This section was updated in 2005 and is available from the Queensland Government Bookshop

Strawberry information kit

Reprint – information current in 1997

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 1997. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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 1997. 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 the strawberry 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 inevitably 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 of 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 the photos of the causes, and beside the photos, the solutions.

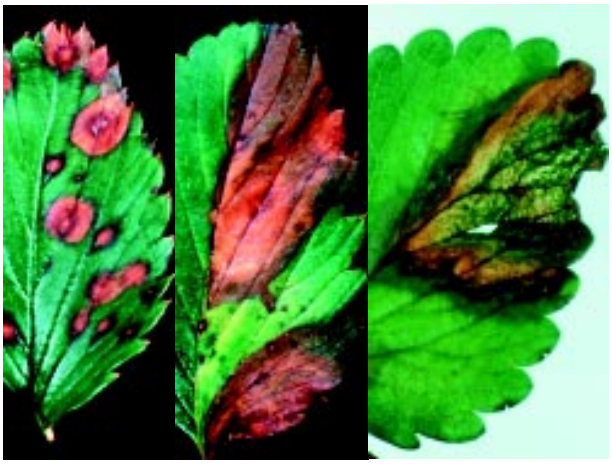
Contents

Spots or marks on leaves

1. Scorch disease

Diplocarpon earlianum

Solution. Maintain a weekly spray schedule using an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Remove old dead leaves three or four weeks after planting and burn or bury.



2. Blight disease

Left & centre: *Phomopsis obscurans*. Right: *Gnomonia comari*. Spots also occur on leaf stalks. *Gnomonia* is generally only a problem in runners from southern states.

Solution: Maintain a weekly spray schedule using an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Good control of *Gnomonia* is difficult, particularly in wet weather. In future, check plants grown from southern runners every day or two for the first month after planting, remove the first diseased leaves that appear, and burn or bury.

3. Eye spot disease

Mycospharella fragariae.

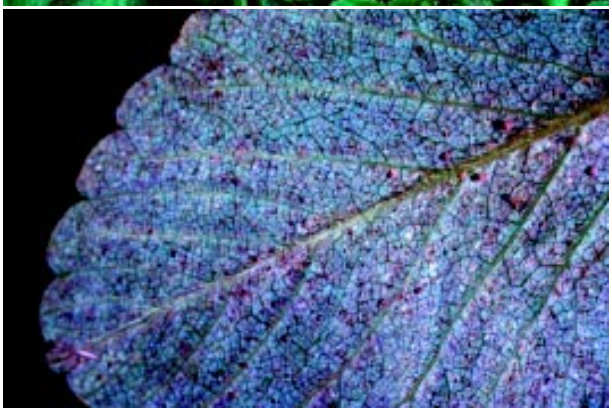
Solution. Maintain a weekly spray schedule using an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Remove old dead leaves three or four weeks after planting and burn or bury.

4. Spray damage

Two common types of damage shown.

Solution: First check that the chemicals being mixed are compatible. Then check that the correct rates are being applied. Check sprayer nozzles for wear and replace where necessary. Re-calibrate the sprayer. Spray during the morning and early afternoon when the spray dries more quickly.

Red or purple leaves



5. Spider (two spotted) mite damage

Tetranychus urticae. Upper: overall view showing the leaf purpling. Lower: closeup of the undersurface of an affected leaf showing the tiny mites and their fine webbing.

Solution: If the damage is as severe as shown in the photo, spray immediately with an appropriate chemical selected from the *Problem Solver Handy Guide*. Follow label directions. Then monitor mite populations every week to fortnight. You can do this yourself, but preferably engage the services of a pest consultant. When mite populations reach a level of five mites per leaf, release predatory mites (or spray if after August).

6. Lethal yellows disease

Mycoplasma-like organism. Note the small yellow inner leaves.

Solution: There is no cure for this disease. Remove affected plants and burn or bury. In future, use certified runners and control weeds around the patch.

7. Potassium or magnesium deficiency

It is difficult to differentiate between these deficiencies in the field.

Solution: Get a leaf or sap analysis done to identify which nutrient is responsible. Apply fertiliser as indicated by the analysis results.

Yellow leaves–1

8. Paraquat herbicide damage

Caused by uptake of herbicide by roots growing under the interrow mulch.

Solution: There is no cure but mildly affected plants gradually grow out of the problem. In future, avoid using paraquat or similar herbicides when rain is expected.

9. Iron deficiency

Generally induced by excessive applications of lime or dolomite or its incorrect placement.

Solution: Mildly affected plants often grow out of the problem without treatment. A foliar spray of iron chelate may quickly overcome the problem. In future, check soil pH to determine liming requirement. Then apply lime or dolomite well before planting and evenly incorporate it into the intended root zone.

10. Zinc, manganese or copper deficiency.

Two types of symptoms shown. It is difficult to differentiate between these deficiencies in the field.

Solution: Get a leaf analysis done to identify which nutrient is responsible. Apply fertiliser as indicated by the analysis results.

11. Spider (two spotted) mite damage

Tetranychus urticae. Healthy leaf at left for comparison.

Solution: If the damage is as severe as shown in the photo, spray immediately with an appropriate chemical selected from the *Problem Solver Handy Guide*. Follow label directions. Then monitor mite populations every week to fortnight. You can do this yourself, but preferably engage the services of a pest consultant. When mite populations reach a level of five mites per leaf, release predatory mites (or spray if after August).

Yellow leaves–2

12. Glyphosate herbicide damage

Caused by drift of herbicide onto the plant.

Solution: There is no cure but mildly affected plants may gradually grow out of the problem. In future, avoid using any glyphosate herbicide in the strawberry patch. Also, prevent drift of herbicide from spraying carried out in the vicinity of the patch.

White or silver leaves

13. Powdery mildew disease

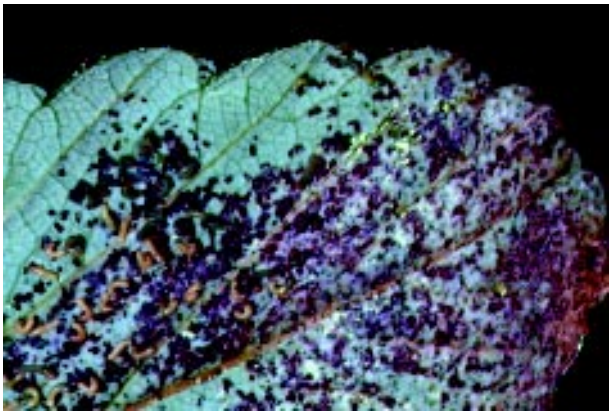
Sphaerotheca macularis

Solution: The weekly spray schedule maintained for black spot normally keeps this disease in check. Where additional control is required, use a chemical from the *Problem Solver Handy Guide*. Follow label directions.

14. Wind damage

Solution: There is no immediate cure for this problem. In future, look at improving windbreaks around the patch.

Chewed leaves–1



15. Cluster caterpillar damage

Spodoptera litura

Solution: First check that the damage is serious enough to warrant spraying. You need to have more than one plant in 250 damaged to make it worth spraying. Where necessary, spray with an insecticide from the *Problem Solver Handy Guide*. Follow label directions. Small outbreaks are best handled by removing infested leaves by hand.

16. Grasshopper damage

Atractomorpha crenaticeps. Generally not a major problem. Occurs mostly in summer in ratoon plants.

Solution: Where leaf damage is significant and crowns are damaged, spray with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

17. Light brown apple moth damage

Epiphyas postvittana. Note the leaves rolled together. Generally only a problem in cooler, inland areas.

Solution: Where necessary, spray with an appropriate insecticide from the *Problem Solver Handy Guide*. Follow label directions.

18. Cutworm damage

Agrotis spp. Mainly a problem in new plants. Left: damaged leaves. Right: closeup of cutworm.

Solution: First check that the damage is serious enough to warrant spraying. You need to have more than one plant in 250 damaged to make it worth spraying. Where necessary, spray with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

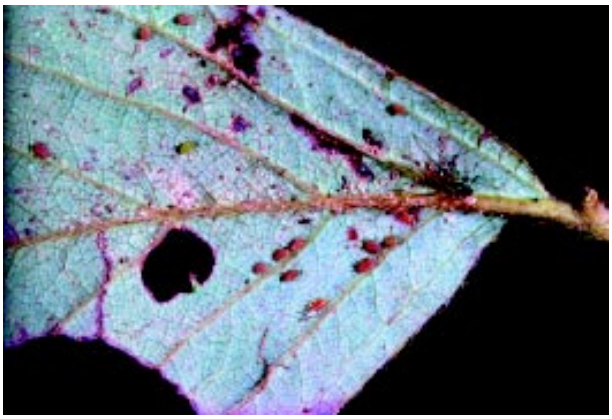
Chewed leaves–2

19. Looper caterpillar damage

Chrysodeixis spp. Caterpillar magnified. Note the hole chewed in the leaf.

Solution: Generally not serious enough to warrant treatment. Small outbreaks are best handled by removing caterpillars by hand.

Small green or brown insects on leaves



20. Aphids

Chaetosiphon fragaefolii, *Aphis gossypii* and *Myzus persicae*.

Solution: Generally well controlled by natural predators, and spraying is rarely needed. Where aphid populations reach more than 45 per leaf, spray with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

Brown margins or tips on leaves

21. Salt damage

Solution: Do not apply any more fertiliser until the problem has been investigated. Get an analysis done on your irrigation water. Get a leaf analysis done, and follow the advice of the leaf analysis laboratory. If your water analysis results are satisfactory, water heavily to leach the salt out of the root zone.

22. Calcium or boron deficiency

It is difficult to differentiate between these deficiencies in the field.

Solution: Get a leaf analysis done to check which nutrient is responsible. Apply fertiliser as indicated by the analysis results.

Crinkled and distorted leaves

23. Bud nematode or crimp

Aphelenchoides besseyi

Solution: First check that the problem is serious enough to warrant treatment. In fruiting plants, it is only worth treating if symptoms occur before the end of April and more than one plant in 100 is affected. Where necessary, apply an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

24. Boron or calcium deficiency

It is difficult to differentiate between these deficiencies in the field.

Solution: Get a leaf analysis done to check which nutrient is responsible. Apply fertiliser as indicated by the analysis results.

Damaged flowers–1

25. Frost damage

Note the blackened centres of the flowers

Solution: Prevent further damage by overhead sprinkler irrigation during the night and early morning while temperatures are below 1°C. Install either a frost alarm to alert you when to start the pump, or a thermostat on the pump to do this automatically.

26. Green petal disease

Mycoplasma-like organism

Solution: There is no cure for this disease. Pull out and burn or bury affected plants to stop the disease from spreading. In future, use certified runners and control weeds around the patch.

Damaged flowers–2

27. Corn earworm

Helicoverpa armigera. Cluster caterpillar (*Spodoptera litura*) causes similar damage.

Solution: First check that the damage is serious enough to warrant spraying. You need to have more than six damaged flowers per 1000 plants to make it worth spraying. Where necessary, spray with an appropriate insecticide from the *Problem Solver Handy Guide*. Follow label directions. Small outbreaks are best handled by removing the caterpillars by hand.

Brown caps on fruit

28. Blight disease

Phomopsis obscurans and/or *Gnomonia comari*. Note the diseased area extending from the caps into the fruit. See also leaf disease symptoms on page 2.

Solution: Maintain a weekly spray schedule using an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Good control of Gnomonia is difficult, particularly in wet weather. Thorough spraying is essential.

Poorly coloured fruit

29. Albinism

Induced by high soil nitrogen levels and overcast weather.

Solution: Do not apply any nitrogen fertiliser until a leaf or sap analysis has been done to confirm the problem. Then manage future applications of nitrogen fertiliser using sap analysis.

30. Ripening problem

Note white tip and shoulders compared to the normal fruit.

Solution: Keep the fruit on the plant for another day or two to allow tips and shoulders to colour properly.

Spots, soft areas or mouldy areas on fruit–1

31. Black spot disease

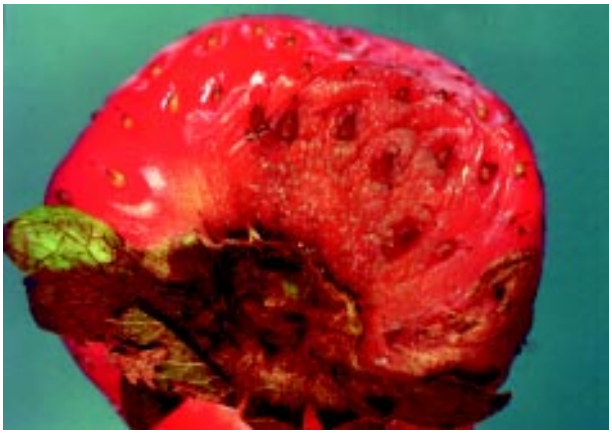
Colletotrichum acutatum. Early symptoms on right.

Solution: Spray weekly with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Remove diseased fruit from the patch at each pick.

32. Leak disease

Rhizopus stolonifer

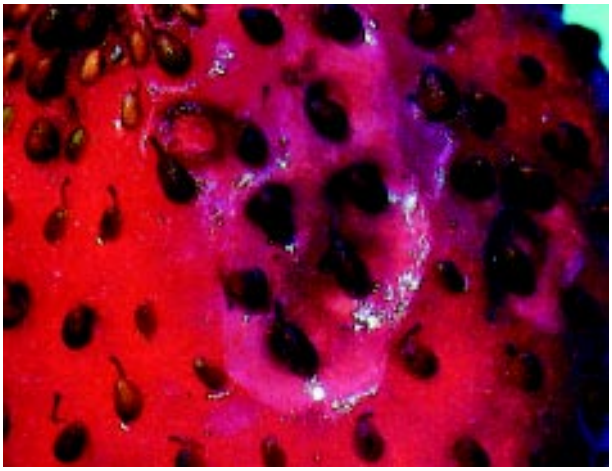
Solution: Remove overripe and diseased fruit from the patch at each pick.



33. Blight disease

Phomopsis obscurans and/or *Gnomonia comari*. Note the diseased area extending from the cap into the fruit. The cap has been cut away for easy viewing. See also leaf disease symptoms on page 2.

Solution: The weekly spray schedule maintained for black spot control normally keeps this disease in check. Good control of *Gnomonia* is difficult, particularly in wet weather. Thorough spraying is essential.



34. Tan brown rot disease

Discohainesia oenotherae. Fruit fly damage and rain damage cause similar symptoms.

Solution: First make sure you have correctly diagnosed the problem. Check to see if there are any fruit fly maggots in the fruit. If so, spray with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Fruit fly is generally only a problem in late spring and summer. It is worse in hydroponic systems where the plants are elevated well above ground. The weekly sprays applied for black spot should keep tan brown rot in check. Nothing can be done about rain damage apart from avoiding susceptible varieties such as Parker and Pajaro.

Spots, soft areas or mouldy areas on fruit–2

35. Grey mould disease

Botrytis cinerea. Favoured by dense plantings where plants grow together.

Solution: Spray with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Remove diseased fruit from the patch at each pick. In future, plant runners wider apart to allow better air circulation.

36. Leather rot disease

Phytophthora nicotianae. Left: dry weather symptom. Right: mould produced in wet weather. Disease is worse where water ponds in and around the fruit.

Solution: There is no available chemical control for this disease. Remove the diseased fruit from the patch. In future, improve drainage within the patch and build good hills to prevent water ponding on the plastic mulch.

37. Powdery mildew disease

Sphaerotheca macularis

Solution: The weekly spray schedule maintained for black spot control normally keeps this disease in check. Where additional control is required, use a chemical from the *Problem Solver Handy Guide*. Follow label directions.

No seeds on fruit

38. Mice damage

Unaffected fruit on left for comparison.

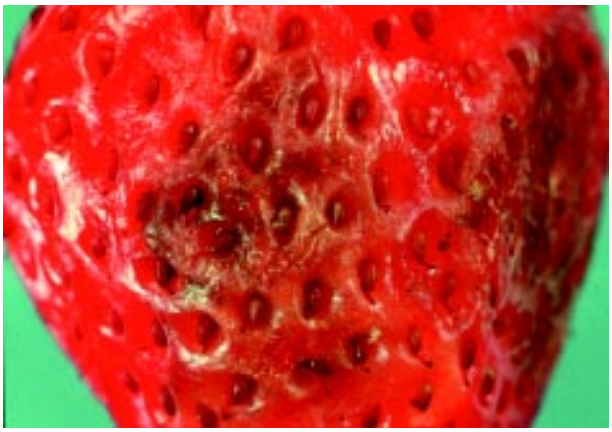
Solution: First check that the damage is serious enough to require action. Mice are best controlled with baits. However, a permit to bait is first required from the National Parks and Wildlife Service.

Brown rusty areas on fruit

39. Heat scald

Generally only a problem in late spring and summer.

Solution: Increasing the amount and frequency of watering may help. Shadecloth covers can be used in extreme cases.



40. Tan brown rot disease

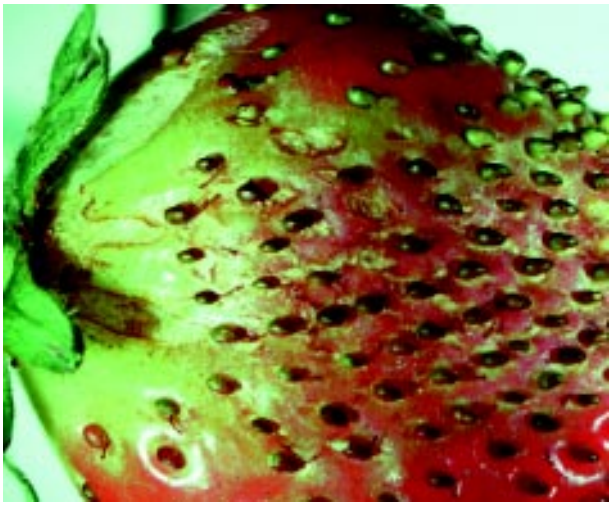
Discohainesia oenotherae

Solution: Not generally serious enough to warrant treatment. The weekly sprays applied for black spot control normally keep tan brown rot in check.

41. Sunburn

Generally only a problem in late spring and summer.

Solution: Increasing the amount and frequency of watering may help. Shadecloth covers can be used in extreme cases.



42. Powdery mildew disease

Sphaerotheca macularis. Spray damage looks similar. It is difficult to differentiate between powdery mildew and spray damage in the field.

Solution: For powdery mildew, the weekly spray schedule maintained for black spot control normally keeps this disease in check. Where additional control is required, use a chemical from the *Problem Solver Handy Guide*. Follow label directions. For spray damage, first check that the chemicals being mixed are compatible. Then check that the correct rates are being applied. Check sprayer nozzles for wear and replace where necessary. Re-calibrate the sprayer. Spray during the morning and early afternoon when the spray dries more quickly.

Distorted fruit

43. Poor pollination, frost damage or Rutherglen bug damage

Rutherglen bug: *Nysius vinitor*. Upper left and right: two types of symptoms shown. Photo at right shows an unaffected fruit for comparison. Lower: Rutherglen bugs in a flower. A winged adult is shown on the right of the photo. The other bugs are immature nymphs.

Solution: First check to see if there are any Rutherglen bugs in the patch. If so, spray with a chemical from the *Problem Solver Handy Guide*. Follow label directions. If there are no bugs present, check that your overhead watering system for frost control is working properly. There is little that can be done about poor pollination. Most poor pollination results from a couple of days of wet weather during flowering. Introduction of beehives may help in other instances.

44. Frogmouth

Caused by rapid changes in temperature. Parker is the variety most commonly affected.

Solution: None.

45. Boron or calcium deficiency

Solution: Get a leaf analysis done to check which nutrient is responsible. Apply fertiliser as indicated by the analysis results.

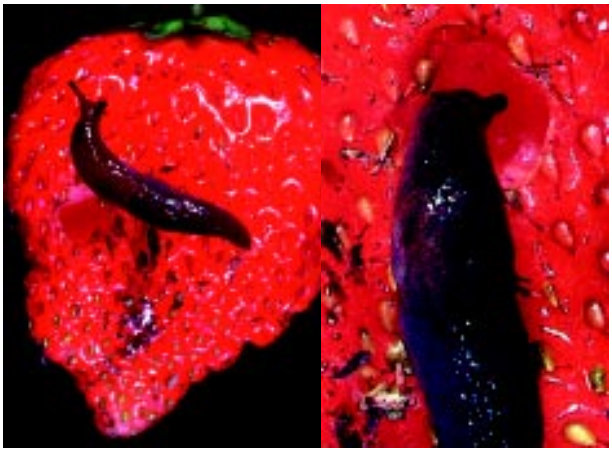
Black fruit

46. Leather rot disease

Phytophthora nicotianae

Solution: There is no available chemical control for this disease. Remove the diseased fruit from the patch. In future, improve drainage within the patch and build good hills to prevent water ponding on the plastic mulch.

Holes and splits in fruit–1



47. Slug damage

Deroceras reticulatum, *Deroceras caruanae*, and *Milax gagates*. Left: overall view. Right: closeup of damage.

Solution: First check that the damage is serious enough to warrant treatment. You need to have more than five damaged fruit per 100 metres of row to make it worth treating. Where necessary, place snail baits throughout the patch. Select baits from the *Problem Solver Handy Guide*. Follow label directions.

48. Rain damage

Field symptom. Inset: closeup of damaged fruit.

Solution: Nothing can be done within the existing crop. In future, avoid varieties which are highly susceptible to rain damage such as Parker and Pajaro.

49. Powdery mildew disease

Sphaerotheca macularis

Solution: The weekly spray schedule maintained for black spot control normally keeps this disease in check. Where additional control is required, use a chemical from the *Problem Solver Handy Guide*. Follow label directions.

50. Corn earworm damage

Helicoverpa armigera

Solution: First check that the damage is serious enough to warrant spraying. You need to have more than six damaged fruit per 1000 plants to make it worth spraying. Where necessary, spray with an appropriate insecticide from the *Problem Solver Handy Guide*. Follow label directions. Small outbreaks are best handled by removing the caterpillars by hand.

Holes and splits in fruit–2

51. Cluster caterpillar damage

Spodoptera litura. Young caterpillar stage at bottom of fruit.

Solution: First check that the damage is serious enough to warrant spraying. You need to have more than six damaged fruit per 1000 plants to make it worth spraying. Where necessary, spray with an insecticide from the *Problem Solver Handy Guide*. Follow label directions. Small outbreaks are best handled by removing caterpillars by hand.

Leafy growths on fruit

52. Phyllody or leafy fruit

Generally a problem only in cool stored runners dug in warm autumn or winter conditions.

Solution: There is no cure for this problem. It is generally confined to only the first few flower clusters produced.

Death or poor growth of new plants

53. Establishment stress syndrome

Worse in immature runners supplied with leaves removed, or where runners have been mishandled.

Solution: There is no cure for this problem. If runners are still available, replant affected sites. In future, handle runners very carefully before, during and immediately after planting.

Wilting and death of established plants–1

54. Crown rot disease

Fusarium oxysporum and/or *Phytophthora nicotianae*.

Solution: There is no cure for this disease. Remove affected plants and burn or bury to stop the disease from spreading. In future, fumigate the soil before planting and use certified runners.

Left: Fusarium crown rot (*Fusarium oxysporum*).

Left: Phytophthora crown rot (*Phytophthora nicotianae*).

Left: internal crown symptoms. On the right of the photo is an affected crown showing the brown discoloration. Healthy crown at left of the photo for comparison.

55. Base rot disease

Sclerotium rolfsii. Note the small 'peppercorns' (resting bodies of the fungus) at the base of the leaf stalks.

Solution: Generally not serious enough to warrant treatment. Trimming affected leaves from plants will help in recovery.

Wilting and death of established plants–2

56. Colletotrichum crown rot

Colletotrichum gloeosporioides. Produces a brown internal discoloration of the crown similar to that shown for crown rot disease on page 16. It is difficult to distinguish between crown rots in the field.

Solution: There is no cure for this disease. Remove affected plants and burn or bury to stop the disease from spreading.

57. Fusarium wilt

Fusarium oxysporum f.sp. *fragariae*. Left: affected plant showing the wilting and death of the older leaves. Right: closeup of affected crown showing the brown discoloration of the water conducting tissue.

Solution: There is no cure for this disease. Remove affected plants and burn or bury to stop the disease from spreading. In future, plant certified runners and fumigate the soil before planting.

58. White grub damage

Rhopaea magnicornis, *Anoplognathus porosis* and *Repsimus aeneus*. White grub shown amongst damaged roots.

Solution: There is no treatment for affected plants. In future, cultivate the soil thoroughly before planting.

Outer ring of dead leaves on plants

59. Verticillium wilt

Verticillium dahliae

Solution: There is no cure for this disease. Remove affected plants and burn or bury to stop the disease from spreading. In future, fumigate the soil before planting.

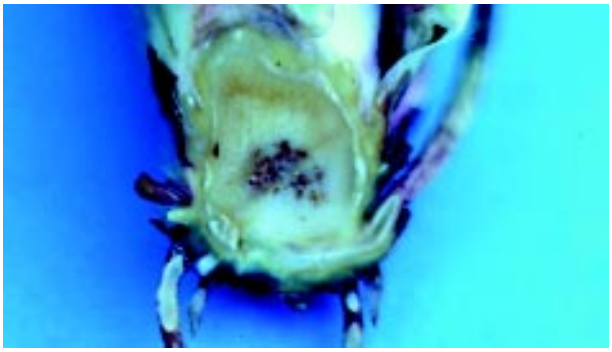
Plants look flattened and grow poorly

60. Bud nematode (crimp) or nitrogen stunt syndrome

Left: an affected plant in the centre with healthy plants above and below.

Bud nematode. *Aphelenchoides besseyi*. Left: close up of an affected plant showing crinkling and distortion of the centre leaves.

Solution: First check that the problem is serious enough to warrant treatment. In fruiting plants, it is only worth treating if symptoms occur before the end of April and more than one plant in 100 is affected. Where necessary, apply an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.



Nitrogen stunt syndrome. Left: cut crown of an affected plant showing the brown flecking in the centre.

Solution: Do not apply any more nitrogen fertiliser until a leaf or sap analysis has confirmed the problem. Then manage fertiliser application by sap analysis. Plants may grow out of the problem once growing conditions improve. In future, use preplant soil analysis and leaf/sap analysis to direct rates of use of fertiliser.

61. Lethal yellows disease

Mycoplasma-like organism

Solution: There is no cure for this disease. Remove affected plants and burn or bury. In future, use certified runners and control weeds around the crop.