

Zinc phosphide and bromadiolone: Frequently asked questions about mouse baiting

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What constitutes a mouse plague?

The CSIRO rodent research group generally considers anything over 500 mice per hectare as being a plague.

Mice living under field conditions have a seasonal pattern of breeding. This generally begins in early spring and can continue into late autumn the following year.

Table 1. Mouse facts

Daily feed intake	1–3 grams
Daily water intake	1–2 grams
Gestation period	19–21 days
Age at weaning	21 days
Age at mating	6–10 weeks
Litter size	5–6
Adult weight	12–30 grams
Breeding season	All year
Begin to eat solid food	11 days
Eyes open	11 days
Duration of oestrus cycle	4 days
Life span	1–2 years

Reference: Marsh, R.E. & Howard, W.E. *The House Mouse. Its Biology and Control* (1977)

Mice living in unfavourable seasonal conditions may have a shorter breeding period, while those with nests and good cover are likely to have an extended breeding period. Research suggests that it is the quality of the food more than the quantity of food that extends the breeding season.

Risk assessment for baiting

Apart from seeing mice, some form of monitoring is advisable to estimate:

- the population
- the possible level of damage
- the impact on non-target species.

Don't forget to look for other risks or hazards, for example sensitive areas and/or organic crops.

Perimeter and in-crop monitoring

This type of monitoring could use census cards or bait stations. Either technique would provide a guide for when baiting or rebaiting is necessary. Details of monitoring techniques are available from Agricultural Protection Officers, Rural Lands Protection Board Rangers or District Agronomists.

Coordination of monitoring

Monitoring results provides important information for managing mouse plagues. Rural Lands Protection Board (RLPB) rangers, agronomists, local pest control authorities and farmers are vital links in this process. Farmers can ensure that monitoring information, and the coordination that relies on this, is as accurate as possible by providing their monitoring information to RLPBs. Monitoring that shows low results or mouse activity emerging in new areas is especially important. All increasing mouse activity should be reported to the local RLPB.



Non-target species

Visual observations around an area that has been baited should commence as soon as bait is laid and continue for at least a week after all bait has been consumed or removed. Any non-target species found should be reported to the agency responsible for the preparation or distribution of mouse bait.

Rodenticides

Available rodenticides

There are two rodenticides currently registered for field use: bromadiolone and zinc phosphide. Both products are available through Rural Lands Protection Boards and many rural suppliers in small or bulk quantities for immediate use.

Bromadiolone (Bromakil[®], MouseOff[®] Bromadiolone Rodent Bait)

Bromadiolone is an anticoagulant poison, either prepared by a Rural Lands Protection Board or available commercially. It is a grain-based bait and is to be used as a crop perimeter bait only.

Zinc phosphide (MouseOff[®] Zinc Phosphide Bait)

This product produces toxic phosphine gas. It is supplied as a prepared bait on grain through the Rural Lands Protection Board and is for in-crop use only. This bait can be laid if mouse activity is at a sufficient level to justify baiting. Strict baiting criteria have been established to minimise risks. *This bait cannot be used in towns or residential areas.*

Only chemicals that are registered for mice can be legally used for this purpose. Other chemicals are not registered because they are either not effective or they have the potential to cause serious loss of wildlife.

APVMA and EPA labels and pesticide control orders

Use of bromadiolone and zinc phosphide rodenticides is strictly controlled by the requirements of the:

- Australian Pesticides and Veterinary Medicines Authority (APVMA); and
- Environment Protection Authority (EPA).

Any label and/or pesticide control order must be read thoroughly by all persons using these, and any other chemical products.

The label and/or the pesticide control order issued by the EPA:

- sets out the rates, terms and conditions of use;
- outlines the criteria to be used to determine whether baiting is justified; and
- indicates the distance restrictions, public notification required, public notice requirements, storage and disposal requirements, and safety directions.

Indemnity for baiting with rodenticides

Before bait is laid on any land, the occupier of that land is required to:

- indemnify certain people and organisations;
- state that they have read and fully understood the relevant label; and
- have fulfilled all conditions of that label.

Frequently asked questions

Will in-crop baiting kill all the mice in the crop?

Baiting will only kill those mice that eat the bait. In general, between 70% and 90% of the total mouse population will be killed.

The use of bait is not a total solution for crop protection; rather it is an attempt to minimise the potential damage to the developing crop.

Will baiting kill native mice?

Most native mice are insectivorous and are seldom found in crops. They tend to live in the native vegetation which may be around a crop. Checking for non-target animal mortalities is a condition for the use of either type of rodenticide.

When should I consider using zinc phosphide?

The use of zinc phosphide is a commercial decision made by the farmer. If the monitoring (census cards, bait stations etc.) indicates that mice are in increasing numbers within a crop and there is a potential for an economic level of damage occurring, then the use of zinc phosphide should be considered.

When should I consider using bromadiolone?

If monitoring of the perimeter of the crop (such as in the grassy verges around the crop or in adjacent pasture) indicates that there is evidence of increasing mouse numbers and there are no mice in the crop, then perimeter baiting would be recommended.

The use of perimeter baiting is part of 'best practice' and should be started as soon as possible.

Can I use zinc phosphide and bromadiolone together in the same system?

It is a recognised part of the 'best practice' strategy when mouse numbers are high to apply bromadiolone as a perimeter bait at the same time zinc phosphide is applied in-crop.

Growers who have baited in-crop should monitor the perimeters carefully and consider the use of a perimeter baiting regime where necessary.

Will I need to rebait?

Mice can re-invade baited crops from perimeters and adjacent areas, and residual mouse populations can continue to breed in-crop. Both of these scenarios are dependent upon mouse numbers, food quality, breeding activity, etc.

Monitoring for mouse activity in treated crops and crop perimeters should continue until at least 2 weeks before harvest (14-day withholding period). This information, along with any additional crop damage, will show when or if rebaiting is needed. This is a commercial decision of the landholder, and the necessity for rebaiting appears to be an exception rather than the rule.

Note that once perimeter baiting programs begin, they may need to be redone prior to harvest.

To avoid bait shyness, rebaiting with zinc phosphide should only occur 14 days after the previous baiting.

Field experience indicates that dense crops such as canola and pulses are more likely to need rebaiting.

CAUTION: It must be remembered that there is a 14-day withholding period for zinc phosphide prior to harvest, so the last in-crop baiting must be at least 2 weeks prior to harvest.

How long will mice cause damage?

Mice will continue to feed on a crop while ever it is a food source. Even though stems may dry out, the seed is still palatable and will be eaten through to harvest.

What happens if the bait gets wet?

Both bromadiolone and zinc phosphide poison have some water-resistant properties.

Zinc phosphide grain bait will tolerate some rain after being laid as the poison is eroded off the bait by the action of the rain rather than by the water dissolving the compound. It is recommended that at least two nights be free of rain after bait is applied to ensure the majority of mice obtain a lethal dose.

If rain has occurred prior to baiting, provided the ground is not extremely wet then bait should still be viable. Commonsense judgment in individual circumstances should be made.

Bromadiolone bait will survive very light rain and dew but should be renewed if it has become too wet.

Are livestock in the adjoining paddock at risk from zinc phosphide?

The phosphine gas from zinc phosphide bait is not readily released into the atmosphere under normal conditions.

Even if all the gas were liberated at once, the concentration would be insufficient to cause any problems to animals or humans in nearby paddocks.

Will the zinc phosphide affect bees and other insects?

Phosphine gas is used as an insecticide in confined spaces, but in the field there is little effect on insects as the liberation of gas is slow.

Bees that are in close proximity of a baited area should be moved if possible, since field evidence indicates that bees may be affected by baiting.

Can I bait on fallow ground?

Currently there is no approval to use a rodenticide on bare ground, but it can be placed in a stubble or vegetative fallow.

Do I need a Permit from the National Parks and Wildlife Service (NPWS) to bait?

You do not need permission from NPWS to bait on agricultural land unless you are aware of the presence of threatened or endangered species.

You need to observe relevant distance restrictions for baiting. You must also take care not to bait in threatened or endangered species' habitats and to minimise the impact to non-target species.

Are my working dogs at risk from mouse bait or baited mice?

Mouse bait and mice that have succumbed to bait represent a very small but potential risk to dogs and other animals. Commonsense indicates that it is a good idea to restrain your working dogs and pets during the baiting program.

How must zinc phosphide mouse bait be stored?

Storage facilities must comply with label requirements; that is, storage facilities must:

- be secure, locked, dry, cool (i.e. must be stored at a temperature less than 30°C);
- not be accessible by children, pets or wildlife;
- ensure no contact with acids, detergents, water, heat or sources of ignition.

There needs to be adequate ventilation at both roof and ground levels if zinc phosphide mouse bait is stored in a closed shed. Normal ventilation that is adequate for a small quantity of other fumigants is not sufficient for storage of large quantities of zinc phosphide without this extra ventilation.

Where zinc phosphide is stored in a closed shed, the doors should be opened at least 15 to 30 minutes prior to entry.

Note that where it is necessary to store large quantities of zinc phosphide in a closed shed, it is also recommended that you wear a respirator when entering the shed.

Preferred storage of zinc phosphide

- Store in the closed, original container.
- Store in a lockable, well-ventilated shed.
- Keep dry and out of direct sunlight.
- Where possible and practical, order only sufficient bait for weekly use.
- Where possible have the bait delivered directly to the airstrip for aerial application, or outdoor loading area for immediate use.

What are the safety requirements for zinc phosphide bait use?

- All persons handling zinc phosphide bait are reminded that this product is a dangerous poison and that they are legally required to follow the conditions set out on the label.
- All persons must wear their correct personal protective equipment as specified on the label, including respirator and gloves.
- Remember, if you can smell zinc phosphide (an almond smell), it has not been cleared from the air you are working in – wear a respirator.

What respirators do I need when handling zinc phosphide bait?

The label specifies that a full-face respirator fitted with a combined dust and gas cartridge, or a supplied air respirator, must be worn when opening zinc phosphide drums and using baits.

How must I dispose of zinc phosphide bait?

The label states: disposal is by burial in a 1 metre deep pit and covered with soil.

This burial site must be specifically marked and set up for this purpose – clear of waterways, vegetation and roots.

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