THE UNIVERSITY OF ARIZONA | COLLEGE OF AGRICULTURE & LIFE SCIENCES | COOPERATIVE EXTENSION Arizona Pest Management Center | ARIZONA PEST MANAGEMENT CENTER

A deeper dive into commensal rodents and flies

Biology and Behavior

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44% of all mammals on earth are rodents

Examples

- Rats
- Mice
- Squirrels
- Chipmunks
- Woodchucks
- Voles
- Gophers

Important character

- A pair of continuously growing incisors in each of the upper and lower jaws.

- Must gnaw each day to keep their teeth short

Homo sapiens !

12,000 – 15,000 rodenticide incidents per year

RAT BITES

- Intangible cost of rat-associated injury and illness
- Over 10,000 rat bites per year in the U.S.
- Infants and defenseless adults are subject to attack by rats

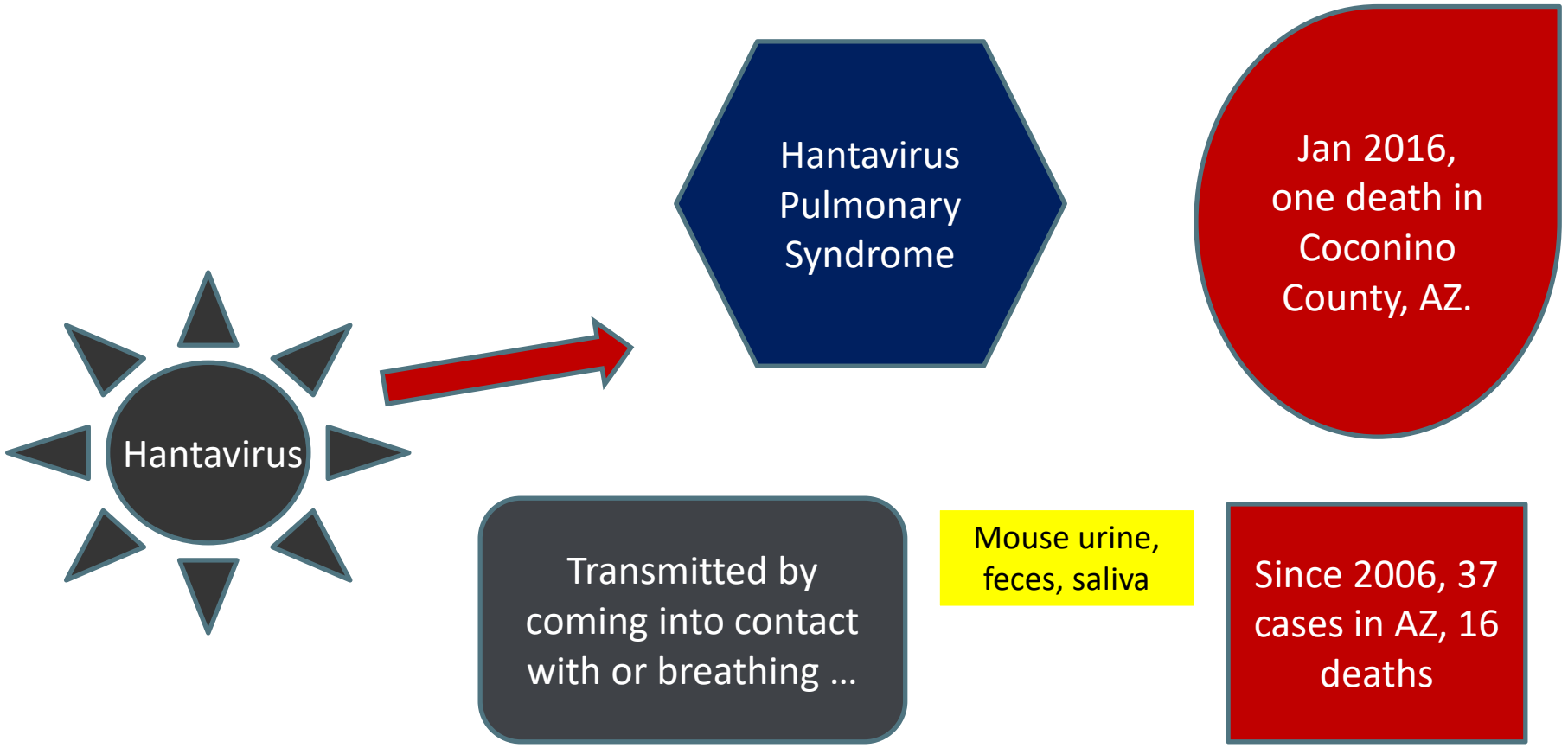
RODENT-BORNE DISEASES

- **RAT-BITE FEVER** –transferred from rat to humans by the bite of a rat

- **LEPTOSPIROSIS** –direct or indirect contact with infected urine
- **SCRUB TYPHUS** - bite of mites that live on the rodents
- **MURINE TYPHUS FEVER** – rats are hosts of flea vectors
- **SALMONELLOSIS** –gastroenteritis can be spread through food or water contaminated with rat and mouse feces
- **PLAGUE** and **HANTA VIRUS**

Allergen issue
Asthma

THREATS TO PUBLIC HEALTH



ECONOMIC IMPORTANCE

- Commensal rodents cost billions of dollars each year in the U.S.
- Destruction to computers and equipment
- Structural damage to school buildings

- Consume and contaminate food
- Cause fires by gnawing the insulation from electric wires

Notable species

ROOF RAT (*Rattus rattus*)

- Smaller than Norway rat, but larger than house mouse, and an agile climber

– Worldwide distribution

ROOF RAT

- Young, 6 -8 per litter
- 4 -6 litters per year
- Live ~ 1 year
- Range, 100 – 150 feet

ROOF RAT

  - **Indoors** – attics, between floors and ceilings, in walls and enclosed spaces
  - **Outdoors** – in trees and dense vine growth
- Food – vegetables, fruits, cereal. Daily requirement ½ to 1 ounce of dry food, more if moist
- **Water – up to 1 ounce each day**

RATS CAN:

- Pass through quarter-sized opening (½”)
- Use wires, conduits or pipes to gain access
- 180 fecal pellets/day
- Survive a 50’ fall
- 13” reach

- 36” vertical jump
- Tread water 3 days
- Swim underwater for 30 sec.
- Swim 1 mile in open water
- Gnaw on wood, lead pipes, cinder blocks, asbestos, aluminum, sheet metal, glass, and sun-dried adobe

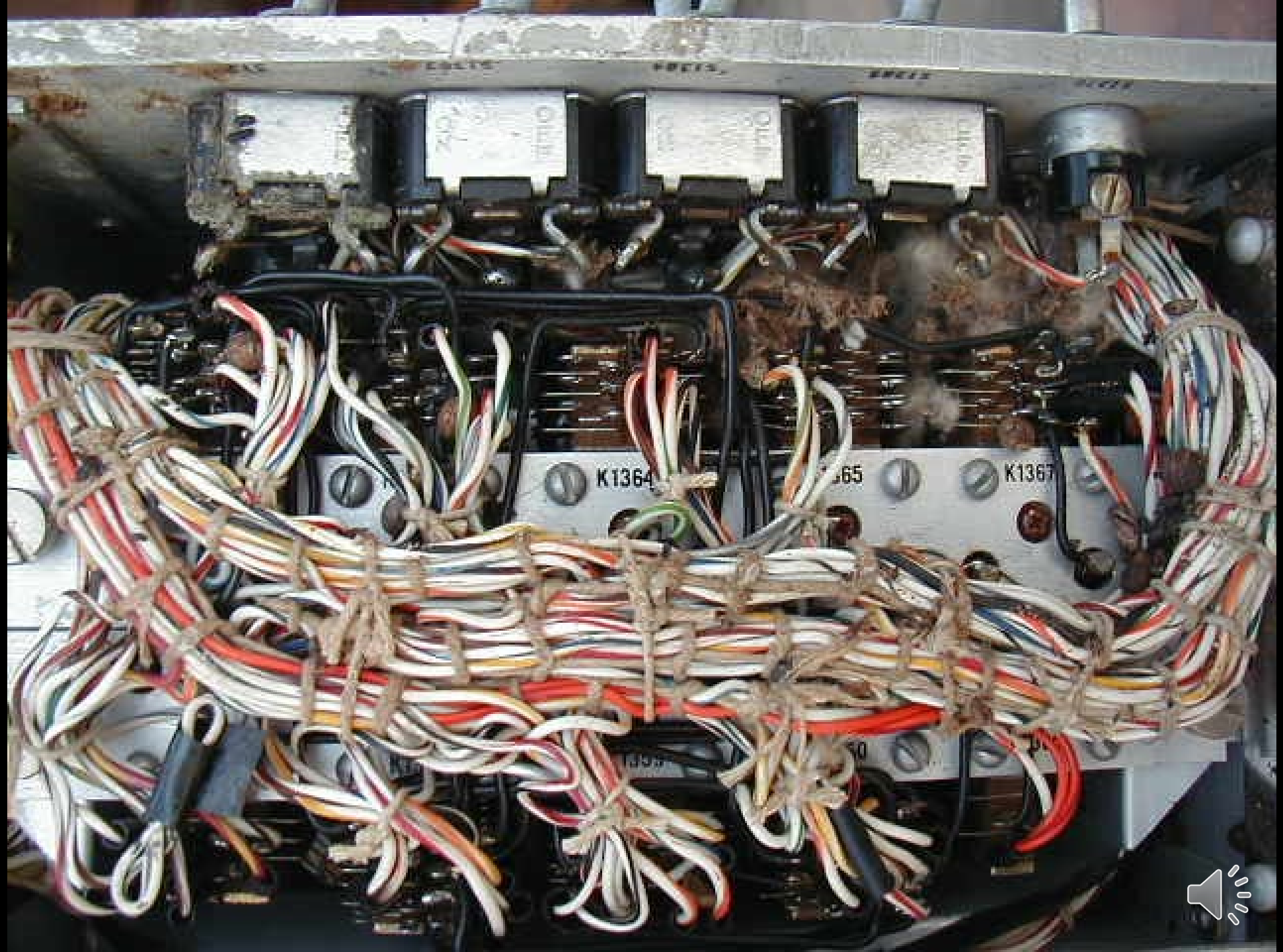
Notable species

HOUSE MOUSE

s musculus)

– Worldwide distribution


COMPAQ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HOUSE MOUSE

- Droppings: small, <¼ inch
- Sexual maturity: reached 1 ½ to 2 months after birth
- Young: 5 – 6 per litter
- Number of litters: as many as 8 per year
- Length of life: < one year

- **Food:** cereal grain preferred, but most types of edible materials;
  a nibbler - daily requirement - 1/10th ounce.
- **Water:** Can utilize metabolic water in food to survive

MOUSE FACTS

- Survive an 8’ fall
- Runs at 12 ft /sec
- 50 fecal pellets/day
- 12” jump vertical
- Swim
- Resurface after being flushed down toilet
- Thrive in cold storage room 14F
- Enter structure with ¼” opening (dime)
- Eats 4 lbs of food and makes 18,000 fecal pellets / 6 mo

MOUSE FACTS

- Several hundreds to thousands of microdroplets of urine/day

Notable species

- Burrowing rodent
- Brown rat, house rat, barn rat, sewer rat, and wharf rat
- 7-18 ounces, 200-500 grams
- Length of head and body, 6 - 8.5 inches
- Total length w/tail, 13 to 18.6 inches
- Usually brown with coarse fur, whitish belly, blunt nose
- Small ears rarely over ¾ inch long

NORWAY RAT
(RATTUS NORVEGICUS)


Chupa Chups

NORWAY RAT

- Large droppings, up to ¾ inch long capsule shaped
- Sexual maturity in 3 – 5 months after birth
- Gestation period, averages 22 days
- 12 – 18 young per litter
- Approx. 4 – 7 liters per year
- Average life span is about 1 year
- Range is about 100-450 feet

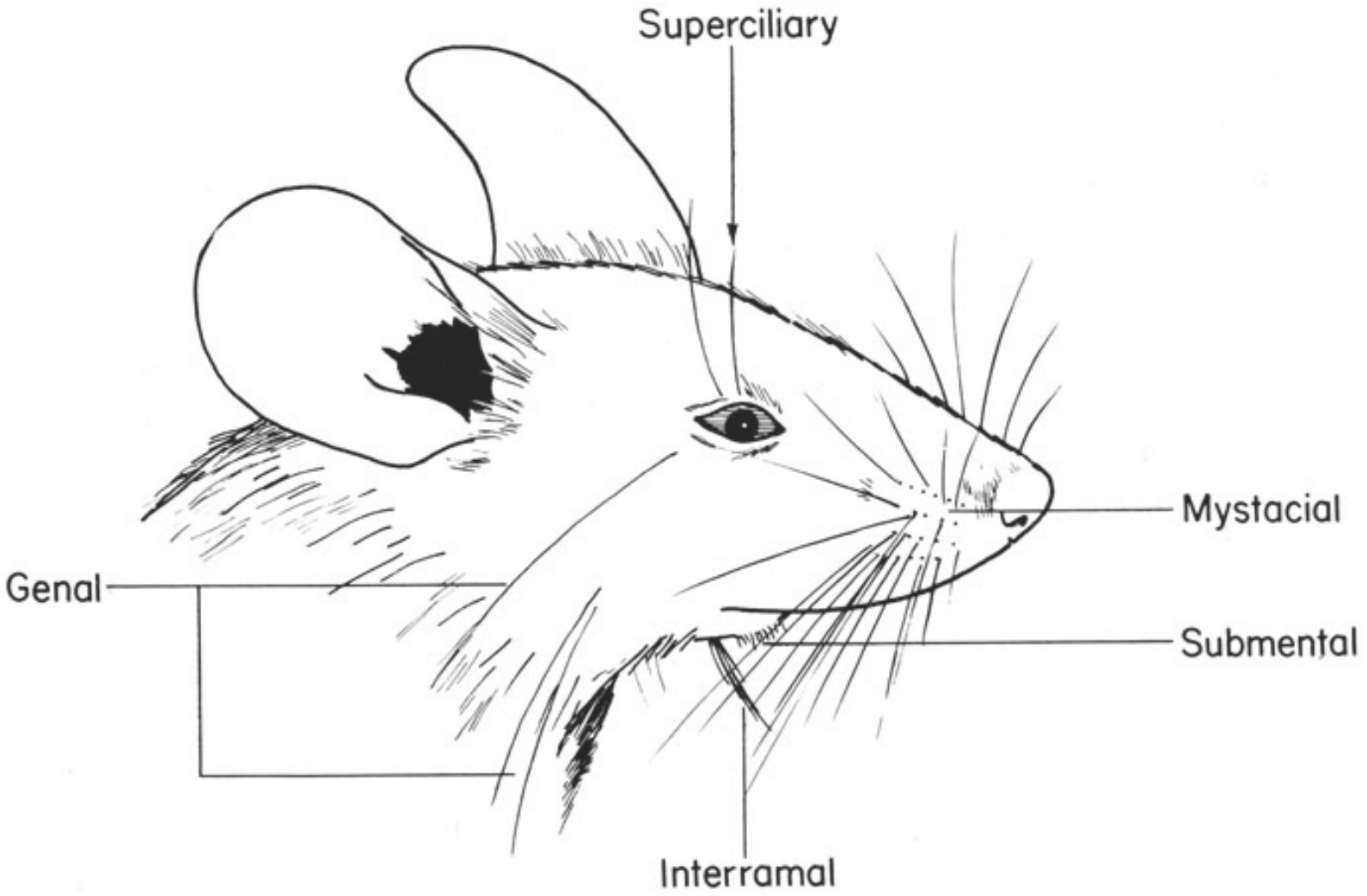
NORWAY RAT

- **Food**
  - Garbage, meat, fish, vegetable, fruit, and cereal baits are well accepted; daily requirement, ¾ to 1 ounce of dry food, more of moist food.
- **Water**
  - Daily requirement, ½ t 1 ounce.

GENERAL RODENT FACTS

- Poor vision, color blind
- Keen smell, taste, touch, hearing
- Mostly active evening, early morning
- Omnivores
- Hoarders
- Territorial
- Do not go beyond home range easily
- Provision nest with any soft material
- Reproductively prolific; may be pregnant while nursing pups
- Kinesthetic memory, orient via touch

VIBRISSAE (WHISKERS)



RECOGNIZING RAT AND MOUSE SIGNS

Rub Marks: Dark markings rodents make with their bodies along runway walls

Key *Conditional* Words for finding rats and mice in and around buildings:

*Warmth

* Near food

* Stationary items

* Let droppings be your roadmaps (trap placement)

QUICK OVERVIEW OF RODENT PREVENTION AND CONTROL: DUMPSTERS

- Repair holes in outside walls
  - cement mortar

IMPORTANT - RODENT BAITING WITHOUT ENVIRONMENTAL IMPROVEMENTS AND GOOD SANITATION WILL BE INEFFECTIVE

- **Poisons and Baits**
  - **Multi-Dose Poisons**
  - **Single-Dose Poisons**
  - **Sterilants**

WHAT SHOULD YOU LOOK FOR WHEN CONDUCTING RODENT INSPECTIONS?

- Partially eaten food
- Urine stains and odors
- Fecal droppings
- Hair
- Tracks in dust
- Chewed material, including foam, insulation, wires, lead, cement, etc.
- Scales
- Dander (skin flakes in fur)

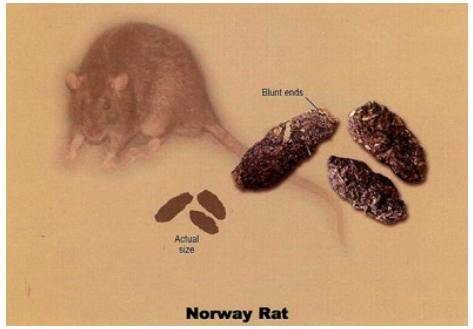
Make a list!

WHAT SHOULD YOU LOOK FOR WHEN CONDUCTING RODENT INSPECTIONS?

Rodent urine stain in dropped ceiling

Mouse droppings by a power strip

WHAT SHOULD YOU LOOK FOR WHEN CONDUCTING RODENT INSPECTIONS?

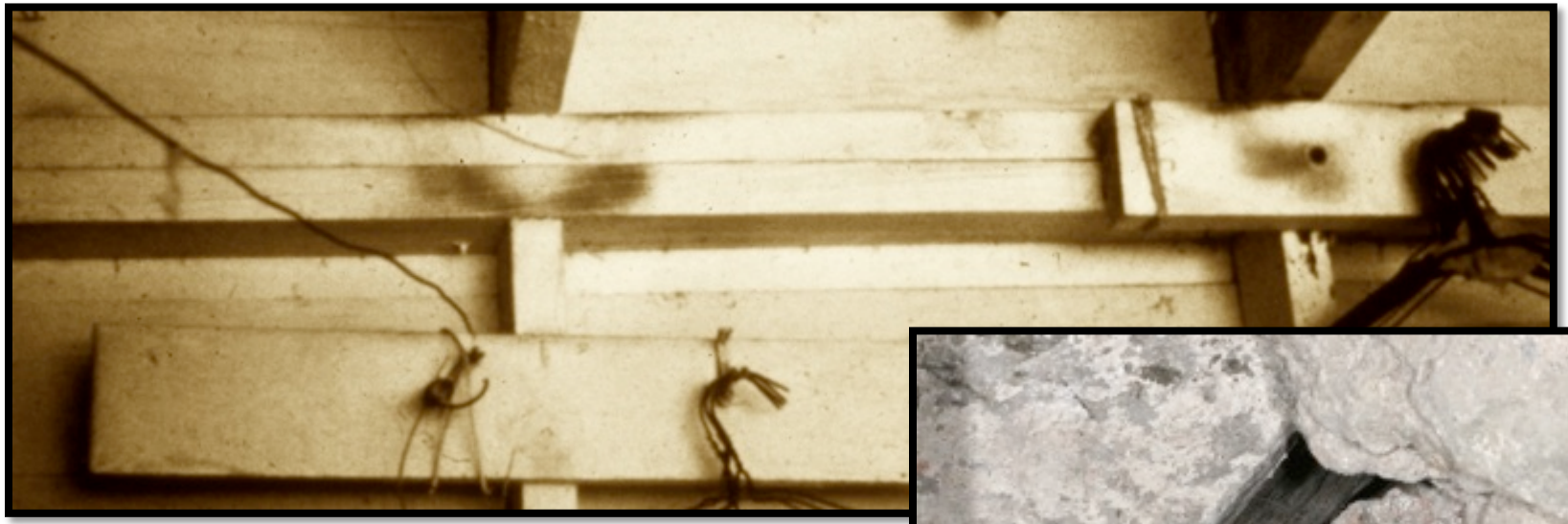


Rat: as large as ¾ inch long

Mouse: about ¼” long

WHAT SHOULD YOU LOOK FOR WHEN CONDUCTING RODENT INSPECTIONS?

Rub marks in an attic

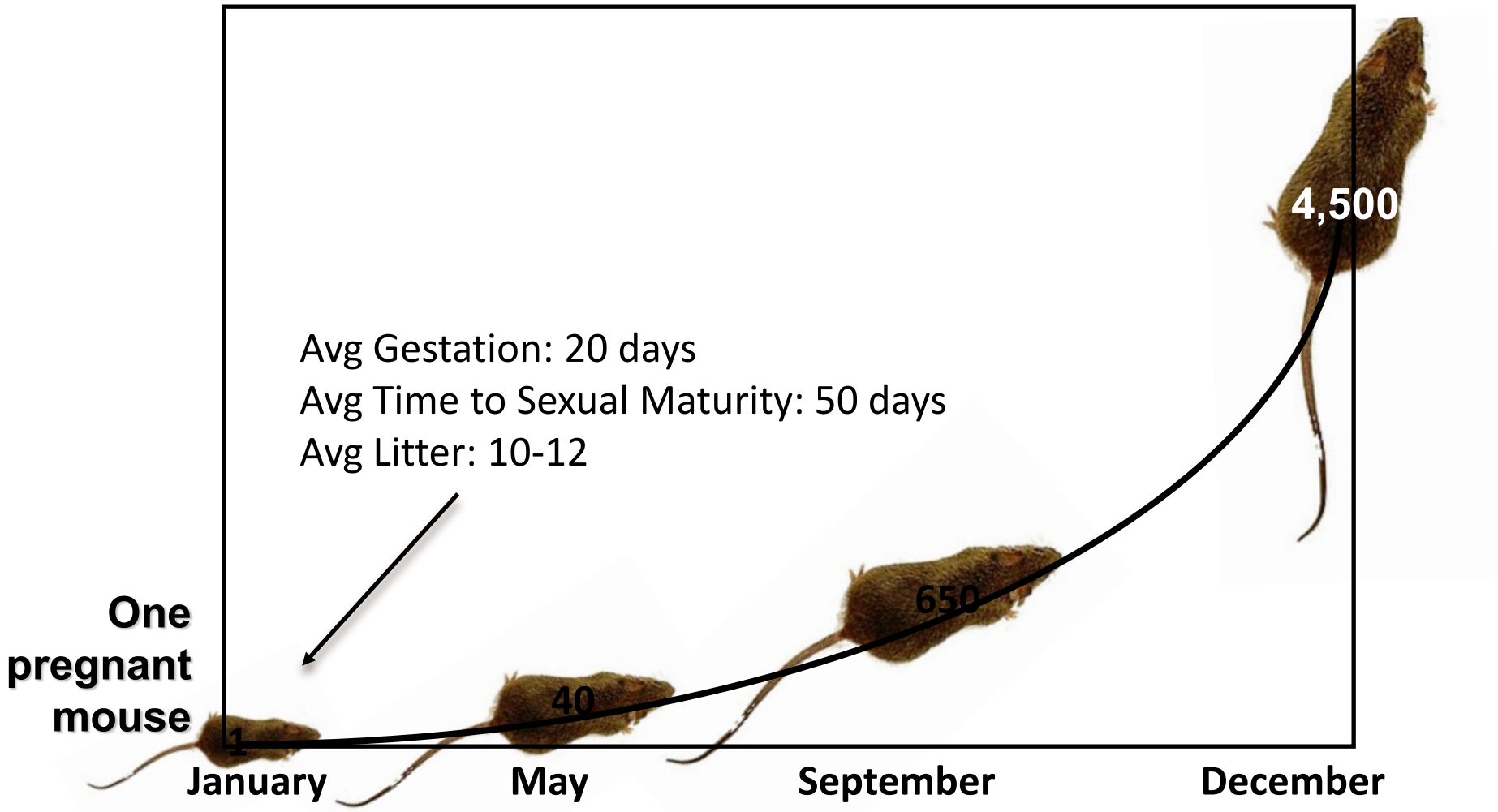


Holes in foundation

WHAT SHOULD YOU LOOK FOR WHEN CONDUCTING RODENT INSPECTIONS?

Chewed wires

Stopping even one does a lot!



INDICATOR PESTS

Found near dead animals or trash

Blow Fly

Hide Beetle

Found near grain or bait stored in walls

Indianmeal Moth

Grain Beetle

FLIES

FILTH FLIES

- House flies
- Blow flies
- Flesh flies
- Drain flies
- Lots of other flies

- Breed in filthy matter (manure, garbage, cadavers, etc.
- Considered pests because
  - nuisance insects
  - contaminate food and other surfaces
  - disease vectors – carry and spread pathogens

House fly

Blow fly

Flesh fly

MOTH FLIES/DRAIN FLIES


Africa Gomez
http://4.bp.blogspot.com/_BZ1l37_Svng/TJPjeGsfk0I/AAAAAAAABnE/hh4wP46wZ_8/s1600/drosophila+on+fallen+apples.jpg

Fruit flies

Housefly life cycle

Diseases transmitted by flies

- Flies can carry a number of microorganisms on their body, that can cause
- Enteric (intestinal) infections : dysentery, diarrhoea, typhoid, cholera
- Helminth (worm) infections)
- Eye infections : trachoma and epidemic conjunctivitis
- Poliomyelitis and certain skin infections (yaws, cutaneous diphtheria, some mycoses and even leprosy).

Diseases transmitted by flies

- Can serve as mechanical vectors (contact on body surface)
- Also through contamination through the flies' vomit and feces

Fly management

Fly management

- High reproductive rate, short lifespan, enable them to easily develop resistance to some commonly used pesticides
- Good sanitation practices, removal of larval breeding sources, adult's habitats alternation, and exclusion/pest proofing methods should be properly implemented
- Pesticide applications should be used only as the last resort depending on the situation and as instructed in the product label

Fly Management = Waste Management

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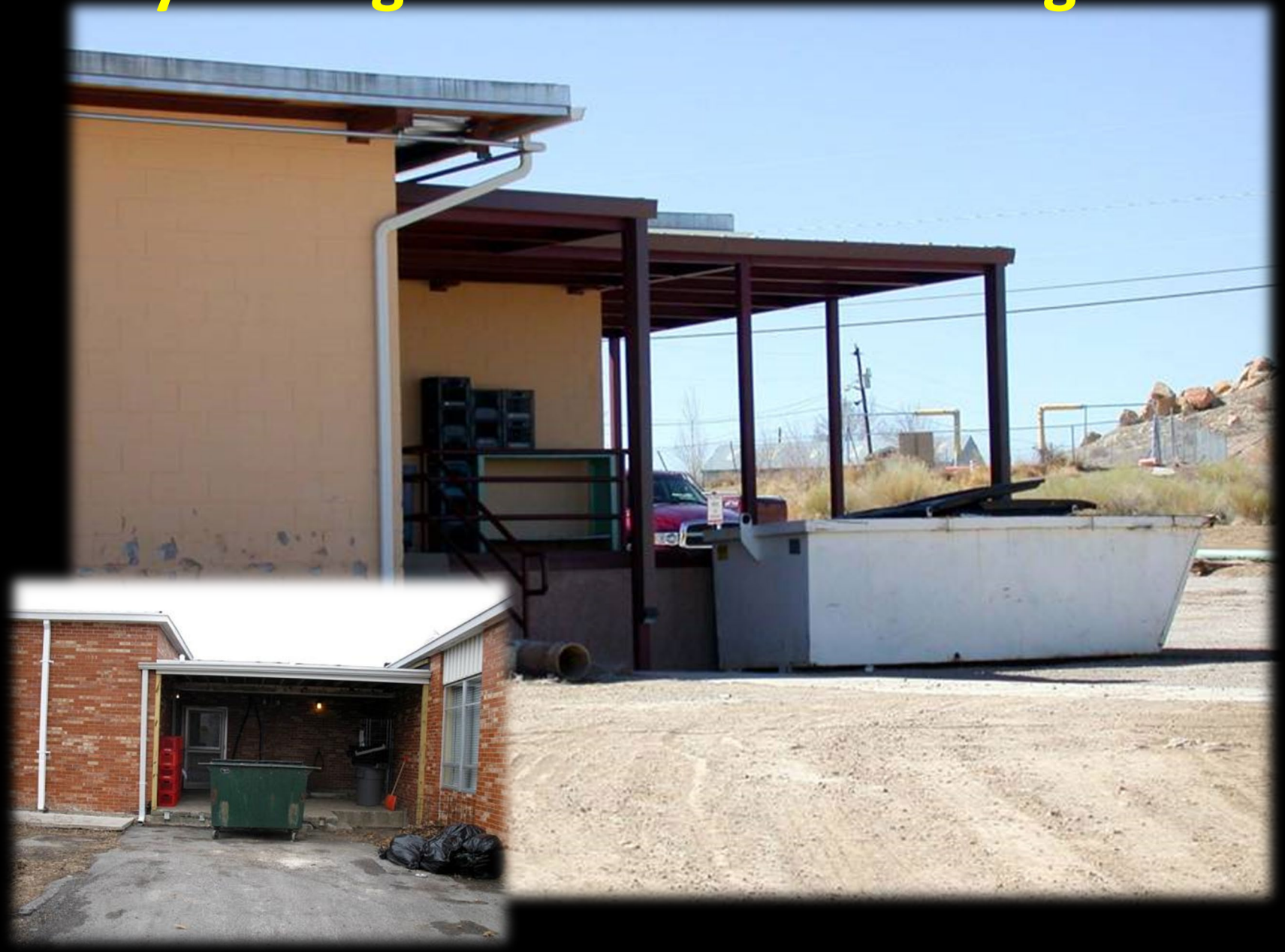

Fly traps

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