

Potato 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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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 potato 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 causes, and on the page opposite, the solutions.

Contents

Leaves	Spots on leaves	3
	Rolled leaves	3
	Ragged or shredded leaves	3
	Yellow leaves	4
	Tunnelling in leaves	7
	Dried out leaves	7
	Purple young leaves	7
	Wilted leaves	7
	Wilted and dead leaves on one side of plant	8
	Stems	Slimy breakdown of stems
Dry rusty brown spots on stems and stolons		8
Bleached stems		8
Inky black rot of stems		8
Tubers	Rots of tubers	11
	Green tubers	11
	Milky oozing from tuber eyes	11
	Flabby tubers.....	12
	Yellow areas on tubers	12
	Secondary growth of tubers	12
	Raised black spots on tubers not removed by washing	12
	Bruising on tubers	12
	Scabs or rough skin on tubers.....	15
	Holes in tubers	16
	Disorders of water conducting tissues of tubers	19
	Abnormal growths from tubers	19
Hollow tubers	19	
Internal discolouration of tubers	20	
Plants	Poor plant emergence	20

Spots on leaves

1. Target spot

The cause. The fungus *Alternaria solani*. Spots also occur on stems.

The solution. No treatment is required during the last two weeks before harvest. Not likely to be a serious problem before tuber initiation unless prolonged wet weather occurs. During the remainder of the crop, maintain a regular spray program using appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions.

3. Irish or late blight

The cause. The fungus *Phytophthora infestans*. Spots also occur on stems.

The solution. Rarely a problem. Sprays applied for target spot will also normally protect against Irish blight. In future, use certified seed.

2. Manganese toxicity

The cause. High levels of available manganese in the soil. Occurs when the soil pH is low (acidic), the soil is waterlogged or when soil temperatures are high.

The solution. Avoiding overwatering is the only thing that can be done in existing crops. In future, raise soil pH above 5.5 using dolomite or lime and increase soil organic matter levels.

Rolled leaves

4. Leaf roll

The cause. Either leaf roll virus, or a nutritional/physiological disorder. Expert diagnosis is required to distinguish between these.

The solution. Poor nutrition is the only one of these problems that can be treated in the existing crop. Seek expert advice on your fertiliser program. To lessen the risk from leaf roll virus in future crops, use certified seed and control aphids early in the life of the crop. Physiological disorders require expert advice for identification and management.

Ragged or shredded leaves

5. Wind damage

The cause. Excessive exposure to strong winds.

The solution. In future, develop better windbreaks and where possible, plant rows in the direction of the main prevailing wind.

Spots on leaves



1. Target spot. Upper: overall symptoms. Lower: closeup of spot showing the target-like appearance.



2. Manganese toxicity



3. Irish or late blight. Upper: overall symptoms. Right: purple spores of the fungus on the underside of a leaf.

Rolled leaves



4. Leaf roll. Healthy plant on left for comparison.

Ragged or shredded leaves



5. Wind damage. Leaves dry out very quickly.

Yellow leaves



6. Calico disease



10. Old age



7. Verticillium wilt. When the stem is cut, a light brown discoloration of the water conducting tissues can be seen.

11. Fusarium wilt.
Note the yellowing of the lower leaves and the wilting of the upper leaves.



8. Nitrogen deficiency. Healthy plants on right for comparison.



9. Leaf roll virus. Healthy plants in foreground for comparison.



12. Herbicide damage. Note the yellowing of the veins. This distinguishes it from nutritional problems.

Yellow leaves

6. Calico disease

The cause. Alfalfa mosaic virus. Spread by aphids.

The solution. Generally not serious enough to require treatment.

7. Verticillium wilt

The cause. The fungus *Verticillium dahliae*.

The solution. There is no treatment for the affected crop. In future, use certified seed. Long term crop rotation with green manure crops will also help to reduce the levels of the fungus in the soil.

8. Nitrogen deficiency

The cause. Insufficient nitrogen fertiliser.

The solution. Seek expert advice on your fertiliser program.

9. Leaf roll virus

The cause. Leaf roll virus. Spread in infected seed and/or by aphids.

The solution. There is no treatment for the affected crop. In future, use certified seed and control aphids early in the life of the crop.

10. Old age

The cause. Natural ageing.

The solution. No treatment is necessary.

11. Fusarium wilt

The cause. Species of the fungus *Fusarium*. More serious in north Queensland.

The solution. There is no treatment for the affected crop. In future, use certified seed. Also develop a long term crop rotation program.

12. Herbicide damage

The cause. Root uptake of a triazine or substituted urea herbicide. Generally occurs in light textured soils when excessive overhead irrigation erodes soil containing the herbicide and concentrates it in particular parts of the field.

The solution. There is no treatment for the affected plants. In future, use registered herbicides with a low toxicity to potatoes and which are most appropriate for the weeds you are attempting to control. Always read the label carefully before use.

Tunnelling in leaves

13. Potato tuber moth

The cause. Larvae of the potato tuber moth *Phthorimaea operculella*.

The solution. Spray as necessary to keep the pest under control. Use appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions. Consider using a pest consultant to more effectively monitor your crop. Remove or destroy crop residues promptly after harvest.

Dried out leaves

14. Frost

The cause. Exposure to frost.

The solution. While air temperature is below 1°C, protect the leaves by continued overhead watering using a solid set irrigation system.

Purple young leaves

15. Purple top wilt

The cause. A phytoplasma (virus-like) organism. Spread by leafhoppers. Can be serious in autumn planted crops.

The solution. Although there is no treatment for affected plants, the spread of the disease may be limited by controlling leafhoppers. Use appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions. In future, use certified seed.

Wilted leaves

16. Bacterial wilt

The cause. The bacterium *Pseudomonas solanacearum*.

The solution. There is no treatment for the affected crop. In future crops, use certified seed and whole (round) seed. Also develop a crop rotation program which avoids planting potatoes, and other hosts such as tomatoes, in the same site for at least two and preferably five years.

17. Fusarium wilt

The cause. Species of the fungus *Fusarium*. More serious in north Queensland.

The solution. There is no treatment for the affected crop. In future, use certified seed. Also develop a long term crop rotation program.

18. Purple top wilt

The cause. A phytoplasma (virus-like) organism. Spread by leafhoppers. Can be serious in autumn planted crops.

The solution. Although there is no treatment for affected plants, the spread of the disease may be limited by controlling leafhoppers. Use appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions. In future, use certified seed.

Tunnelling in leaves



13. Potato tuber moth. Larvae tunnel between the upper and lower surfaces of the leaf.

Wilted leaves



16. Bacterial wilt. Healthy plant in background for comparison. Plants wilt quickly with the leaves initially remaining green.

Dried out leaves



14. Frost damage

Purple young leaves



15. Purple top wilt. Young leaves are smaller and 'bunched' together. See also photo No. 18.



17. Fusarium wilt. Note the wilting of the upper leaves. Also causes yellowing of the lower leaves.



18. Purple top wilt. Note the purpling of the young leaves, and the aerial tubers forming in the leaf axils.

Wilted and dead leaves on one side of plant



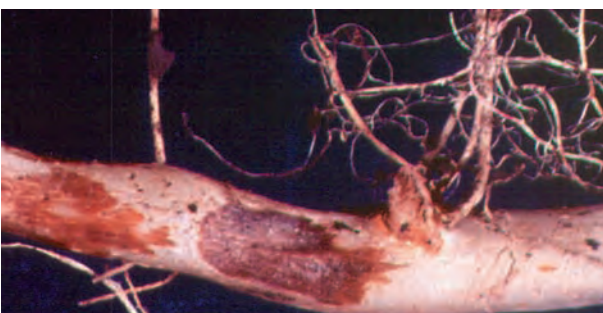
19. Verticillium wilt. Inset shows brown discoloration of water conducting tissues.

Slimy breakdown of stems



20. Slimy stem

Dry rusty brown spots on stems, roots and stolons



21. Black scurf

Bleached stems



22. Sclerotinia rot. Note that the disease commences with a wet rot producing a cotton like mould. The stem later dries to produce the bleaching symptom. Long black resting bodies of the fungus form inside the affected stems.

Inky black rot of stems



23. Blackleg

Wilted and dead leaves on one side of plant

19. Verticillium wilt

The cause. The fungus *Verticillium dahliae*.

The solution. There is no treatment for the affected crop. In future, use certified seed. Long term crop rotations with green manure crops will also help to reduce the levels of the fungus in the soil.

Slimy breakdown of stems

20. Slimy stem

The cause. Soft rot bacteria entering sunburnt stems when the tops of well grown crops lay over near crop maturity. Develops rapidly in cold, overcast, wet conditions in crops damaged by wind.

The solution. There is no treatment for the affected crop. In future, manage nitrogen fertiliser more carefully to avoid crops which are too 'well grown'.

Dry rusty brown spots on stems, roots and stolons

21. Black scurf

The cause. The fungus *Rhizoctonia solani*.

The solution. There is no treatment for the affected crop. In future crops, use certified seed and treat it with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Also prepare land early so previous crop residues decompose fully. Develop a long term crop rotation program.

Bleached stems

22. Sclerotinia rot

The cause. The fungi *Sclerotinia sclerotiorum* and *Sclerotinia minor*.

The solution. Spray with appropriate chemicals from the *Problem Solver Handy Guide*. Further sprays may be required during cooler weather. Follow label directions. Also develop a long term crop rotation program.

Inky black rot of stems

23. Blackleg

The cause. Species of the bacterium *Erwinia*.

The solution. There is no treatment for the affected crop. In future crops, use certified seed and clean and disinfect seed cutting and handling equipment. Develop a long term crop rotation program.

Rots of tubers

24. Phoma rot (dry rot)

The cause. Species of the fungus, *Phoma*. This disease increases with length of storage, particularly under high temperatures.

The solution. In future, use certified seed. Harvest as soon as the crop is mature. Store harvested potatoes under cool well ventilated conditions. Develop a long term crop rotation program.

25. Fusarium rot

The cause. Species of the fungus *Fusarium*. This disease increases with length of storage, particularly under high temperatures.

The solution. In future crops, use certified seed. Harvest as soon as the crop is mature. Store harvested potatoes under cool well ventilated conditions. Develop a long term crop rotation program.

26. Sclerotinia rot

The cause. The fungi, *Sclerotinia sclerotiorum* and *Sclerotinia minor*.

The solution. In future, use certified seed. Harvest as soon as the crop is mature. Store harvested potatoes under cool well ventilated conditions. Develop a long term crop rotation program.

27. Blackleg and soft rot

The cause. Species of the bacterium *Erwinia*. Can be serious if tubers have been washed in a contaminated washing plant.

The solution. In future, use certified seed and whole (round) seed. Minimise tuber damage at harvest. Allow tubers to heal before sending to market, particularly when harvested in summer. Develop a long term crop rotation program.

Green tubers

28. Green skin

The cause. Exposure to light.

The solution. In future, keep tubers well covered by soil. Also do not store tubers in situations exposed to sunlight or artificial light.

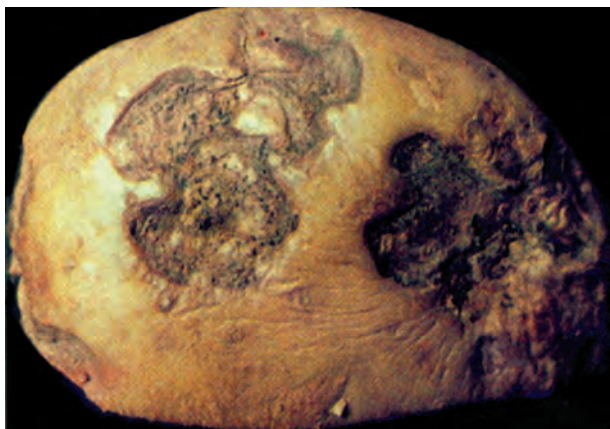
Milky ooze from tuber eyes

29. Milky eye

The cause. The bacterium *Pseudomonas solanacearum*.

The solution. In future, use certified seed and whole (round) seed. Clean and disinfect seed cutting and handling equipment. Develop a long term crop rotation program which avoids planting potatoes, and other host plants such as tomatoes, in the same site for at least two and preferably five years

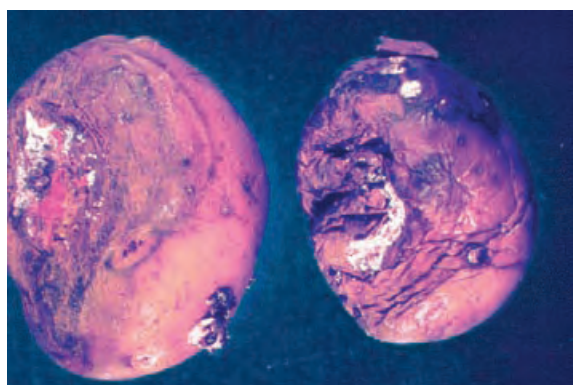
Rots of tubers



24. Phoma rot (dry rot). Note the small black dots on the affected areas.



27. Blackleg and soft rot. Affected tubers have a very unpleasant smell.

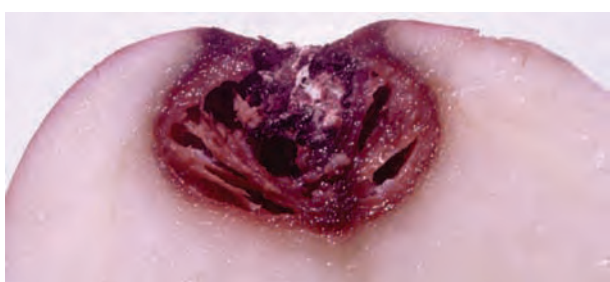


25. Fusarium rot. Note the white or pink strands of fungus on the surface of the tuber.

Green tubers



28. Green skin



26. Sclerotinia rot. Upper: external symptoms. Lower: internal symptoms.

Milky ooze from tuber eyes



29. Milky eye

Flabby tubers



30. **Leaf roll virus.** Left: diseased tuber. Right: healthy tuber.

Secondary growth of tubers



33. **Lumpy tubers**

Raised black spots on tubers not removed by washing



34. **Black scurf**



31. **Purple top wilt**

Yellow areas on tubers



32. **Sunburn.** Note the clearly defined margin of the affected area.

Bruising on tubers



35. **Blue spot**

Flabby tubers

30. Leaf roll virus

The cause. Plant affected by leaf roll virus. Virus spread in infected seed and/or by aphids.

The solution. In future, use certified seed and control aphids early in the life of the crop.

31. Purple top wilt

The cause. Plant affected by a phytoplasma (virus-like) organism. Spread by leafhoppers. Can be serious in autumn planted crops.

The solution. In future, control leafhoppers by spraying with appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions.

Yellow areas on tubers

32. Sunburn

The cause. Exposure to the sun, either when heavy rain erodes the hill or when harvest is delayed in hot weather in crops with little or no canopy remaining.

The solution. In future, form good hills to keep tubers covered with soil. Harvest as soon as the crop is mature.

Secondary growth of tubers

33. Lumpy tubers

The cause. Either purple top wilt or uneven growth from extremes of temperature.

The solution. In future, maintain even growing conditions and control leafhoppers by spraying with appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions.

Raised black spots on tubers not removed by washing

34. Black scurf

The cause. The fungus *Rhizoctonia solani*. Worse if harvesting is delayed in warm, moist soil.

The solution. In future, prepare land early so residues decompose fully before planting. Then use certified seed and treat it with an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions. Harvest as soon as the crop is mature.

Bruising on tubers

35. Blue spot

The cause. Mechanical damage during harvesting from either dry cloddy soil or harvesting equipment. Crisps made from bruised tubers develop a condition known as blue spot.

The solution. In future, do not harvest in dry cloddy soil unless it is first watered. Modify the harvesting and grading equipment to reduce damage. Do not drop tubers more than 15 cm on to hard surfaces.

Scabs or rough skin on tubers

36. Common scab

The cause. Species of the bacterium *Streptomyces*. Infection occurs through the lenticels of very young tubers. Mainly a problem in summer, particularly if insufficient water is supplied during the tuber setting and early enlargement stage. Often worse where animal manures have been used.

The solution. In future, avoid animal manures and use certified seed. Maintain adequate moisture levels for four weeks after tuber initiation. Develop a long term crop rotation program.

37. Powdery scab

The cause. The fungus *Spongospora subterranea*. Can be serious in winter crops in south Queensland.

The solution. In future, use less susceptible varieties such as Sebago and use certified seed. Develop a long term crop rotation program. If a serious problem, delay planting for a month or so.

38. Skinning

The cause. Mechanical damage during harvesting of immature potatoes.

The solution. In future, do not harvest potatoes before the skin has set.

39. Enlarged lenticels

The cause. Wet soils near harvest.

The solution. In future, improve soil drainage and do not overwater near harvest.

40. Root knot nematode

The cause. Species of the root knot nematode, *Meloidogyne*. Uncommon.

The solution. In future, use certified seed and avoid planting late maturing crops. Develop a long term crop rotation program.

41. Growth cracks

The cause. Uneven watering and poor fertilising. Some varieties are more susceptible than others.

The solution. In future, manage water and fertilisers more carefully.

42. Russet scab

The cause. Unknown. Most common when prolonged wet conditions occur before harvest.

The solution. No treatment available.

43. Armillariella rot

The cause. The fungus *Armillariella mellea*. A problem in newly cleared land only.

The solution. Before planting in newly cleared land, remove all tree stumps and large roots.

Scabs or rough skin on tubers



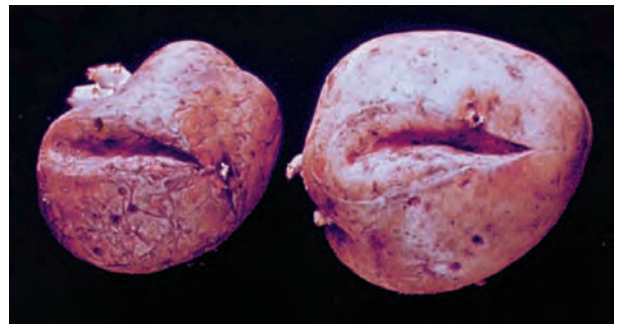
36. Common scab



40. Root knot nematode



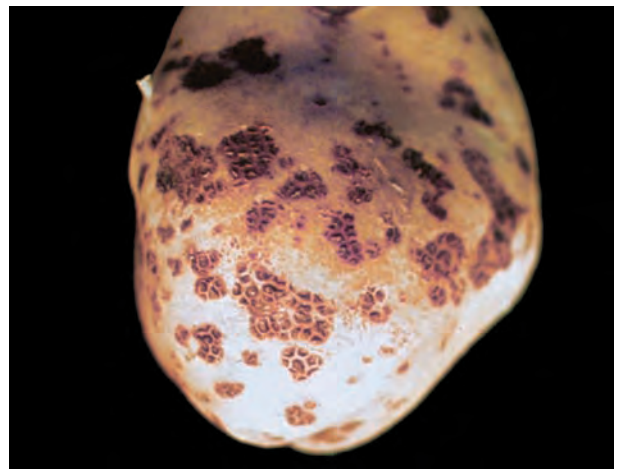
37. Powdery scab



41. Growth cracks



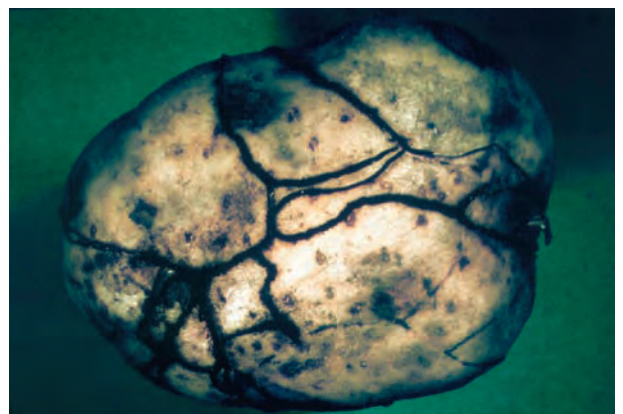
38. Skinning



42. Russet scab



39. Enlarged lenticels



43. Armillariella rot

Holes in tubers



44. Whitefringed weevil. Upper: external symptoms showing the white larvae of the weevil. Lower left: internal symptoms. Lower right: adult weevil.



47. Wireworm. Upper: internal and external symptoms. Lower: a wireworm larva.



45. Rodent damage



48. Crickets. Upper: internal and external symptoms. Lower left: adult mole cricket. Lower right: adult field cricket.



46. Potato tuber moth

Holes in tubers

44. Whitefringed weevil

The cause. Larvae of the whitefringed weevil *Graphognathus leucoloma*. Eggs are laid in summer and larvae remain in the soil until the following summer.

The solution. There is no short term treatment. Crop rotation will help in the long term.

45. Rodent damage

The cause. Mice or rats. Varieties with a higher sugar content, such as Pontiac, seem to be more susceptible.

The solution. In future, harvest as soon as the crop is mature.

46. Potato tuber moth

The cause. Larvae of the potato tuber moth *Phthorimaea operculella*. Moths gain access to the tubers through cracks in the soil or when tubers lose soil cover. Worse in spring and autumn.

The solution. In future, keep tubers covered with soil and irrigate to prevent soil cracking. Spray throughout the crop as necessary to keep the pest under control. Use appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions. Consider using a pest consultant to more effectively monitor the crop.

47. Wireworm

The cause. Larvae of the click beetle, *Elaeteridae* spp.

The solution. In future at planting, apply an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

48. Crickets

The cause. Mole crickets, *Gryllotalpa* spp., or field crickets *Teleogryllus* spp.

The solution. In future, spread baits whenever cricket activity is detected. Use an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

Disorders of the water conducting tissues of tubers

49. Bacterial wilt

The cause. The bacterium *Pseudomonas solanacearum*.

The solution. In future crops, use certified seed and whole (round) seed. Avoid using washed seed. Clean and disinfect seed cutting and handling equipment. Develop a long term crop rotation program which avoids planting potatoes, and other host plants such as tomatoes, in the same site for at least two and preferably five years.

50. Irish or late blight

The cause. The fungus *Phytophthora infestans*.

The solution. Rarely a problem. Sprays applied for target spot will also normally protect against Irish blight. In future, use certified seed.

51. Desiccant damage

The cause. Damage from desiccant sprays used for killing tops.

The solution. In future, do not apply desiccants when plants are stressed for water. Use the registered rate on the label to achieve a 'quick kill'.

52. Fusarium rot

The cause. Species of the fungus *Fusarium*. This disease increases with length of storage, particularly under high temperatures.

The solution. In future crops, use certified seed. Harvest as soon as the crop is mature. Store harvested potatoes under cool well ventilated conditions. Develop a long term crop rotation program.

Abnormal growths from tubers

53. Purple top wilt

The cause. A phytoplasma (virus-like) organism. Spread by leafhoppers. Can be serious in autumn planted crops. Most prevalent in dry seasons and where alternative host plants such as bellvine are present.

The solution. In future crops, control leafhoppers by spraying with appropriate chemicals from the *Problem Solver Handy Guide*. Follow label directions.

Hollow tubers

54. Hollow heart

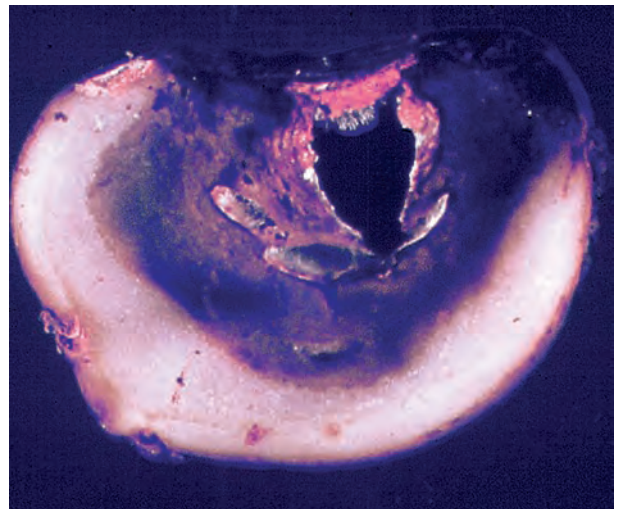
The cause. Uneven growing conditions. Most likely to occur in oversize tubers weighing more than 450 g. Some varieties such as Atlantic are more susceptible.

The solution. In future, improve water management to promote even growth. Close, regular plant stands will avoid tubers growing to an excessive size. Harvest as soon as the crop is mature.

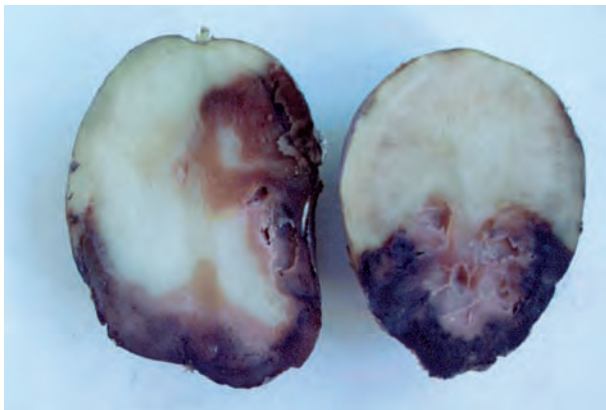
Disorders of the water conducting tissues of tubers



49. Bacterial wilt. A white ooze appears when pressure is applied.



52. Fusarium rot. Note the white or pink strands of fungus on the surface and inside the tuber.



50. Irish or late blight

Abnormal growths from tubers

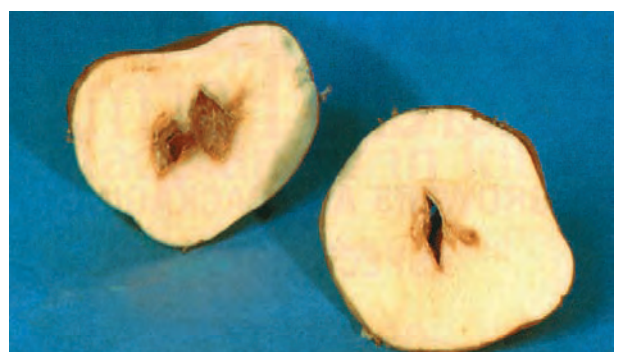


51. Desiccant damage



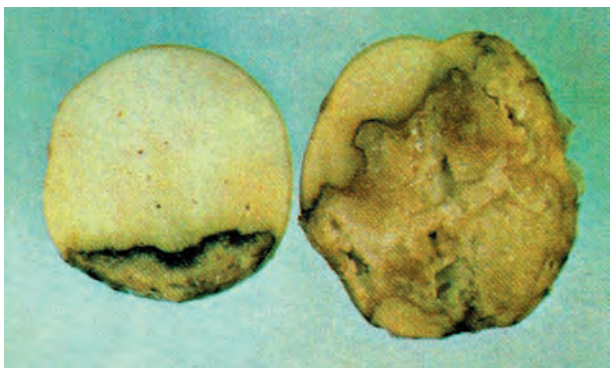
53. Purple top wilt

Hollow tubers

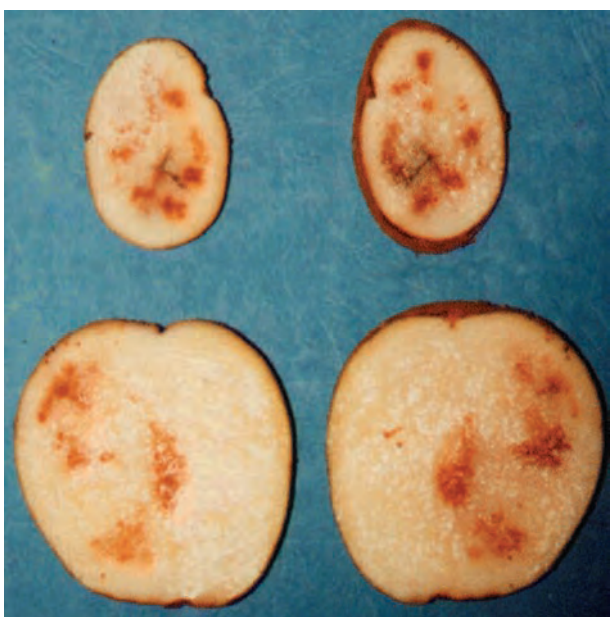


54. Hollow heart

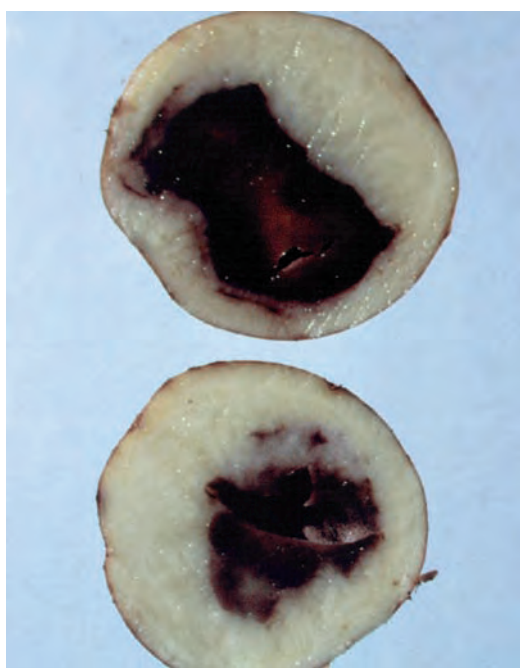
Internal discoloration of tubers



55. Blackleg



56. Brown fleck



57. Black heart

Poor plant emergence



58. Seedpiece breakdown. Healthy seedpiece and plant at left for comparison.



59. Old seed. Shoots do not emerge and the seedpiece produces one or more small tubers before decaying.



60. Little potato disorder. (tuberous shoots, submarines).

Internal discoloration of tubers

55. Blackleg

The cause. Species of the bacterium *Erwinia*.

The solution. In future, use certified seed and clean and disinfect seed cutting and handling equipment. Develop a long term crop rotation program.

56. Brown fleck

The cause. High soil temperatures during bulking. Calcium and/or boron deficiency is also believed to be involved.

The solution. In future, ensure calcium and boron levels are adequate, and do not plant susceptible varieties, such as Winlock, to mature in hot weather.

57. Black heart

The cause. A lack of oxygen from waterlogging and poor storage conditions.

The solution. In future, store tubers in well ventilated conditions. Do not store tubers under high temperatures. Manage irrigation to prevent waterlogging.

Poor plant emergence

58. Seedpiece breakdown

The cause. Unknown. The seedpiece breaks down and the lower stem and roots rot. Sebago is the most susceptible variety.

The solution. In future, treat seed with a chemical dust before planting. Use an appropriate chemical from the *Problem Solver Handy Guide*. Follow label directions.

59. Old seed

The cause. Seed held too long before planting. Seed stored in a cool room for longer than eight months is susceptible.

The solution. In future, store seed correctly. Refer to Section 4 for more detail on seed storage.

60. Little potato disorder (tuberous shoots, submarines)

The cause. Planting physiologically old seed, planting seed that has been stored under warm conditions into cold soil, or other undetermined causes. The seed potato shoots, but produces a small potato instead of a normal shoot. Occasionally the problem also occurs when good young seed is planted into soil at optimum temperatures of 15 to 17°C. The cause of this is as yet undetermined.

The solution. In future, when storing and handling seed, avoid high temperatures which accelerate ageing of seed. Refer to Section 4 for more detail on seed storage and handling. Do not plant until soil is at optimum temperatures of 15 to 17°C.