

Rodents

and their control



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Gain a reputation as an expert in the field.

So, you want to be a successful “rat catcher,” well, read on. The vast majority of pest managers undertake rodent control in their daily work but not all of them undertake the work with the right attitude. Far too many simply inspect rodent bait, replace it if necessary and move on hurriedly to the next bait station thinking that they are fulfilling the terms of their contract with the client. They don’t have the necessary “killer instinct” which is mandatory if you wish to gain a reputation as an expert in the field. This pest bulletin deals mainly with the most effective control methods as there are many reference materials which detail biology and life cycles. A good source of information on all matters relating to pest management in Australia is, “Urban Pest Management in Australia” by John Gerozisis, Phillip Hadlington and Ion Staunton, 5th Edition, UNSW Press, 2008. If you don’t have a copy already, then go and get one!

Rats and mice are “nasty little creatures” to most people, although there are those who consider them to be excellent pets. One can admire their many skills without “falling in love” with them and one can certainly seek to eradicate an infestation without feeling any regret over the loss of life. However, as with the control of any vertebrate pest, one must always comply with any legislation regarding the treatment of these animals irrespective of their pest status.

THE HISTORY

Rodent control has roots in Egyptian culture when grain was stored in bins for later use. Of course, rats and mice found this situation too good to ignore and started to “dig in” as their needs dictated. The ancient Egyptians were no fools and soon utilised cats as an effective means of control. The cat became a revered animal in their theology. Nowadays, if you put a cat in your shop to kill the rats, the authorities can impose a fine for having a cat on the premises plus another one for having rats! Times have changed.

Moving forward to the Victorian era in England, we have the story of the famous rat catcher, Jack Black who was the self-described “rat and mole destroyer to Her Majesty Queen Victoria”.

Not only did Black destroy the vermin, but he supplied the demand for live rats for use in ratting competitions held in many taverns where terriers fought live rats while their masters bet on their prowess at killing rats.

Jack had started catching rats at the age 9, and by the early 1840s he was rat catcher for various Government Departments in London which included the Royal Palaces occupied by the Queen.

If you like reading history books and you like killing rats, then a good combination can be found in the free eBook entitled, “Full Revelations of a Professional Rat-catcher” by Ike Matthews, first published in 1898. Some interesting excerpts can be found in this bulletin. The book contains some worthwhile advice including the idea that traps, dogs and ferrets are a better means of control than baits because one avoids the possibility of evil odours and, an even better idea that, if your client refuses to pay the account, you simply threaten to release the live rats in the place you caught them. According to the author, this is a fool proof method of credit control!

Today, we have a vast range of control methods and a considerable number of rodenticides available to us. There is really no excuse for failure



WHY?

There are many reasons why we consider rodents to be pests, any one of which would be sufficient to want to rid our properties of them.

These reasons include:

- **Disease carriers** – rats and mice have the potential to transmit a number of diseases, some of them potentially fatal. The most notorious is doubtless the plague (or “Black Death”) which has wrought catastrophe on mankind since Roman times. This disease has been responsible for the death of countless millions of unfortunate individuals throughout history and literally restructured the social system in the Middle Ages. More details on diseases can be found in “Urban Pest Management in Australia.”
- **Consumption and contamination of foodstuffs** – rodents can be the difference between life and death for all too many people throughout the world even today because of their habit of eating human food. As well as directly eating the food, they contaminate even greater quantities by their droppings, urine and shed hairs. In addition, they damage cartons and containers, rendering them unsellable to retail establishments. One very large food warehouse was, at one stage, losing up to one million dollars a year due to rodent damage! A common term for pest rodents is “commensal,” which derives from the Latin word “mensa” meaning “table,” and means “eating at our table.” Unfortunately, rats don’t necessarily just eat at our table but, have been known to chew table legs and table cloths. On at least one occasion, a rat emerged from the restaurant kitchen late at night and began chewing on the shoe belonging to the last customer who was idly reclining in his chair. Luckily for the restaurant owner, the customer had imbibed a few beverages and probably thought that he had been hallucinating! Instead of a “pink elephant,” he had visualised a “black rat!”
- **Physical damage** – both rats and mice need to gnaw continually to prevent their incisor teeth from growing too long. They may also gnaw to gain access to food containers and nesting sites. In one warehouse, the rats were chewing the ends off 1.25 litre plastic bottles, filling them with shredded shrink-wrap and using them for nesting “boxes.” They probably had a good drink to celebrate the impending births. The major risk from their chewing habit is that of causing fires and electrical short circuits by attacking electrical cables. It is not uncommon for whole establishments to shut down because of this damage, with consequent severe monetary loss.
- **Fear reaction** – it is a normal human feeling to shy away from rats or mice running free but, some people are more sensitive than others. “Don’t worry;” is a frequent comment, “They’re more frightened of you than you are of them.” “That is impossible,” is a frequent reply!



WHAT?

Fortunately, we don't carry out rodent control in Central America; otherwise we might need to deal with the world's largest rodent, the Capybara, which can weigh up to 50kg! There are approximately 2,000 species of rodents so far described, comprising more than half of all living mammals. Small rodents are utilised as a source of food by many carnivorous mammals and birds. As a response to this heavy predation, they tend to become sexually mature at an early age, have short gestation periods and produce frequent, large litters. All these factors combine to make them a pest which can rapidly invade any domestic or commercial building.

All Australian rodents belong to the single family, Muridae. The three pest species belong to the subfamily, Murinae. There are approximately 60 native species in Australia including the well-known Water Rat, Bush Rat and Stick-nest Rats. It is not uncommon for native species such as bush rats and various species of mice to be found in people's backyards, so it is imperative that you can identify the animal's species before undertaking a control programme. A programme is underway to remove the dreaded roof rats from bushland around Sydney Harbour and replace them with our native bush rat¹.

The three pest rodents that you need to be able to identify are:

- ***Rattus rattus*** – roof rat, black rat, fruit rat, tree rat, ship rat, Alexandrine rat. Wow! What a lot of common names. You can work out for yourself that this rat really is common! This rat has a head and body length of 165-205 mm, a tail length of 185-245 mm and a body weight of 95-340 g. As you can see, the tail is longer than the body which makes it easy to identify if it is not running at the time. It has relatively large eyes and ears. Its colour ranges from black to light brown.

This species may have up to 6 litters of 5-10 young per annum after a gestation period of 21-22 days. The baby rats develop rapidly and may be weaned when 20 days old. They can reproduce after 3-4 months and may live up to a year in the wild or as long as 3 years in captivity.

This species most likely arrived in Australia with the First Fleet and has spread throughout much of coastal Australia. It can be found in both settled and unaltered country but has not been able to penetrate into the arid areas of central Australia.

Nearly everybody has seen a roof rat although they may have mistaken it for a native species. It is common around farms (especially poultry farms), stables, waste disposal areas, food warehouses and in older parts of cities. It prefers food of fruit or vegetable origin but will consume virtually any human food. Because of its habit of consuming fruits and vegetables, its need for water is reduced.

It is frequently found in domestic dwellings where residents may be alerted to its presence by scratching noises in the roof void. It may nest inside a roof void, in a tree top, inside wall insulation or in boxes stacked on pallets. It is an extremely agile rat, climbing trees, conduits and other vertical structures with great ease.

It is unwelcome in any location because of its ability to transmit diseases (it was the carrier of the Black Death), damage fittings and fixtures and consume and contaminate food and food packaging.

- ***Rattus norvegicus*** – Norway rat, brown rat, sewer rat, laboratory rat, white rat. If the roof rat is the "acrobat" of the family, then the Norway rat is the "strong man." These sturdy rodents have a combined head and body length of 180-255 mm, a tail length of 150-215 mm and a weight of 200-400 g. This rat is stocky, with scruffy brown fur, small eyes, short ears and a short, thick tail. Unlike the more timid roof rat, a Norway rat, when cornered, will repeatedly launch itself towards the perceived danger.

Norway rats are also prolific breeders and can produce 5-6 litters of up to 18 young per annum but usually in the range of 7-10. The gestation period is 21-23 days and the young are weaned after around 20 days.

This species is the dominant rat in Europe and America where it is termed the "common rat." It too arrived in early sailing ships but has not managed to colonise as much of Australia as the roof rat and tends to be found more often around major coastal cities and ports. However, very large infestations (around 10,000) have been found in poultry farms a long way from any port. Because it is not a strong climber, it normally lives a colonial life in deep and extensive burrow systems. Within each colony a ranking order exists between males with each dominant individual having a territory with several breeding females. After reaching maturity, young rats are forced to leave the territory and look for a new home. This phenomenon can also be observed in many human domestic situations.

Norway rats will also eat any human food but prefers garbage, cereals, meat and fish and they need regular access to water. In the poultry farm noted earlier, the rats were living in burrows constructed in the piles of manure under the cages and lived on eggs, dead chickens and poultry pellets whilst drinking from the drippers used by the chickens. They were active all throughout the daylight hours and would casually walk across the feet of the people collecting the eggs. The population had been in existence for around 20 years before the owner felt the need to call in a pest manager!



- **Mus domesticus** (or *Mus musculus* or *Mus musculus domesticus*) – house mouse. As you can see, there is some confusion as to the exact species we have in Australia, although recent studies lean towards *Mus domesticus* as being our species.

House mice have a combined head and body length of 60-95 mm, a tail length of 75-95 mm and a weight of 10-25 g. They have a slender body, a pointed nose with fairly large ears and a fur colour of brown to grey.

They are “opportunistic” breeders, reaching sexual maturity at around 8 weeks of age. They may produce 6-10 litters per annum with 5-6 young per litter. The gestation period is around 19 days.

House mice probably originated in central Asia and now can be found worldwide and can be considered to be one of the world’s most successful living mammals. Despite its

common name, it does not restrict itself to living in domestic dwellings as can be witnessed during the periodic mouse plagues which sweep across the countryside. House mice are sometimes called “field mice” even by pest managers who should know better. This is done in an attempt to avoid any stigma attached to having a mouse problem in the client’s house.

These creatures may live either indoors or outdoors, usually coming inside to avoid severe cold weather. Because of their small size, they can enter through almost any aperture. Experts say that, “if you can stick a pencil through a hole, then a mouse can surely follow.”

Inside a building, mice will set up home in any secluded environment e.g. roof voids, wall voids, inside furniture or cupboards, in expansion joints or in pallets of stock.

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FEEDING BEHAVIOUR

Whereas rats are considered to be “cautious avoiders,” mice are “curious investigators” and will explore a new environment much more rapidly than any rat species. If you want to be considered an intellectual, you may wish to call rats “neophobic” a term originating from the Greek meaning, “fear of new objects in the environment.” This is a behavioural trait strongly exhibited in rats but quickly overcome in mice.

Rats may tend to avoid bait stations and traps for a few days until they become accustomed to the disturbance. However, it is not unknown for rats to totally consume baits on the first night if the bait is palatable and other food sources are rare.

Sometimes, pest managers blame neophobia for the fact that the rodents aren't consuming the bait whereas the rodents are simply not interested in grain based bait while there are numerous more attractive foodstuffs to be found.

When there is intense food competition, providing a very palatable bait like Generation FirstStrike soft baits can help driving rodents away from their current food source. Use of traps and glue boards may also be considered to decrease rodents numbers.

Proofing and hygiene should always be implemented and is a key part of any treatment to reduce available food source and shelter. The curious nature of mice is of assistance to us when trying to eradicate an infestation by either rodenticides or mechanical means. They are omnivorous in their feeding habits and will eat small amounts at many locations and at frequent intervals.

Rats, on the other hand, tend to gorge themselves at only one or a few locations. That is why mice bait stations may be placed as close as three metres apart where rat bait stations may be fifteen metres apart.

All proprietary rodenticides have cereal grain as their base because that substance is accepted by all pest species and is weather resistant. Most, if not all products are claimed to contain ‘secret ingredients’ to enhance bait acceptance.

RODENT SENSES

Rats and mice have certain similarities with us humans although their senses are greatly enhanced.

Briefly stated, they have **excellent** senses of:

- Smell,
- Taste,
- Hearing,
- Touch and,
- Kinesthesia (muscle memory) but, relatively poor vision.

Thus, any contaminated baits, traps or glue boards may be avoided due to the rodents' heightened senses. They are generally accustomed to the smell of humans and will not avoid baits or traps if they detect our odour. However, you are advised to wear disposable gloves at all times when carrying out rodent control. You really don't want to come in contact with rodent urine, droppings, hair or nasty germs, do you?

When there is intense food competition, you will need to rely more heavily upon proofing, hygiene, traps and glue boards.



INSPECTION

As with any other integrated pest management undertaking, a thorough inspection must be undertaken before you can even think about treatment. If rats or mice are entering a building through a hole in the brickwork, it is just plain crazy to install a number of bait stations and check them until when and if, activity ceases. A few minutes of effort and the problem is solved. The rodents are now outside and hopefully go somewhere else to feed! Then you can go and offer your services to the neighbours!

In order to carry out an inspection, you must have a:

- Strong torch (preferably a backup torch as well),
- Notebook to record your findings,
- Digital camera (note that cameras are not allowed on many commercial sites),
- Sense of smell,
- UV light for detecting urine stains (if you have some spare cash) and,
- Enough time to do it properly.

You must also have desire to look at all the area in concern. It has been known for some salespeople to carry out an inspection from a factory's lunch room because it was raining (but only lightly!). A complete inspection will lead to a much more professional management campaign. You will also find copies of the site plans to be very helpful when quoting on commercial premises as you can more easily calculate the number of bait stations required when you know the perimeter lengths and the location of all entry points. It's even better still if you have a copy of the map of existing bait station locations if you are quoting on an establishment which is already on contract with another pest manager.

When carrying out your inspection, you must take into account the species with which you are dealing. If there are Norway rats causing the problem, then you may not pay as much attention to the roof void as you would when treating roof rats. However, you will need to inspect all the grounds especially creek beds and you will need to look at adjoining properties in case that the rats are living there. You can't just think to yourself that, "The rats are eating the dog food in Aisle 3, so I'll look around Aisles 2 to 4." In one case, the rats eating the dog food were living on an elevated platform in a far corner of the warehouse and

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nobody, including the pest manager, had even thought to climb the ladder and take a look! You must think, "Roof rats, roof rats, I must look at all high areas," and then, you proceed to do so even if it means climbing into roof voids and inspecting cavity walls.

So, what exactly are you looking for? There are always signs of activity to be found and they are:

- **Live** (or dead) rodents – this is a sure sign if they are alive and almost as sure if the corpses don't smell too much.
- **Droppings** – look at the texture, the size, the shape and the quantity. Shiny, black and gleaming? Then they are definitely fresh. Grey, dusty and crumbling? Then they are antiques and the infestation may not be current. You can tell the species by the shape and size but be warned that the differences between roof rat and Norway rat droppings are not always clear cut.
- **Tracks** – Footprints and tail marks betray rodent activity. Sometimes you can dust flour lightly over the floor and detect marks the next morning.
- **Smear marks** (also known as "rub marks" or 'grease marks') – these are made when the rodents come in contact with hard surfaces over a period of time. They will often be found around entry points, indicating locations which will need to be sealed. Smear marks will last for years in an undisturbed environment so are not always conclusive proof of current activity.
- **Gnaw marks** – these are usually quite obvious and can be found where rodents have chewed through materials e.g. timber or cardboard, to gain access to foodstuffs or nesting sites or where they are simply gnawing to keep their incisor teeth at a manageable length.
- **Burrows** – made by Norway rats predominantly but also at times by mice and roof rats. An enormous infestation of roof rats was found in a poultry farm where they were living in burrows dug into the piles of chicken manure. Norway rats are the main "diggers" and burrow into creek beds, manure piles or simply into the soil usually covered by tall grass or weeds.
- **Nests** – these are not often found in the case of roof rats as they are normally hidden away in roof voids or other obscure areas. Mice nests are more commonly located as they are more often in lower areas.
- **Sounds** – these are normally heard in the evening or dawn when the rodents come out to play and usually emanate from the roof void. The rule is: mice sound like rats, rats sound like possums and possums sound like elephants!
- **Smell** – there is a characteristic odour associated with rodents and cannot be mistaken for anything else. It is a sickly sweet, cloying odour which lingers after the rodents disappear.

- **Stock damage or consumption** – rodents consume around 10% of their body weight a day but destroy or contaminate much, much more. Any packet, carton or bag which has been damaged must be discarded and is a direct loss to the owner.
- **Urine stains** – these are not visible to the naked eye and only show up when exposed to ultraviolet (black) light. You need a UV source to find them and other organic substances will show a “false positive.”

You can also speak to residents or employees in an effort to determine the existence of rodent activity. This process is fraught with danger as some people exaggerate (“so big

you could throw saddles over them!”) and some minimise the problem. They are usually the bosses who don’t want their problems known, especially to the local authorities.

You also need to pay attention to “cultural” defects such as gaps in walls and under doors, doors being left open, open rubbish containers, overflowing dumpsters, discarded stock in a corner of the warehouse, rubbish in a roof void or sub floor. The residents or staff may be blind to these problems because they see them every day or, they may be just too plain lazy to bother themselves. All these areas of concern must be addressed in an integrated pest management programme.

TREATMENT PLAN

Once you have all the information you can derive, you will need to draw up a treatment plan, properly costed in the case when you have to present a quotation to a prospective client. Too many pest managers have fallen into the trap where they have underquoted a job and then need to cut corners or suffer a financial loss. When you present a quotation to a potential client, you should stick to it and not enter into a “bidding war.” There will always be somebody who will offer a “better” deal but, if you can act in a professional manner by quoting the correct number of bait stations, proofing materials and labour costs, then you will (hopefully!) gain a reputation for acting in a responsible way. If you feel at somewhat of a loss when trying to prepare a quotation, then you can always call upon the services of the trained staff of Globe Australia or a representative of a rodenticide supplier.

Depending upon the species of rodent and the type of rodenticide you choose, you can calculate the number of bait stations required. In commercial premises, you will always be using “tamper resistant” bait stations, fixed in place by screws, chain, glue or other means. Glue is not a good idea as the bait stations can’t be picked up for easy cleaning. They will also need to be numbered and recorded on a bait station plan. The distance between bait stations is determined by the label rates and rodent species and could be from three to fifteen metres. You should always use “rat size” bait stations on the exterior and interior perimeters of a contract even though you might only find mice. You should also only use the larger size in roof voids. “Mice size” stations can be used in offices, canteens, store rooms and other areas where large stations may not fit. Some pest managers only use rat stations on the exterior and mice stations on the interior and roof void, working on the assumption that the rats are intercepted by the external stations and only mice “filter” inside. This is a totally erroneous concept as rats will easily enter premises via incoming goods apart from just walking through the front door. The subject of “fence line” bait stations is subject to some confusion as most

rodenticides can only be used adjacent to “structures.” Some pest managers claim that fences are structures but this is not the way the manufacturers think. Therefore, ensure that you are complying with all label regulations.

Special rules apply when dealing with schools², HACCP sites, AQIS³ sites or organic food production or vending establishments. Make sure that you are fully cognisant of all the relevant regulations before providing a quotation. The managers of these establishments have to live by very strict rules and they rightfully expect you to be fully conversant with them. One slip up and you will probably be shown the door. You should also refer to the AEPMA Code of Practice regarding food factories⁴. This is an extremely informative document with references to all types of pests not just rodents.

Now that you have won the contract and made arrangements to start the job, you need to implement a very clever plan. It is a serious mistake to rely solely upon rodenticides when trying to eradicate a rodent infestation. This may be the cheapest option but often ineffective when used in isolation.

The only permanent means of control is by “proofing” all entry points with durable materials such as stainless steel. Softer materials such as “foam filler” are futile. You must either seal the entry points yourself or ensure that the client does so. If you leave these access points untreated, then you are only making your task so much harder, if not impossible. Proofing may be expensive and time consuming but is **not** an “optional extra.”

You must also address the hygiene/sanitation problems you have uncovered. As long as garbage or foodstuffs are freely available to the rodents, you have little chance of success. Why eat a block of waxy wheat when you have a nice fresh tomato or strawberry tart to chew on?



NON-CHEMICAL CONTROL

Ike Matthews, author of “Full Revelations of a Professional Rat-catcher,” had very fixed ideas about rodent control. He preferred traps or the use of ferrets or dogs to catch rats. He didn’t like baits because of the danger of resident evil odours emanating from the carcasses of dead rodents. Over 100 years later, things have not changed although there are odour destroying materials on the market e.g. “Earth Care’s Odor Remover Bag.” Traps and glue boards are still used but are a more expensive option when compared to rodenticide baiting because you have to check them daily and some people are a little disconcerted by the sight of the dead rodents. In Victoria, special regulations apply to the use of glue boards and must be consulted before employing them. In “organic” sites, traps and glue boards may be the only option available for use.

There are many tricks to using traps including the choice of attractants or bait. You probably already know that cheese is not the first choice but some foodstuffs have proven popular over the years. These include: oranges, apples, chocolate, bacon, figs, dates, prunes, pineapple, walnuts, melon and peanut butter – probably the most commonly used. Some pest managers swear by tinned cat food. You can also purchase commercially made rodent attractants to place on traps. You may think that you would need to open the can first but, in one food warehouse, the rats had learnt the knack of actually opening ring pull cans! True story!

The traps are placed perpendicular to the walls and in corners, behind furniture and in areas where the rodents are feeding. When using traps which can be baited without being set, they should be placed out and the rodents allowed to become accustomed to them and readily take the bait before being set. Some types of trap cannot be baited without being set. As stated before, traps must be checked daily, dead rodents removed and traps re-set.

Glue boards are not a popular choice with some people and moves have been made to have them removed from use. These moves have been rejected by pest managers and glue board suppliers because they are extremely useful in environments where there is food competition. Objections raised include the hypothesis that the rodents take hours or longer to die,

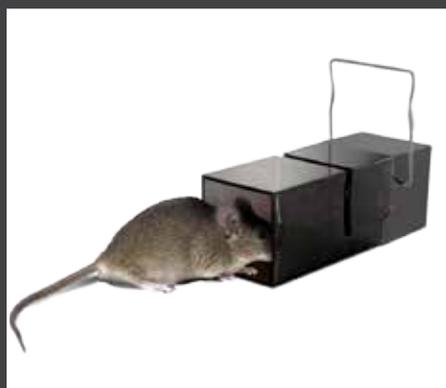
succumbing from starvation. Mice usually die within an hour, sometimes less than ten minutes, dying from hypothermia or stress. Rats may take longer. Unlike traps, glue boards are placed along runways where the rodents are moving at top speed and cannot avoid them. Many glue boards are purchased in joined pairs and the pair can be placed in the runway without being separated. When the rodents are seen to be running across them, the boards are separated and Whammo!

Glue boards should never have attractants sprinkled on them as they are designed to catch rodents unawares. In some cases, pest managers have overdone the “berley” concept and literally covered the glue board with bird seed. The rodents would have trouble finding a spot to even stick a foot!

As a matter of interest, the most mice caught on a rat sized glue board was fourteen – this record made in a pet food manufacturing facility located in the Central West area of NSW during a mouse plague. Another person (female worker in a stable) claimed thirteen mice but she had actually removed each mouse after it had been caught thus disqualifying her from second place.

Another interesting case was a fast food outlet in western Sydney where approximately 1,500 roof rats were caught on glue boards over a period of 9 months! The rats used to climb down from the roof and watch the staff cooking the daily offering, probably licking their lips at the expectation of a free feed to come. Nobody remembers how many glue boards were used in this epic venture.

Multiple catch mouse traps can also be quite effective, being able to catch up to 15 mice between winding. The mice simply enter the trap’s opening due to curiosity and are flung into a holding department prior to being dispatched humanely. These devices are very worthwhile in establishments where toxic baits are not permitted.



New innovative Mouse Trap by Liphatech



Rodent Glue Boards



Trap-in-a-box™

A trademark of Pelsis.



RODENTICIDE CONTROL

A less expensive and time consuming option is to use rodenticides, almost invariably single-feed anti-coagulants. These have been in use since 1979 in Australia and overcame the problem to “warfarin resistance” which was first noted in Sydney in 1972. In the intervening period, rats were virtually immune to warfarin (a multiple dose anti-coagulant) and could consume endless quantities of bait without any ill effects. After the discovery of Bromadiolone by Liphatech, the first second generation rodent control molecule back in 1976; a bromadiolone based bait was first used on these contracts and, complaints changed from, “There are rats everywhere!” to, “There are bad smells everywhere!”

The rats had been so accustomed to feeding on a virtually non-toxic substance, that they immediately consumed the new bait and died within a few days. Prior to the introduction of bromadiolone, the only control methods which produced results were proofing, trapping and the use of acute rodenticides such as 1080 and thallium. These substances were highly toxic and quick acting but had no antidote so were not popular with the rodents or the pest managers who had to use them.

The basic rule to remember when using rodenticides is that there must be palatable bait available at all times. There is

such a concept as “pulse baiting” when the baits are only replaced periodically. However, a client or auditor opening a bait station has the expectation that there will be bait inside it. They might confuse pulse baiting with just plain laziness or inefficiency! Another problem which rears its ugly head is the fact that snails, slugs, crickets and cockroaches **love** rodenticidal blocks and can eat or contaminate them before the rodents get a chance. You can use wrapped blocks such as Maki Wrapped (bromadiolone 50ppm, 20g) which are much more resistant to attack. I would not recommend sprinkling salt as places where slugs and snails are found are usually very humid. Salt will dissolve quickly and leave bait stations messy for poor results. Moreover, the practice of sprinkling salt is often discouraged by auditors as the salt may fall out of the bait stations and this is not acceptable. Some pest managers spray a saline solution inside their stations to deter snails and slugs but this is not a fool proof measure. Red back spiders are also big fans of bait stations and their presence is a sure sign that you are not cleaning them often enough. Auditors and clients certainly don't want to see bait stations full of spider webs and spiders and they, (the spiders not the clients), have been known to bite unsuspecting pesties.



As noted before, bait stations must be placed at the appropriate intervals according to the species of rodent and the label instructions. They are also normally placed at either side of doorways, both inside and outside in a hope to intercept rodents as they make a bid to gain entry to the premises. Some cheapskates only put bait stations on one side of the doorway but you can never tell whether the rodents are going to be “left handed” or “right handed” and they may not go in the direction you had predicted leading to big problems and making the pest manager looking like an incompetent operator.

It is futile to simply place rodenticide baits in a building such as a food manufacturer or warehouse and then anticipate that the rodents will immediately stop eating the existing foods and start eating your baits although many pest managers have succumbed to that erroneous line of thinking. Why would they? In cases like this, you will need to rely upon other measures such as proofing, improved levels of hygiene and the use of highly palatable baits in combination of traps or glue boards. You may never totally eradicate the population; you are only nibbling around the edges of the problem. In such cases e.g. pet food manufacturers, the client may have to accept the fact that there will always be some level of activity. In most instances however, the client will only be satisfied with total control and so will the local council or state Health Dept.

Sometimes, the problem resides in the fact that insufficient bait stations or too lengthy an interval between visits has been quoted. In one case, poultry sheds of 220 metres in perimeter length had only 4 bait stations installed. The rats were more likely to die from frustration in trying to find the bait stations than from the effects of the rodenticide. When you have a large infestation, you will need to ensure that enough visits are scheduled to keep the bait up to the rodents. The following good advice was taken from an article in “Pest Control Technology” magazine⁶ which can be received by email every month – free of charge!

“Monthly treatments are unlikely to eliminate a roof rat infestation. If all of your rodenticide is consumed between service visits, you may not be killing them faster than they reproduce. Increase the amount of bait per station, the number

of stations or the service frequency — or if you are really serious, all of these techniques.

If you are killing Roof rats but are not making progress toward eliminating the population, you may be “harvesting” subordinate rats on the periphery. You could be missing the dominant part of the population which is producing replacements as fast as you kill them. Find the part of the population outside your control effort.”

As the author noted, it is imperative that you provide for sufficient visits so that there is always bait for the rodents to eat. Depending upon the size of the infestation, you may need to quote for an initial treatment followed by 2 follow up visits a week apart, followed by fortnightly visits. Some commercial contracts require weekly visits; others may only need monthly visits. You would be very “brave” to quote on quarterly visits for any commercial premises whereas domestic premises may only receive annual visits whilst having a three month “free service period.” You cannot give a guarantee against rodent activity or damage as the pests could enter from the place next door or be brought inside contained in pallets of stock. These finer points of negotiation will need “fine tuning” as you move on in your career.

Mice can be even more difficult to control as they may live inside boxes of foodstuffs or packing materials. Many more bait stations may be needed and they will have to be placed along aisles of warehouses not just around the perimeter of the building. The territory of a mouse may range from 1 to 3 square metres, so you need to ensure that there is a bait station within each territory. Your bait station supplier will love you!

In schools, you may need to use a multiple dose anti-coagulant e.g. coumatetralyl. In HACCP, AQIS or organic food sites, toxic baits are permitted in few if any, instances. An acceptable alternative is the use of non-toxic detector wax blocks. These are placed in the standard bait stations and inspected regularly to see if there are any gnaw marks visible. If there are, traps or glue boards can be introduced. The major drawback is that, if the detector blocks are not checked sufficiently frequently, then they just provide a palatable food source and make the rodents bigger and stronger!



Generation First Strike



Maki Original Block



Maki Wrapped Block

OTHER FORMULATIONS

Rodenticidal blocks aren't the only formulation available of course and have only been used in the last 30 years or so. Prior to that, loose grain bait – whole or kibbled wheat – was often used. These formulations were prone to spillage as they were usually placed in open plastic or cardboard containers or even aluminium pie dishes – a really professional look! They were also more likely to be eaten by cats or dogs as they did not contain “Bitrex,” a bittering agent which makes it impossible for most animals to eat the treated material. Why don't rodents object to the taste? You would have to ask them I'm afraid. Loose grain is still available for the home owner market.

The other formulations commonly used by pest managers include:

- **Soft Bait** - In recent years Liphatech introduced Generation FirstStrike a soft bait based on the newest active ingredient, Difethialone. It contains food grade vegetable oils, refined flour and no wax for unsurpassed attractiveness and palatability;
 - It has proven very successful in highly competitive food environment and big infestations.
 - As most modern baits it also contains Bitrex and can be secured inside bait stations. Its small size (10g) allows for more flexible bait placements.
- **Grain & pellet bait** – Bromakil grain or pellet, based on bromadiolone, can be used used for the treatment of rat burrows. Only a few pellets need to be placed in a Norway rat burrow to gain control. Using more pellets or blocks may cause the rats to get “suspicious” and throw them out of the burrow. A very clever device has been constructed by some pest managers to disperse pellets down a burrow without the need to put your hands in peril from the attack of an irate rat.
- **Place packs** – previously called “throw packs” because that is what most people did with them – open a manhole cover and throw them through. Now they have changed the name so you feel guilty if you just throw them. You are supposed to inspect the enclosed space – roof void or sub floor – and place them gently down. At least, that's the theory. They are a grain based rodenticide enclosed in a labelled plastic bag for professional appearance and safety, bait stations should always be a consideration.
- **Concentrates** – the most commonly used product is a powdered formulation with coumatetralyl as the active ingredient. It can be used as a “contact dust” (sometimes called “tracking powder” which is really an inert substance used to detect rodent tracks) or as a bait concentrate and mixed with an attractive foodstuff. This method is very successful if the rodents are accustomed to eating a certain food e.g. pumpkin seeds or tomatoes, because the concentrate can be added to these foods to tempt the rodents into feeding on them. They are not suitable for situations where spill proof bait must be used. When used as a contact dust, it is applied in a thin layer to areas along which the rodents run. This may be a runway, a burrow entrance or even a purpose designed pipe. It cannot be used in locations where it may blow or fall onto animals, foodstuffs, food preparation surfaces or food handling equipment.
- **Liquid concentrates** – The commercial formulation Bromakil Drink uses bromadiolone as the active ingredient and is diluted according to label instructions. Liquid bait should be placed in a spill proof dispenser, either a drink bottle used by pet rodents or rabbits, or a purpose designed container which can be held in a tamper resistant bait station. Sometimes, pest managers have poured diluted concentrate onto a certain food item which the rodents have been accustomed to eating. In a wholesale grocery shop, the Roof rats had been eating lentils, chick peas and sunflower seeds. They refused to eat the wax blocks and who could blame them? After futile attempts with glue boards, the contractor resorted to placing these items in open bait stations and pouring liquid bait on top. A few weeks later, the rats had all gone. He had broken a few rules so we could never approve of his actions but the client was happy and paid the bill.
- **Fumigants** – unless you are a licensed fumigator, you cannot use fumigants such as aluminium phosphide pellets or tablets for rodent control. Even if you are, there are very strict rules to obey and you must be aware of them. Fumigants are normally only used for gassing burrows of Norway rats as long as they are well away from human or animal habitation.



SUMMARY

We have only dealt with the major aspects of rodent control and have not even mentioned the safety aspects. You are no doubt aware that you **must** follow all label instructions with regard to mixing, use and wearing of PPE. To become a competent “rat catcher,” you need training and experience. You should also consult the experts from Globe Australia if you need any advice on products or treatment procedures. The basic points to remember are:

- You must conduct a thorough inspection before planning or carrying out a treatment.
- You must recommend an integrated pest management programme incorporating non-chemical and chemical control measures.
- You must adhere to all label instructions regarding usage patterns and safety precautions.
- You must quote enough visits to ensure that there is always enough palatable bait available for the rodents to consume.
- You cannot rely upon one single formulation and you may need to use a range of products and materials in your campaign.
- You need to “think like a rat” in order to beat a rat. Where are they living? Where do they travel? What are they eating? and,
- Take the job as a personal challenge. Are you really going to let a rat which has a brain the size of a pea outwit you?

Happy hunting!

Excerpts from “Full Revelations of a Professional Rat-catcher” by Ike Matthews

This work will not be complete if I do not deal with the Rat-catcher’s life. The profession is a peculiar and exciting one, but all right if pursued in the right way. Although the calling takes one into dirty and obnoxious places, there is no reason why the Rat-catcher should not always appear respectable.

Of course there are inconveniences that the Rat-catcher has to put up with. Whatever engagements he takes in a town, the only time he can catch rats with a good result is in the night. On one occasion, when going round with my bull’s-eye lamp to examine the traps, I was taken for a burglar by the policeman on the beat, and he doubted me so much that he would not release me until I had shown him my cage with rats in and my traps set all over the place.

I can assure my readers that the Rat-catcher is well remunerated for the trouble he undertakes in these cases, and moreover this is the class of people he requires to fraternise with. There is always a plentiful supply of “refreshments” on these outings, and I would therefore advise the Rat-catcher not to indulge too freely.

Further, Rat-catching is a business in which one is not called upon to allow credit. It is all a ready-money trade, and as there is not much competition, the Rat-catcher can command a good price for his work. He has always one resource open to him when he has finished a job according to contract (catching say 40 or 50 rats), should there be a dispute about the price and the people decline to pay the bill, then he has the expedient of letting the rats at liberty again in the place where he had caught them. Most people will pay the price you send in rather than have the rats turned loose again.

Although I am showing how the Rat-catcher can always have the advantage of stubborn payers, I may as well assure my readers that in all my experience such an occurrence as the above has never happened with me, simply because I always make my arrangements beforehand, which course I always find the best and most satisfactory all round.

I must tell my readers, especially those having large shops, etc., that it is a good plan, if possible, to turn off the gas and water every night and week-end, for I have seen a good many cases where the rats in the night-time have eaten through a water-pipe, and the place has been flooded by morning. It is just the same with a gas-pipe, and my opinion is that it is quite possible for fires to be caused by rats in the night-time. Rats are very fond of nibbling and scratching at soft wood, and it would be an easy matter at a grocer’s shop for a rat to bite or scratch through the package of a gross of matches and ignite them, and the same cause may prove disastrous with any other inflammable goods.

I don’t think the Rat-catcher’s life is one of the worst if he looks well after his business, for he has a few advantages over other occupations. In the first place, he is his own master, and need only doff his coat when he chooses, there being for him no such summons to work as a factory bell. And if he fancies a day’s outing in the country he can always take his dog and ferrets with him, and make a day’s pleasure into a remunerative business, by reason of the income from the rats, and I find from experience that the best friends he has are his dog and ferrets, if he will look well after them and treat them kindly, for I think that a Rat-catcher in the country without a good dog might walk over scores of rats and never know they were there, so you will see that his dog is chiefly what he has to trust to.

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