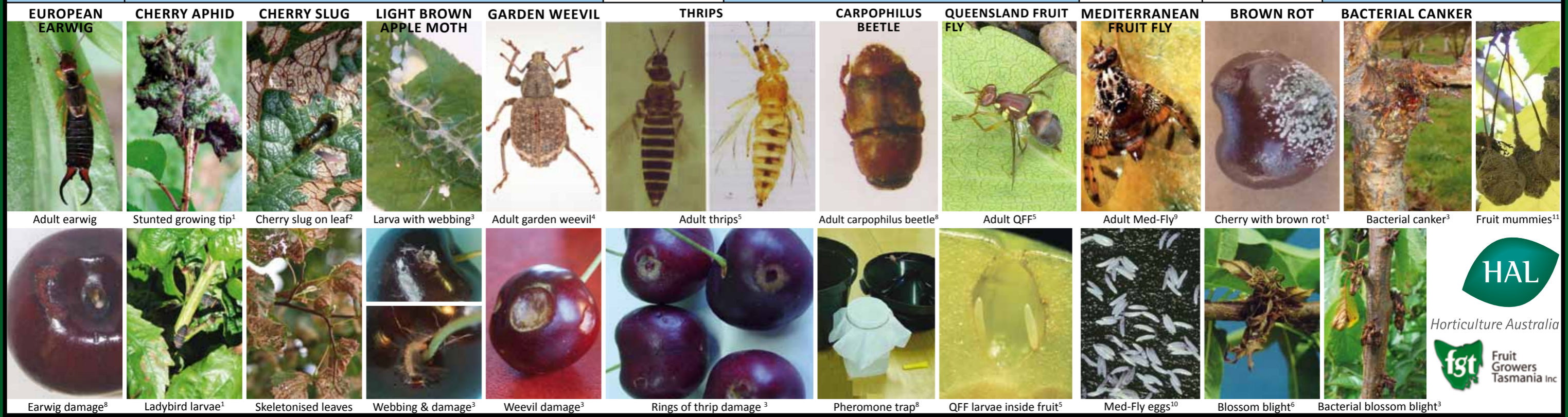


	100% LEAF FALL	DORMANCY			BUDSWELL	BUD BURST	FLOWERING	SHUCK FALL	SHOOT AND FRUIT DEVELOPMENT	HARVEST	POST HARVEST	50% LEAF FALL				
<b>GROWTH STAGES</b>																
<b>EUROPEAN EARWIGS</b>	Adults move underground	Adults underground with eggs			Males emerge	Over-wintering eggs hatch	Females and juveniles emerge		Earwigs move up trees and cause fruit damage Females lay 2nd clutch in soil. Second generation of juveniles emerge.			Adults move underground				
<b>MONITORING</b>					Place traps in orchard and monitor weekly											
<b>CULTURAL CONTROL</b>		Control weeds and remove mulch from under trees. Remove low-hanging branches														
<b>BIOLOGICAL CONTROL</b>					Use poultry to control earwigs (small scale)											
<b>CHEMICAL CONTROL</b>					Apply ground baits before earwigs move up into trees				Apply ground baits for second generation before earwigs move up into trees							
<b>CHERRY APHID</b>	Eggs overwinter in bark and crevices				Early colonies come from overwinter eggs in orchard		Wingless aphids colonise leaf tips		New colonies from early colonies or from outside orchard			Adult aphids return to orchard Eggs laid on bark to overwinter				
<b>MONITORING</b>					Check growing tips regularly and identify 'hot spots'											
<b>CULTURAL CONTROL</b>					Remove colonies as they appear (small scale)											
<b>BIOLOGICAL CONTROL</b>					Encourage parasitic and predatory insects with nectar-producing plants within orchard, headlands and windbreaks											
<b>CHEMICAL CONTROL</b>					Apply winter oil near hatching to smother eggs as they develop		Apply selective aphicides if action thresholds are reached Spray 'hot spots' early to prevent spread through the orchard									
<b>CHERRY SLUG</b>	Slugs (larvae) overwinter and pupate underground				Adults emerge & eggs laid on leaves		Slugs appear on leaves		Slugs pupate underground Second generation emerges		Second generation slugs do most damage to foliage		Slugs drop from leaves to overwinter underground & pupate in spring			
<b>MONITORING</b>					Check foliage weekly for slugs and leaf damage											
<b>CULTURAL CONTROL</b>	Remove host weeds surrounding orchard (hawthorn, rogue plum, sweet and sour cherry trees)															
<b>BIOLOGICAL CONTROL</b>	Encourage parasitic and predatory insects with nectar-producing plants within orchard, headlands and windbreaks															
<b>CHEMICAL CONTROL</b>	Good control of the first generation slugs will reduce damage later in the season. Vegetable oil sprays reduce slug numbers as do <i>Bacillus thuringiensis</i> (Bt) sprays. Most insecticides targeted at other pests will reduce or control cherry slug.															
<b>LIGHT BROWN APPLE MOTH</b>	Grubs (larvae) overwinter in ground cover		Grubs pupate in ground cover		Eggs, grubs & pupae on ground plants & stonefruit foliage			Grubs damage cherry fruit then pupate in tree foliage			Grubs migrate to ground cover					
<b>MONITORING</b>					Place pheromone traps in orchard by October and check weekly. Use 3 traps per block and >1 trap per ha. Place extra traps outside orchard when pheromone mating disruption ties are used. Look for threshold of 3 moths per trap per week per block. Monitor growing tips of young trees											
<b>CULTURAL CONTROL</b>	Mow ground cover and control weeds				Put out pheromone mating disruption ties at 500/ha											
<b>BIOLOGICAL CONTROL</b>	Encourage parasitic & predatory insects with nectar-producing plants within orchard, headlands and windbreaks. Innundate orchard with <i>Trichogramma</i> wasps from late December when moth flights occur															
<b>CHEMICAL CONTROL</b>	Apply selective insecticides when action threshold is reached in traps, or with field monitoring. Some sprays are mandatory for export programs.															
<b>GARDEN WEEVIL</b>	Weevil larvae overwinter and pupate underground				Garden weevil adults emerge from October. Adults chew fruit & leaves at night. Eggs laid over summer, starting 3 weeks after emergence								Larvae overwinter under ground			
<b>MONITORING</b>					Monitor soils for pupae numbers when heavy infestations are present		Place traps in orchard and check weekly. Place banded cardboard traps on trunks and trellis posts									
<b>CULTURAL CONTROL</b>					With heavy infestations, rotary hoe interrows when majority are pupating								Remove mulch from under trees and control weeds. Remove low-hanging branches			
<b>BIOLOGICAL CONTROL</b>					Use poultry to control weevils (small scale)											
<b>CHEMICAL CONTROL</b>	Apply sprays when action thresholds are reached. Consider dusk or night application															
<b>THRIPS</b>	Adult thrips overwinter in grass and weeds						Adults move from weeds to blossoms		Most damage occurs to fruit at blossom and at near-maturity Several generations occur each season				Thrips move out of trees to flowering weeds & grasses			
<b>MONITORING</b>							Place sticky traps in orchard and monitor weed flowers		Monitor daily during blossom		Monitor yellow sticky-traps weekly. Monitor fruit bunches close to harvest for thrips and for damage					
<b>CULTURAL CONTROL</b>	Control weeds, especially weeds flowering prior to blossom						Don't mow flowering weeds during blossom		Weed control is important. Wind breaks help reduce in-flying thrip numbers							
<b>BIOLOGICAL CONTROL</b>	Encourage lacewings and other predatory insects to control thrips, especially in ground covers															
<b>CHEMICAL CONTROL</b>	Apply 3 consecutive sprays if action thresholds are reached. Use insecticide with alternative mode of action if monitoring shows action thresholds are reached again later in season															
<b>CARPOPHILUS BEETLE</b>	Larvae, pupae and adults over-winter in fruit dumps and underground. Adult also over-winter in fruit mummies and under bark						Adults become active in late spring, attacking ripening fruit and spread brown rot. Adults lay eggs in ripening/rotten fruit and larvae leave fruit to pupate underground. Lifecycle is about 1 month, overlapping generations can occur						Adults breed in fruit dumps and fallen fruit			
<b>MONITORING</b>							Use funnel traps baited with fermented apple juice to monitor carpopophilus numbers. Check fallen fruit for presence of carpopophilus. Monitor temperatures - adults fly at about 22°C or warmer									
<b>CULTURAL CONTROL</b>	Remove rotten and fallen fruit from orchard. Slash orchard floor regularly. Adult carpopophilus are excellent flyers and will move in from other blocks and farms															
<b>BIOLOGICAL CONTROL</b>	Use attract and kill traps to reduce carpopophilus numbers. An area wide treatment is essential. Start at least 6 weeks before fruit harvest.															
<b>CHEMICAL CONTROL</b>	Use registered insecticide only if necessary															
<b>QUEENSLAND FRUIT FLY</b>	Adults may survive winter in protected places. Pupae may overwinter in pomefruit mummies. Adults emerge in spring.						Adults feed on protein and mate. Females are attracted to ripening fruit and lay eggs under fruit skin causing stings. Larvae eat fruit causing disease and fruit fall. Larvae pupate under ground and adults emerge. Life cycle is about 28 days at 25°C.						Adults overwinter in protected spots			
<b>MONITORING</b>							Hang fruit fly traps in orchard and check every 3-4 days. Higher numbers occur in wetter seasons. Check fruit for stings from 8 weeks pre-harvest									
<b>CULTURAL CONTROL</b>	Remove fruit trees that are regularly not harvested and other alternative host sources						Remove rotten and fallen fruit from orchard. Slash orchard floor regularly. Fruit fly will move in from other blocks and farms									
<b>BIOLOGICAL CONTROL</b>	Where QFF and Med Fly are both present Med Fly numbers will be low from QFF competition															
<b>CHEMICAL CONTROL</b>	Low pressure QFF - Use bait sprays when monitoring indicates flies are present, spray 7-10 day intervals. High pressure QFF - Use bait sprays at 7-10 day intervals all season. Use registered cover sprays where ICAs require them															
<b>MEDITERRANEAN FRUIT FLY</b>	Adults may survive winter in protected places. Pupae may overwinter in pomefruit mummies. Adults emerge in spring.						Adults feed on protein and mate. Females are attracted to ripening fruit and lay eggs under fruit skin causing stings. Larvae eat fruit causing disease and fruit fall. Larvae pupate under ground and adults emerge. Life cycle is about 28 days at 25°C.						Adults overwinter in protected spots			
<b>MONITORING</b>							Hang fruit fly traps in orchard and check every 3-4 days. Higher numbers occur in wetter seasons. Check fruit for stings from 8 weeks pre-harvest									
<b>CULTURAL CONTROL</b>	Remove fruit trees that are regularly not harvested and other alternative host sources						Remove rotten and fallen fruit from orchard. Slash orchard floor regularly. Fruit fly will move in from other blocks and farms									
<b>BIOLOGICAL CONTROL</b>	Med Fly tolerates cooler temperatures than QFF. If it was introduced to southern states it would survive well															
<b>CHEMICAL CONTROL</b>	Low pressure Med Fly - Use bait sprays when monitoring indicates flies are present, spray 7-10 day intervals. High pressure Med Fly - Use bait sprays at 7-10 day intervals all season. Use registered cover sprays when ICA requirements exist															
<b>BROWN ROT</b>	Spores overwinter on infected twigs and mummified fruit left in the orchard				Spores infect flowers		Spores dormant in developing fruit				Rotten fruit and infected twigs provide infection for next season					
<b>MONITORING</b>					Estimate potential infection (fruit mummies)		Look for blossom blight		Check fruit clusters for infections							
<b>CULTURAL CONTROL</b>	Remove mummies and infected twigs from orchard				Control earwigs, LBAM* and carpopophilus beetle to slow spread of infection											
<b>BIOLOGICAL CONTROL</b>																
<b>CHEMICAL CONTROL</b>	Apply systemic fungicides															
<b>BACTERIAL CANKER</b>	Bacteria overwinters in active cankers on bark and twigs				New cankers appear on bark and twigs		Bud death noticeable		Fruit develops soft flat spots				Limb and trunk infections occur			
<b>MONITORING</b>					Check trees for new cankers & remove		Lesions on leaves cause tattering		Spread of infection slows or stops in dry weather				Check trees for new cankers			
<b>CULTURAL CONTROL</b>	Choose orchard sites carefully for frost, drought & waterlogging Choose varieties with tolerance of <i>Pseudomonas syringae</i> **				Use clean grafting wood		Heat-treat trunk cankers. Cut off limbs with cankers at 30cm below canker		Prune out infected wood and remove from orchard				Avoid winter pruning			
<b>BIOLOGICAL CONTROL</b>																
<b>CHEMICAL CONTROL</b>	Apply copper at early and late dormancy						Apply half strength copper where leaf infections are serious						Apply copper at 10% and 80% leaf fall			



Adult earwig<sup>1</sup> Stunted growing tip<sup>1</sup> Cherry slug on leaf<sup>2</sup> Larva with webbing<sup>1</sup> Adult garden weevil<sup>4</sup> Adult thrips<sup>5</sup> Adult carpopophilus beetle<sup>8</sup> Adult QFF<sup>5</sup> Adult Med-Fly<sup>7</sup> Cherry with brown rot<sup>1</sup> Bacterial canker<sup>3</sup> Fruit mummies<sup>11</sup>  
 Earwig damage<sup>8</sup> Ladybird larvae<sup>1</sup> Skeletonised leaves Webbing & damage<sup>1</sup> Weevil damage<sup>3</sup> Rings of thrip damage<sup>3</sup> Pheromone trap<sup>9</sup> QFF larvae inside fruit<sup>5</sup> Med-Fly eggs<sup>10</sup> Blossom blight<sup>6</sup> Bacterial blossom blight<sup>3</sup>



# Acknowledgements and Contributors:

Read more about Integrated Pest Management in the *Australian Cherry Production Manual* available online at [www.cherrygrowers.org.au](http://www.cherrygrowers.org.au).

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\*LBAM: Light Brown Apple Moth

\*\**Psuedomonas syringae* is the causal bacteria in Bacterial Canker.