Almond IPM: Monitoring carpophilus beetle in almonds

INTRODUCTION

Pest monitoring is a critical component of IPM systems. It can provide growers with valuable information on the presence, distribution and population levels of pests, and on the impact of pest management activities. This update which includes findings from recent research, provides information on monitoring of carpophilus beetle and is intended to help growers obtain the best value from their monitoring efforts.

NUT SAMPLING

Summer sampling of new crop nuts

Samples of new nuts collected shortly before harvest provide useful information on the distribution of carpophilus damage across orchards. This can help growers plan the most appropriate harvest and post-harvest management of the crop, such as earlier harvest and prompt fumigation and/or processing to limit further damage in crops from more heavily infested blocks.

Sampling position is important

Nuts collected from the ground immediately after trees are shaken represent the entire crop throughout each tree, and so provide a good overall average of damage or infestation levels of any pest throughout the tree. Nuts collected from trees before harvest represent only those areas from which they are collected. Unless the samples include nuts from all areas of the trees, especially different heights in the canopy, the average damage level found in the samples may not reflect the true damage level of the crop.

Detailed sampling in two blocks in the SA Riverland and two in the Robinvale district during the 2020 harvest, showed the within-tree distribution of kernel damage by carpophilus beetle (Figure 1) to be the opposite of that for carob moth.

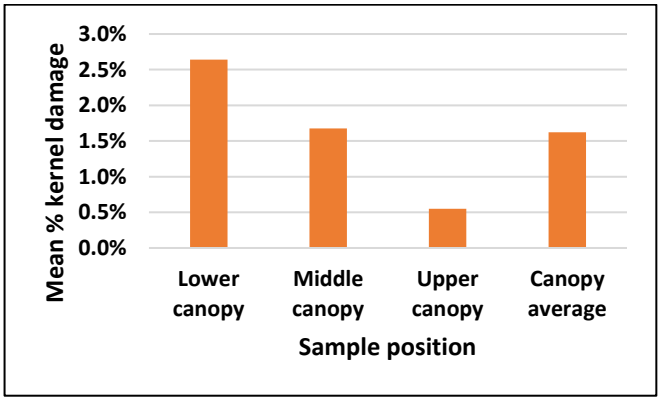

Figure 1. Variation in carpophilus beetle damage to almond kernels at harvest between various sampling positions.

While carob moth damage in new crops is concentrated in the upper canopy, damage by carpophilus beetle was clearly focussed in the lower canopy. The damage levels shown in Figure 1 are averages across the four blocks that were sampled. Actual damage levels in the lower canopies ranged from 0.75% to 6.1% and were 1.5 to 2 times the canopy average, meaning that samples collected only from the lower canopy (within reach of someone standing on the ground) would over-estimate the average level of crop damage by carpophilus beetle.

Take-home message: To determine carpophilus beetle damage levels in new crops, sample nuts from the ground after tree-shake, or ensure that the full height of the canopy is represented in samples collected directly from trees.

Timing of sampling is important

Carpophilus beetle infests almonds as soon as hull split occurs, and kernel damage increases rapidly until the nuts are harvested and disinfested or processed (Figure 2). Because of this rapid growth in damage, pre-harvest samples collected a considerable time (e.g. 2-3 weeks) before harvest may lead to a significant under-estimation of actual crop damage levels at harvest.

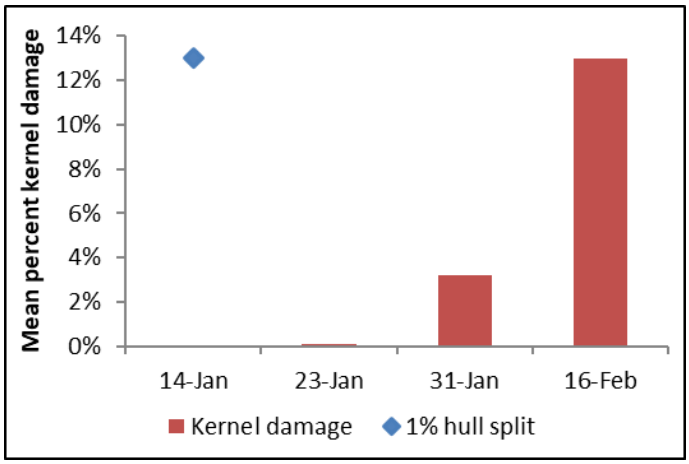

Figure 2. Growth in infestation and kernel damage in new nuts by carpophilus beetle over time.

Take-home message: Pre-harvest samples to determine damage levels from carpophilus beetle should be collected as close as practicable to the time of harvest.

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Winter sampling of mummy nuts

Sampling of old mummy nuts and leftover crop from the most recent harvest can be used to determine the levels of carpophilus beetle infestation being carried into winter. This may help orchard managers to target hygiene efforts towards the most heavily infested blocks.

Sampling position is important

Extensive sampling of mummy nuts from high and low in tree canopies, and from the ground, over two winters, found that a much greater proportion of nuts on the ground is infested with live carpophilus beetle, compared to nuts from low or high in the tree canopy (Figure 3).

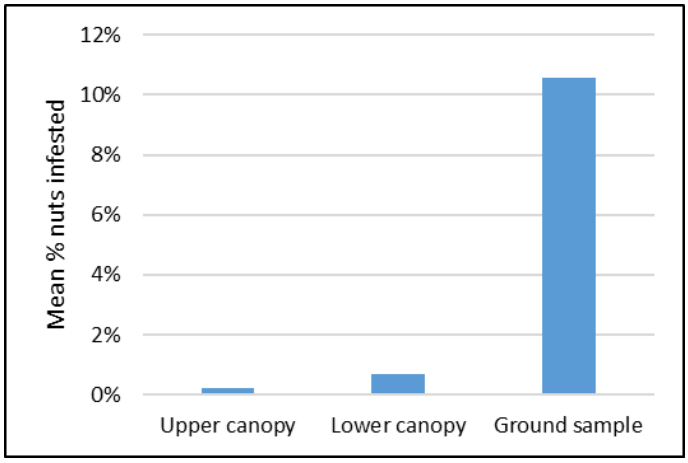

Figure 3. Variation in infestation of almond mummy nuts with live carpophilus beetle in winter, between various sampling positions.

Take-home message: When sampling mummy nuts for carpophilus beetle infestation in winter, collect nuts from the ground under trees rather than from the trees themselves.

BEETLE TRAPPING

Traps developed for use in stone fruit orchards use food odours and pheromones to successfully attract and kill the *Carpophilus* species that damage fresh stone fruit. When tested in almond orchards these traps were shown to be relatively ineffective in attracting the different *Carpophilus* species that damages almond kernels. Their use as a monitoring tool in almonds is complicated by the fact that they attract several *Carpophilus* species, not just the damaging species, so to be of real value the beetles trapped need to be identified to species level which is not a simple task. The traps are also labour-intensive to maintain. Research into improved traps for use in almonds is currently underway.

Take-home message: The carpophilus beetle trap for stone fruit is a relatively ineffective monitoring tool for use in almonds. Research is underway to develop an effective trap.

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