

# Lettuce 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](http://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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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](http://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- Financial information—costs and returns listed in this publication are out of date.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](http://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 lettuce 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

## Stunted plants



Causes can be corky root, ammonium toxicity, black root rot, mosaic, lettuce necrotic yellows or herbicide damage.

### 21. Corky root (below left)

**Cause.** The bacterium *Rhizomonas suberifaciens*. It builds up in soils used for continuous lettuce production. Common sowthistle is a weed host.

**Solution.** Check the roots for corkiness. Plant varieties with resistance to corky root. Practice crop rotation to reduce build-up of the disease in the soil. Use transplants rather than direct-seed in soils known to harbour the disease. See also page 10.



### 22. Ammonium toxicity — jelly butt

**Cause.** Overuse of ammonium or urea fertilisers, particularly in cold wet soils, and applications of large quantities of poultry manure too close to planting. It is worse in spring and autumn when days are warm and the nights cool.

**Solution.** Do a soil test to calculate nitrogen requirements for the crop and revise fertiliser program. Avoid overuse of poultry and feedlot manures. Always apply these manures several months before planting the crop. Use potassium nitrate or calcium nitrate to supply nitrogen.



### 23. Black root rot

Susceptible variety on left; resistant variety on right.

**Cause.** The fungus *Thielaviopsis basicola*. Poor drainage and soil temperatures between 17 and 25°C favour the disease. It affects a wide range of crops and survives in the soil for long periods. Common sowthistle is a weed host.

**Solution.** Plant varieties with resistance to the disease. Avoid double cropping lettuce or rotating with susceptible crops such as soybean, cowpea, clover or lucerne. Improve soil drainage. Soil fumigation gives short term control.



### 24. Mosaic

Note infected plant in lower left of photo.

**Cause.** The lettuce mosaic virus. Both seed-borne and spread by aphids, mostly from older lettuce crops but also from weeds.

**Solution.** Use seed which has been tested free of the virus. Check with the seed/seedling supplier. Destroy old lettuce crops as soon as harvesting is completed.

## Stunted plants



### 25. Lettuce necrotic yellows

Upper: note stunted plants at bottom of photo. Lower: aphids on sowthistle.

**Cause.** The lettuce necrotic yellows virus. Affected plants are stunted, with twisted leaves. Spread by the sowthistle aphid *Hyperomyzus lactucae* from the common sowthistle.

**Solution.** Destroy sowthistle weeds in and around the crop. Spray to control aphids with an appropriate chemical from the *Problem solver handy guide*.



### 26. Herbicide damage

**Cause.** Inappropriate herbicide use. Residual herbicide in the soil, perhaps from a previous crop.

**Solution.** Ensure herbicides are used according to the recommendations on the label.

## Wilted plants



### 27. Wilted heads

**Cause.** Usually caused by Sclerotinia rot but corky root, black root rot, rhizoctonia base rot and ammonium toxicity may cause similar wilting.

**Solution.** Investigate possible cause and follow recommendations.

- Sclerotinia rot: check for white fungal growth and black sclerotia (see photos page 11).
- Corky root: check root system for corkiness and cracking (see photo page 10).
- Black root rot: check roots for black lesions and black vascular system (see photos page 10).
- Ammonium toxicity: check for jelly butt (see photos page 10).

## Discoloured, stunted or rotting roots and butts



### 28. Black root rot

Upper: infected roots of young plants on left; roots of healthy plant on right. Lower: infected older plant with diseased roots on left; cross section of butt on right.

**Cause.** The fungus *Thielaviopsis basicola*. Poor drainage and soil temperatures between 17 and 25°C favour the disease. It affects a wide range of crops and survives in the soil for long periods. Common sowthistle is a weed host.

**Solution.** Plant varieties with resistance to the disease. Avoid double cropping lettuce or rotating them with susceptible crops such as soybean, cowpea, clover or lucerne. Improve soil drainage. Soil fumigation gives short term control.



### 29. Corky root

Secondary roots rot and main root is cracked, corky and a khaki colour.

**Cause.** The bacterium *Rhizomonas suberifaciens*. It builds up in soils used for continuous lettuce production. Common sowthistle is a weed host.

**Solution.** Plant varieties with resistance to corky root. Practice crop rotation to reduce build-up of the disease in the soil. Use transplants rather than direct-seed in soils known to harbour the disease. See also page 8.



### 30. Ammonium toxicity — jelly butt

Left: early stage of disease. Right: advanced stage.

**Cause.** Overuse of ammonium or urea fertilisers, particularly in cold wet soils, and applications of large quantities of poultry manure too close to planting. It is worse in spring and autumn when days are warm and the nights cool.

**Solution.** Do a soil test to calculate nitrogen requirements for the crop and revise fertiliser program. Avoid overuse of poultry and feedlot manures. Always apply these manures several months before planting the crop. Use potassium nitrate or calcium nitrate to supply nitrogen. See also page 8.

## Rotting heads

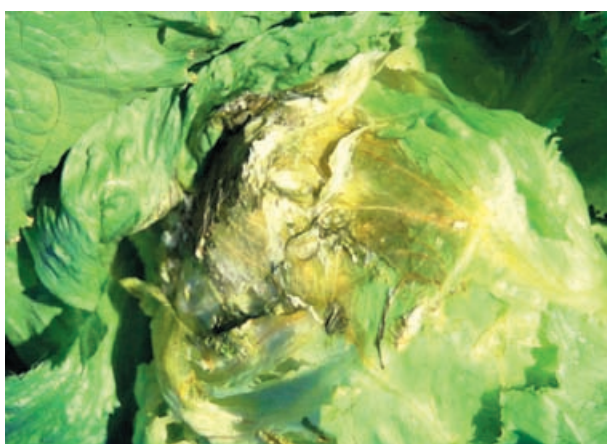


### 31. Sclerotinia rot

Upper: note white mould and black sclerotes on head. Lower: collapsed, rotting head.

**Cause.** The fungi *Sclerotinia sclerotiorum* and *S. minor*. A soft watery rot develops at ground level and moves into the head. Worse in cool moist weather.

**Solution.** In cooler months avoid planting into infected fields. Avoid planting in wet, shaded areas. As soon as harvesting is completed, destroy crop residues by deep cultivation.



### 32. Bacterial soft rot

**Cause.** The bacterium *Erwinia carotovora*. This is a soft, slimy, foul smelling rot. Bacteria survive in crop debris and infect heads by water splash through damaged tissues. Worse in hot wet weather.

**Solution.** Avoid harvesting while plants are wet. Minimise damage to plants in the field and postharvest. Clean and disinfect harvesting equipment and packing sheds. Cool produce immediately after harvest, and keep cool during storage and transport. Do not double crop lettuce, that is, do not plant immediately after a previous lettuce crop.

## Poorly shaped heads



### 33. Bolting

Note the elongating seed stem in the upper right of the plant.

**Cause.** The lettuce has started to go to seed. You have planted the wrong variety for this timeslot or the weather has been warmer than usual.

**Solution.** Cut open a head for internal confirmation of bolting, see photo 37 on page 13. Decide if the crop is marketable and harvest immediately. Revise your variety program.

## Pale or scalded heads



### 34. Frost damage

**Cause.** Frost, which causes leaf blisters. After a day or so the epidermis (skin) of these blisters becomes flaky.

**Solution.** Do not plant in low-lying fields over winter.



### 35. Sunburn

**Cause.** Hot days, especially after a period of overcast weather. The wrapper leaves exposed to sun become white and papery.

**Solution.** No remedy available.



### 36. Spray burn

**Cause.** Mixing pesticides that are incompatible, using spray oils in sprays, using the wrong rates of pesticides or spray additives. These problems are aggravated by warm sunny weather.

**Solution.** Apply pesticides strictly according to the label recommendations. Avoid using spray mixtures. Check compatibility of pesticides and spray additives.

## Internal head problems



### 37. Bolting

Note the elongating seed stem.

**Cause.** The lettuce has started to go to seed. You have planted the wrong variety for this timeslot or the weather has been warmer than usual.

**Solution.** Decide if the crop is marketable and harvest immediately. Revise your variety program.



### 38. Tipburn

**Cause.** Calcium deficiency in growing tissues. Related to periods of rapid growth, warm weather and water stress.

**Solution.** Improve water management. Plant the right variety for the season. Do a soil test before planting the next crop. Apply calcium if needed. Weekly foliar applications of calcium nitrate at 800 g/100 L of water may help.



### 39. Heliothis (budworm) damage

Note the droppings left by the grub.

**Cause.** Larvae of the moths *Helicoverpa armigera* and *H. punctigera*. Heliothis is a major pest of lettuce. Grubs feed on the outer and internal leaves of the head.

**Solution.** No remedy once heliothis are large and feeding internally. Check the crop regularly for signs of the pest and spray as required. Time sprays to target newly hatched grubs before they burrow into the plant's centre. Spray with an appropriate chemical from the *Problem solver handy guide*.

## Problems visible at harvest



### 40. Sclerotinia rot (drop)

Note the black sclerotes in the rotted area.

**Cause.** The fungi *Sclerotinia sclerotiorum* and *S. minor*. A soft watery rot develops at ground level and moves into the head. Worse in cool moist weather.

**Solution.** In cooler months avoid planting into infected fields. Avoid planting in wet, shaded areas. As soon as harvesting is completed, destroy crop residues by deep cultivation.



### 41. Ammonium toxicity — jelly butt

Upper: early symptom. Lower: advanced symptom.

**Cause.** Overuse of ammonium or urea fertilisers particularly in cold wet soils and applications of large quantities of poultry manure too close to planting. It is worse in spring and autumn when days are warm and the nights cool.

**Solution.** Do a soil test to calculate nitrogen requirements for the crop and revise fertiliser program. Avoid overuse of poultry and feedlot manures. Always apply these manures several months before planting the crop. Use potassium nitrate or calcium nitrate to supply nitrogen.



### 42. Varnish spot

**Cause.** The bacterium *Pseudomonas cichorii*. The bacteria survive in other hosts, soil and on crop residue. Worse in cool weather. The bacteria are spread by water splash, particularly to damaged or injured leaves. Affected areas do not decay.

**Solution.** Use trickle irrigation rather than overhead sprinkler systems. If using overhead sprinkler systems, schedule irrigations to prevent watering during the evening and night.

