MOUSEOFF®

Zinc Phosphide Rodent Bait

Protecting Australia's Crops

Introduction

This booklet highlights ways to minimise the risks of mouse infestation in crops and also describes the control of mice using MOUSEOFF® Zinc Phosphide (MOUSEOFF® ZP) Rodent Bait.

PREVENTING MOUSE PROBLEMS IS BETTER THAN TREATMENT. PREVENTION REQUIRES KNOWLEDGE, PLANNING AND AN ABILITY TO REACT QUICKLY. POPULATIONS CAN DOUBLE WITHIN A MONTH TO DAMAGE CROPS AT ANY STAGE. THIS DAMAGE CAN BE PREVENTED BUT IT IS IMPORTANT TO ACT EARLY.

MOUSEOFF® ZP is approved for broad-acre control of mice **in crops**. MOUSEOFF® ZP should be used in conjunction with other measures to prevent mouse build-up. Application of MOUSEOFF® ZP produces a rapid decline in mouse numbers. Uneaten bait degrades, leaving no harmful residues.

acta
Excellence in Pest Animal Management

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The information contained in this booklet is based on scientific literature and material produced to date, and is believed to be reliable. Animal Control Technologies and collaborating agencies assume no responsibility for the accuracy or completeness of the data contained herein.

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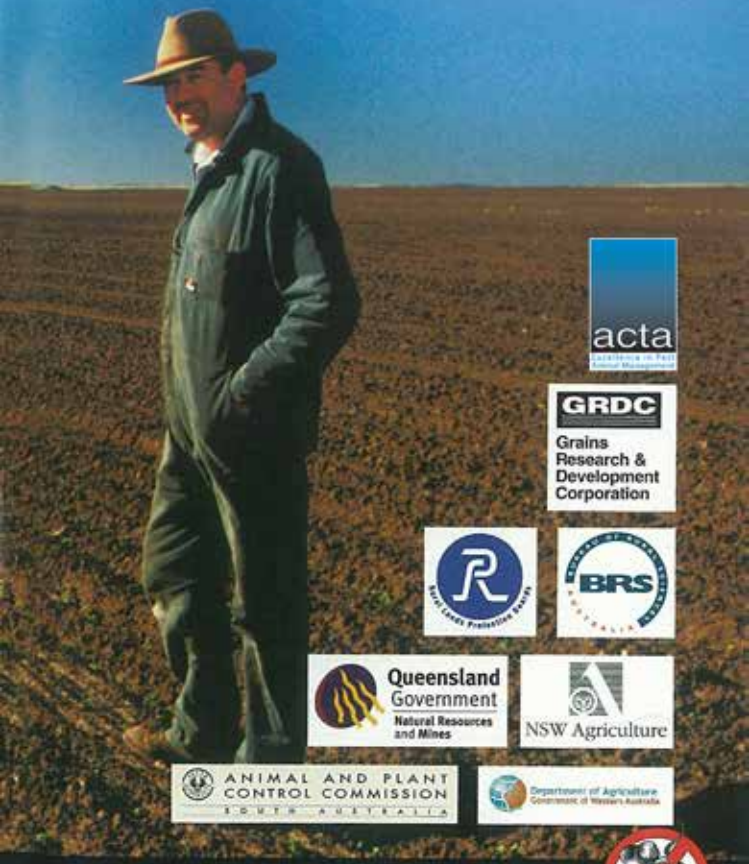

MOUSEOFF®

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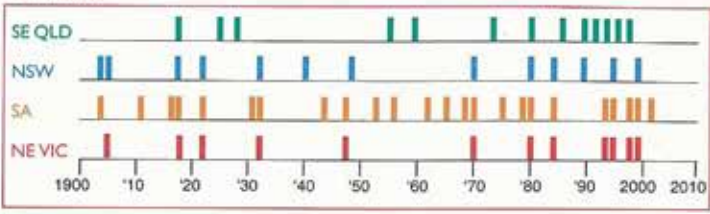
1. Mouse Problems in Australia

• Factors contributing to mouse infestation

Serious mouse infestations have occurred in grain-growing areas for more than a century. On average, serious mouse infestations occur about once every four to ten years and last up to two years. Infestations are common following exceptionally good cropping seasons.



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Many other factors contribute to the occurrence of outbreaks:

- changes in farming practices and continuous cropping
- high yields leaving more feed available from harvesting losses
- crop irrigation and raised beds
- minimum tillage/direct seeding with reduced cultivation
- increase in stubble retention and reduced grazing
- larger holdings requiring faster harvesting rates

There are good reasons for these farming practices. However, a consequence may be increased mouse numbers. This is an acceptable trade-off in most years.

SPILT GRAIN FROM HARVESTING PROVIDES FOOD FOR MOUSE BREEDING, SO BE AWARE IN THE SEASON FOLLOWING BUMPER HARVESTS.

Mouse numbers build up to cause damage over a period of months, when:

- there is an extended breeding season (ie early start and/or late finish),
- food is plentiful,
- nesting sites are favourable, and
- diseases, parasites and predation are minimal.

Rapid build-up requires continuous breeding and high juvenile survival. Sometimes, the rapid-increase phase is not recognised until numbers are already approaching plague proportions.

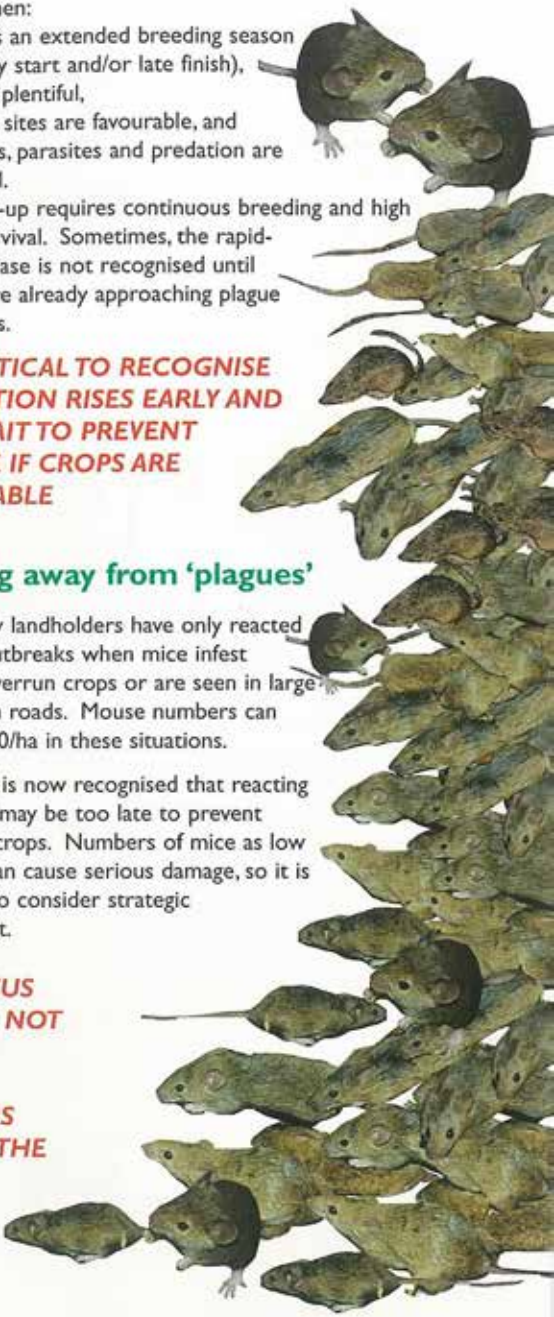
IT IS CRITICAL TO RECOGNISE POPULATION RISES EARLY AND APPLY BAIT TO PREVENT DAMAGE IF CROPS ARE VULNERABLE

• Moving away from 'plagues'

Traditionally landholders have only reacted to major outbreaks when mice infest buildings, overrun crops or are seen in large numbers on roads. Mouse numbers can exceed 1000/ha in these situations.

However, it is now recognised that reacting to 'plagues' may be too late to prevent damage to crops. Numbers of mice as low as 200/ha can cause serious damage, so it is important to consider strategic management.

THE FOCUS SHOULD NOT BE ON MOUSE NUMBERS BUT ON THE RISK TO CROPS.



• What damage do mice cause?

Common house mice are always present in cropping areas, but mostly in very low numbers that pose little problem to the landholder. However, numbers can very quickly rise to high levels. Moderate to high mouse numbers damage crops, stored grain and fodder, farm infrastructure and equipment.

Mice can affect horticulturists, viticulturists, graziers, rural businesses, intensive livestock facilities and wool stores. Mice can spoil food with faeces and urine and can transmit diseases and parasites to humans and livestock (eg Salmonella).

Direct and indirect costs of serious plagues can exceed $100 million nationally. Individual farms can suffer partial or complete crop loss.

Corn damage by mice

Pods chewed off canola stem

• What crops are at risk?

In cropping areas mice target most major crops including cereals, legumes, pulses, sorghum and maize. High-protein vegetable crops including peas, beans and chickpeas are also at risk along with intensive vegetable crops such as zucchini, tomatoes, eggplants, capsicums and melons. Summer and winter cereal crops are vulnerable at several stages of development including at sowing, at flowering and during the doughy, milky or podding stages through to pre-harvest mature crops.

Mouse damage to sorghum

Lupin pods damaged by mice

Sorghum debris at base of plant

• What type of crop damage occurs?

Crop damage is often unnoticed until it is severe. Sometimes mouse damage is misdiagnosed as snail or slug damage, or the effect of moisture stress or disease.

Signs of mouse activity include chewed stems, damage to seed heads and/or debris at the base of the plant.

In cereal crops such as wheat, mice chew the growing stems of the plant to feed on sap, stopping development of the head or causing the stem to collapse.

Mice can drop seed heads by chewing through the top node at flowering and also attack the maturing heads. This can cause losses of up to 50% at pre-harvest stage.

Mice can seek and dig up newly sown seed.

Growing stems chewed to feed on sap

Damage may not be consistent throughout the crop. Look for bare patches, mouse holes and 'highways', and evidence of wilting or stem damage at nodes. Investigate mouse activity within the crop (not just on the edges).

Extreme mouse damage visible from the air with damage well inside the crop

Mice can also feed on emerging seedlings.

BEWARE: MODERATE MOUSE NUMBERS CAN CAUSE SIGNIFICANT DAMAGE, DEPENDING ON THE STAGE OF THE CROP CYCLE.

If crop is at risk it is appropriate to treat mice strategically while at low to moderate numbers. This reduces the breeding base for mice and prevents further crop damage.

THE KEY TO PREVENTING CROP DAMAGE IS RECOGNISING AND TREATING INFESTATIONS EARLY.

Top node chewed to drop head

2. Know your enemy!

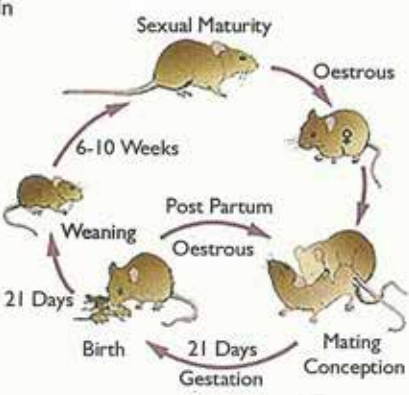
• Some facts about mice

Adult mice typically weigh 10-30g and have a body length of over 75 mm. Mice have good senses of smell, taste and hearing, however they have poor vision and are colour-blind. Mice generally move along scent-marked trails and use their long sensitive whiskers as sensors when moving at night.

• When do mice breed?

Females reach sexual maturity at 6 to 10 weeks of age. Conception to birth is 19-21 days and mothers can re-mate immediately after giving birth to produce up to 10 litters per year under ideal conditions.

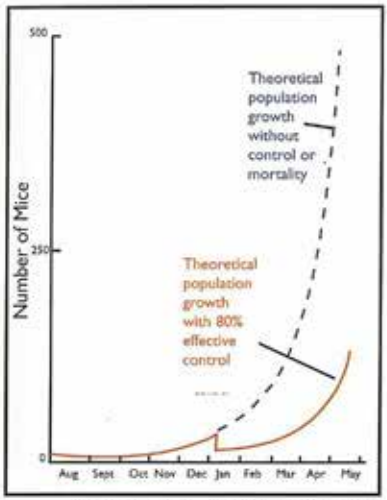
Mice can breed at any time if food is available. In Australia, breeding peaks in spring/summer while there is abundant high protein food from insects, seed and growing plants. Breeding slows in late autumn/winter. An extended breeding season (early start or late finish) can allow mice to reach plague proportions in just one season but it sometimes takes two seasons for a plague to develop.



WARNING: ONE BREEDING PAIR CAN PRODUCE 500 MICE OVER A FIVE MONTH PERIOD UNDER IDEAL CONDITIONS.

• What is their breeding potential?

Average litter size is 5 to 6 but can be as high as 13. Hypothetically one breeding pair can give rise to 500 mice in 21 weeks but high mortality rates normally limit extreme populations.



Source: Department of Agriculture NSW

• Weaning and survival of mice

Young mice begin eating solid food at 11 days, are weaned at 21 days and can breed after about 6-10 weeks. Average life span of only a few months in the field because mortality is high even in favourable habitat.

• What is their social structure?

Mice are social animals that maintain territories. They can live in family groups of 1-40 individuals per burrow. When densities are high, the social system may break down. In the non-breeding season territories are not well defined and home ranges are larger.

• When are mice active?

Mice are active at night and feed from several sites around the nest. Mice are seldom seen during daylight unless they are at high densities.

• Can mice swim and climb?

Mice are excellent swimmers and can remain under water for several minutes. During floods adults may move to dry places abandoning newborn mice. Light rain does not kill many adult mice.

Mice can swim

Mice can dig, can vertically jump up to 40 cm, can fall at least 2.5 m without injury, and can squeeze through openings as small as 6 mm wide. They climb almost any rough surface including ropes and electrical wires.

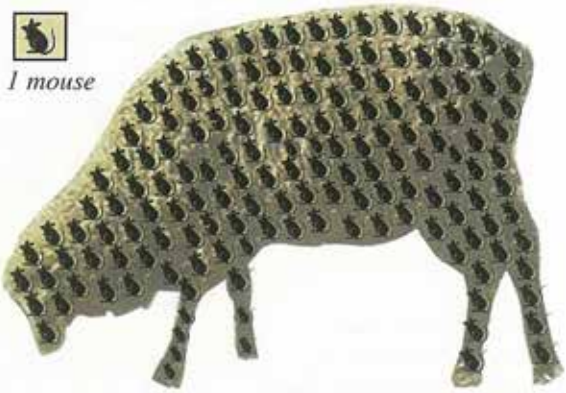
Mice can climb

Depending on soil type, mouse burrows can withstand heavy rainfall. Only prolonged flooding affects mice in the field.

MINOR RAINS DO NOT REMOVE MICE, BUT LANDHOLDERS CAN BE MISLED BY APPARENT REDUCED ACTIVITY. NORMAL RAIN SELDOM PENETRATES TO UNDERGROUND NEST SITES.

• What does the average mouse eat?

Adult mice consume about 2-3 g of food per day. They are omnivorous and in the field survive mainly on grass seeds, cereal and legume grains. Their diet also includes insects, snails, earthworms, plant tissue and some fungi when available. Usually, mice do not need to drink as they can obtain sufficient moisture from their food.



200 mice eat the equivalent of one sheep, consuming about 200kg of food per year.

However, this calculation does little justice to the true scale of damage since mice chew the heads off stems, partially eat seed heads, remove newly sown grain, stunt early crops, chew machinery wiring/electrical fittings and contaminate storage areas.

THE IMPACT ON CROPS IS MUCH GREATER THAN JUST THE FEED MICE CONSUME.

• What causes reductions in mouse numbers?

Frosts and cold weather do **not** necessarily kill mice, but may restrict population growth. Nutritional stress can reduce abundance and may make mice more vulnerable to disease. However, if mice can remain warm and well fed in their insulated subterranean nests, extreme environmental conditions may not have much impact.

The main causes for collapse when densities are high are the cessation of breeding, exhaustion of food supplies and spread of disease.

• An integrated approach to reduce risks

While baiting is effective in stopping damage in crops, there are also preventative measures to minimise the risk of mouse numbers rising. This is called 'integrated pest management' or 'IPM'. An integrated approach, such as monitoring mouse activity, removing mouse harbour and reducing the feed supply can help prevent numbers building up in a range of crops.

MOUSE MANAGEMENT SHOULD BE PROACTIVE RATHER THAN REACTIVE.

The following tips may help to minimise mouse numbers rising:

- remove surface shelter by slashing, burning, or herbicide treatment of grass and weeds along fence-lines, roads, and around sheds to reduce food

Slashing fencelines

- use galvanised mouse barriers to protect pig, poultry and storage facilities

Mouse barriers

- consider changing the crop rotation to reduce the number of mice maintained over a long period of time
- burning stubble to reduce snail or nematode numbers also reduces cover for mice. However, it does not kill mice underground or adequately remove spilt grain

Patchy burnt stubble

- avoid planting dry if there are signs of mouse activity. Sow when soil is moist enough to allow rapid germination
- sow to an even depth (as deep as agronomically possible) if mouse numbers are high. Do not over bury seed

- cross-harrow, diagonal roll or prickle chain after sowing
- **use harvesting techniques that minimise grain loss. Use crop lifters and knife guards, harvest at slow speed, set combs and sieves to minimise shatter and seed loss, use airfronts or flexifronts for pulses, and fit screens to capture broken and pinched grain and weed seeds**
- harvest legumes earlier to reduce losses
- minimise shattering of pods and seed heads when windrowing
- graze stubble after harvest to reduce the residual grain and harbour (but leave sufficient cover to minimise erosion)
- where soils are not prone to erosion, mulching stubble after harvest exposes mice to predators and buries spilt grain.

Cross harrowing

Cross harrowed paddock

Graze stubble

If mouse numbers rise despite IPM measures, use MOUSEOFF® ZP strategically to remove the base population of mice BEFORE damage occurs.

MOUSEOFF® ZP may also be used to overcome a severe established mouse infestation.

3. Bait after monitoring mice and assessing crop risk

• Where are high-risk areas?

Any cereal growing area may be at risk from mice. Weed seeds and unharvested or spilt grain provide mice with an abundant food source. If the crop from the previous season was exceptionally good, or harvest was inefficient due to shatter, lodging or machinery problems, the possibility of mouse problems within the next crop is increased. Heavy early autumn rainfall also raises the probability of future mouse problems by allowing early plant growth (including weeds), which provides mice with additional food and harbourage.

• How can mouse risk be assessed?

On farm monitoring of mice will indicate the extent and severity of the problem.

MOUSE NUMBERS CAN VARY WIDELY BETWEEN AND WITHIN PADDOCKS, SO ALL LANDHOLDERS SHOULD MONITOR THEIR OWN CROPS FOR EMERGING PROBLEMS.

Damage to crops is a frequent, but not continual threat, so **at least** an annual assessment of mouse activity and risks is needed.

• Counting mouse holes

In sandy or clay soils it is possible to walk and count mouse holes on a path a metre wide by 100 metres long (ie 100m²). Allow for two mice per active hole. (The range can be from 0 to 40 mice per hole). If an average of 5 active holes are counted per 100 m², with 2 mice per hole, then there are about 1000 mice per hectare (1 ha = 10,000m²). **NOTE: This technique does not work well for cracking clay areas where mouse holes are difficult to define.**

WARNING: DO NOT RELY ON OTHERS, AS YOUR PROBLEM MAY BE WORSE.

Walking transects to count mouse holes

• Trap Lines

Snap-back traps baited with cardboard soaked in canola or linseed oil can be used to estimate mouse presence. Place at least 20 traps at 10 m spacings along lines ('transects'). Check traps early next morning. Repeat trapping every few months, but increase frequency if mouse problems emerge and crop is at risk. If, at any time, more than 10% of traps hold mice there is potential for significant crop damage.

Breeding status can also be assessed. If females show evidence of pregnancy or lactation (ie. extended nipples), the problem may worsen quickly.

Cardboard or paper soaked in canola oil is a simple trap bait

Fluoro paint makes it easier to find traps

• Canola squares

Peg out at least 20 canola oil soaked paper squares (10 x 10 cm), at 10 m intervals along transects in crops, stubbles, and other areas where mice may be living. The amount of paper eaten overnight provides a rough index of the abundance of mice in an area.

If an **average** of 5-10% or more of paper is eaten then mice pose a threat. However, the amount eaten may also be influenced by the availability of other food.

As mice can be patchy between and within paddocks, the more lines of squares put out, the better the indication of potential mouse problems.

Mark canola cards with fluoro tape for easy relocation

BEWARE - CANOLA SQUARES UNDERESTIMATE MOUSE NUMBERS IF DENSITY IS HIGH OR IF ALTERNATIVE FOOD IS ABOUT. CHECK FOR OTHER SIGNS AS WELL (eg. active burrows and crop damage).

Peg down canola squares in crop and around crop perimeter

Approx. 5% eaten

Beware - mouse problem emerging consider baiting

Approx. 60% eaten

You have a major problem and crop is being damaged

• Grain Stations

Place a small spoonful of grain under bird-proof covers (e.g. upturned flowerpot with mouse access holes or roofing iron with a stone on top) in a grid pattern or transect throughout the paddock. Measure the loss of grain (eaten by mice) after 1-5 nights. This will give a rough idea of how many mice come to the feeding station and the potential for seed loss, allow ~ 3g per mouse per night.

• Other indicators and warning signs of mice

Close and regular inspection of crops is needed. Some useful tips include :

- check for circular patches of dead crop
- check for mice after dusk using a spotlight
- look for mice on roads at night – **beware this can be a very late sign of a serious problem**

Increased predators

Dead mice on roads

Mice under tin sheet

Bare patch in crop

- increased predator birds may mean that mice are about
- place sheets of galvanised iron or bags at strategic locations and note mice when lifted, also
- look for mouse tracks in soil eg. well-worn paths between cracks on cracking soils or between holes in sandy or loam soils.

Mouse highway in pasture

Mouse highway in decimated crop

Mouse highway in canola crop

• Distinguishing active from inactive mouse holes

Lightly cover over holes encountered in a transect (see Counting Mouse Holes p18), marking each to facilitate relocation. Then count the proportion re-opened next day.

Talcum powder can also be used to identify active burrows. Sprinkle talc around holes then check next morning for disturbance and tracks. **Note: rain and strong wind can mask the mouse tracks and this method does not tell how many mice are present in each active hole.**

Sprinkle talc around holes

Undisturbed talc (inactive)

Disturbed talc(active overnight)

• Informing neighbours and agencies

Communication through the neighbourhood 'grape vine' helps everyone appreciate the risk within a district.

IT IS NOT A CRIME TO ADMIT TO HAVING MICE!

Growers should contact their local district agronomist, rural merchant or government agency if mouse populations increase. This information is relayed to relevant authorities, media, bait manufacturers and other agronomists to raise awareness and preparedness.

EARLY WARNING ENABLES EVERYONE TO BE PREPARED.

4. MOUSEOFF® Zinc Phosphide Bait

• What is MOUSEOFF® ZP?

MOUSEOFF® ZP is manufactured from graded, cleaned, certified and sterilised* wheat, coated with zinc phosphide (25 g/kg) and mixed with oil attractants. Zinc phosphide is a grey/black powder and the bait is correspondingly grey. (Note: occasional variations in darkness of grey colour do not indicate changes in strength).

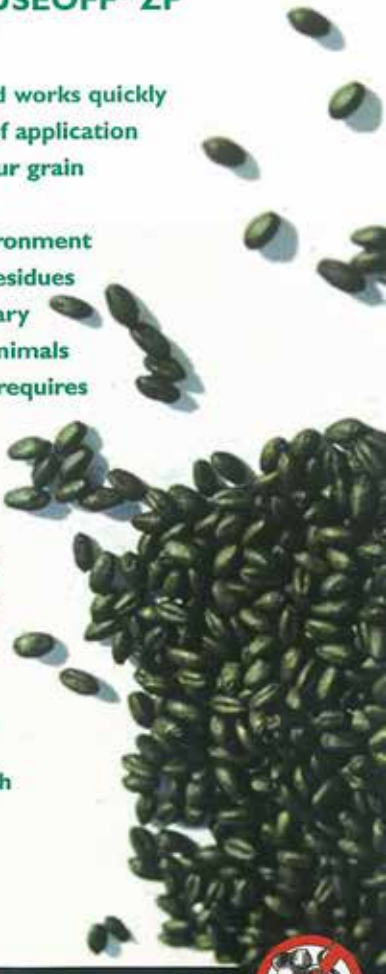
* Sterilisation prevents germination of the poisoned wheat and any potential weed seed contaminants.

MOUSEOFF® ZP IS FULLY APPROVED FOR CONTROL OF MICE IN BROAD-ACRE CROPS.

• Features of MOUSEOFF® ZP

MOUSEOFF® ZP:

- **is highly effective and works quickly**
- **requires a low rate of application**
- **is used by many of our grain trading partners**
- **degrades in the environment leaving no harmful residues**
- **presents low secondary risks to non-target animals**
- **is easily applied and requires no mixing**
- **is stable at room temperature for several years**
- **works in newly sown and developed crops**
- **is a low cost broad-scale bait**
- **is Australian Made**
- **can destroy more than 30 mice for each cent spent on bait.**



• How does MOUSEOFF® ZP work?

MOUSEOFF® ZP acts rapidly. When a mouse eats a poisoned grain, a tiny quantity of toxic phosphine gas is released in the acidic conditions of the mouse's stomach.

$$Zn_3P_2 + 6H^+ \rightarrow 2PH_3\uparrow + 3Zn^{++}$$

Zinc phosphide + acid → phosphine gas + zinc

Phosphine is rapidly absorbed by the stomach and quickly acts by depressing the central nervous system and by inhibiting the liver, diaphragm and brain of the mouse. Mice die within hours of ingestion of just a single grain.

USUALLY GREATER THAN 90% CONTROL IS ACHIEVED WITHIN 1-2 DAYS OF BROADCAST APPLICATION.

If there is plenty of alternative food available it may take a little longer for mice to find the bait.

Re-treatment may be necessary where there is a large amount of alternative food, where mice rapidly reinvade from untreated areas or where there are localised high densities ('hot spots') of mice.

Dead mice dug out of burrow following MOUSEOFF® ZP application

• What happens to the mice?

Most mice die underground. This can be confirmed by excavating holes to find carcasses or by rechecking burrow activity after baiting. Birds and other scavengers quickly take the few mice that do die on the surface so few dead mice are seen. The dead mice are not toxic to scavengers.

• Where is MOUSEOFF® ZP available?

MOUSEOFF® ZP is a Schedule 7 poison product. It is available in all States from approved rural merchant stores, some government agencies and some contractors. When there is no demand for the bait the stores generally do not hold stock, so allow a few days for delivery and give early warnings of requirements. Some states require an Agricultural Users Permit (ACUP) to purchase, possess and/or use MOUSEOFF® ZP.

MOUSEOFF® ZP is available from rural merchants

DO NOT LEAVE IT UNTIL THE LAST MINUTE TO BUY BAIT .

• How is MOUSEOFF® ZP packaged?

MOUSEOFF® ZP is available in 125 kg epoxy-lined steel drums with ring closure lids and in 15 kg plastic pails with tamper-evident lids.

• Are there special conditions for transport?

MOUSEOFF® ZP is **NOT** classified as a dangerous good (DG) for transport and can be carried on normal trucks and utilities without special signage. Transport or storage in enclosed vehicles or spaces is not recommended due to a small quantity of phosphine gas trapped in the headspace of the container.

• How long does stored bait remain active?

MOUSEOFF® ZP is stable for several years provided it is stored dry at less than 40°C in original packaging.

BAIT IS EASILY OBTAINED FROM RURAL DISTRIBUTORS, SO STORAGE ON FARMS IS NOT NEEDED. ONLY SUFFICIENT BAIT FOR IMMEDIATE USE SHOULD BE PURCHASED.

5. Tips for using MOUSEOFF® ZP

• How much MOUSEOFF® ZP is required?

Regardless of the stage of crop development, type of crop or number of mice, the prescribed application rate is 1 kg/ha. A single grain is lethal to a mouse and application at this rate has the theoretical potential to kill over 25,000 mice/ha or about 2-3 mice per square metre.

However, some mice may have time to eat several grains before being killed by the first grain eaten. Thus, the 1 kg/ha application rate provides for control of gluttons and high local densities of mice in most circumstances.

• How is MOUSEOFF® ZP applied?

MOUSEOFF® ZP is broadcast by ground spreaders or aircraft. Usually ground spreading is best suited to small areas and newly sown crops whereas aerial application is recommended for larger areas and developed crops. Most aerial contractors are approved and equipped for MOUSEOFF® ZP application. **Do not apply the bait in heaps or trails.**

Many ground spreaders are suitable. It is important to ensure that spreaders can evenly apply at the rate of 1 kg/ha.

Calibration can be checked by driving the ground spreader over a tarp at a set speed. Count the number of grains spread on tarp.

• When should MOUSEOFF® ZP be used?

Where mouse numbers are high, or significant mouse damage to crops is threatened, baiting provides the only effective means of mouse control.

MOUSEOFF® ZP can be used to reduce mouse numbers before or after sowing and at any stage of crop development up to 2 weeks before harvest.

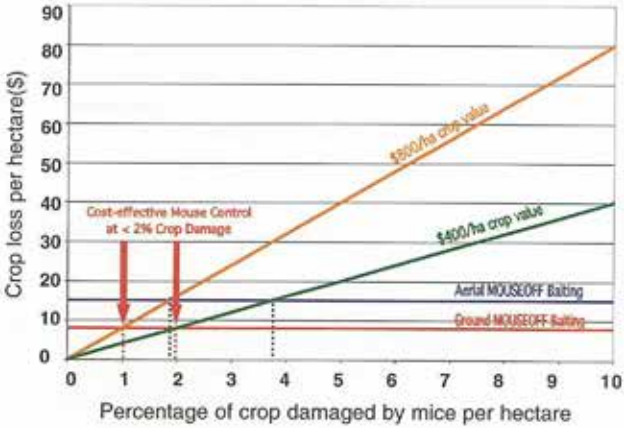
THE DECISION TO BAIT IS RELATED MORE TO THE RISK OF CROP DAMAGE THAN TO ABSOLUTE NUMBERS OF MICE.

Landholders should balance the cost of baiting against the expected crop loss, taking into account grain price and yield. Crop damage can occur with moderate densities that are sometimes ignored.

BE AWARE OF MICE AND INITIATE CONTROL ACTIONS EARLY, BEFORE CROP DAMAGE OCCURS.

The benefits of ground application of MOUSEOFF® Zinc Phosphide exceeds the costs of application if crop damage exceeds 1-2%.

Benefits of Ground Applications of MOUSEOFF® Zinc Phosphide



If a crop is worth $800/ha, then only 1% of the crop needs to be at risk before the cost of baiting is recovered. If mice threaten 10% of the crop, the benefit is 10 times the cost.

• Does rain affect bait?

MOUSEOFF® ZP remains active for several days even after dew or light rain. However, bait application should be delayed if heavy or sustained rain is forecast.

• Where can MOUSEOFF® ZP be used?

MOUSEOFF® ZP may be broadcast in crops, pasture and ploughed land.

MOUSEOFF® ZP is **not** approved for use in towns or residential areas or around farm buildings. Slower acting anticoagulant (blood thinning) bait, such as MOUSEOFF® Bromadiolone Rodent Bait, can be used in bait stations around and within farm buildings.

Most anticoagulant baits are not suitable for use in crops due to possible residues and non-target wildlife impacts. Check with your local agronomist.

• Is it sensible to apply bait just to 'hot spots'?

Baiting hot spots with MOUSEOFF® ZP is acceptable if they are well defined and localised. However small baited areas are more likely to be re-infested quickly from surrounding areas. As with most pest animal management, it is preferable to achieve large areas of control for best protection from reinvasion.

• What can be done with empty containers?

Containers are **not** returnable. There is an oily smear containing traces of zinc phosphide left in empty containers. Plastic pails must **not** be reused and should be disposed of in accordance with label instructions. Drums can be re-used for non-food applications after very thorough cleaning using high-pressure soapy water. Allow to stand full of soapy water for at least one day and triple rinse. Contaminated equipment can also be cleaned using warm soapy water. Spilt bait should be swept up immediately and buried.

• Safety directions for MOUSEOFF® ZP

Although zinc phosphide is very toxic if consumed, the diluted bait has no dust, is slow to react, has only 2.5% zinc phosphide on the grain and is well packaged.

STRICT SAFETY PROCEDURES HAVE BEEN DEVELOPED TO AVOID HAZARDS DURING HANDLING OF BAIT. THESE ARE PROVIDED IN DETAIL ON THE PRODUCT LABEL.

Zinc phosphide is **not** an irritant and is **not** readily absorbed through skin, however users must wear protective clothing including PVC or nitrile gloves and overalls when handling bait. Wash off ZP residues with soap and water if contamination occurs.

Phosphine gas is poisonous. A small quantity of phosphine gas is trapped in the headspace of containers, and people handling bait should avoid breathing the gas (garlic-like odour). It is imperative that containers are only opened outdoors where the gas can dissipate. The gas trapped in containers dissipates within seconds of opening and degrades in air. However, the momentary concentration exceeds the allowable limits for phosphine, therefore users must wear full-face respirators, fitted with gaseous and particulate filter cartridges conforming to AS1715, to prevent exposure.

If accidental poisoning occurs contact your

POISONS INFORMATION CENTRE

13 11 26

MOUSEOFF® ZP does **not** require placement of signs on access points to treated properties or notification of neighbours. However, good neighbourly etiquette is to let others know. This may also encourage large-scale treatment on a number of farms providing better protection from reinvasion.

6. Environmental Considerations

• Protecting the environment

Zinc phosphide is especially suited to broad-scale management of rodent infestations. Many product features combine with strict baiting criteria to minimise risks to non-target animals as follows:

- the grey/black bait colour is not attractive to birds and is difficult to find after application
- bait slowly and completely degrades when exposed to moisture containing acid. Weak acids may come from soils or from the dissolution of carbon dioxide from the air into rainwater. Zinc phosphide also oxidises to harmless zinc phosphates and phosphites over time, there are no harmful residues in soils or waterways

Black bait grains are hard to find but easily smelt by mice

- zinc phosphide is not taken up by plants so there are no crop residues
- zinc phosphide does not build up or concentrate in animals or the environment
- the bait rapidly degrades in stomach acid and in the carcasses of poisoned rodents so the risk of secondary poisoning is very low
- a high proportion of mice die underground
- the risk of direct consumption of bait by non-target animals (including livestock, native animals,birds and pets) is minimised by the even application of 1 kg/ha and rapid consumption by mice at night
- small, non-lethal doses of zinc phosphide cause some larger animals to vomit and avoid further exposure (Note: rodents cannot regurgitate)

Extensive surveys have confirmed very low risk of non-target impact if MOUSEOFF® ZP is applied as per label instructions.

• Distance restrictions or withholding periods

Application of bait is **not** permitted in areas that have not been planted, cultivated or do not possess ground cover or that are within 50 m of wildlife habitat refuges.

The withholding period before harvest or grazing stubble treated with MOUSEOFF® ZP is 14 days.

7. Are alternative chemicals safe for crops?

Zinc phosphide is an approved rodenticide for mouse control in broad-acre crops.

Use of chemicals such as strychnine or organophosphates would threaten export markets if residues were found in grain products. It is illegal to use these chemicals to control mice in crops and it is hazardous to the environment. Often their effectiveness and palatability is unproven.

ALL LANDHOLDERS AND DISTRIBUTORS ARE URGED TO ACCEPT THEIR ROLE AND RESPONSIBILITY FOR SENSIBLE AND APPROPRIATE APPLICATION OF MOUSEOFF® ZP.

Strict adherence to directions will ensure continued availability of broad-acre control for large-scale mouse infestations.

If any aspect of usage is in doubt, please contact your merchant agronomist or Animal Control Technologies.

ACTA products for large-scale pest animal management available through agencies and/or leading rural merchant stores:

FOXOFF®
Fox Bait
For the control of foxes

SLUGGOFF®
Slug & Snail Bait
For the control of snails & slugs in the home garden

FOXSHIELD®
Fox Bait
Fish based bait for fox control

DEN-CO-FUME®
Fumigation Cartridges
For the control of foxes in natal dens

DOGGONE®
Wild Dog Bait
For the control of wild dogs

RABBAIT®
1080 Oat Bait
For the control of rabbits

RABBAIT®
Pindone Oat Bait
For the control of rabbits

MOUSEOFF®
Zinc Phosphide Bait
For the control of mice in crops

MOUSEOFF®
Bromadiolone Grain Bait
For the control of rats and mice

RATTOFF®
Zinc Phosphide Bait Sachets
Reducing rat populations in sugarcane crops

MOUSEOFF®
Bromadiolone Rodent Block
For the control of mice and rats in domestic, commercial & industrial buildings

PIGOUT®
Feral Pig Bait
For reductions in feral pig populations

FOXECUTE®
PAPP Fox Bait
For the control of foxes

DOGABAIT
PAPP Wild Dog Bait
For the control of wild dogs

Animal Control Technologies Australia Pty Ltd
Phone: 03 9308 9688 Fax: 03 9308 9622
Email: enquiries@animalcontrol.com.au
More info at www.animalcontrol.com.au

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