

- Labels can be confusing sometimes



You can't manage what you
can't measure

Rodent ID



Questions



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