TORTRICID PESTS WITHIN MACADAMIA ORCHARDS leading control initiatives

Pioneering the control of macadamia nut pests in SA.
By **Rob Elfick**

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MNB Damage

Effective control of macadamia nut pests in SA involves addressing the Macadamia Nut Borer (*Thaumatotibia batrachopa*) and the False Codling Moth (*Thaumatotibia leucotreta*). Both belong to the Tortricidae family and are collectively known as the "tortricid moth complex", due to their overlapping life cycles and detrimental impact on macadamia nut crops.

During its destructive larvae stage, the Macadamia Nut Borer damages nuts by burrowing into the husk and nut, rendering them unsuitable for market. Similarly, the False Codling Moth poses a substantial threat to macadamia nuts and various fruit crops in SA. Its larvae tunnel into the nut/fruit, causing extensive damage and rendering it unmarketable.

Effectively managing these pests involves monitoring their populations, utilising pheromone traps for adult moth detection, and applying appropriate insecticides, or employing mating disruption at targeted times. Integrated pest management (IPM) practices, which encompass biological control agents, cultural practices, and chemical control, are crucial to reduce reliance on chemical treatments.

These moths collectively threaten macadamia nut production in SA, necessitating vigilant monitoring and effective management strategies to minimize crop losses. Growers should embrace IPM strategies and stay abreast of the latest research to combat these pests, safeguard their macadamia nut crops, and promote sustainability.

At River Bioscience our steadfast commitment revolves around upholding high-quality standards and offering sustainable crop protection solutions to our valued growers. Through extensive research, development, and innovation we have introduced two new products during this season, MultiMax and *Trichogrammatoidea cryptophlebiae*, designed to combat the tortricid pests. These products, produced locally at our facility, are the result of dedicated efforts by our team of scientists and researchers, featuring a patented virus to ensure effective pest control.

Our solution for the tortricid pests for macadamias

MultiMax™ is a novel patented biopesticide that is effective against tortricid larvae, including Macadamia Nut Borer, False Codling Moth, and Litchi Moth.

It provides growers with a less risky, effective, virus-based pesticide for population control. Population knockdown reduces pest pressure and limits infestation as fruit and nuts become more susceptible to larvae of tortricid moths. Maintaining a low population of tortricid pests throughout the season ensures the risk of infestation is limited as far as possible, heading up to key susceptible periods.

Trichogrammatoidea cryptophlebiae is a biological product that contains *Trichogrammatoidea cryptophlebiae*, an effective egg parasitoid of moth eggs.

Trichogrammatoidea cryptophlebiae are tiny beneficial wasps that have the potential to reduce moth populations in orchards through the effective parasitism of moth eggs. This biological control agent can be used as a component in IPM programmes that seek to suppress infestations. The incorporation of *Trichogrammatoidea cryptophlebiae* in IPM programmes can help growers decrease pest incidence and crop loss with minimal use of synthetic chemistries, thus maximising their crop production and increasing their financial gains.

Macadamias

IPM practices are crucial, to reduce reliance on chemical treatments.

MultiMax™ is also a nucleopolyhedrovirus (NPV) that serves as a biological control agent in agriculture by infecting and eliminating pest larvae. Nucleopolyhedroviruses are highly specific to a particular insect species, ensuring they pose no threat to non-target organisms, including humans and animals. Once applied to the crop, MultiMax™ is ingested by targeted larvae from the fruit/nut surface. Within the larva's digestive system, the protective protein layer of the virus is digested, allowing it to replicate within the host cells, ultimately causing the destruction of the larva tissues. As infected larvae perish, they release virus particles, leading to secondary infections in the surrounding environment.

Trichogrammatoidea cryptophlebiae involves the introduction of beneficial wasps into orchards, which parasitise moth eggs. This process encourages the Trichogramma population, perpetuating the cycle of parasitism and reducing pest numbers. Trichogramma wasps lay eggs inside tortricid moth eggs within the orchard. The developing Trichogramma larvae consume the moth egg internally, leading to the emergence of adult wasps and repeating the parasitic cycle. Multiple Trichogramma releases assist in keeping populations of the beneficial wasp high in the orchard, which results in continuous availability to provide biocontrol.

Combining NPVs with beneficial insects like *Trichogrammatoidea cryptophlebiae* generates a synergistic effect on pest control. As the NPV-infected pest population declines due to virus-induced mortality, the available prey for beneficial insects also diminishes. Consequently, the beneficial insects intensify their search for pest eggs to parasitise, further reducing the pest population and minimizing infestations.

Overall, employing nucleopolyhedroviruses alongside beneficial insects presents a sustainable and eco-friendly approach to agricultural pest management. This strategy harnesses natural predators while precisely targeting specific pest species. Integrated pest management involving these methods reduces reliance on chemical pesticides, fostering a more balanced and sustainable ecosystem within agricultural systems.

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