



Fundamentals of Rodent pest Management





Fundamentals of Rodent Pest Management

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Fundamentals of Rodent Pest Management

Introduction





Introduction

Rats - The most damaging vertebrate pest

Destruction of Food & Materials



It's estimated that rats destroy around 20 percent of the world's food supply*

Disease Transmission



Rats transmit diseases including leptospirosis, plague, and rat-bite fever

Dirty & Disgusting



Rats are typically associated with "dirty" areas and sightings invoke fear among people.



How much do you know about the behaviour of rats?

Please click on the correct answer:

- A. Rats are curious
- B. Rats are solitary animals
- C. Rats are wary
- D. Rats can see well





Did you know that ...

Rats are good **athletes**...

They can:

- Jump 1m in the air
- Swim 1km
- Dive through sewer systems

This enables rats to move around **quickly**, often at night in areas **hidden** to us.

How wide an opening can rats squeeze through?

- a) 10mm high b) 15mm high c) 20mm high d) 25mm high





Did you know that ...

Rats are very **wary**.

- They tend to nest in underground burrows
- They prefer to travel in areas they know are safe for them
- They are cautious about anything new

Hundreds of rats may be present in an area without people even realizing it.





Rats as disease carriers...

Rats spread many **diseases** including:

- Plague
- Murine typhus fever
- Rat-bite fever
- Salmonella food poisoning
- Leptospirosis
- Trichinosis





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Habits and Behaviours





Habits and behavior of rats...

Rats can learn and adapt their behavior to their surroundings.

Hence a knowledge of habits and behavior is important for management.

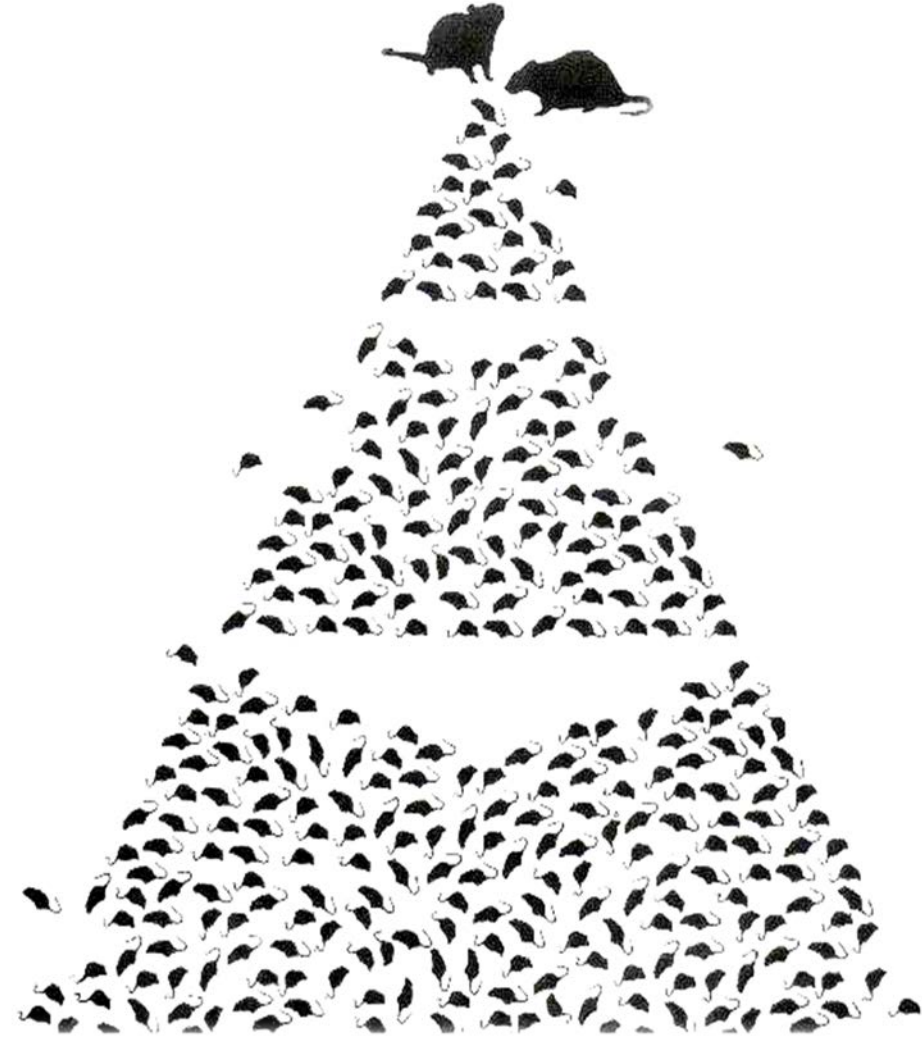




Habits and behavior of rats...

Rats have a high reproductive potential.

- Sexually mature in 3-4 months
- Average litter size is 6-10
- 4-6 of litters per female per year
- They can live for up to 3 years, but the average lifespan of a rat in the field is usually less than 1 year.





Habits and behaviour of rats...

Rats are social animals:

- They live in colonies with defined **territories**
- The colony has a **hierarchical** structure with a dominant male leader.
- Rats aggressively **defend** their territories and feeding sites.





Habits and behaviour of rats...

Which of the following **senses** are the weakest in rats?

- A. Vision
- B. Smell
- C. Touch
- D. Hearing
- E. Taste
- F. Balance





Habits and behaviour of rats...

These are notes for each answer on previous slide...(they can click on each to see the relevant text)

Vision: Rats and mice have poor vision and are color blind. They can detect motion and highly reflective objects which can cause avoidance behavior.

Smell: Smell is important for rodents. They use smell to recognize pathways to food, to identify members of the opposite sex who are ready to mate, and to differentiate between members of their own colonies and strangers.

Touch: Due to highly sensitive body hairs and whiskers rodents are highly sensitive to touch. They use touch to explore their environment. Rodents prefer a stationary object on one side so they tend to travel in more secure areas such as along walls.

Hearing: Rodents use sound to locate objects to within close range. They can hear higher frequencies compared to humans and use high frequency sounds during certain periods such as mating.

Taste: Rodents have a highly sensitive sense of taste which enables them to detect chemicals at extremely low concentrations. This can lead to food (or bait) avoidance if it is contaminated.

Balance: Rodents have an excellent sense of balance which allows them to walk on narrow surfaces such as pipes and wires and will always land on their feet in a fall.



Habits and behavior of rats...

Rats are wary of anything **new**

- Rats will **avoid** any new objects until they feel that the objects pose no hazard to them.
- Consequently, rats prefer **established** food sources and will hoard food in hidden areas
- Importantly, from a management viewpoint, rats will avoid baits when first applied, then only approach **tentatively** before consuming them in any significant quantity.





Habits and behavior of rats...

Rats will **forage** in a range of 100 to 150m from their nest

- They are most active between **dusk** and **midnight**.
- Activity during the day is limited to short bursts





Habits and behavior of rats...

Rats tend to **nest** in burrows:

- Burrows are typically **outdoors** but can be located inside buildings
- They are quite shallow (<0.5m deep) and short (<1m in length)
- There is a **central** nest





Habits and behavior of rats...

Which of the following indoor areas are favored by rats as nesting sites?
(more than one answer is possible)

- A. Wall and floor voids
- B. Open areas
- C. Storage rooms
- D. Cluttered areas





Major Rodent Pests

Can you **identify** the following types of rodents?

(Drag the correct name to the correct picture)



Norway Rat
(Rattus Norvegicus)



House Mouse
(Mus Musculus)



Roof Rat
(Rattus Rattus)



Fundamentals of Rodent Pest Management

Major Rodents Pests





Major rodent pests...

Norway rat (*Rattus norvegicus*) also known as the house rat, brown rat, wharf rat, sewer or water rat

- Up to 450g
- Usually found in built-up areas
- Active at or below ground level (e.g. sewers, rubbish dumps, basements)
- Range up to 50 meters
- Dig burrows
- Omnivorous - eating 20-30g/day meat, cereals, fish etc.
- Needs access to water
- Originated: Magnolia



Identification tips:

The Norway rat is a large stocky rat that is strong and sometimes aggressive. The body fur is coarse, and ranges from reddish to greyish brown with buff-white underparts. The nose is blunt, the ears small and close-set. The tail is scaly, semi-naked and shorter than the head and body combined.



Major rodent pests...

Roof rat (*Rattus rattus*) *also known as the black rat, ship rat, gray-bellied rat*

- Up to 260g
- Found in urban and rural areas
- Likes to climb (but will sometimes burrow)
- Nests in buildings and amongst vegetation
- Range up to 50 meters
- Omnivorous / vegetarian – 20-25g/day vegetables, cereals, fruits etc...
- Originated: S.E. Asia



Identification tips:

The Roof rat is smaller and sleeker in appearance than the Norway rat. The fur is usually grayish black to a solid black and belly varies from buff-white to all gray. The snout is pointed, the ears are large. The tail is long.



Major rodent pests...

House mouse (*Mus musculus*)

- Up to 30g
- Common worldwide
- Indoors or outdoors
- Range up to 3-10 meters
- Dig burrows and may nest in furniture
- Omnivorous/vegetarian e.g. 3 g/day cereals and animal feed
- Inquisitive, nibbles at food
- Can go without water
- Originated: Central Asia



Identification tips:

Small, slender body with large ears. The tail is semi-naked and is as long as the head and body together. Fur is usually dark grey on the back and light grey on the belly.



Rodent control

The level of rodent control expected depends on the **situation** you are dealing with.

- For instance it's easier to control one or two rats in a garage, but **eliminating** rats from a neighborhood is much more challenging!
- Rodent control can also be very **sophisticated** especially around food handling facilities where there are strict baiting restrictions and other limitations.
- Hence you need to develop your rodent control **strategy** based on the particular situation you are dealing with.





Fundamentals of Rodent Pest Management

Rodent Control

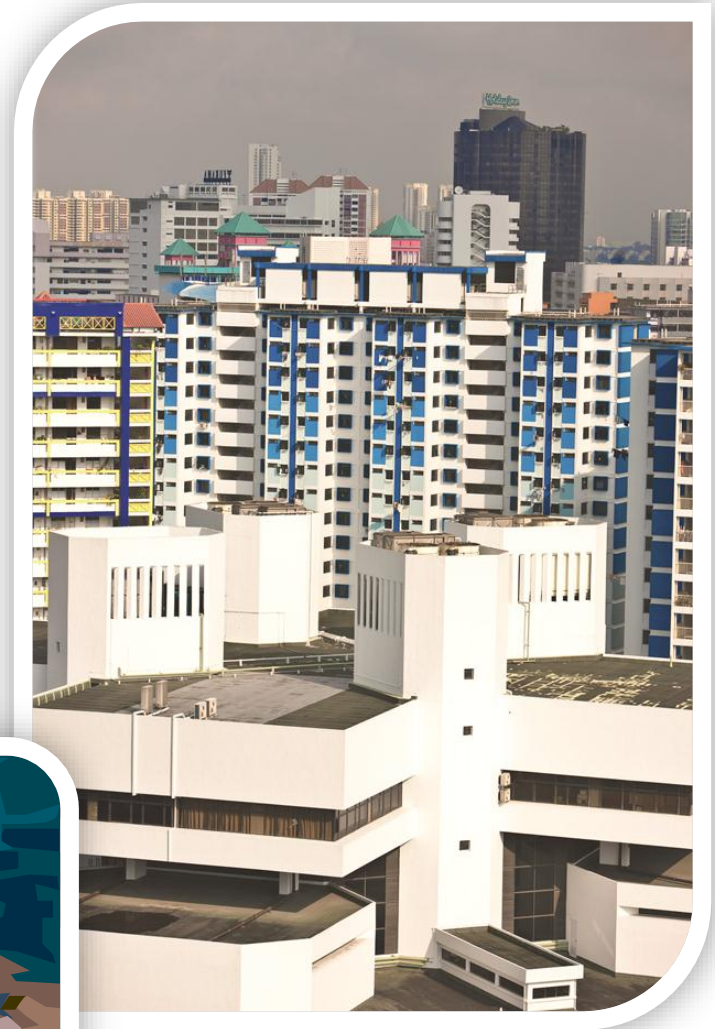




Rodent control

Rodent control

- As the source of rodents is usually outdoors and rodents can range quite long distances, effective control necessitates that the whole community works together to control them as well as **eliminate sources** of food, water, and shelter.





Fundamentals of Rodent Pest Management

Rodent Prevention





Prevention

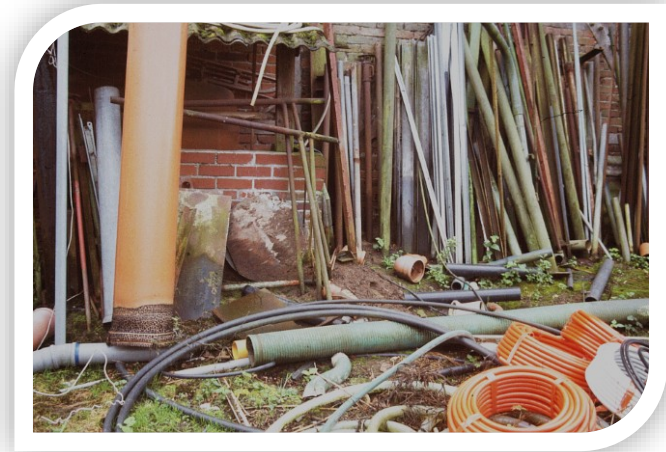
The key to long-term rodent control is to eliminate:

Potential food

Shelter

This means there must be a good sanitation program – both indoors and out including:

- Eliminating access to food
- Removing all rubbish
- Eliminating clutter
- Controlling weeds
- Eliminating breeding sites and hiding places
- Involving surrounding neighbors





Prevention

The best way to control rodents is to prevent them from entering structures:

It is therefore a good strategy to rodent proof a building as much as possible.

- The aim of rodent proofing is to:
- Stop rodents from entering a building
- Deny rodents access to food
- Reduce access to nest sites

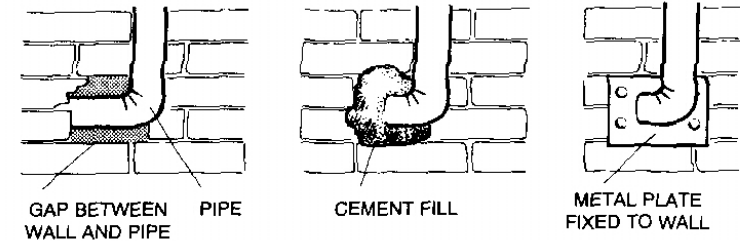




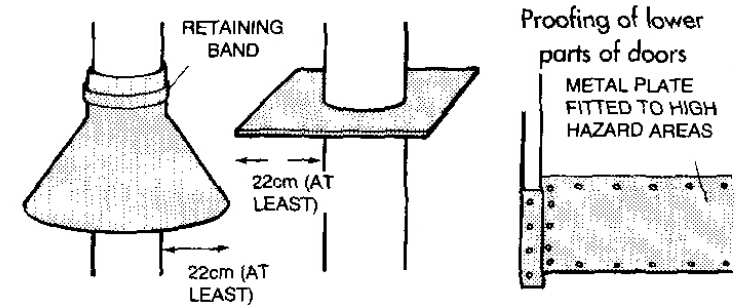
Prevention

When rodent proofing, all potential rodent **access** points should be considered:

- Seal all gaps and openings greater than 2cm
- Seal all service pipe and wiring penetrations
- Fix broken windows, warped doors and unscreened vents
- Reduce gaps beneath doors
- Fit **metal** guards around outside pipes
- Secure roof materials and vents to ensure no gaps



Guards for gutter pipes and ships hawsers



Some rodent-proofing techniques:

When sealing it's best to use metal fittings/plates to avoid gnawing by rodents.



Fundamentals of Rodent Pest Management

Inspections





Inspection

As with all pest management programs, success largely depends on the quality of the **inspection**.

Signs of rodent infestation include:

- Droppings
- Runways, tracks and rub marks
- Gnawing damage
- Burrows
- Urine stains and smell
- Disappearance of food
- Noises at night
- Pet behavior
- Sightings
- Trap counts

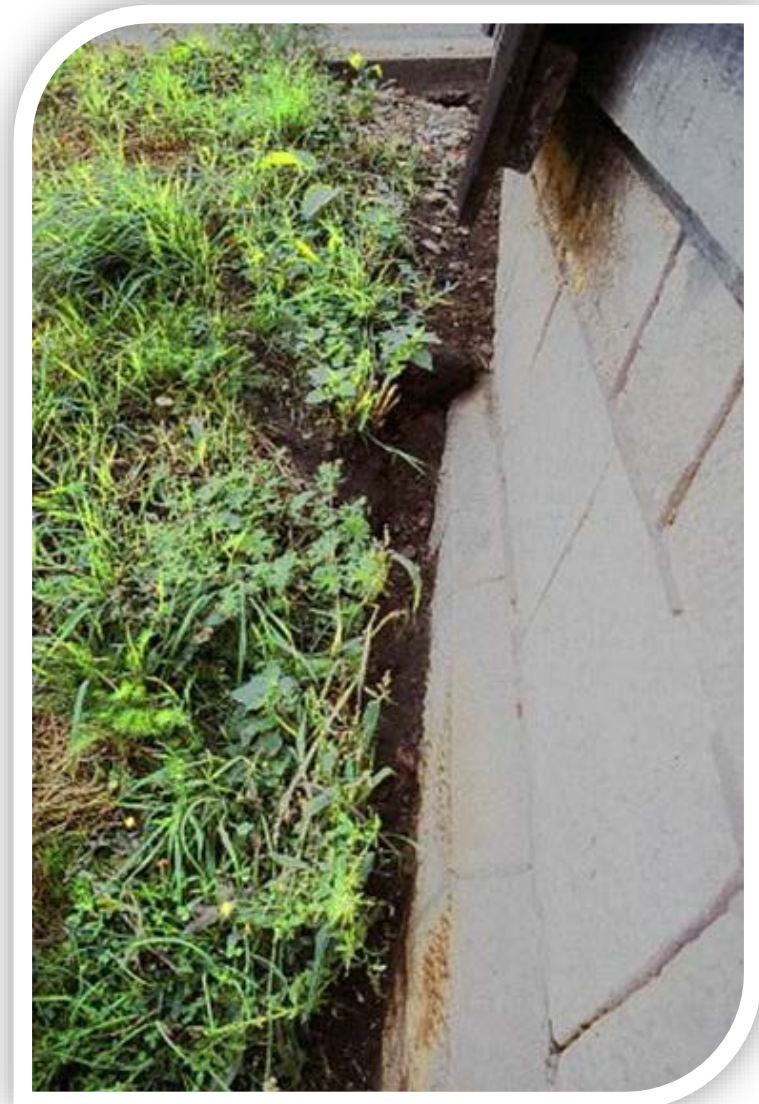




Inspection

Which of the following signs tells you there could be a rodent problem here?
(drag the relevant sign of infestation to the picture)

- ☐ Droppings
- ☐ Runways, tracks and rub marks
- ☐ Gnawing damage
- ☐ Burrows
- ☐ Urine stains and smell
- ☐ Disappearance of food
- ☐ Noises at night
- ☐ Pet behavior
- ☐ Sightings
- ☐ Trap counts





Inspection

Are you able to identify which **type of dropping** belongs to which type of rodent?
(drag the image of the rodent to the relevant dropping)





Inspection

Determining the **level** of infestation

It's very difficult to accurately **estimate** the numbers of rodents in a particular area, but below is a rough guide to help you estimate the level of rodents infestation that is present:

Low:



Signs and sightings of rodents are few. None or a small amount of bait consumed

Medium:



Rodent signs are found but not in abundance. Small amount of bait consumed.

High:



Rodent signs are fresh and found in abundance. Large amount of bait consumed.



Fundamentals of Rodent Pest Management

Recommendations





Recommendation

Once the inspection has been completed it's time to inform and involve the customer as they are also part of the long-term solution.

The customer has an important role to play.





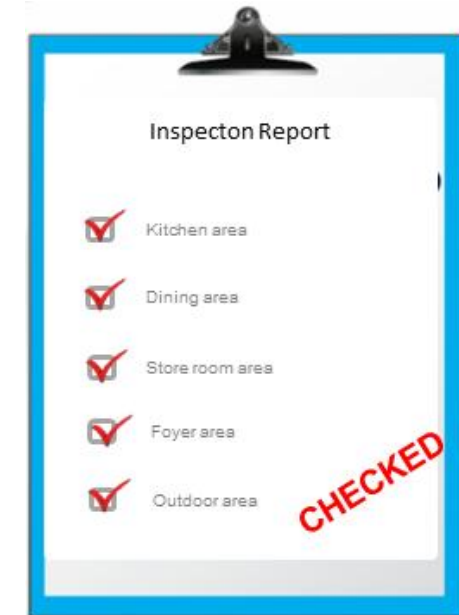
Recommendation

Inform the customer what you have **found**:

Provide the customer with a copy of your inspection report and **explain** the findings.

Propose your **management** approach:

Explain the management approach you propose to take and why you believe it's **best suited** to your customer's situation and needs.



**Rodent
Proofing**

Trapping

Rodenticides



Recommendation

Provide **documentation** if necessary.

Some customers may require copies of certain documents such as:

- Product labels
- MSDS's (material safety data sheets),
- Inspection reports



Example of product label

CONTRAC RODENTICIDE				
SAFETY DATA SHEET	ACCORDING TO REGULATION EC: 1907/2006	DATE OF ISSUE: 22 December 2010	PREPARED BY: T31	
1. IDENTIFICATION OF THE SUBSTANCE/ PREPARATION AND COMPANY				
PRODUCT NAME: CONTRAC RODENTICIDE				
USE: Anticoagulant Rodenticide	MANUFACTURER/IMPORTER: Bell Laboratories, Inc. 1699 Kinnaman Blvd. Madison, WI 53704, USA email: productinfo@bell.com	EMERGENCY PHONE NO.: 1-877-854-2494 (United States/Canada) 1-952-852-4656 (Outside United States/Canada) or Local or Regional Poison Control Center		
FORM: Formulated Dry Bait				
2. HAZARD IDENTIFICATION				
PRIMARY ROUTES OF ENTRY: Ingestion				
3. COMPOSITION/INFORMATION ON INGREDIENTS				
COMPOSITION: Bromadiolone [3-[5-(4-bromo-1,1,1-trifluoro-4-yl)-5-hydroxy-1-phenylpropyl]-4-hydroxy-2H-1-benzopyran-2-one]		% BY WEIGHT: 0.005 %	CAS NO.: 28772-56-7	EC NO.: 249-205-9
4. FIRST AID MEASURES				
EYE CONTACT: Flush with cool water for at least 15 minutes. If irritation develops, obtain medical assistance.				
SKIN CONTACT: Wash with soap and water. If irritation develops, obtain medical assistance.				
INHALATION: None.				
INGESTION: Call physician or emergency number immediately. Do not give anything by mouth or induce vomiting unless instructed by physician.				
SYMPTOMS: Ingestion of excessive quantities may cause nausea, vomiting, loss of appetite, extreme thirst, lethargy, diarrhea, bleeding.				
ADVICE TO PHYSICIAN: If ingested, administer Vitamin K ₁ intramuscularly or orally as indicated by bihydroxycoumarin overdoses. Repeat as necessary as based upon monitoring of prothrombin times.				
5. FIRE-FIGHTING MEASURES				
EXTINGUISHING MEDIA: Extinguish with water, foam or inert gas.				
MEASURES UNSUITABLE FOR SAFETY REASONS: None.				
PROTECTIVE EQUIPMENT: Firefighters should be equipped with protective clothing and self-contained breathing apparatus.				
6. ACCIDENTAL RELEASE MEASURES				
PERSONAL PROTECTION: Gloves should be worn during clean up.				
ENVIRONMENTAL PROTECTION: Avoid entry to watercourses.				
CLEAN UP AND DISPOSAL: Sweep up spilled material, place in properly labeled container for disposal or reuse. Dispose of all wastes in accordance with all local, regional and national regulations.				
7. HANDLING AND STORAGE				
HANDLING: Keep product in the original container. Do not handle the product near food, animal feedstuffs or drinking water. Keep out of reach of children. Do not use near heat sources, open flame, or hot surfaces. Wash thoroughly with soap and water after handling.				
STORAGE: Store in a cool, dry place inaccessible to children, pets and wildlife. Keep container tightly closed when not in use. Avoid contamination of lakes, streams and ponds by use, storage and disposal.				

Trade Name: Contrac Rodenticide
Supplier: Bell Laboratories, Inc.

Date Created: 22 December 2010
Page: 1 of 2

Example of MSDS
(front page only)



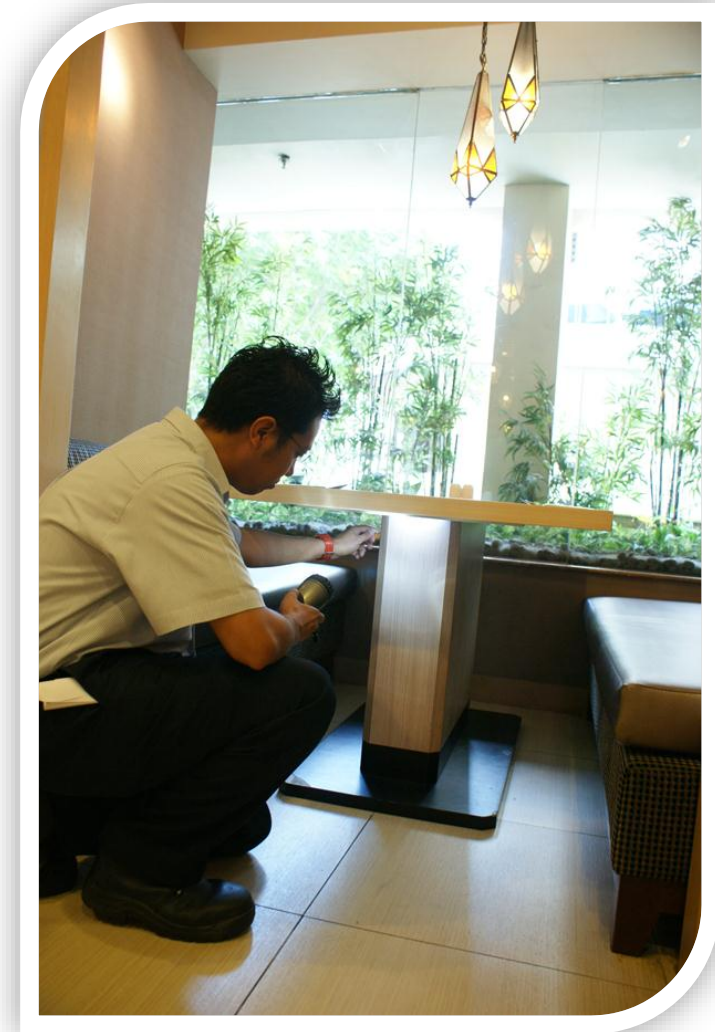
Recommendation

Explain what the customer needs to do.

Typically the customer needs to address some points in order for your management strategy to work best.

For example:

- Improve **sanitation**
- Reduce **clutter**
- Seal **cracks & crevices**
- Store food in **closed containers**
- Empty **rubbish** frequently
- Reduce **harborages** and available food sources





Recommendation

Ensure realistic **expectations**.

To **avoid** problems later it is best to explain to the customer what sort of result they can expect and any limitations to success.

For the two situations below, where do you think the greater chance of success lies?



(correct)





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Management





Management

The main **management methods** for rodents include:



A **combination** of approaches will normally give the best result.

But as each situation is different, what combination is used depends on the expertise of the applicator.

Rodent proofing has been discussed already so here we will focus on **trapping** and **rodenticides**.



Management

Using rodent **traps** is one of the most effective control methods.

In general traps are useful against **small** infestations and for **maintenance** programs, but you need a lot of traps.

Advantages and disadvantages of traps:



Advantages:

- Alternative to chemicals
- Quick results for small infestations
- Allow immediate disposal of dead rodents (eliminating potential odour concerns)
- Provide a good monitoring tool

Disadvantages:

- Labour and time-consuming for large infestations
- Less cost-efficient compared to baiting
- Trap avoidance or fear of traps
- Some traps can cause injury to people, pets or wildlife
- Some traps do not provide a humane method of killing a rodent



Management

There are three types of traps for rodent control.

- Snap traps
- Multiple-catch traps
- Glue board traps





Management

Keys to an effective trapping program:

- Install numerous traps
- Install traps in areas of high activity
- Position the traps so rodents can pass over them easily
- Add food as an attractant for the rodents
- Use a well-designed trap that allows for easy installation and faster setting





Management

Rodenticides are also a common and effective control method.

In general, rodenticides are useful against **small and large** rodent infestations but require **careful** use, and require time to kill the rats (up to 10 days).



Rodenticides





Management

There are three **types** of rodenticides.

- Baits
- Tracking powders
- Fumigants

Baits are the ones most commonly used, and come in various forms such as blocks, pellets, loose grains, liquids, and pastes.

Rodenticides





Management

Rodenticide baits:

Try to **match** the description with the correct type of rodenticide bait:



Rodenticides

Pellet Baits

Moisture-resistant food particle bait that can be readily picked up and handled by the rodent. Suitable for deep burrow insertion.

Loose Meal Baits

Food particle bait that is readily picked up and handled by the rodent, but susceptible to absorbing moisture.

Packet Paste Baits

Ready-to-use, highly palatable food bait placed inside a small packet. For use in bait boxes and can aid in visually confirming rodent activity.

Block Baits

Versatile food bait, suitable for use under dry & damp conditions. Provides attractive gnawing surfaces, with hole to attach it to stations.

Fresh Food Baits

Made by mixing rodenticide concentrates with a "fresh" food carrier. Should be matched to what the rodents are already feeding on.

Liquid Baits

Good for situations where water is scarce. Can evaporate quickly and care needs to be taken to prevent spillage and contamination.



Management

Rodenticide **tracking powders**:

Tracking powders can provide control in situations where baits are not well accepted due to plentiful **alternative food** sources.

Rodents pick up the powder on their feet and fur, and when they groom themselves they ingest the powder.

In which of the following situations would you consider using a tracking powder?



In and around homes.



Along rodent
runways inside
tracking containers.

(correct)



Food handling
establishments.



Inside rodent
burrows.

(correct)



Management

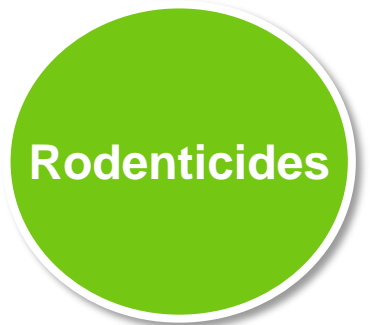
Rodenticide **fumigants**:

Fumigants are poisonous gases that can be used to control the rodents **quickly**.

They come in tablet, or cartridge form

They are **hazardous** and thus can only be used by certified professionals..

In which of the following situations would you consider using a fumigant?



Direct applications
to rodent burrows.

(correct)



Food handling
establishments.



In and around homes.



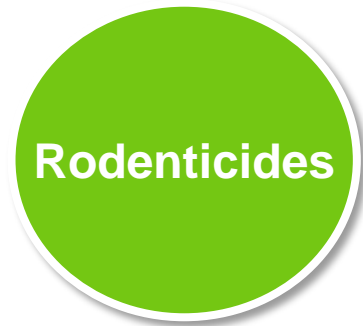
Trucks, railcars, and
ships.

(correct)



Management

Precautions on using rodenticides:



- When using baits in residential areas ensure baits are placed in a **tamper resistant** station, out of reach and sight of children, pets and wildlife.
- All baits must be applied in a manner to **prevent contamination** of food or surfaces in direct contact with food.
- Keep detailed **records** of where the baits are placed on the site.
- Follow all label **guidelines** and specific guidelines for sensitive areas like food-handling establishments.



Monitoring

After the control program is implemented it's important to regularly monitor it's effectiveness.

There can be two scenarios:



If rodents are under control:



Continue monitoring to ensure no re-infestation

Maintain sanitation and exclusion techniques to avoid encouraging a new infestation

If rodents persist:



Look for other sources of infestation

Apply additional control measures or more baits if the bait has been consumed

If infestations persist consider having the infested areas modified to reduce suitable environments for rodents



Fundamentals of Rodent Pest Management

Summary





Summary

The key **to successful** rodent control is to control the rodent population, not just individual rats.

- 🐭 To be controlled rodent habits and behavior must be understood
- 🐭 A thorough rodent inspection of the site is important to develop the best control solution
- 🐭 Successful rodent programs use a combination of tools and procedures
- 🐭 The best long-term solution is to rodent-proof structures
- 🐭 Trapping and rodenticides are the main control measures used



Fundamentals of Rodent Pest Management

Congratulations!



Bye-Bye

