FINAL REPORT

GRDC
GRAINS RESEARCH & DEVELOPMENT CORPORATION

ABT00002

Improving knowledge on best practice use of zinc phosphide for in-crop mouse control

PROJECT DETAILS

PROJECT CODE:	ABT00002
PROJECT TITLE:	IMPROVING KNOWLEDGE ON BEST PRACTICE USE OF ZINC PHOSPHIDE FOR IN-CROP MOUSE CONTROL
START DATE:	01.07.2002
END DATE:	01.07.2005
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Summary

Animal Control Technologies Australia developed MOUSEOFF® Zinc Phosphide Bait# to provide the grains industry with an effective, safe and cost effective mouse control option. The product can be used at all stages of crop growth to reduce the development of 'plague' mice populations. During the emergency use permit phase of the project, inaccurate information was disseminated and it was clear that growers had been conditioned to reaction rather than pro-action on mouse management. This project was developed to provide quality information and training on mouse management in crops, and to ensure 'best practice' use of the product and chemical in order to save the industry millions of dollars annually in crop losses due to mice.

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Old or Archival Reports (Projects that concluded in 2007 or earlier)

The information contained in these older reports is now several years old, and may have been wholly or partially superseded or built upon in subsequent work funded by GRDC or others. Readers should be aware that more recent research may be more useful for their needs. Findings related to agricultural chemical use are also potentially out of date and are not to be taken as a recommendation for their use.

Conclusions

This project aimed to transfer knowledge about pro-active mouse management, MOUSEOFF® Zinc Phosphide Bait#, the zinc phosphide chemical itself, and therefore achieve good product stewardship and appropriate product use to a variety of agencies and individuals responsible for pest animal management in crops. The project was considered to be successful in 'training the trainer' and thus provided a greater depth of knowledge at all levels of industry.

Increased awareness and understanding of the use of zinc phosphide to prevent crop damage by mice has been achieved based on 'best practice' principles including monitoring, planning, implementation and evaluation.

The project complemented several GRDC Crop Protection Programs including Program 3: 'Development and Support for Crop Protection, Education and Training' and also Program 6: 'Product and Service Delivery Seminars/Training/Adviser Updates' and 'Alliances with the Private Sector for Information Distribution'.

As a result of this project, increased knowledge and information transfer regarding mouse management are likely to prevent future serious losses in broadacre crops. This will therefore reduce potential economic burdens on crop growing communities throughout Australia.

Recommendations

Recommendations regarding the pro-active management of mice within crops have been developed after consultation with rodent and pest animal management experts. These recommendations have been incorporated into a comprehensive 32 page MOUSEOFF®# booklet, which details integrated pest management (IPM) strategies, the benefits of and techniques for on-farm mouse monitoring, and the best practice use of MOUSEOFF® Zinc Phosphide Bait# for mouse control in crops.

Other recommendations have been incorporated into the professionally developed MOUSEOFF® DVD/video, as well as in the finalised workshop package, presented in CD ROM format.

The key recommendations from this project relate to monitoring and early implementation of control techniques to achieve pro-active management of mouse populations in crops. This ensures that numbers are treated at low levels before the onset of significant damage, thereby reducing the economic impacts on growers throughout the grain growing regions of Australia.

While significant progress has been made, there is further opportunity for the GRDC to continue to assist in mouse management education through timely reminders in existing industry communication channels (Ground Cover, TopCrop, etc.) and the rural press. Such actions may cost relatively little but could assist in saving millions of dollars in crop losses.

Additional booklets could be distributed directly to growers in South Australia (SA), New South Wales (NSW), Queensland (Qld) and Victoria (VIC) if GRDC was to sponsor a mailout and additional printing. This would provide a good publicity

opportunity for GRDC and further increase the value of work already carried out in this project.

Outcomes

The main benefit to grain growers from this project is improved dissemination of accurate knowledge about the correct and appropriate application of zinc phosphide# bait for control of mice in vulnerable crops, as well as the distribution of improved up-to-date advisory information and improved training of farm advisers at several levels. This information will aid in economic decision making by growers to ensure that crops are not lost to mouse infestations, as has occurred in the past.

The new information booklet and companion DVD/video now form the basis of an entirely new approach to mouse management that moves away from reactive management of 'plagues' to pro-active monitoring, risk assessment and early intervention in emerging mouse 'infestations'.

Recognition of the impact of modest mouse numbers on high risk phases of the crop cycle has been greatly increased at the government, semi-government (e.g. Rural Lands Protection Boards (RLPBs)), merchant and private agronomy levels of farm advisory services. However, further provision of information to individual growers by advisers will be improved by the availability of a slideshow and accompanying notes on CD-ROM format. The CD-ROM has been distributed to all advisers who attended the workshops. The project has achieved its objective of 'training the trainers' and hopes to aid these trainers in transferring the message to their clients. Key growers in each district were also directly involved in the seminar program, while information regarding monitoring mice and using zinc phosphide bait to reduce mouse densities before 'plague' situations developed was also delivered directly to growers through the rural press and existing grains industry newsletters.

Overall, the information provided has prevented development of inaccurate communication on mouse management and baiting, and has alerted the industry to the effectiveness and necessity of the new technology for early intervention to reduce economic crop losses due to mouse infestations. This will result in a more structured, and less *ad-hoc* approach to mouse management over coming decades, while the adoption of the zinc phosphide mouse control technology will save millions of dollars worth of potential crop losses.

Economic outcomes are estimated at between $10 and $100 million yearly (depending on mouse activity).
The mouse problem has been solved with no crop or environmental residues nor significant risks to non-target wildlife.
The social concern and economic damage from severe mouse infestations have been solved with a long term cost-effective solution that is directly available to the affected farming sector.

Achievements/Benefits

Mouse infestations pose a significant and increasing threat to broadacre crops throughout Australia. The development of a readily available zinc phosphide# bait (MOUSEOFF®#) provides the most cost-effective control option to reduce crop damage caused by mice. However, registration and uptake of the product had progressed well ahead of industry training. Since its introduction in 1997, the MOUSEOFF® rodenticide has saved more than $300 million of crops under threat of mouse damage. Despite this success, research knowledge about the product and the active ingredient (zinc phosphide) remained largely confined to a number of scientists and agency leaders with direct experience of mouse management or who contributed to the development of zinc phosphide as a mouse toxicant. Proper communication and extension of research and technical innovation were required for this new technology to be used and adopted effectively in the long term.

Not only was there limited knowledge of control options for mice in crops, but discussions at all levels of pest mouse management indicated a lack of recognition of the damage to crops caused by moderate or low infestations of mice. Historically, mouse management was based on late reaction to large 'plagues', where control actions were implemented after significant crop damage had occurred. As part of this re-active management, mouse damage to crops was recognised very late, and often substantial damage was tolerated or even unnecessarily expected before control options were implemented. This approach was very expensive for growers, as significant crop losses were experienced, crops often required re-sowing, and large quantities of product were needed to eliminate the high populations of mice within the crops.

This project was therefore initiated to promote information transfer and training for the management of mouse infestations using MOUSEOFF® at several industry levels, and to attempt to establish a pro-active approach to mouse management in crops that reduces the economic impact of this pest species.

Before this project was implemented, agronomist information about the MOUSEOFF® product, the mode of action of zinc

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phosphide and the impact of mice in crops was relatively limited. This GRDC-sponsored extension and training project systematically allowed for the transfer of up-to-date knowledge at a greater organisational depth to a range of key participants including a) growers, b) agency staff, c) government and private agronomists, d) merchant agronomists e) aerial contractors, and f) environmental groups, all with an interest in mouse management in crops nationally.

One of the most important techniques that needed to be promoted was on-farm monitoring of mouse numbers as a way of encouraging pro-active management while populations were still relatively low. This reduces the potential impact of mice damage in crops, and therefore eliminates the need for re-active management (as has historically occurred), where an attempt is made to control mouse populations that are in 'plague' proportions. The transition from re-active to pro-active mouse management has resulted in control options being applied to eliminate low population numbers before the entire crop is lost.

A major component of this project therefore was to provide information and promote methods for on-farm mouse monitoring and tools for decision making in the event that mouse problems arose at critical times of crop development. This extension and training were conveyed to participants through a workshop program that was regularly updated and revised after each presentation (as a result of feedback from participants) to ensure that the most appropriate and relevant information was being disseminated to workshop participants.

Workshops were conducted in major grain-growing regions throughout Australia including Dalby, Theodore, Capella and Jambin (Queensland), Launceston and Hobart (Tasmania), Walpeup and Horsham (Victoria), Bellata, Narrandera and Trangie (NSW), and Kadina, Wudinna and Lameroo (South Australia). These workshops were aimed at key growers, as well as those advisers who can assist in providing decision assistance for growers on pest animal management, particularly mice. Therefore, other workshop participants included trained agronomists (government, private and merchant), aerial contractors and state pest animal control agencies.

Involvement of participants from the merchant system was considered to be beneficial to provide good product stewardship for MOUSEOFF® throughout the supply chain and to substantially increase the advisory resource to growers. Training these advisers is expected to reduce the misuse and misinformation that could potentially threaten the long-term availability of zinc phosphide, particularly if merchant staff, contractors and farm advisers are well trained and linked effectively to local state agency staff.

In addition to the workshops, other extension tools were updated and introduced into the training package. The comprehensive MOUSEOFF® booklet, (which details the Integrated Pest Management (IPM) principles that can be applied throughout the year to reduce the potential for mouse population numbers to rise, as well as techniques for on-farm monitoring, and best practice use of MOUSEOFF® as a control option), was updated after consultation and review by a panel of 19 rodent specialists and land managers with experience regarding mice in crops. This collaborative approach enabled the consolidation of new knowledge and extension information, and 70,000 copies of the revised booklet were produced for distribution.

Other resources were developed including a Farmer Alert and Back Pocket Guide that were drafted and distributed to the GRDC for publication. A professional DVD/video training tape was also distributed to all workshop participants. A comprehensive CD ROM incorporating each updated training module was produced and distributed at the completion of the workshops to allow for subsequent presentation of the training seminar by agronomists and other advisers. Fluorescent 'mouse monitor' pads were also distributed to encourage early recognition of emerging mouse infestations.

This project has achieved the aims of moving the mouse management principles away from a re-active 'crisis' approach to a more pro-active approach based on earlier recognition of emerging problems and a more systematic and integrated approach to evaluating and solving these problems. Improved recognition of damage caused by even modest numbers of mice at the various stages of crop development, and encouragement of on-farm monitoring of both mice and crop damage have reduced the economic significance of this pest species in broadacre crops throughout Australia.

Other research

A poster detailing the achievements of the project as an information dissemination technique to encourage and educate on the best practice management of mice in crops was presented at the 13th Australasian Vertebrate Pest Conference held in

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Wellington, New Zealand in May 2005. The poster generated considerable interest from conference participants, particularly as a success story in relation to the transfer of information throughout the advisory services and farm management chains, as well as directly to end users (growers). Other land management bodies involved with pest animal management and control (such as the Department of Conservation, New Zealand), were interested in using similar approaches and techniques to transfer knowledge regarding invasive animals (including rodents) and the options available for control of these species.

Intellectual property summary

The workshop package on best practice mouse management in crops is the joint property of GRDC and ACTA, but recognises the inputs of participating organisations. The seminar package has copyright to offer some control over misuse or unauthorised replication, although it is understood that the end objective is to ensure the package is widely available to groups or organisations that have a role in ensuring best practice control of mice. Therefore, access to the package will not be unreasonably restricted.

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