INTEGRATED SYSTEM KEY TO RODENT CONTROL IN ORCHARDS

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Crop loss resulting from rodent damage is a big issue for the macadamia industry. In high pressure years, losses of up to 30 per cent of the crop, caused mainly by rats, have been recorded in Australian orchards. Research has shown that the rat (Rattus rattus) is responsible for more than 95 per cent of all rodent damage in orchards and that there is a complex interaction between rats and the orchard system.

Rats in the orchard

Early research identified that rats used resources based on relative availability, so they fed in trees while nuts were developing as well in non-crop habitats. During nut fall (from May to September), they relocated and took fallen nuts to non-crop habitats and burrows. Importantly, rats never just depended on macadamia resources, rather they supplemented their diet with alternative non-crop resources throughout the year.

In recent years, however, the dynamics of rat populations in orchards has changed as they have started nesting in trees permanently, rather than foraging from non-crop habitats next to orchards. This change has been driven by changes in structure and resource availability in the orchard, particularly the introduction of new cultivars which maintain nuts longer in the tree, and modifications in cultural practices which influence non-crop resource availability in the orchard.

Historical management

Traditionally, rats have been managed in the orchard using mortality-based approaches such as baiting, fumigation of burrows and trapping. While these methods kill rodents, alone they do little to suppress populations and ultimately reduce crop losses. This is why an integrated management system is important. Effective rat management must consider the complex crop/pest interactions that occur throughout the orchard system and be designed to reduce population numbers before there are significant crop losses.

An integrated rat management approach incorporates: effective monitoring, habitat modification, resource (crop and non-crop) management and mortality-based control. When combined, such an approach results in cost-effective rodent management.

Rats can cause substantial losses in the orchard. Photo: Ken Dorey

Management recommendations

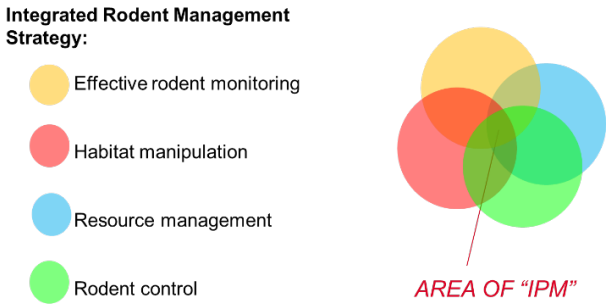
Management must be based on a season-long strategy that focuses on reducing the attractiveness of the orchard system to rats by minimising the availability of alternative food resources and nesting sites. It is also important to monitor the orchard regularly so you can quickly react to outbreaks and manage populations before they do too much damage. These recommendations are not prescriptive, rather are a guide to growers to help you minimise crop losses because of rat infestations.

Season long. It is imperative that neighbouring non-crop habitats are effectively managed and maintained. Riparian zones, headlands, property boundaries and wind rows must be kept clear of weedy, non-crop vegetation, e.g. grasses, lantana and wild tobacco, which provide a food and nesting sites for rats. An option is to revegetate these areas to species that do not support rats, e.g. rainforest species.

Maintaining inter-row nature strips to reduce cover and alternative food resources and encourage natural predators

such as owls is another important strategy. These nature strips can also be established and maintained so they encourage beneficial insects. If rat activity is observed in these refuges, baiting or trapping programs should be undertaken. Once the pollination period is over, refuges may be slashed and only reestablished when required (before flowering).

It is also recommended that trees be skirted to open the orchard system, which allows access for natural predators and reduces canopy access for foraging rats.



An effective rat management strategy incorporates monitoring, habitat modification, resource management and mortality-based control.

Harvest. Harvest regularly to minimise nut on the ground. This is particularly important from May through September, the period when rats have been shown to remove nuts from the orchard floor. At the end of each harvest season, remaining nut on the ground should be mulched as soon as practicable to ensure there is nothing for rats to feed on.

New plantings. The impacts of rodents should be considered when establishing new plantings. Studies have shown that certain varieties are more susceptible to rodent damage because they have characteristics such as thinner shells and prevalence of stick tights.

Using these varieties is not being discouraged, rather it is a good idea to plan and consider where higher risk varieties could be best planted and how rats can be managed in blocks that contain them. Block design is doubly important as the inability to harvest and manage blocks resulting from poor weather is often a precursor to high rodent damage.

Baiting and burrow management. Baiting should be undertaken strategically, targeting known areas of rodent activity in the orchard. Rather than spreading limited baiting resources around the entire orchard, focus on key blocks that historically have been more affected by rat damage.

Early in the season, when rodents are known to be feeding in the tree (January to May), target baiting programs at trees because baiting on the orchard floor reduces effectiveness. When there are fewer nuts in the trees and more on the ground (May through to final harvest) target baiting programs at the orchard floor.

Inter-row nature strips that also act as beneficial insect refuges are an important part of rat management.

Bait stations are essential. They are not only a legal requirement of registered bait products but are essential to increase bait take and maintain bait freshness. Secure baits in bait stations and make sure they are kept off the bottom of the station using the securing rods provided. If there are no securing rods, use a wire tie.

Where there are ground burrows, eradicate the rats before disturbing or ripping them. Burrow fumigation (e.g. carbon dioxide) and baiting have been shown to be effective. When baiting, use baits that will not fill burrow entrances, as block baits will be expelled from burrows and made available to non-targets. Using suitable registered dusts or grain baits is considered the most suitable approach.

More Information

For more information on this topic visit the Australian macadamia industry website www.australianmacadamias.org/industry or contact the Industry Development Manager at the AMS on 1800 262 426.

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