

Onion 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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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 onion 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.

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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 the solutions.

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Non-emergence or death of young seedlings



1. Uneven germination

There are three common causes of this problem—damping off, *Fusarium* root rot and stem girdling.

Damping-off

Cause. The fungus *Pythium* sp. It is a common soil organism, and increases rapidly in plant residue. Seed and young plants can be attacked.

Solution. Make sure any plant residue is incorporated early. Maintain a good crop rotation. Plant on beds and improve drainage. Treat seed with an appropriate chemical from the *Problem solver handy guide*.

Fusarium root rot

Cause. The soil-borne fungus *Fusarium* sp. It is common where onions have been grown regularly.

Solution. Maintain a good crop rotation.

Stem girdling

The cause. Heat, wind, soil crusting and emergence in high temperatures. Early plantings (mid February) are more prone to damage.

The solution. Avoid soil types prone to crusting. Ensure adequate soil moisture at emergence. Avoid plantings that emerge in high temperatures.



2. Manganese toxicity

Cause. High levels of available manganese. It is often associated with acid soils.

Solution. Ensure soil pH is higher than 5.8.

Spots or marks on leaves



3. Onion thrips

Cause. Feeding by the insect *Thrips tabaci*. Thrips are more common in a hot dry spring following a mild dry winter.

Solution. Control onion thrips, particularly in the latter stages of crop growth. Spray with an appropriate chemical from the *Problem solver handy guide*.

Spots or marks on leaves



4. Downy mildew

Cause. The fungus *Peronospora destructor*. It is spread by wind in cool weather. Downy mildew survives as spores in onion crop residues in the soil and on seed bulbs, then infects leaves. Wider spaced plantings allow better air flow and spray penetration.

Solution. Plant less susceptible varieties, for example Gladalan types. Ensure all crop residue is decomposed before planting. Plant rows wider apart. Spray with an appropriate chemical from the *Problem solver handy guide*. Refer also to the management strategy in Section 3, *Growing the crop*.



5. Phytophthora blight

Cause. The soil-borne fungus *Phytophthora nicotianae*. Spores are splashed onto leaves, causing a rapid blight of the leaf. It is worse where residues, for example from grading, have been dumped in the field. Generally only a minor problem in wet years.

Solution. Do not return shed residue to the field. Use a good crop rotation.

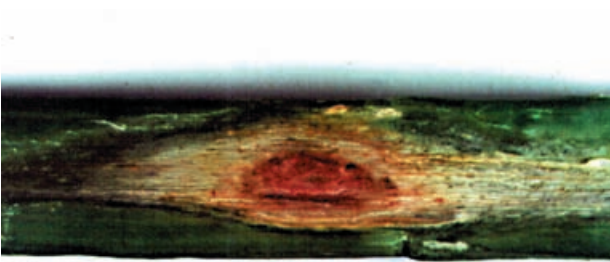


6. Chemical burn

Cause. Usually weedicide damage caused by using the wrong rates, wrong pressure or applying at the wrong growth stage. Minor leaf damage may appear even when weedicides are correctly applied.

Solution. Spray in calm weather. Do not add extra wetter. Do not spray in the heat of the day. Follow the label details regarding rates, pressure and stage of growth.

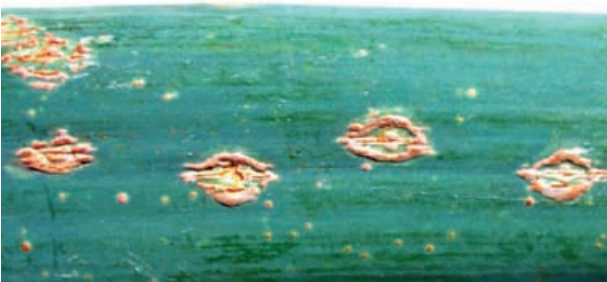
Spots or marks on leaves



7. Purple blotch

Cause. The fungus *Alternaria porri*. It survives on onion residue. Spores are spread in wet, windy weather or by overhead irrigation.

Solution. Ensure all crop residue is decomposed before planting. Spray with an appropriate chemical from the *Problem solver handy guide*.



8. Rust

Cause. The fungus *Puccinia allii*. It spreads quickly in warm, moist conditions. Rust is not normally found in commercial crops.

Solution. There are no chemicals registered for its control. Destroy volunteer plants and maintain crop rotation.

9. Root diseases

Yellowing of leaves



Cause. There are three soil-borne diseases that will destroy plant roots, resulting in poor nutrient uptake and yellow leaves. These are white rot (*Sclerotium cepivorum*), Fusarium wilt (*Fusarium* sp.) and pink root (*Pyrenochaeta terrestris*). Leaf symptoms are similar to Fusarium root rot, so you need to look at the roots.

White rot sclerotes survive in the soil for at least 15 years. They germinate in cool weather and attack seedlings and bulbs.

Fusarium wilt is common where onions have been grown regularly.

Cereal crops are alternative hosts for pink root, which is more active in warm weather.

Solution

White rot

Do not plant into infested areas for at least 10 years. Apply an appropriate chemical from the *Problem solver handy guide* as a field spray immediately after planting and in mid June. Take precautions to ensure infested soil or planting material is not brought into clean areas.

Fusarium wilt

Maintain a good crop rotation. Plant on beds and ensure good drainage.

Pink root

Rotate with non-susceptible crops. Do not plant an infested area in warm weather.

Yellowing of leaves



10. Zinc deficiency

Cause. Not enough zinc available to the plant.

Solution. Apply a foliar spray of 1 kg of zinc sulphate heptahydrate plus 1 kg of urea in 470 L of water per hectare. Take a soil analysis before planting future crops to show whether the soil is deficient in zinc. Apply a soil application before planting if necessary.



11. Leaf senescence

Cause. Natural ageing. The yellowing of leaves occurs when the nutrients move to the maturing bulbs.

Solution. None necessary.



12. Nitrogen deficiency

Cause. Not enough nitrogen available to the plant.

Solution. Ensure adequate levels of nitrogen are applied to the crop before bulbing.

Dieback of leaf tips



13. White rot

Upper: development of patches of white rot in field. Lower: healthy bulb on left for comparison; infected bulb on right.

Cause. The fungus *Sclerotium cepivorum*. It survives in the soil for at least 15 years as sclerotia. Sclerotia can be carried from infested to non-infested areas in soil and irrigation water. Harvesting machinery, tractors, implements and human feet can spread white rot mechanically. The sclerotia germinate in cool weather, attack seedlings and bulbs and reduce root growth.

Solution. Do not plant into infested areas for at least 10 years. Apply an appropriate chemical from the *Problem solver handy guide* as a field spray immediately after planting and in mid June. Take precautions to ensure infested soil or planting material is not brought into clean areas.



14. Fusarium root rot or pink root

It is difficult to distinguish between these problems on leaf symptoms. Pink root can be identified by examining the roots for pink discoloration.

Fusarium root rot

Cause. Species of the fungus *Fusarium*. It is common where onions have been grown regularly.

Solution. Rotate onions with other crops.

Pink root

Cause. The soil-borne fungus *Pyrenochaeta terrestris*. This fungus is more active in warm weather. Cereal crops are alternative hosts.

Solution. Rotate with non-susceptible crops. Do not plant an infested area in warm weather.



15. Phytophthora blight

Cause. The soil-borne fungus *Phytophthora nicotianae*. Spores are splashed onto leaves, causing a rapid blight of the leaf. It is worse where residues, for example from grading, have been dumped in the field. A minor problem in wet years.

Solution. Do not return shed residue to the field. Use a good crop rotation.

Dieback of leaf tips



16. Environmental stress

Note the leaf tips.

Cause. There are several causes of environmental stress, including poor water quality, insufficient water, waterlogging, poor nutrition and frost damage. Frequent, light irrigations increase the risk of salt damage.

Solution. If water quality is marginal, irrigate only at night and apply heavier, less frequent applications of water. Apply adequate water to maintain soil moisture. Ensure onions have good drainage. Apply extra nitrogen after waterlogging if required. Frost is not normally a major problem.



17. Downy mildew

Cause. The fungus *Peronospora destructor*. It is spread by wind in cool weather. Downy mildew survives as spores in onion crop residues in the soil and on seed bulbs, then infects leaves. Wider spaced plantings allow better air flow and spray penetration.

Solution. Plant less susceptible varieties, for example Gladalan types. Ensure all crop residue is decomposed before planting. Plant rows wider apart. Spray with an appropriate chemical from the *Problem solver handy guide*. Refer also to the management strategy in Section 3, *Growing the crop*.

Blue grey mould on leaves



18. Downy mildew

Cause. The fungus *Peronospora destructor*. It is spread by wind in cool weather. Downy mildew survives as spores in onion crop residues in the soil and on seed bulbs, then infects leaves. Wider spaced plantings allow better air flow and spray penetration.

Solution. Plant less susceptible varieties, for example Gladalan types. Ensure all crop residue is decomposed before planting. Plant rows wider apart. Spray with an appropriate chemical from the *Problem solver handy guide*. Refer also to the management strategy in Section 3, *Growing the crop*.

Spots or marks on seed stems



19. Downy mildew

Appears as large light green or yellow spots.

Cause. The fungus *Peronospora destructor*. It is spread by wind in cool weather. Downy mildew survives as spores in onion crop residues in the soil and on seed bulbs, then infects leaves. Wider spaced plantings allow better air flow and spray penetration.

Solution. Plant less susceptible varieties, for example Gladalan types. Ensure all crop residue is decomposed before planting. Plant rows wider apart. Spray with an appropriate chemical from the *Problem solver handy guide*. Refer also to the management strategy in Section 3, *Growing the crop*.



20. Stalk rot

Stem often breaks at the infection site.

Cause. The fungus *Stemphylium vesicarium*. It is worse in warm wet weather. Spores are spread by wind.

Solution. Chemicals from the *Problem solver handy guide* registered to control purple blotch and downy mildew will reduce the incidence of stalk rot.



21. Onion thrips

Immature thrips appear as light green; adult thrips (approx. 1 mm in length) are brown.

Cause. Feeding by the insect *Thrips tabaci*. Thrips are more common in a hot dry spring following a mild dry winter.

Solution. Control onion thrips, particularly in the latter stages of crop growth. Spray with an appropriate chemical from the *Problem solver handy guide*.

Spots or marks on seed stems



22. Purple blotch

Appears as large elongated purple spots.

Cause. The fungus *Alternaria porri*. It survives on onion residue. Spores are spread in wet, windy weather or by overhead irrigation.

Solution. Ensure all crop residue is decomposed before planting. Spray with an appropriate chemical from the *Problem solver handy guide*.

Withered seed heads



23. Botrytis blight

Left: infected seed head. Right: healthy seed heads.

Cause. Species of the fungus *Botrytis*. It survives as sclerotia on crop residues and on seeds. Spores are spread by wind.

Solution. Deep plough to bury sclerotes. Maintain weed control to improve air movement and reduce humidity around the plants. There are no chemicals registered on onions for the control of this disease.



24. Rutherglen bug

Left: adult bug. Right: immature nymphal stages.

Cause. The insect *Nysius vinitor*. These sucking insects may appear in plagues in late spring and early summer.

Solution. Spray with an appropriate chemical from the *Problem solver handy guide*.

25. Unwanted seed heads

Unwanted seed heads



Seed stems are undesirable in bulb production.

Cause. Incorrect planting time for the variety. Bulbs developed from these plants are unmarketable.

Solution. Ensure correct planting time for the variety.

Discoloured roots



26. Fusarium root rot

Left: affected plants with yellowing, dying leaves and poor root development. Right: healthy plant for comparison.

Cause. Species of the fungus *Fusarium*. This soil borne fungus is common where onions have been grown regularly.

Solution. Maintain a good crop rotation. Improve drainage and plant on beds.



27. Pink root

Pink to red discoloured roots.

Cause. The soil-borne fungus *Pyrenochaeta terrestris*. It is more active in warm weather. Cereal crops are alternative hosts.

Solution. Rotate with non-susceptible crops. Do not plant an infested area in warm weather.

White cottony fungus with soil adhering to roots



28. White rot

Left: healthy bulb on left. Right: note adherence of soil to infected bulb.

Cause. The fungus *Sclerotium cepivorum*. It survives in the soil for at least 15 years as sclerotes. Sclerotes germinate in cool weather, attack seedlings and bulbs and reduce root growth.

Solution. Do not plant into infested areas for at least 10 years. Apply an appropriate chemical from the *Problem solver handy guide* as a field spray immediately after planting and in mid June. Take precautions to ensure infested soil or planting material is not brought into clean areas.

White fungus and visible sclerotes on bulbs



29. Sclerotium base rot

Small brown sclerotes appear in the white fungal growth.

Cause. The soil-borne fungus *Sclerotium rolfsii*. It is worse where undecomposed organic matter is present. It is more common in late sown crops in warmer months.

Solution. Use a good crop rotation. Deep plough to bury sclerotes. Ensure organic matter is completely broken down.



30. White rot

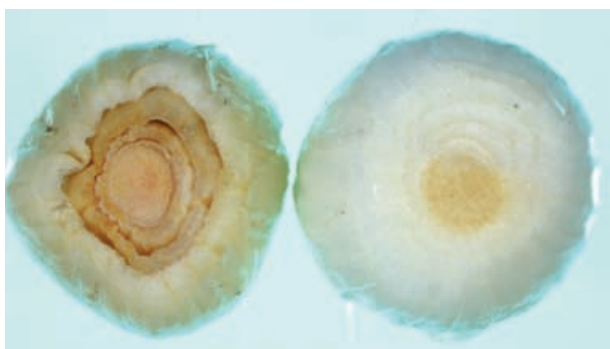
Note small black sclerotes.

Cause. The fungus *Sclerotium cepivorum*. It survives in the soil for at least 15 years as sclerotes. Sclerotes germinate in cool weather, attack seedlings and bulbs and reduce root growth.

Solution. Do not plant into infested areas for at least 10 years. Apply an appropriate chemical from the *Problem solver handy guide* as a field spray immediately after planting and in mid June. Take precautions to ensure infested soil or planting material is not brought into clean areas.

31. Fusarium rot

Brown rotted bulbs



Cross-section of base of bulb. Left: diseased bulb. Right: healthy bulb for comparison.

Cause. The soil-borne fungus *Fusarium* sp. It is common where onions have been grown regularly.

Solution. Maintain a good crop rotation. Improve drainage and plant on beds.

Red to pink stain on base of bulb



32. Pink root

Note the loss of roots on the bulb at left of photo.

Cause. The soil-borne fungus *Pyrenochaeta terrestris*. It is more active in warm weather. Cereal crops are alternative hosts.

Solution. Rotate with non-susceptible crops. Do not plant an infested area in warm weather.

Abnormal bulbs



33. Doubles

Cause. Environmental conditions. Incorrect planting time. May and June plantings are less affected.

Solution. Ensure correct planting time for the variety.



Cause. Onions were stored too long and started to shoot, or were harvested at an immature stage.

Solution. Do not store too long. Do not pick immature onions.



35. Pipers

Cause. Onions had seed stems developing when harvested.

Solution. Ensure correct planting time for the variety. Tell pickers not to harvest onions with seed stems.

34. Sprouts

Abnormal bulbs



36. Peeled onions

Right: healthy bulb for comparison.

Cause. Rough handling.

Solution. Handle onions with care, while curing and grading



37. Bullnecks (scallions, bottlenecks)

Cause. Environmental conditions. Incorrect planting time. Uneven plant stands. May and June plantings are less affected.

Solution. Ensure correct planting time for the variety. Ensure an even plant stand.

Discoloured bulbs



38. Greening

Cause. A reaction to sunlight, and late applications of nitrogen. Mainly a problem in white onions; it is worse in poor stands. Susceptibility depends on variety and stage of growth.

Solution. Ensure a good plant stand. Avoid late applications of nitrogen. Do not delay harvest. Breeding tolerant varieties offers the best option for avoiding this problem. The late season variety Diamond White has good resistance to greening.



39. Purpling

Cause. Genetic problem in brown onions.

Solution. Carefully select seed bulbs.

Black stain beneath the shell



40. Black mould

Left: skin peeled back to show black spore masses. Right: spore mass along veins of outer skin.

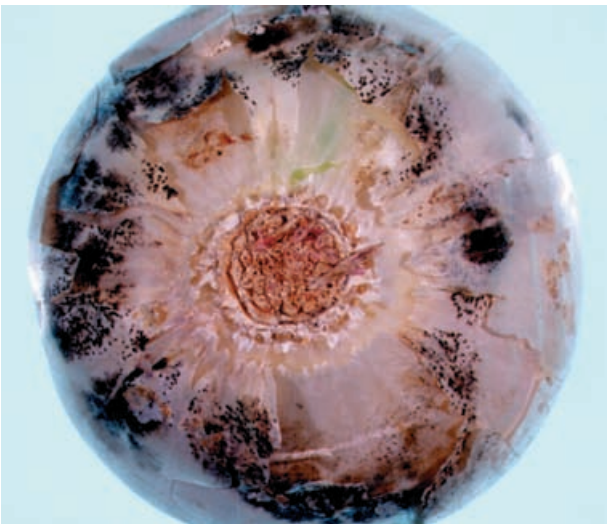
Cause. The fungus *Aspergillus niger*. Spores occur in the soil, on seed and on crop residue. They are carried by wind and infect wet bulbs. Can cause heavy losses in storage and transit. Common in warm to hot humid conditions.

Solution. Rotate crops. Store onions under cool, dry conditions. Pre-harvest sprays and post-harvest dipping are being investigated.

41. Smudge

Cause. The fungus *Colletotrichum circinans*. Spores survive on plant residue in the soil. Spores get onto the onion during harvesting and symptoms appear under poor storage conditions. Brown onions are very resistant.

Solution. Ensure organic matter is completely broken down. Store onions under cool, dry conditions.

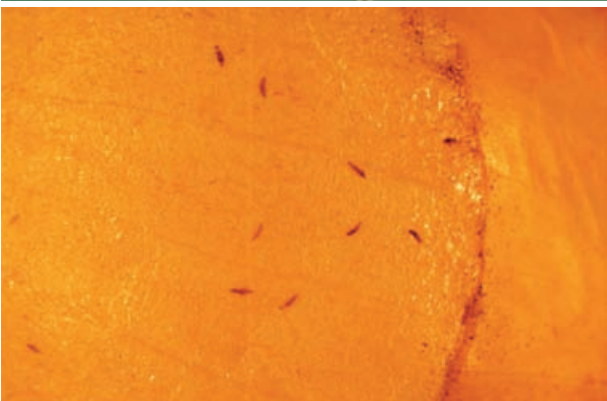


42. Thrips damage

Upper: healthy bulb on left for comparison. Lower: close-up of thrips on bulb.

Cause. Feeding by the insect *Thrips tabaci*. The damage appears as tissue dimpling under the protective shell of the onion. Thrips are more common in a hot dry spring following a mild dry winter.

Solution. Control onion thrips, particularly in the latter stages of crop growth. Spray with an appropriate chemical from the *Problem solver handy guide*.



Bulb breakdown



43. Grey mould

Cause. Species of the fungus *Botrytis*. It survives as sclerotia on crop residues and on seeds. Spores are spread by wind. Symptoms only occur in storage, or during wet periods close to harvest. Infection occurs through injuries.

Solution. Deep plough to bury sclerotes. Harvest at the correct maturity stage. Handle with care to reduce injury. Hold bulbs under dry conditions to cure them quickly. More detail on drying and curing is in the harvesting and marketing part of Section 3, *Growing the crop*. Store bulbs under cool, dry conditions.



44. Purple blotch

Cause. The fungus *Alternaria porri*. It survives on onion residue, spores are spread in wet, windy weather or by overhead irrigation.

Solution. Ensure all crop residue is decomposed before planting. Spray with an appropriate chemical from the *Problem solver handy guide*.