

A close-up photograph of a pistachio tree branch. The branch is covered with vibrant green, serrated leaves. Several clusters of pistachio nuts are visible, some appearing dark and mature, while others are lighter and less developed. The background shows more of the tree's foliage and a clear blue sky.

Orchard Sanitation for Pistachios

Craig Feutrill, PGAI PITGroup Coordinator

What is Orchard Sanitation?

- Orchard sanitation means the removal and destruction of all fallen nuts and the left over nuts on the trees – ideally after the second shake; nuts which are infected, damaged or decayed along with other parts of the plant. Orchard sanitation is often initiated during Autumn, through Winter to early Spring.
- Orchard Sanitation is an essential part of reducing pest and disease levels



This of course is an ideal solution in an ideal world

**Let's think
about 2011**

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Meet Anthracnose



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Meet Anthracnose



Australia Pistachio Disaster Hints at Agricultural Breakdown

Australia's pistachio farmers expected a bumper crop this year. Instead they had a harvest of horrors, with nuts blackened by a fungus that had never before caused an outbreak in pistachios. The culprit was anthracnose, a fungal disease best known for infecting mangoes. It raced through the industry, resulting in a harvest some 50 percent [...]

Anthracnose cracks Aussie pistachios

April 29 , 2011

Unexpected fungus decimates Australia's pistachio crop

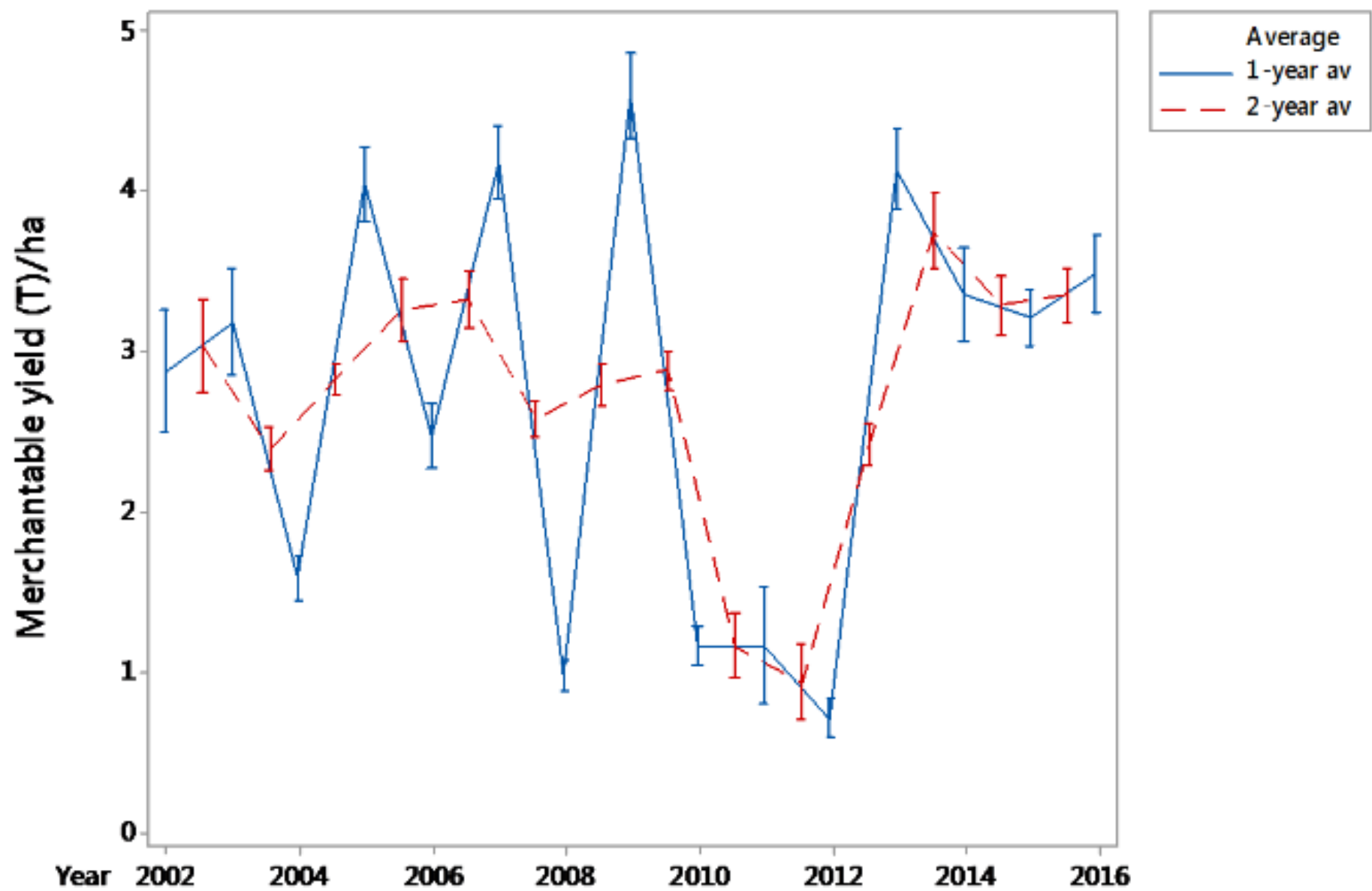
EARTH 29 April 2011

By [Wendy Zukerman](#)

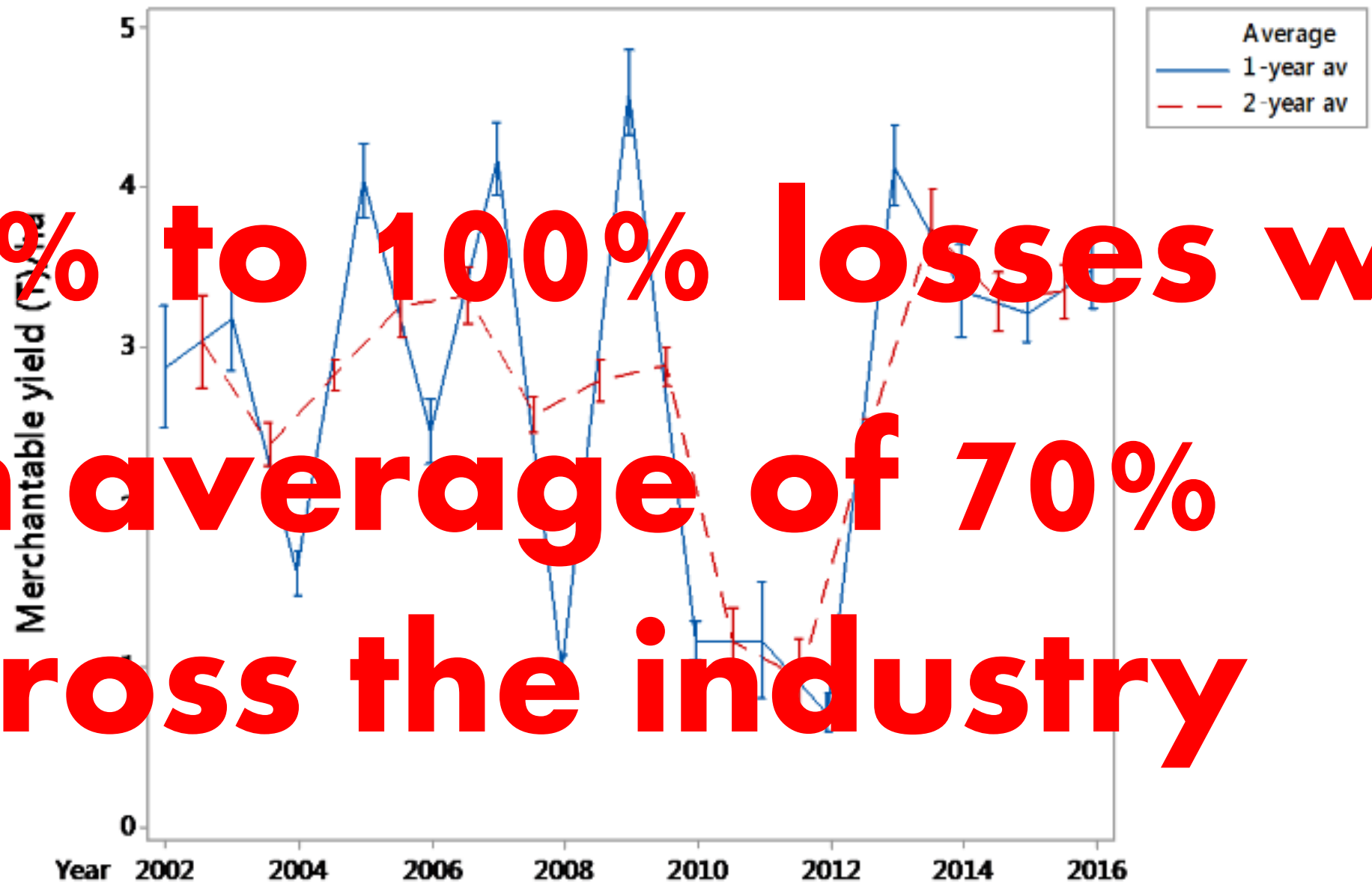
Australia's pistachio farmers were expecting a bumper crop this year, but a fungus has decimated the harvest. Curiously, it had infected the nuts only rarely until now. Is a genetic mutation or a spate of bad weather to blame?

Aussie pistachio industry to 'spray and pray' against disease

May 16 , 2011



40% to 100% losses with an average of 70% across the industry



- *Colletotrichum* spp. spores, frequent rain events and mild temperatures, trigger anthracnose epidemics.
- *Colletotrichum acutatum* survives over winter in pistachio buds, and in lesions on infected fruit, rachises, leaves and twigs that remain on the tree, or on the orchard floor.



Why Orchard Sanitation?

- Practicing good sanitation can be beneficial in reducing the disease causing pathogens or overwintering insects. Many organisms can survive for months or years on dead & decayed plant materials or in the soil which can cause infections in the subsequent years.
- Once good orchard sanitation practices are followed, these disease causing organisms can be reduced or eliminated further reducing the need for fungicides (or pesticides) thereby improving the effectiveness of disease management practices.

What Could Possibly Go Wrong Now?

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- Mango Shoot Looper



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- Navel Orangeworm (NOW)
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- New fungus/disease ? →
Pistachio Bushy Top Syndrome (PBTS)



Sanitation Practices you can follow:

This is very important, albeit expensive.

- **Re-shake** to remove all infected nuts and rachises.
- For Navel Orangeworm (NOW) in the USA, one of the greatest pest-control activities a grower can do is to shake. Research has shown the survival rate of NOW in mummies on a tree is three times greater than in mummies on the ground.
- Getting nuts out of crotches, another spot mummies will collect after harvest, is also an important winter sanitation activity. They have to get swept out, removed from the crotch and onto the ground. Many US growers use pruning crews to remove nuts from tree crotches.

Sanitation Practices you can follow:

- **Remove** mulch and/or incorporate under-tree debris (so fungus is not splashed from under canopy to lower limbs and leaves in spring).
- **Remove** diseased plant tissues from infected plants. Prune damaged branches several inches below the point of infection. Never leave diseased plant material in the orchard, as pathogens may continue to multiply by producing spores or other propagules.
- **Disinfect** tools used to prune, whether the limbs are damaged or healthy. Cutting blades should be dipped into a commercial sanitizer, 10% Lysol disinfectant, 10% bleach, or rubbing alcohol between each cut. This is especially important when pruning bacterial diseases. If using bleach, rinse and oil tools after completing work, to prevent corrosion.

Sanitation Practices you can follow:

- **Don't prune during rain.** It is not yet clear if a forced leaf drop (as with urea or zinc) and fungicide application after rain would deliver economic benefits in affected orchards.
- **Remove** weeds, including roots, which may serve as alternate hosts for pathogens.
- Above and below ground portions of severely infected trees should be completely removed and destroyed. Preventing the spread of pathogens to healthy trees and the elimination of inoculum from one season to another can help reduce the amount of fungicide needed in a given year.

Sanitation Practices you can follow:

- **Remove/mulch** all fallen nuts or mummies and prunings. Think 'clean up – clean out'.
- Winter sanitation is a tougher job in pistachio orchards than in almonds and walnuts. This reflects the smaller size of pistachio nuts. Pistachios are also harder to destroy. Due to their lighter weight (tan for example, almonds), they resist being sucked up and broken by the flail mower. The high air velocity of some equipment used to blow the tree berms free of trash and overwintering nuts can deposit some of them into the adjacent tree row just cleaned.



The CMV Terminator....









Pistachio Sanitation Trial - 2014

NOW Egg Traps

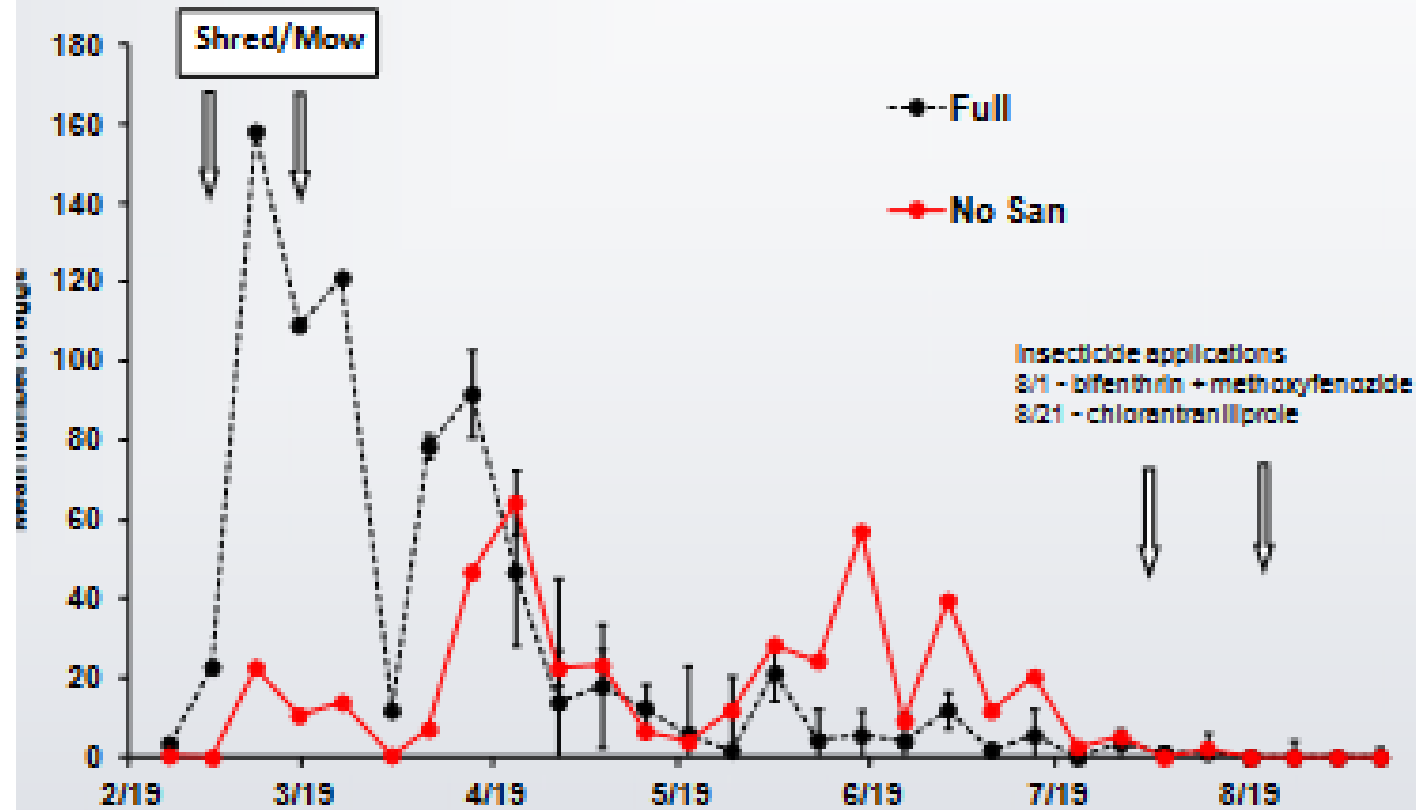


Figure 3. NOW eggs counted on traps, each point represents the mean \pm SE of 12 traps from 3-160 ac plots for each treatment in 2014.

The 'Worminator' - The Nichols mummy grinder



The system requires some prep work on orchard floors, and it requires an almond harvester to windrow pistachio mummies and condition an orchard floor before bringing the grinder in. The Worminator then comes through and picks up the mummies, collects them in an enclosed hopper, shreds them and drops them back on the floor in fine pieces that no longer provide a food source for the navel orangeworm. Nichols said he ran the grinder at 4 miles-per-hour with good results this past winter.

A close-up photograph of a ladybug with a red-orange body and black spots, perched on a green, thorny stem. The stem has several sharp, white thorns. Other smaller insects, including what appears to be an aphid and a small black insect, are also visible on the stem. The background is a soft, out-of-focus green.

Thank You

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