

Low chill stonefruit information kit

Reprint – information current in 1998



REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website www.deedi.qld.gov.au

This publication has been reprinted as a digital book without any changes to the content published in 1998. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest www.infopest.qld.gov.au
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website www.deedi.qld.gov.au or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

This publication was last revised in 1998. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

This information has been made available to assist users to identify issues involved in low chill stonefruit production. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.



Queensland Government



Problem **SOLVER**

Every crop will have a problem or two. The key to dealing with problems is prompt identification, and where appropriate, prompt treatment. This section helps you with both these decisions. The common problems are shown in a series of pictures grouped according to the main symptom. From the contents, find the symptom that best fits your problem. On that page, you will find photos of the causes and the solutions.

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Yellowing of older leaves

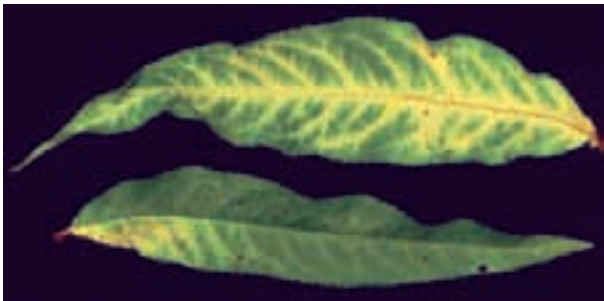


1. Magnesium deficiency

Left: mild symptoms. Right: severe symptoms. Note the yellowing is between the veins while the veins remain green.

Cause. Insufficient magnesium available to the plant. May be due to either insufficient magnesium in the soil, or the application of heavy rates of lime, gypsum or potassium fertiliser.

Solution. Do a leaf analysis to confirm your diagnosis. Check soil pH. If pH is within the range 5.5 to 6.5 (1:5 soil:water), apply Granomag to the soil. If pH is less than 5.5, apply dolomite to the soil.

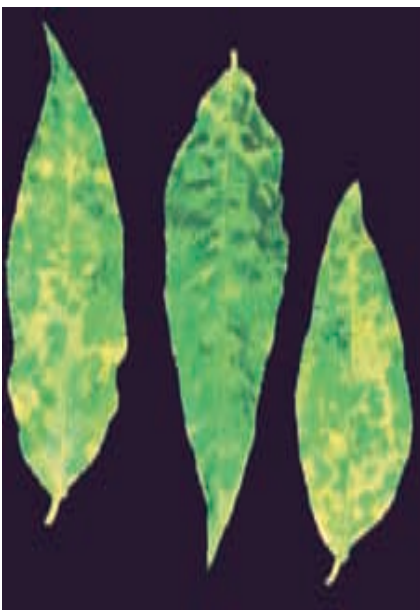


2. Sodium toxicity

Note the veins are also yellow.

Cause. High levels of sodium in the soil. Generally caused by irrigating with water containing high levels of sodium.

Solution. Do a leaf and soil analysis to confirm your diagnosis. Test your irrigation water for its sodium content. Change your water source if the sodium level is high.



3. Boron toxicity

Nitrogen deficiency looks similar to boron toxicity but causes an overall yellowing of leaves.

Cause. Boron toxicity is caused by application of too much boron or its uneven application to the soil. Nitrogen deficiency is caused by insufficient nitrogen available to the plant. It commonly develops after harvest.

Solution. Do a leaf analysis to check whether it is boron toxicity or nitrogen deficiency. If boron toxicity is confirmed, carefully check the calculation of your boron rates in future. Also apply borax or Solubor very evenly to the soil under trees. To achieve an even application, mix borax or Solubor in water and spray on the ground. If nitrogen deficiency is confirmed, more nitrogen fertiliser may be necessary after leaching rains. Keep watering until dormancy.



4. Aluminium toxicity

Note the veins are yellow and spots have formed along the branch.

Cause. Low soil pH in soils with naturally high levels of aluminium.

Solution. Check soil pH. If it is below 5.0 (1:5 soil:water), apply lime or dolomite to the soil. Where possible, use soils that are naturally low in aluminium.

Yellowing of older leaves



5. Spider mite damage

Note the yellowing is most obvious near the centre vein of the leaves.

Cause. The two spotted mite *Tetranychus urticae*.

Solution. Check that damage is serious enough to warrant treatment. At least 20% of leaves sampled must have mites on them to warrant treatment. Then release predatory mites (20 to 60% of sampled leaves infested) or spray with an appropriate chemical from the *Problem solver handy guide* (more than 60% of sampled leaves infested and less than 40% of leaves with predators on them).

Yellowing of young leaves



6. Zinc deficiency

Note the yellow leaves are closer together than normal. Treatment with Cultar may also produce bunched leaves but without the yellowing of zinc deficiency.

Cause. Insufficient zinc available to the plant.

Solution. Do a leaf analysis to confirm your diagnosis. If deficient, apply zinc sulphate to the soil. A short term response can be achieved with a foliar spray of zinc sulphate heptahydrate at a rate of 250 g/100 L water. During dormancy at about three weeks before pruning, apply a bark spray of zinc sulphate heptahydrate at a rate of 2 to 5 kg/100 L water.



7. Glyphosate herbicide damage

Left: mild symptoms. Right: severe symptoms showing the severe distortion of leaves.

Cause. Drift of glyphosate herbicide on to green parts of the tree.

Solution. Apply herbicide carefully to avoid any herbicide contact with the trunk and leaves.



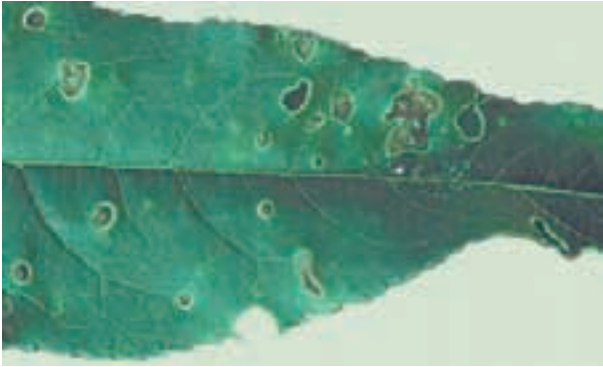
8. Iron deficiency

Note the leaf growth is normal when compared with that of zinc-deficient trees.

Cause. Insufficient iron available to young leaf growth. Generally only a problem in alkaline soils or where heavy rates of lime or dolomite have been applied.

Solution. Do a leaf analysis to confirm your diagnosis. If deficient, apply a foliar spray of iron sulphate at a rate of 100 g/100 L water.

Holes in leaves



9. Zinc toxicity

Note that copper toxicity may cause similar symptoms.

Cause. High levels of zinc in the leaves.

Solution. Do a leaf analysis to confirm your diagnosis. If zinc or copper toxicity is confirmed, check soil pH and if less than 5.5 (1:5 soil:water), apply lime or dolomite. Also check the calculation of rates for previous applications of zinc or copper.



10. Shot hole disease

Cause. The fungus *Stigmina carpophila*. Bacterial spot also produces a shot hole effect (see photo on page 5).

Solution. Spray every two to three weeks from petal fall to leaf fall with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. Also spray at budbreak. Prune carefully to allow good air circulation so that leaves dry quickly after rain. Shaded and wind-exposed orchards are more susceptible to the disease.



11. Spray damage

Cause. Problems with incorrect chemical rates, application or spray compatibility.

Solution. Check that chemicals you are using are registered and are being applied at the correct rates. If using mixtures, check labels to make sure the chemicals are compatible. Calibrate your sprayer to make sure it is applying the right amount of chemical per hectare.

Pink crinkled leaves



12. Leaf curl disease

Cause. The fungus *Taphrina deformans*.

Solution. There is no cure for affected leaves. In future, spray with an appropriate chemical from the *Problem solver handy guide* just before budswell. Repeat the spray a week later if budswell is uneven. Follow label directions.

Brown spots on leaves

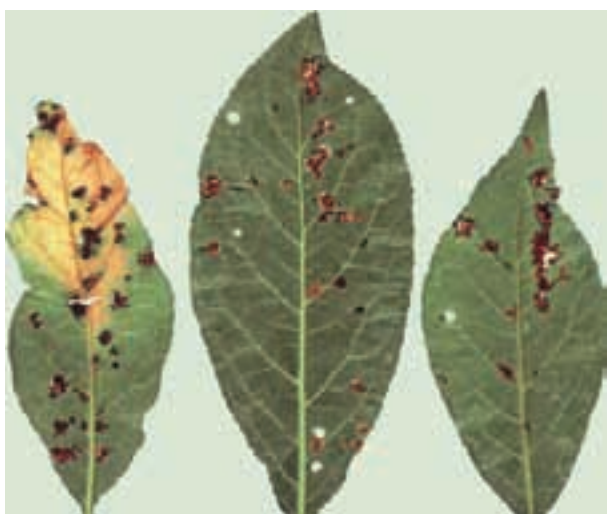


13. Rust disease

Left: upper leaf surface. Right: lower leaf surface showing the brown rust pustules.

Cause. The fungus *Tranzschelia discolor*.

Solution. Spray every two to three weeks from petal fall to leaf fall with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.



14. Bacterial spot disease

Note how the spots eventually crack and fall out, leaving a shot hole effect.

Cause. The bacterium *Xanthomonas campestris* pv. *pruni*.

Solution. There is no immediate cure. Removing and burning or burying diseased twigs and leaves will reduce spread. Copper sprays, used in other crops, cannot be used in low chill stonefruit as they cause leaf drop. However, they can be used during dormancy to reduce the risk of infection in the next crop. Suitable copper sprays are listed in the *Problem solver handy guide*. Follow label directions. Improve wind protection for the orchard. In future, plant resistant varieties. A special treatment is available for plums. See *Problem solver handy guide*.

Brown edges on leaves



15. Calcium deficiency

Note that potassium deficiency and hot, dry weather may cause similar symptoms.

Cause. Insufficient calcium available to the plant. The problem is exacerbated by dry soil conditions.

Solution. Do a leaf analysis to confirm your diagnosis. If calcium deficiency is confirmed, check soil pH. If pH is less than 5.0 (1:5 soil:water), apply lime or dolomite to the soil. If pH is greater than 5.0, apply gypsum to the soil. Provide adequate irrigation during hot, dry weather.



16. Salt burn

Cause. Either irrigation with salty water or overuse of fertilisers.

Solution. Do a water analysis to check whether the problem is caused by salty water. If confirmed, use another water source. If salty water is not the problem, seek expert advice on your fertiliser rates and program.

White blotches on leaves



17. Paraquat herbicide damage

Cause. Drift of paraquat herbicide on to green parts of the tree.

Solution. Avoid drift of herbicide on to leaves by using a shield on the spray nozzle. Confine spraying to still days.

White and orange spots on leaves



18. San José scale

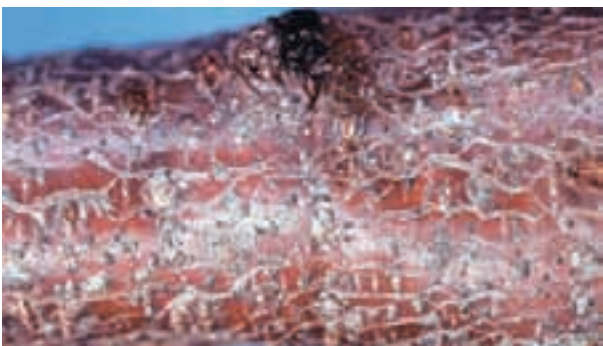
Upper: overall symptoms. Lower: close-up of scales (highly magnified).

Cause. The insect *Comstockaspis perniciosus*.

Solution. If trees are in leaf, spray with an appropriate non-oil chemical from the *Problem solver handy guide*. Follow label directions. If trees are dormant (up to budswell), spray with winter oil. Follow label directions.

In future during winter, monitor 20 randomly-chosen trees per hectare for evidence of scale. If found, spray immediately with winter oil. Check trees again at budswell and re-spray with winter oil if scale is detected. Continue to check trees throughout the growing season, and if scale is detected, spray with an appropriate non-oil chemical from the *Problem solver handy guide*. Follow label directions. An opportune time to spray is in September when the young crawler scales are most susceptible.

Use high volume sprays to ensure the entire tree, including the trunk, is thoroughly wetted. Regularly remove and burn dead twigs and limbs.



19. White peach scale

Cause. The insect *Pseudaulacaspis pentagona*.

Solution. Treat as for San José scale above.



Dead tips on twigs



20. Oriental fruit moth (tip borer)

Upper: early field symptom. Lower: close-up of affected tips. Note that some of the leaves on affected tips may remain green. A larva of the moth can be seen in the tip on the right in the lower photo.

Cause. The insect *Cydia molesta*.

Solution. In small orchards, cut off and burn dead tips. In larger orchards, spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.



21. Bacterial canker disease

Note all of the leaves on affected tips wilt and die.

Cause. The bacterium *Pseudomonas syringae* pv. *syringae*.

Solution. There is no immediate cure. Removing and burning or burying affected twigs and leaves will reduce spread. Copper sprays, used in other crops, cannot be used in low chill stonefruit as they cause leaf drop. However, they can be used during dormancy to reduce the risk of infection in the next crop. Suitable copper sprays are listed in the *Problem solver handy guide*. Follow label directions. Spray at 30 to 50% leaf fall, before and after winter pruning.



22. Brown rot disease

Note the mummified fruit and furry growth on diseased areas.

Cause. The fungi *Monilinia fructicola* and *Monilinia laxa*.

Solution. Spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. In future, prune out and destroy all diseased twigs and 'mummies' during winter.

Brown areas on twigs



23. Rust disease

Cause. The fungus *Tranzschelia discolor*.

Solution. Spray every two to three weeks from petal fall to leaf fall with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.



24. Hail damage

Cause. Impact damage from hailstones.

Solution. Where hail is frequent, consider using hail netting.

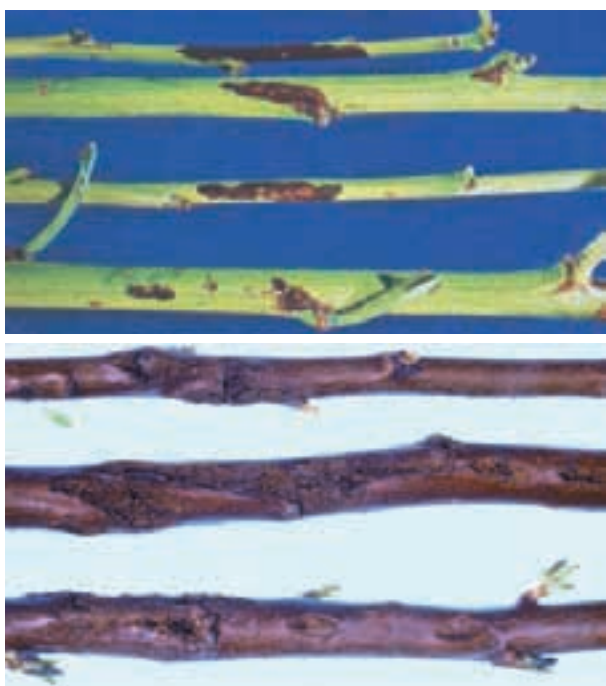


25. Boron deficiency

Left: pitting on affected twigs. Right: leaf symptoms.

Cause. Insufficient boron available to the plant. The problem is exacerbated by dry soil conditions and heavy liming.

Solution. Do a leaf analysis to confirm your diagnosis. If boron deficiency is confirmed, apply borax or Solubor evenly to the soil under the trees. To achieve an even application, mix borax or Solubor in the required amounts of water and spray on the ground. A short-term response can be obtained from spraying the foliage with Solubor at a rate of 100 g/100 L water.



26. Bacterial spot disease

Upper: early symptoms. Lower: advanced symptoms.

Cause. The bacterium *Xanthomonas campestris* pv. *pruni*.

Solution. There is no immediate cure. Removing and burning or burying affected twigs and leaves will reduce spread. Copper sprays, used in other crops, cannot be used in low chill stonefruit as they cause leaf drop. However, they can be used during dormancy to reduce the risk of infection in the next crop. Spray at 30 to 50% leaf fall, before and after winter pruning. Suitable copper sprays are listed in the *Problem solver handy guide*. Follow label directions. Improve wind protection for the orchard. In future, plant resistant varieties. A special treatment is available for plums. See the *Problem solver handy guide*.

Gum oozing from trunk and branches



27. Phytophthora trunk canker disease

Damage is generally confined to the trunk and lower main branches.

Cause. The fungus *Phytophthora cinnamomi*.

Solution. Treat affected trees with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. In future, purchase disease-free trees growing in a well drained potting mix. Plant in well drained sites and stake newly-planted trees to prevent wind moving the trees and damaging the bark at ground level. Mulch the ground under the trees to prevent soil splashing on to the trunks.



28. Bacterial canker disease

Cause. The bacterium *Pseudomonas syringae* pv. *syringae*.

Solution. There is no immediate cure. Removing and burning or burying affected twigs and leaves will reduce spread. Copper sprays, used in other crops, cannot be used in low chill stonefruit as they cause leaf drop. However, they can be used during dormancy to reduce the risk of infection in the next crop. Spray at 30 to 50% leaf fall, before and after winter pruning. Suitable copper sprays are listed in the *Problem solver handy guide*. Follow label directions. Improve wind protection for the orchard. In future, plant resistant varieties.



29. Fungal gummosis

Symptoms may develop throughout the tree. Copious amounts of gum are produced during wet weather.

Cause. The fungus *Botryosphaeria* sp.

Solution. The only immediate treatment is to prune out and burn badly affected branches. Avoid leaving pruning stubs as these are potential entry points for the fungus. Remove and burn winter prunings. As trees under stress are more susceptible to attack, keep trees in good growing condition by careful watering and fertilising.

Fungus on trunk and branches



30. Dieback fungus disease

Photo shows brackets of the fungus on a large pruning cut.

Cause. The fungus *Schizophyllum commune*. Other wood-rotting fungi that may cause dieback are *Trametes versicolor*, *Trametes velutina*, *Pycnoporus coccineus*, *Stereum strigoso-zonatum* and *Stereum purpureum*.

Solution. The only immediate treatment is to prune out and burn badly affected branches. Avoid leaving pruning stubs as these are potential entry points for the fungus. Paint large pruning cuts with white plastic paint or tree sealing compound, preferably one with an anti-mould additive.



31. Sunburn

Photo shows a dieback fungus growing on sunburnt areas.

Cause. Sudden exposure of limbs to the sun after pruning.

Solution. The only immediate treatment is to prune out and burn badly affected branches. After major pruning, paint exposed major limbs with white plastic paint.

Dead flowers



32. Blossom blight disease

Cause. The fungi *Monilinia fructicola* and *Monilinia laxa*.

Solution. Spray with an appropriate chemical from the *Problem solver handy guide* at 10% bloom, full bloom and petal fall. Follow label directions. Prune out and destroy all diseased twigs and 'mummies' during winter.

Gum ooze on fruit



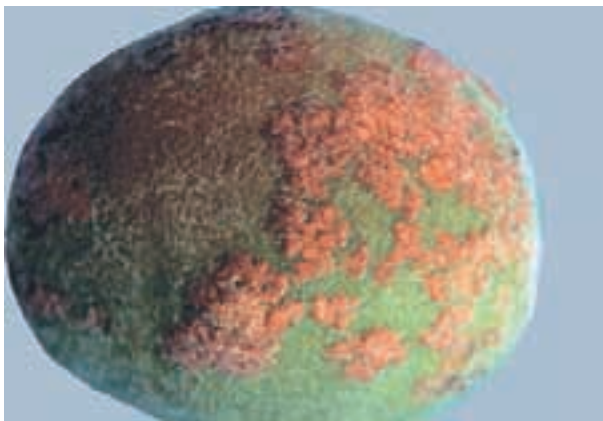
33. Queensland fruit fly

Upper: early external symptoms showing gum spots around sting marks. Lower: fly maggots inside a ripening fruit.

Cause. The insect *Bactrocera tryoni*.

Solution. Management of fruit fly involves regular spraying from at least six weeks before harvest right through to the completion of harvesting. It is important that spraying begins when flies start to become active. The best way to determine this is to start monitoring with fruit fly traps from soon after fruit set. Check traps every few days and start spraying when 20 flies per 3 to 4 days are caught or gumming on fruit is observed. Use a bait spray from the *Problem solver handy guide*. Follow label directions. Spray every five to seven days as indicated by the fly traps or symptoms on fruit. Reapply immediately after rain. Stop bait spraying four weeks before harvest and switch to cover sprays. Spray every seven days until harvest. Spray the whole tree. Choose cover sprays from the *Problem solver handy guide*. Follow label directions. Do not leave rotting fruit in the orchard or around the packing shed.

Red blotches on fruit

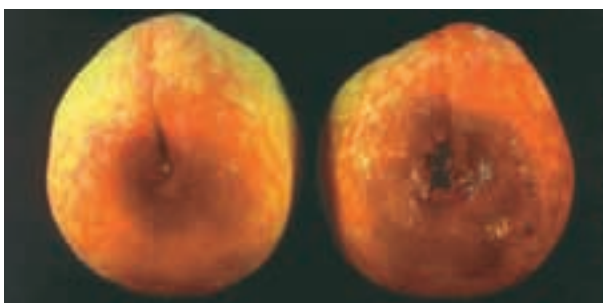


34. Leaf curl disease

Cause. The fungus *Taphrina deformans*.

Solution. There is no cure for affected fruit. In future, spray with an appropriate chemical from the *Problem solver handy guide* just before budswell. Repeat the spray a week later if budswell is uneven. Follow label directions.

Soft tip on fruit

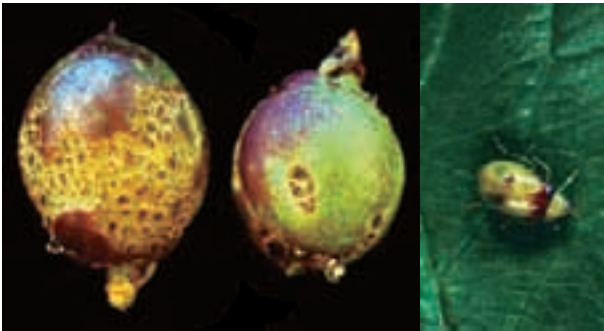


35. Calcium deficiency

Cause. Insufficient calcium available to the plant. The problem is exacerbated by dry soil conditions and excessive levels of nitrogen.

Solution. Do a leaf analysis to confirm your diagnosis. If calcium deficiency is confirmed, check soil pH. If pH is less than 5.0 (1:5 soil:water), apply lime or dolomite to the soil. If pH is greater than 5.0, apply gypsum to the soil. Provide adequate irrigation, particularly during hot, dry weather.

Brown or black marks on fruit

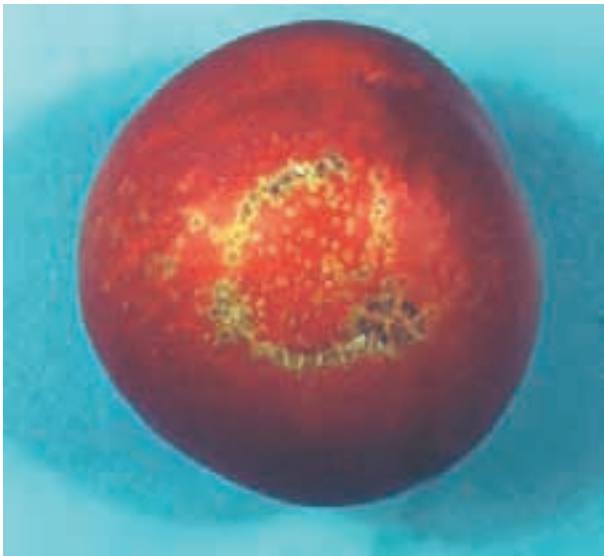


36. *Monolepta* (red shouldered leaf) beetle

Left: scaly-like damage on fruit. Right: adult beetle (magnified).

Cause. The insect *Monolepta australis*.

Solution. When swarms of beetles move into the orchard, spot spray infested trees with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.



37. Spray burn

Damage has a circular appearance and is generally confined to one side of the fruit.

Cause. One or more of the following: spraying at the wrong rates; using poorly calibrated equipment; using mixtures of incompatible chemicals; spraying under slow drying conditions.

Solution. Check the labels of chemicals you are mixing together to make sure they are compatible. Check that you are applying chemicals registered for stonefruit and at the correct rates. Re-calibrate your sprayer to make sure it is applying the right amount of chemical per hectare. Spray during the morning and early afternoon when the spray dries more quickly. This applies particularly to emulsifiable concentrates.

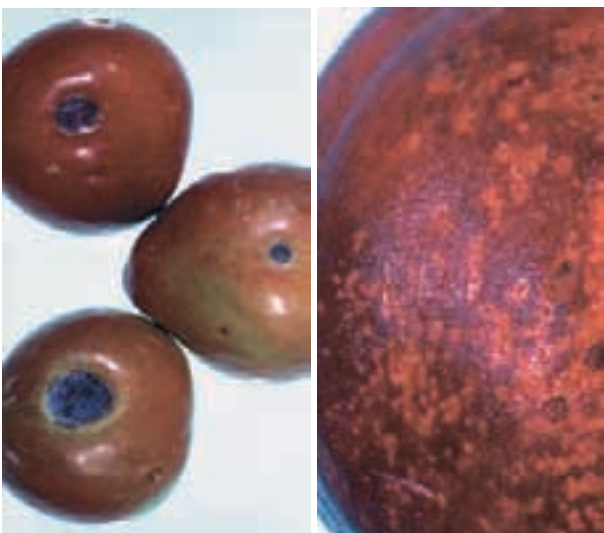


38. Hail damage

Damage is generally on the upper exposed side of the fruit.

Cause. Impact damage from hailstones.

Solution. Where hail is frequent, consider using hail netting.



39. Bacterial spot disease

Left: symptoms on plum showing the large circular spots. Right: symptoms on nectarine showing the smaller, more angular spots.

Cause. The bacterium *Xanthomonas campestris* pv. *pruni*.

Solution. There is no immediate cure. Registered copper sprays cannot be used in low chill stonefruit as they cause leaf drop. However, they can be used during dormancy to reduce the risk of infection in the next crop. Spray at 30 to 50% leaf fall, before and after winter pruning. Suitable copper sprays are listed in the *Problem solver handy guide*. Follow label directions. Improve wind protection for the orchard. In future, plant resistant varieties. A special treatment is available for plums. See the *Problem solver handy guide*.

Brown or black marks on fruit



40. Rutherglen bug

Left: affected fruit showing the overall brown russet. Right: a swarm of bugs.

Cause. The insect *Nysius vinitor*.

Solution. Check that the damage is serious enough to warrant treatment. You need at least 5% of a sample of fruit to be affected to make it worth spraying. Where required, spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.



41. Thrips

Damage is mainly on small fruit, generally near the stem end.

Cause. The insect *Thrips imaginis*.

Solution. Check that the damage is serious enough to warrant treatment. You need to have a number of thrips present on at least 10% of trees to make it worth spraying. Where required, spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.

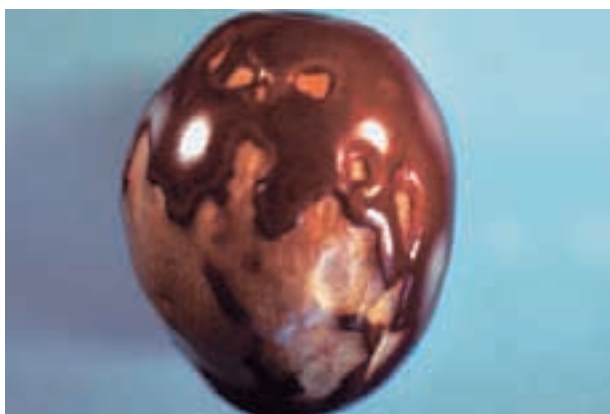


42. Rust disease

Damage consists of small sunken spots.

Cause. The fungus *Tranzschelia discolor*.

Solution. Spray every two to three weeks from petal fall to leaf fall with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. Good spray coverage is essential.



43. Sunburn

Cause. Poor leaf cover during hot weather. The plum variety Gulfruby is highly susceptible.

Solution. Keep trees under good growing conditions to maintain adequate leaf cover for the fruit. Choose earlier maturing varieties to avoid fruit being exposed to late season heat waves.

Brown or black marks on fruit

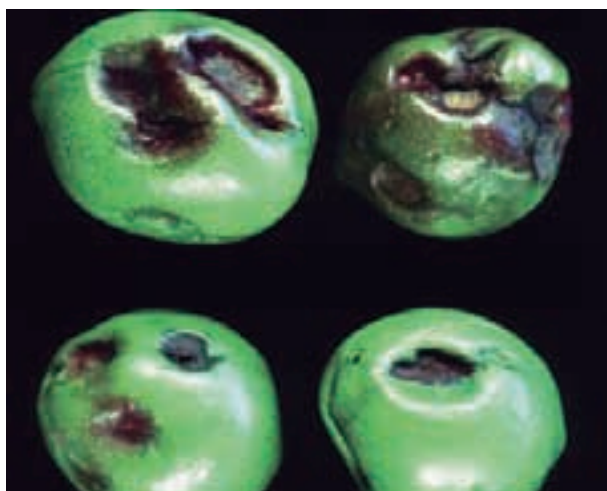


44. Postharvest browning

Damage consists of brown marks just under the skin (circled). Sometimes the marks are black, and the condition is called 'inking'.

Cause. Thought to be abrasion damage in conjunction with high levels of iron, copper or aluminium in or on the fruit. Can develop before harvesting, at harvesting or during packing.

Solution. Handle fruit carefully to reduce fruit abrasion within the field and during harvesting and packing. Avoid applying trace element sprays within three weeks of harvesting. Do a leaf and soil analysis to check the status of iron, copper and aluminium.

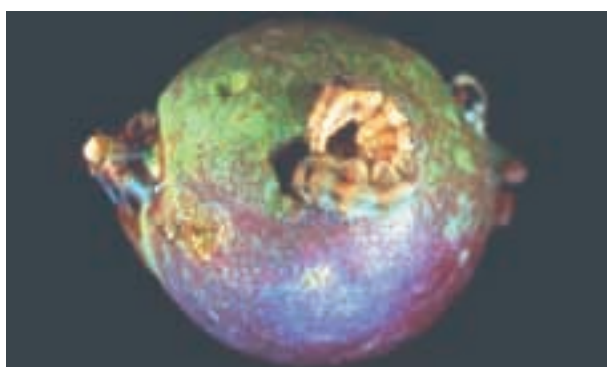


45. Fruit spotting bug

Cause. The insects *Amblypelta* spp.

Solution. First check that the damage is serious enough to warrant treatment. You need at least 5% of a sample of fruit to be affected to make it worth spraying. Where required, spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.

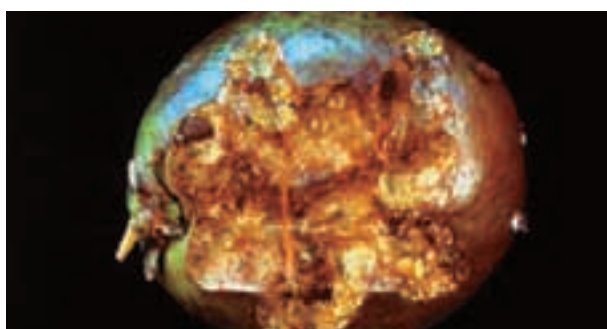
Holes or chew marks in fruit



46. *Heliothis* grub (budworm)

Cause. The insect *Helicoverpa punctigera*.

Solution. First check that the damage is serious enough to warrant treatment. You need at least 5% of a sample of fruit to be affected to make it worth spraying. Where required, spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions.

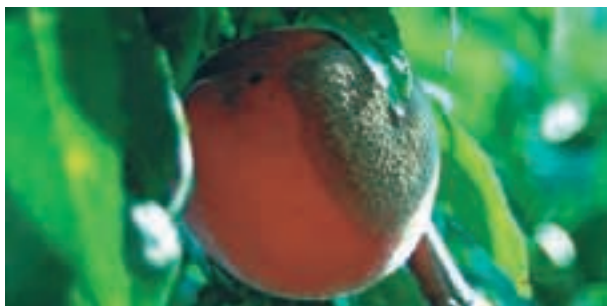


47. Bird damage

Cause. Feeding by birds such as lorikeets and silvereyes.

Solution. Total enclosure netting is considered the only effective control measure. Bird scaring devices may be effective for short periods.

Furry mould on fruit



48. Brown rot disease

Cause. The fungi *Monilinia fructicola* and *Monilinia laxa*.

Solution. Spray with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. In future, spray at 10% bloom, full bloom and petal fall to reduce the chances of later fruit infection. Prune out and destroy all diseased twigs and 'mummies' during winter.



49. Rhizopus rot disease

Cause. The fungus *Rhizopus stolonifer*. Generally only a problem during storage, transport and marketing. Occasionally develops in the field after prolonged warm wet weather.

Solution. Dip fruit after harvest in an appropriate chemical from the *Problem solver handy guide*. Follow label directions. Handle fruit carefully to avoid skin injury. Regularly remove and bury discarded fruit from the packing shed.

Cracks or splits in fruit



50. Cold damage

There are two symptoms of cold damage. Left: splits in the skin and flesh. Right: fine skin cracking.

Cause. Late frosts or cold weather during early fruit development. The skin and flesh splitting symptom is generally also associated with rapid development of fruit and water stress.

Solution. There is no immediate treatment. In the long term, choose varieties that are later maturing and less prone to the fine skin cracking symptom. Avoid planting sites which are subject to frequent late frosts.



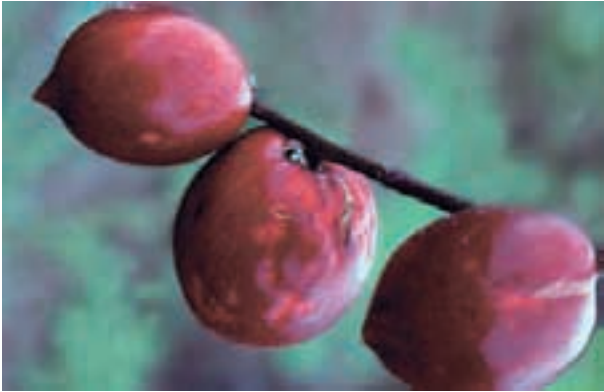
51. Split stone

Fruit with split stone is generally misshapen and frequently open at the stem end.

Cause. Physiological problem in early ripening peach varieties accentuated by high temperatures and water stress in late summer. Practices that reduce fruit set and encourage large fruit also contribute to the problem.

Solution. For susceptible early ripening varieties, avoid practices that reduce fruit set and encourage large fruit size. These include excessive fruit thinning, girdling, heavy irrigation and heavy nitrogen application close to harvest. Crop these varieties as heavily as possible while maintaining marketable fruit size.

Sunken areas on fruit



52. Boron deficiency

Cause. Insufficient boron available to the plant.

Solution. Do a leaf analysis to confirm your diagnosis. If boron deficiency is confirmed, apply borax or Solubor to the soil under the trees. To achieve an even application, mix borax or Solubor in the required amounts in water and spray on the ground. A short term response can be obtained from spraying the foliage with Solubor at a rate of 100 g/100 L water.

Dead limbs on trees



53. Heavy scale infestation

Upper: dead limb from white peach scale infestation. Lower left: close-up of San José scale. Lower right: close-up of white peach scale.

Cause. The scale insects *Comstockaspis perniciosus* (San José scale) and *Pseudaulacaspis pentagona* (white peach scale).

Solution. If trees are in leaf, spray with an appropriate non-oil chemical from the *Problem solver handy guide*. Follow label directions. If trees are dormant (up to budswell), spray with winter oil. Follow label directions.

In future during winter, monitor 20 randomly chosen trees per hectare for evidence of scale. If found, spray immediately with winter oil. Check trees again at budswell and re-spray with winter oil if scale is detected. Continue to check trees throughout the growing season, and if scale is detected, spray with an appropriate non-oil chemical from the *Problem solver handy guide*. Follow label directions. An opportune time to spray is in September when the young crawler scales are most susceptible.

Use high volume sprays to ensure the entire tree, including the trunk, is thoroughly wetted. Regularly remove and burn dead twigs and limbs.



Dead limbs on trees



54. Dieback fungus disease

Photo shows brackets of the fungus on a large pruning cut.

Cause. The fungus *Schizophyllum commune*. Other wood-rotting fungi that may cause dieback are *Trametes versicolor*, *Trametes velutina*, *Pycnoporus coccineus*, *Stereum strigosozonatum* and *Stereum purpureum*.

Solution. The only immediate treatment is to prune out and burn badly affected limbs. Avoid leaving pruning stubs as these are potential entry points for the fungus. Paint large pruning cuts with white plastic paint or tree sealing compound, preferably one with an anti-mould additive.



55. Phytophthora trunk canker disease

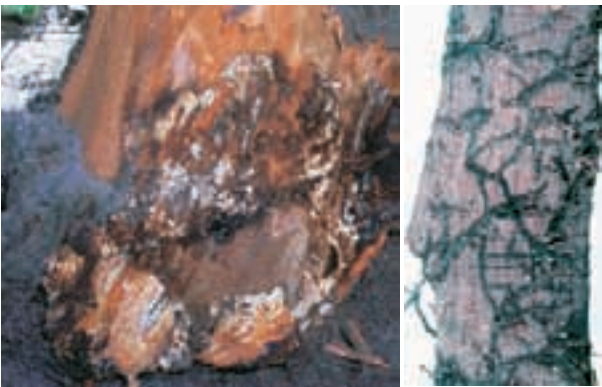
Upper: typical dead limb showing gum oozing from the dead area. Note that bacterial canker disease may produce similar gumming (see page 9 of this section). Lower: close-up of a brown canker in the wood at ground level (bark removed).

Cause. The fungus *Phytophthora cinnamomi*.

Solution. Treat affected trees with an appropriate chemical from the *Problem solver handy guide*. Follow label directions. Buy disease-free trees growing in a well drained potting mix. Plant in well drained sites and stake newly planted trees to prevent wind moving the trees and damaging the bark at ground level. Mulch the ground under the trees to prevent soil splashing on to the trunks.



Dead limbs on trees



56. Armillaria root rot disease

Upper: severely affected tree showing extensive limb death. Lower left: exposed wood at the base of the trunk showing the white fungal growth under the bark. Lower right: 'shoestrings' of the fungus growing on a large root.

Cause. The fungus *Armillaria luteobubalina*.

Solution. There is no cure for affected trees. Remove diseased trees with as many roots as possible and burn. Before replanting affected sites, either fumigate the soil or leave fallow for at least two years. Avoid planting trees in areas where old tree roots and stumps are present.

Poor growth of trees with leaf fall



57. Nitrogen deficiency or nematode damage

Upper: general symptom. Lower: roots affected by root-knot nematode, one of two common nematodes affecting stonefruit. Note the lumps on the roots.

Cause. Insufficient nitrogen available to the plant or infestation by the nematodes *Meloidogyne* spp. (root-knot nematode) or *Pratylenchus penetrans* (root-lesion nematode). Nitrogen deficiency commonly develops after harvest.

Solution. Do a leaf analysis to check whether nitrogen deficiency is responsible. If confirmed, get some expert advice on your fertiliser program. More nitrogen may be necessary after heavy leaching rains. Water trees well right up to dormancy.

If the problem is not nitrogen deficiency, do a nematode soil test. If nematodes are a problem, there is little that can be done in the existing orchard apart from maintaining good irrigation and fertiliser programs. When replanting, use trees propagated on rootstocks such as Okinawa and Flordaguard, which are more resistant to nematodes. Rest replant sites for at least one year while growing a green manure crop in and around the site. Choose a green manure crop that is not a host of either nematode.