

Rodent Problems in Recreational Areas

Introduction

The presence of large-area vegetation, debris, accumulation of articles, improper storage of saplings/construction materials and wastes rendering recreational areas susceptible to intrusion of rodents. Structural design of flower beds, animal/bird cages, refuse collection facilities, service room, etc. also provides rodents with harbourages and routes for dispersal, particularly in areas where food are handily available in and around animal/bird cages.

Rodent Prevention and Control Measures

Generally, rodent control measures can be classified into fundamental measures and supplementary measures.

A. Fundamental Measures

Food and Harbourage

2. Whenever the problem of domestic (commensal) rats or mice is considered, it should always be remembered that 'prevention is better than cure'. If the general standard of environmental sanitation is maintained at a high level and rodent harbourage is either eliminated or kept to a minimum, such will always prove of the greatest value in preventing infestation. Particular attention should be paid to the storage and disposal of anything which could be taken by rodents as food. Rodents are omnivorous and will consume any substance as their food that could be in the form of food for human consumption and food residues. Food for human consumption should be kept in metal or glass containers, with well fitted covers, grain and other food in rodent-proof stores or godowns, etc. Correct disposal of all putrescible refuse (garbage) is of the greatest importance, and far too frequently such refuse is left lying about or is not deposited in metal or plastic dust-bins or receptacles with well fitted covers.

3. In many site office/food premises of recreational area, there are sufficient harbourages to support infestation and it will frequently be found that some, at least, of these harbourages can be eliminated. Rodents build their harbourages at concealed areas of building, void between structure, space/area unattended by human for a considerable period of time etc.

4. Flower beds in sitting out area found in parks are susceptible to rodent infestation,

particularly the flower beds near to refuse collection points and/or food premises. On the other hand, bird food/pet food left behind by visitors is another important food source attracting intrusion of rodent nearby. Rodents burrowed underground to make their harbourages in area or corners unattended by human activities, etc.

5. Constant attention should be given to these two factors, namely food and harbourage which are the most important in the prevention of rodent infestations. Sealing/filling up any space that could be accessed by rodents and tidying up all areas of premises and flower beds would eliminate harbourage for rodents.

Rodent-proofing

6. Rodent-proofing of buildings/structures is another important method of prevention which should be applied whenever it is possible and practicable to do so. This is particularly important for places where quantities of food are kept.

7. There are many ways by which rats and mice may enter buildings/structures, and a very thorough search is necessary to locate all possible means of entry. Rat-holes and other small openings can be blocked by filling or covering them with appropriate material (e.g. fine concrete, cement mortar, 20-gauge sheet or barbed wire ball etc.). Broken or missing gratings should be replaced. Ventilation grids and other similar openings may be proofed externally either with 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm), these materials will exclude both rats and mice. Space beneath doorways result from worn steps should be repaired or renewed. Wooden doors may have to be protected at the bottom by fitting a 20-gauge metal 'kicking-plate', at least 300 mm high, on the outside. This should have a maximum clearance of 6 mm (1/4 in). A similar plate should be fixed to the door frames to form a continuous band of metal.

Rodent Proofing Principles

8. The following are a few examples to demonstrate the principles which should be applied for the prevention of rodent infestation:-

- (1) Opening and passings for pipes, wires, and ducts through walls should be completely sealed, etc.
- (2) Voids or 'dead' spaces are sometimes inevitable and in some parts of a building (e.g. the space above a suspended ceiling) may in fact have been designed as a

void with the intention of using it for plumbing, electrical conduits, or air-conditioning ducts. Nevertheless, these voids should be made inaccessible to vermin and the materials and decorative finishes used should be resistant to gnawing by rodents. There should be no voids between the sides, backs, or bottoms of built-in furniture and the adjacent walls or floors. There should be no voids greater than 6 mm (1/4 in) wide behind wooden skirting. Voids caused by fixing battens behind panel should be kept to a minimum and the voids made inaccessible to vermin; the materials used should be resistant to gnawing (such as 20-gauge metal or cement mortar, etc. as mentioned in paragraph 7).

- (3) Places such as food-preparation areas, and food stores should NOT have false ceilings. However much one dislikes the appearance of the mass of piping which must often be left exposed if there is no false ceiling, it is important to remember that the warmth of a food-preparation area and scent of food will attract rats, and that a false ceiling provides an ideal harbourage and nesting place for rats. An infestation due to this precise cause, and which proved most difficult to eradicate, was found in the kitchen of a local building not more than four years old. These rooms should therefore leave no access, even the very small one, to rodent.
- (4) Vertical pipes may be used by rats to reach entry points or harbourage places. A rat would find it difficult to climb (by wedging itself) between a pipe and a wall/vertical surface or between adjacent pipes, if the space between these structures is too big. Vertical pipes should, therefore, be spaced at least 100 mm apart, and be at least 100 mm from wall/vertical surface. Circular rat guard made of 20-gauge metal with diameter of at least 550 mm should be deployed if necessary. The gap between the rat guard and the pipe should not be larger than 6 mm. The rat guard should be installed in height of at least 100 cm above ground or the nearest object that cannot be reached by rodent. Besides, there should be no shortcut or any other structure nearby letting the rodent by-pass the rat guard easily.

B. Supplementary Measures

Trapping

8. Trapping is one of the methods for controlling of rodents. Traps are the preferred method of capturing rodents in situations where the use of rodenticides is considered

undesirable, e.g. where poisoned rodents dying in inaccessible areas could cause unwanted odour problems or where rodents are specifically required for disease or other biological studies. Break-back traps are used to instantly kill rats and mice; to capture live rodents, wire cage traps/Multiple-catch traps are used. Wire cage traps/Multiple-catch traps for rats and mice should be baited and set on the first day that they are laid. In general, wire cage traps found in the local markets are not designed for trapping mice. The size of the cage/multiple-catch traps must be smaller than 331 mm in length, 181 mm in width or 156 mm in height.

9. Only when countering heavy rodent infestation where other rodent control methods have been exhausted without satisfactory results, sticky traps/glue traps may be considered as a tool to supplement the rodent control programme. They should not be set outdoor or in areas with possible activities of other non-target animals, e.g. birds, cats and reptiles, etc. Consideration may be given to enclosing the sticky trap/glue trap in a lockable, temper-resistant rodent station or dedicated rodent sticky trap/glue trap tunnel for complete protection against non-target animals. Frequent inspections should be arranged to each sticky trap/glue trap laid and any trapped rodent shall be handled of immediately in a humane manner. The carcass should be properly handled as soon as possible. The use of sticky traps/glue traps should be suspended as soon as the situation of rodent infestation is alleviated. When sticky traps/glue traps are used, the frequency of inspection should be increased. Internationally recommended inspection interval range from hourly to every 12-hour. (added in June 2023)

10. Rats and mice feel safe by moving close to vertical surface such as wall, rather than across open areas. Break-back traps should therefore be placed at right angle to the vertical surface against which rodents are known or suspected to run. Traps should extend from a vertical surface at a right angle, with the trigger end nearly touching the vertical surface (Fig 1). If traps are set parallel to the vertical surface, set them in pairs, with the triggers situated to intercept rodents coming from either direction (Fig 2). When cage traps are used, they should also be placed similarly at right angles with the open of the trap facing the vertical surface. Whenever possible, set rat cages firmly on ground. The position for traps should be carefully chosen, and traps should remain in the same position throughout each trapping period. **For best results, traps should be placed 2-3 m apart for mice and 3-5 m apart for rats.**



Fig 1 Method of laying break-back trap



Fig 2 Method of setting traps parallel to the vertical surface

11. If the captured non-target animal is or suspected to be injured, contact Society for the Prevention of Cruelty to Animals (SPCA) at their emergency hotline 2711 1000 for assistance. (added in June 2023)

12. A very common cause of unsuccessful trapping is the laying of insufficient number of traps. For the best results, a thorough survey is needed to ascertain the locations of rodent harbourage and movement. Base on the result of the survey, as many traps as possible and reasonable should be laid. **It is suggested that at least six traps should be laid for one or two rodents.**

13. Rats are omnivorous, consuming a great variety of food but are very sensitive to the freshness of food. Fresh baits should be used as far as possible. Mixed baits, in a certain extent, can minimize the impacts of environmental factors, human practices or variations in rodent behavior on the efficiency of traps during the rodent trapping exercises. As food preference of rodents varies from time to time and place to place, it is necessary to find out the best combination of food baits for a particular location with rodent infestation. A combination of food baits could be selected from three or four different food baits to be

placed inside the cage traps on for the first few days of the trapping programme and observe the trapping efficiency of different food baits. Once the more attractive food baits under such circumstances were found, the most and the second most attractive food baits could be used together for the subsequent trapping periods in that areas. However, the list of food baits preferred in a location does not guarantee similar attractiveness to rodents in another location. Trials on different food baits should be conducted in any trapping operation at individual location to find out the preferred combination of food baits. Based on the field test results, bread with peanut butter, barbequed pork (char siu) and sweet corn could be a good choice for rodent trapping. Other appropriate food baits could also be included whenever applicable.

14. For both rats and mice infestations, it is better to carry out repeated trapping programme with a large number of traps laid for a few days, rather than distribute scattered traps over a wide area for a longer period. For a trapping programme, traps should be laid for at least five consecutive nights.

Poisonous Baiting

15. The most commonly used rodenticides are anti-coagulant but different kinds of rodenticides have different application methods. Information stated on the product label should be strictly followed to ensure the effectiveness and safety. Generally speaking, there are two major kinds of anti-coagulants, the multiple-dose and single-dose.

16. Multiple-dose anticoagulants are effective against all species of local commensal rodents and it would not induce bait shyness of rodents. The master mix of rodenticide should be added to other bait base, such as uncooked rice, oil and sugar and all the ingredients should be mixed well.

17. Single-dose anti-coagulants are also cost-effective against all rodent pests. They are formulated into different ready-to-use form, such as pellets, wax block, etc. Generally speaking, pellets are more acceptable than wax block due to the high wax content of wax block rendering it less palatable to rodents. The bait packs are to be evenly distributed in the target area with application rate as state in the product labels. Bait pellets should be pushed into rat burrows, thrown into places not readily accessible to humans and domestic animals, placed in protected positions and other infested places such as junk accumulation points. It is not advisable to hang the poisoned bait over 10 cm above ground. It takes a few days for the bait to effect and most poisoned rodents will die within two weeks after baits were laid.

18. Anti-coagulants are also toxic to human; they should be handled with great care. Adequate verbal and written warning must be given to members of the public, local residents and relevant parties to avoid any accidental poisoning. All poison baits should be placed inside a non-breakable bait box to prevent swallowing by non-targeted animals. For better control effect, all poison baits should be replaced regularly.

By Food and Environmental Hygiene Department
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**Problems Commonly Observed in
Recreational Areas and Corresponding Measures**

Item	Problem found	Possible improvement works
Flower bed and Vegetation		
1	<p>Wall of flower bed is too low or with protruded structure/uneven surface.</p> 	<ul style="list-style-type: none"> ● Wall of flower bed should be at least 1m high with smooth external surface without any protrusion. 
2	<p>Weep hole of flower bed could be encroached by rodent as harbourage</p> 	<ul style="list-style-type: none"> ● Screen weep holes with grating of aperture not greater than 6mm

3

Soil surface covered by low rise dense vegetation is vulnerable to rodent intrusion and make detection of rodent infestation difficult.



● High rise vegetation exposing the soil surface is preferable.



4

Boulders or other ornamental structure may provide sheltered void for burrowing of rodents



● Avoid setting boulders or other ornamental structure in flower bed
● Surround the base of boulders or ornamental structure with pebbles or gravels.
● Regular inspections to identify any suspected rat holes and take prompt rodent control action whenever rodent sign is confirmed

5

Presence of surface channels at close proximity to flower bed or dense vegetation provide concealed runways for rodent dispersal



- Surface channels should be kept clear from flower bed or other dense vegetation.
- Install wire mesh with aperture size not greater than 6mm underneath the gratings/concrete slabs of the surface channels to prevent easy access of rodents

6

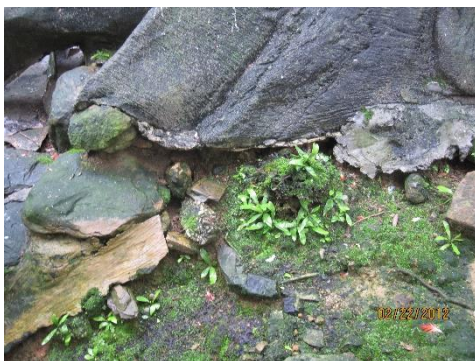
Extensive root system of trees, e.g banyan create natural harbourage for easy burrowing of rodents



- Avoid planting of banyan trees or bamboos.
- Expose the roots of the tree by removing vegetation nearby for easy inspection and removal of refuse
- Plug holes/voids in-between roots by wire mesh ball or other feasible materials
- Regular inspections to identify any suspected rat holes and take prompt rodent control action whenever rodent sign confirmed

Animal / Bird Cages

7 The landscape structure of animal/bird cages is very susceptible to intrusion and harbouring of rodents. The soft soil surface is highly susceptible burrowing. The presence of boulders and other concrete structure provide sheltered voids for borrowing of rodents.



- Construct the landscape foundation with concrete and cover with shallow soil layer to prevent burrowing of rodents.
- Avoid setting boulders or other ornamental structure on soil surface
- Surround the base of boulders or ornamental structure with pebbles or gravels.
- Regular inspections to identify any suspected rat holes and take prompt rodent control action whenever rodent sign is confirmed.

8 Unattended animal/bird feed provide rodents with handy food source

- Residue of animal/bird feed must be removed promptly after feeding and should not be left unattended.



- For feeding of bird, it may consider hanging up container with feed not less than 1m above ground to avoid access of rodents.
- A rat guard with diameter not less than 550mm should be fixed at the hanging material not less than 1 m from the feeding container.

9 Dense vegetation around animal/bird cage provide harbouring places for rodents for easy access into the animal/bird cages for food.



- Avoid planting of dense vegetation around animal/bird cages.
- Wire mesh of animal/bird cages should be rodent proofed either with 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm).
- A buffer zone at least 30 cm made of rodent proof material, such as concrete, are suggested to be installed outside animal/bird cages
- Screen opening/drain holes with 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm) should be installed to drain hole connected to animal/bird cages

10

Drain hole provides rodents with entrance for intrusion into animal/bird cages for food or harbourages



- Screen opening/drain holes with 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm).



11

Soil surface around pond/pool provide rodent with borrowing gound.



- Pave the surround areas of pond/pool with concrete
- If surface channel is unavoidable, install 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm) underneath the gratings
- Avoid setting boulders or other ornamental structure in immediate surroundings of pond/pool.

12

Broken wall of animal/bird cage allows easy intrusion of rodents



- Regular inspections to surroundings of animal/bird cages to identify defective structure for prompt follow up actions.

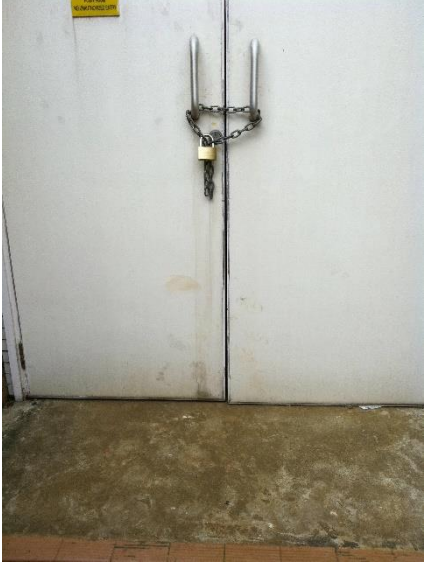

Others

13

Ventilation louver on door/wall of switch room/pant room provide rodents with access to the switch room/plant room for harbourages.



- Install 6 mm. (1/4 in.) mesh, 24-gauge, expanded metal or with galvanized steel woven wire cloth of 22 S.W.G. at about seven meshes to the inch (25.4 mm) behind the ventilation louver (inner side of the door/wall)

<p>14</p>	<p>Gap between doors of switch room/plant room and the threshold clearance greater than 6mm in size would allow intrusion of rodents.</p> 	<ul style="list-style-type: none"> ● Fitting a 20-gauge metal ‘kicking-plate’, at least 300 mm high, on the outside. This should have a maximum clearance of 6 mm (1/4 in). A similar plate should be fixed to the door frames to form a continuous band of metal.
<p>15</p>	<p>Void underneath raised container office provide rodents with harbourages and also accumulate refuse food sources for rodents.</p> 	<ul style="list-style-type: none"> ● Fitting a 20-gauge metal plate to cover the void to prevent access of rodents.
<p>16</p>	<p>Improper storage of construction materials and wastes invite rodent infestation and provide harbourages for rodents.</p>	<ul style="list-style-type: none"> ● Construction materials and wastes should be properly stored in rodent proofed environment. Hoarding boards should be closely placed to avoid any gap of side greater than 6mm allowing passage of rodents. ● Storage of construction materials and wastes should not be located at close proximity to flower bed or refuse collection facilities.



- Construction materials and wastes should be removed or moved regularly to avoid prolonged storage.

17 Refuse collection bins in close proximity to flower bed or vegetation allow easy access to food sources



- The number of refuse collection bins should be kept at minimal and set at location with clear distance from flower bed and vegetation or other potential rodent harbourages, e.g. switch rooms.

18

Decaying remains of tree may develop as an ideal harbourage of rodent



- Remain of tree should be removed completely soonest possible
- For temporary measure, tree hole found on ground should be sealed with small boulders or any other rodent proof material, e.g. cement.