

Rats and Mice

(Dave Pehling)

Slide 1

Once you decide you have a rodent problem, what do you do about it? This is what clients want to know. Usually by the time they call, there is already a very active infestation.

Slide 2

There are four basic steps to effective rodent control. First of all, we need to reduce the carrying capacity as much as possible. We do this by trying to get rid of as much food and water as we can. We need to kill these rodents. There is no room for catch and release with these commensal rodents. Reduction of the shelter will also help reduce the carrying capacity. Along with that, it is especially important to rodent-proof the living structures.

Slide 3

Reducing the available food and water can be very difficult, especially if you have pets or livestock or if you are an organic gardener with bone meal and blood meal in storage.

Slide 4

Anything vaguely edible must be kept in rodent proof container, rooms, or buildings. Plastic is pretty marginal. It will slow them down but it is not really rodent proof.

Slide 5

For bulk materials, metal garbage cans are very good. Rodents cannot chew through these and if you have a tight fitting lid, they cannot get into these.

Slide 6

Garbage cans, of course, are primarily for putting garbage in. You have to be sure the garbage stays in the can. A situation like this will not only draw rodents, but also raccoons, opossums, bears, and coyotes, depending on where you are.

Slide 7

It is very important not to leave pet food out, especially overnight. Some people think that their dog needs food out there twenty four hours a day. And, in a situation like this, it is a very heavy draw for rodents and raccoons, skunks, opossums, and all sorts of animals you might not want poking around your house.

Slide 8

For Norway rats in particular, it is also important to remove dog droppings. Research has shown that Norway rats can live very well on a straight diet of dog feces; it contains all the nutrients they need.

I have not read of any problems with cat droppings or other livestock droppings, although the potential is certainly there. Basically do the best you can with getting these out of the environment. Bury them; get them in the garbage; anything you can do to get them out of the garden.

Slide 9

Try to remove any windfall fruit, nuts, ornamental seed pods, anything of that sort that could be rodent food. There are some ornamental berries in your landscape you want to keep because they are attractive, but, try to reduce the amount of food just as much as you can.

Slide 10

Keep a close eye on your garden for rodent feeding. This can sometimes be the first indication that there is a problem.

Slide 11

If you like to compost material, in particular food scraps, you have to be careful how that is done. Food scraps, of course, are also rodent food. So, if you compost your food scraps, it has to be in a rodent resistant container of some sort. Plastic is marginal but if you monitor the situation you can tell if rodents try to get in there.

Slide 12

Bird feeders are a very strong draw for rodents of all kinds. Rodents are very good at getting into these. You have to get some kind of rodent resistant bird feeder. If at all possible, put a seed-catching screen underneath. So, if jays get in there and scatter seed, it won't fall to the ground where rodents can get to it. Remember that rats can have a very long reach. Here you can see a Norway rat with its tail wrapped around, almost like a monkey reaching out to get some seed.

Slide 13

There are a variety of rodent guards you can purchase or make. There are a lot of ways to make your bird feeder inaccessible to rodents of all kinds.

Slide 14

We also need to eliminate adult rodents as much as we can (hopefully all of them). We have a wide variety of tools available to us.

Slide 15

Trapping is usually the method of choice, although it takes quite a bit of study to be successful. The common rat traps are very effective. Or, you can cage trap rats and mice. But, then you have live animals you need to eliminate. You can't release these animals into the environment, they will just come back. It is against state law to catch an animal and then release it off the property on which it was trapped.

Slide 16

Trapping takes quite a bit of study because there is not a lot of information that comes with the traps, unlike rodenticides where the instructions are very precise on the box. In general, for mice, you want to place mouse traps about every five to ten feet apart where there are signs of mouse activity; this is droppings, rub marks, tracks, etc. For rats, you need to use the larger traps. Placement about fifteen to twenty feet, again, where there are signs of the rodents. It doesn't do you any good to place traps where the rodents are not.

Slide 17

Traps can be baited with a wide variety of materials. Try to find something that will stay fresh on the trap, something that will stay on the trap, and something that the rodents like. These are just a few suggestions. In general, Norway rats tend to be more attracted to meat type baits than the roof rats are. Roof rats like more fruity materials. But they are not all that picky. Both species will be attracted to either of these baits.

Slide 18

Bait must be something that will stay on a trap. If you want to use something like a piece of a peanut or a walnut, either this needs to be wired on or you can also use something like a hot glue gun to attach the bait. By having a good secure bait, you can often catch several rodents without having to put fresh bait on.

Slide 19

It is very important to place the traps where the rodents are naturally going to run over them. The trigger should be facing a vertical surface and should be right in the runway.

Slide 20

For roof rats, these animals run up and down 2x4s, along supports over head, so you can often just screw a rat trap onto a joist and catch them in that way.

Slide 21

If at all possible, it is always a good idea to tie your traps down. These traps are very effective and have a high lethality, well over 75%. If you do this long enough, you will eventually catch a rat by a tail or a foot. Unless the trap is tied down, he's going to drag it away and you will lose the trap and the rat.

Slide 22

When using traps outside, it is very important to place them in trap boxes. You can purchase these or make them out of wood. By using trap boxes, you keep the traps out of reach of non-target animals, in particular birds, which will very readily get caught in rat traps.

Slide 23

You can expand the trigger of traps by various methods as shown in the diagram. This makes the trap more effective as a runway set, in which case, you really don't need to bait it. But, I always think that bait adds to the attractiveness of any trap. In this picture, you can see where I have forced on a piece of cardboard.

Slide 24

Victor now has what they call their professional model which already has an expanded treadle. This is a very efficient trap. I don't particularly like it because the rodent has to push straight down on the trigger. The old metal four-way trap would go off no matter which direction the trigger was pushed.

Slide 25

Glue traps are available. They are not very humane. Quite often in the morning you will go out and find a live rodent in there, in which case, you need to kill it yourself. Large rats can often pull loose even from the large style of these. Also, these grip the body, so technically, according to Initiative 713 in Washington state, these are not legal traps. I don't think they would be called common rat and mouse traps, and those are the only body gripping traps that as of 2009 are legal in the state of Washington for catching animals.

Slide 26

There are many problems with glue board traps. First of all, I already mentioned is it a legal trap? There certainly are no trap cops out there that are going to throw you in jail, but if you want to stay within the legal parameters of our state, you need to know what you are doing. Dust and moisture can spoil the glue on these traps, so they are usually not a good choice for out in the greenhouse or out in the shed. As I mentioned, rodents can sometimes escape from these. With age some of them dry out so they lose some of their stickiness. Smart rats don't like to step on them, and they aren't humane. About the only good point they have going for them is if your dog sticks his nose in there it is not really going to hurt him. Just dose him with vegetable oil, the trap falls right off.

Slide 27

One of the down sides of trapping is that if you are successful, you will come into close contact with dead rodents. Many people find that distasteful. Traps have to be checked at least once a day. Twice is even better. Even if the trap is set off, you will not always have a rodent in there. But if you do, you need to handle it correctly, wear plastic gloves.

Slide 28

In this case, this person used leather which is not ideal. You want something you can either dispose of or disinfect. Drop the rodent into a sealable plastic bag. Or, if you live out in the country, you can just bury it a foot deep out in the back acre and that will be fine.

Slide 29

Now we'll talk about rodenticides. These are rodent poisons, and these are usually the tool of choice because they are so easy to use and they are highly effective.

Slide 30

As far as Master Gardener pesticide recommendations go, remember that you may only recommend materials that are published in WSU publications and are approved for your recommendations. In general, these will be materials that are registered home use only in Washington state.

Slide 31

So, we are very restricted in what rodenticides Master Gardeners may recommend. WSU Pestsense has finally put on a section that has rodents. It is under nuisance, I think...

Slide 32

...and under mice and rats. Washington State University says Master Gardeners may recommend Victor Fast-Kill Blocks and Victor Fast-Kill Pellets. These contain the active ingredient Bromethalin, which we will talk about shortly.

Slide 33

Rodenticides have many advantages. They are very easy to use. They are very effective when used correctly. And, compared to trapping they are relatively low maintenance.

Slide 34

On the down side, some are very toxic even to non-target animals. Some have a very strong potential for secondary poisoning of pets and wildlife. And, if rodents have access to the living structure, use of rodenticides can lead to odor problems.

Slide 35

Rodenticides come in a wide variety of formulations, everything from pellets, to tracking powder, to liquid concentrates. As of about 2012 though, consumer rodenticides will only be available in block form and in preloaded bait stations. At this time, I have no idea what that is going to do to the cost.

Slide 36

It is very important every time a rodenticide is used, that the directions are read. The label on the pesticide is a legal document, and it is against state and federal law to vary from that. Also, the label has a lot of good information. Some baits may legally be used in and around structures. But others can only be used indoors. It is very important you stay with those guidelines.

Slide 37

Most of the rodenticides we have available these days are the anticoagulants. These are just a few of the brand names you might find on the shelf. As of about 2011 or 2012, most of these will no longer be available for consumer use.

Slide 38

Anticoagulant rodenticides, of course, affect the animal by reducing the clotting properties of the blood until he eventually just bleeds to death internally. One of the nice things about the anticoagulant is there is an antidote, Vitamin K1, which if administered in time can usually pull a pet through an anticoagulant poisoning episode.

Slide 39

These are just some of the active ingredients you will find in the brands on the shelves right now. As I mentioned, in a few years most of these will no longer be available. We will still have Warfarin, of the anticoagulants, but the rest of these will only be available for agricultural or commercial use.

Slide 40

Right now all of these brands are available for home use. That is one of the problems. Home owners are not always really careful how these tools are used. Misuse has caused the EPA to make the ruling that most of these will no longer be available, at least not with the second generation anticoagulant active ingredients.

Slide 41

Bromadiolone is another second generation anticoagulant which we will not have use of as far as consumers go after about 2011.

Slide 42

Right now Brodifacoum and Bromadiolone are both available. Brodifacoum is the active ingredient in D-Con, most forms of D-Con now. You can see the difference in the LD-50s, the toxicity of these to non-targets. A single bar bait of D-Con is enough to kill a 22 pound dog. The Bromadiolone formulations, on the other hand, would take several pounds for a lethal dose for a dog. Cats are surprisingly resistant to these materials.

Slide 43

There are some other rodenticides available. These, at least a couple of these, should be available to consumers after 2011. Bromethalin, in particular, which is the one WSU recommends in Hortsense, will certainly be available. There are several brand names on the market at this time. Cholecalciferol, this is basically Vitamin D3, and in the right dosage in rodents it causes basically a fatal heart attack. Zinc phosphide is an old style stomach poison - very acutely toxic. It is not widely available at this time for consumer use except in mole and gopher bait. And those formulations will still be available for consumer use after 2011. It is just that they may not be used above ground.

Slide 44

The problem with the second generation anticoagulants is they have been implicated in secondary poisoning. And, that is when say a rat gets a good belly full of D-Con and runs out in the woods and gets eaten by a hawk or an owl. In many instances, that can cause fatality to the raptors. Because of that, the EPA has done a study and they have come up with that these are the three least hazardous to birds and mammals: Warfarin, Bromethalin, and Cholecalciferol. And I believe all three of these will be available for consumer use after 2011.

Slide 45

Right now, as I mentioned, baits are available in a variety of formulations. You can get the granular formulations in place packs (which again will no longer be available after 2011, as I read the EPA reports). Right now these are available though, but they should always be fastened down when being used; a little bit of duct tape or staple, some way to fasten them down so the rodent cannot easily pick them up and run off with them, which they will sometimes do.

Slide 46

Bar baits are widely available, and this is the formulation that will be available to consumers in coming years. Although, it will only be available in prefilled bait stations.

Slide 47

And these are a couple different brands of bait stations. There are many on the market now and they vary widely in price.

Slide 48

By this time, you can certainly make your own bait station. Something of this sort is very secure and very effective. If you make your own bait station, it is important that there is an opening on each end, because rats, in particular, do not like to go into dead end holes. Mice, on the other hand, are not really wary animals and they will enter anything to get to bait.

Slide 49

Something like this certainly is not very secure. But, if you don't have children or pets around and this is say in a closed greenhouse, this is one way you can present bait.

Slide 50

Something of this sort is much more secure. This is nothing more than a length of heavy PVC pipe. I like to use something four to five inches in diameter. Rats find it much more comfortable to go into something that large. Whatever size you use, it is important the bait be secured inside. Either with tape or if you are using a bar bait, I like to drill a hole halfway down the pipe and run out a piece of wire. On that, you can securely fasten one or two bar baits. Pull the wire so the bait goes halfway up the pipe. Then you can wrap the wire around the outside. That makes it secure so that if a dog goes in there and rolls the bait station around the bait will not fall out.

Slide 51

Placement of the bait stations is also very important. Just follow the label directions. The general rule of thumb is that for mice you should place the bait stations about every five to ten feet apart, where there are signs of rodents. For rats, you can place them farther apart, about every 15 to 20 feet or so. Again only where there are signs of rodents.

Slide 52

The reason for these different spacings is that these different rodents have different home ranges. Rats are larger animals; they range farther from their home base, that is, their main nest. Norway rats - somewhere around a hundred feet. Literature says that roof rats will range considerably farther, up to maybe 300 feet or so. House mice are much smaller; they stay closer to home, about 20 feet from their nest. Deer mice undoubtedly range farther.

Slide 53

Now in places where there is danger of an ongoing rodent infestation, you may need to have a perimeter baiting program. These are preventative treatments in areas where there is a constant influx of rodents.

Slide 54

One of the problems with using baits around structures is that if rodents do have access to the living structure, you will occasionally have rodents dying in between the walls. No matter what you have read or what you have heard, there is no bait that always makes rodents go outside to die. Rats generally have to go outside at least once every twenty four hours for a drink and this is quite often where they die, but not all the time. I have found many dead rats curled up dead in their nest in insulation in walls.

Slide 55

If you do have problems with dead rodent odors, the best thing to do if at all possible is

to remove the carcass and that will take care of the problem rather quickly. If you can find the body, you can apply deodorants as a space spray in the area and that will usually make it at least bearable. The odor usually goes away on its own within a month or so. Although sometimes it does hang on for a few months.

Slide 56

In the meantime, with that carcass in the wall, you may have a population explosion of blowflies. And in a way that is good, the blowflies are speeding up the decomposition of the body and will speed the reduction of the bad odor. In the meantime, break out the fly swatter and just deal with the flies as they show up.

Slide 57

Now you may sometimes have clients call back and complain about failures with control. This can be caused by a number of things. Quite often it is because there is a lot of extra food around. Perhaps foods that the rodents like better than the baits on the traps or the toxic baits you are using. Or, if you are not putting out enough bait stations or trapping stations. You need to cover the entire living territories of these rodents or you won't get good control. They breed very quickly. If there is not enough toxic bait used, if you are using bait stations, you need the bait to get to all of the members of the colony. Or, if the baiting or trapping program is too short. Older rats can sometimes be very nervous animals and may not even approach a bait station for up to two weeks or so. So, you have to figure at least a month for halfway decent control - maybe longer than that.

Slide 58

We like to talk about biological controls and natural controls when dealing with a lot of garden pests. As far as vertebrates go, they can help but they are certainly not going to eliminate a problem. Wild predators will take a number of animals. But, wild animals never wipe out their food sources. Diseases are not highly effective. These are very resilient animals. Many years ago a scientist tried to develop a disease to control rodents and it just didn't work very well. As far as pets go, terrier type dogs and cats do catch a number of rodents. But again, they never can catch the breeding core population. So, they may keep the population at a lower level but you are still going to have problems. Cats usually like to concentrate on birds too, so keep that in mind if you like your bird population.

Slide 59

I am sure you have all heard about various electronic repelling devices for all sorts of pests, insect and animal. In laboratory situations, none of these have ever proven to be effective at all. In fact, in one test where there was a device that was supposed to repel cockroaches, the cockroaches chose to live inside the device because it was warmer than the ambient temperature. Bottom line is, none of these have been proven. If you have a client that just insists on using one, well that's their call. People have a way of convincing themselves that things work because they really want them to work. Without baseline data there is really no way to tell in many situations.

Slide 60

Reducing harborage, or hiding places, or nesting places, is also very important in any rodent control program. And it can be quite difficult in many situations.

Slide 61

Removing debris on the ground is very important for controlling Norway rats, which like to burrow under these materials. This is often where they make their nest. So, if at all possible, get things that are on the ground, off the ground. Elevate them on sawhorses or pallets or something of that sort. Where if it is building material, you know, build what you are going to build with it. Norway rats can be a problem around rock gardens too. Of course, you are not going to rip out your rocks. In a situation like that, you need to deal with them in other ways.

Slide 62

Remove brush, dense ornamentals, things of that sort as much as you can from around structures. Items like this are very conducive to rodent infestations and are very attractive to these animals.

Slide 63

And that leads us to rodent proofing. And this is particularly important for the house, the living structure.

Slide 64

In general, rats and mice are very versatile animals. These are some of their capabilities. They are excellent jumpers, climbers, they can compress their bodies down and squeeze through cracks much smaller than you would expect.

Slide 65

These are some of the materials that are recommended for rodent proofing. Keep in mind that rats in particular can in time gnaw through poor quality concrete and even thin sheet metal. So whatever you do, you want it to be solid.

Slide 66

You need to close up all opening over one quarter of an inch if you expect to keep out mice. Be sure floor drains are covered. Watch your downspouts. Just any kind of opening you can think of that you can close up will help rodent proof the structure.

Slide 67

For gaps around pipes and wires, simple steel wool can work. Although that will rust in time. There is a commercial product called Copper Stuff-It which you can order over the internet. But, copper scouring pads work just as well. You can pull these apart with pliers and stuff those into cracks. And they won't rust and rodents cannot or will not chew

through them. For openings that have to be open for ventilation purposes, those need to be protected with quarter inch hardware cloth and it needs to be secured so the animals can't pull them lose.

Slide 68

As I mentioned, floor drains have to be covered with the covers that come with them. And if those openings are over a quarter inch in diameter, you need to have quarter inch hardware cloth underneath that cover. Unless the pipe is guarded elsewhere. That is if it drains outside, if it has a quarter inch guard on it, or some other kind of guard then that inside floor drain isn't that important. But, it should be covered.

Slide 69

With roof rats becoming more common it is more and more important that we watch vertical access to the roof. Vertical pipes and wires need to be monitored continually. If rodents are using those to gain access to the roof, you need to install some sort of animal guards. And this is just one model. This will not only keep out rats and mice but it will also work for possums and raccoons, other animals that will try and get up on the roof and gain access to the house.

Slide 70

This is another kind of guard. This simply makes it so the animal can't grip the pipe nor get its claws in the brick or whatever kind of siding this is.

Slide 71

If rodents are trying to chew through doors to get to organic fertilizers or animal feed or for some other reasons, these areas have to be protected as well.

Slide 72

Sheet metal flashing, applied as in the picture here, works very well. You could even use quarter inch hardware cloth for this although it doesn't look as nice.

Slide 73

For Norway rats, they leave a lot of tunnels in places they are infesting so you need to fill those in and keep an eye on them. If they get opened up again, that can be a real good indication that your problem has returned or that you have not completely solved your infestation.

Slide 74

If you have trouble with rodents or other animals tunneling under structures, you might need to install and off set curtain wall. And this can be metal mesh as in the left hand image or for a very permanent solution you could even put in a concrete off set curtain wall. These are pretty simple but they are quite labor intensive. Keep in mind that

Norway rats are capable of tunneling up to four feet deep to get underneath the foundation. Although that is pretty much a worst case scenario.

Slide 75

So to summarize, there are two phases of rodent control. First we need to eliminate the rodents directly. We do this by using rodenticides, or traps, or we can use a combination of the two. We need to be sure to use as many bait stations or trap stations as is necessary to control the problem, keeping in mind the home ranges of these animals. We need to be sure if we are using toxic bait station to use plenty of the product for as long as necessary. Keep in mind it may take at least a couple of weeks for the older rats to begin using these bait stations. And we need to reduce the carrying capacity of the area. Try to reduce all the available food and water you can, reduce all the hiding places or harborage, and especially try to rodent proof the structure.

Slide 76

If clients find all of this overwhelming, there are companies that will deal with rodent problems for a price but be sure to remind them that rodent problems can be ongoing. So, it may be a year to year problem and it can be an ongoing expense. With a little bit of study and practice, anybody can learn to control their own rodent problems.