



ORCHARD HYGIENE

Pest & Disease Management In Winter

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Over-wintering strategies

All pests and diseases have strategies to survive winter

- Over-winter on trees and branches
- Under bark
- On infected fruit and leaves
- In debris or weeds on the orchard floor
- Underground



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Mokkie (2014), "Dead leaves", commons.wikimedia.org, (CC_BY_3.0)



Tann, J (2012), "Capeweed", commons.wikimedia.org, (CC_BY_2.0)

Hygiene management

Good hygiene management can:

- Significantly reduce or eliminate pests and diseases
- Prevent pests and diseases from getting a major foothold
- Reduce the need for chemicals
- Lessen residues in fruit to meet export MRLs
- Encourage the presence of beneficials

Brown rot

- Overwinters in mummified fruit, gum-oozing branches & diseased fruit beneath trees
- Hygiene management:
 - Cut out and dispose of mummies and attached growth
 - Collect and dispose of fallen fruit
 - Prune and dispose of cankers, infected leaves and branches
 - Rake and remove tree litter on the orchard floor
 - Collect and dispose of pruning materials
 - Disposal = burning

Rust

- Rust spores over-winter on dead, infected leaves on the ground, and in the tree framework
- Hygiene management
 - Remove and dispose of any fruit and green leaves retained by the tree
 - Remove and dispose of all fallen leaves from branches and crotches
 - Remove and dispose of all diseased wood and leaves during pruning

Queensland fruit fly

- Overwinters in mummified fruit, gum-oozing branches & diseased fruit beneath trees
- Hygiene management
 - Collect and dispose of fallen fruit
 - Cut out and dispose of mummies
 - Remove unwanted or neglected fruit trees
 - Collect and dispose of any rotting, overripe or unwanted fruit

Carpophilus beetle

- Overwinters in damaged and rotting fruit
- Hygiene management
 - Cut out and dispose of mummies remaining on trees
 - Collect and dispose of fallen fruit
 - Collect and dispose of any rotting, overripe or unwanted fruit
 - Clean-up around packing sheds
 - *Good fruit fly control means less damaged fruit for beetles*

Carpophilus beetle – *special note*

- Chemical control is difficult
 - Residues can exceed the MRLs of major export destinations
 - Low efficacy of the available chemical products
 - Short-term effect of insecticides
 - Disruption to beneficials often leads to secondary pest-flare

Two spotted spider mite

- Adult females lay eggs under bark, in fallen leaf matter, and other areas that provide shelter
- Overwinter in shelters on ground, in bark of trees and non-crop host plants (e.g., broad-leaf weeds)
- Hygiene management
 - Rake up and dispose of fallen leaf matter in orchard
 - Remove and dispose of non-crop host plants and weeds
 - Use chemicals sparingly to reduce potential for resistance and to encourage beneficials such as predator mites

Light brown apple moth

- Larvae over-winter on mummies on trees, or weeds and vegetation surrounding orchard
- Hygiene management
 - Remove and dispose of old and rotting fruit
 - Remove LBAM host plants such as the broadleaf weeds,
 - Plant non-host cover crop species such as grasses
 - Set traps and monitor LBAM larvae in orchard

Overview 1

- 1) Remove and dispose of mummies and leaves on trees
- 2) Prune and dispose of cankers and infected branches
- 3) Removal and dispose of fruit and leaf litter from orchard floor
- 4) Control broad-leaf weeds around trees and orchard floor
- 5) Spray trees with dormant oils, sulphur or copper-based fungicides

Overview 2

- 6) Collect and dispose of pruning materials
- 7) Disinfect pruning tools between cuts
- 8) Disposal = burning
- 9) Regularly inspect tree bark for signs of aphids, red spider mite, scale insects and codling moth grubs