

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

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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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

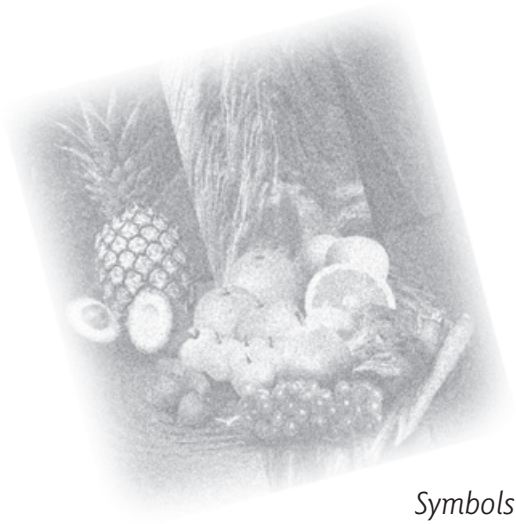
This publication was last revised in 1997. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

This information has been made available to assist users to identify issues involved in 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.

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Queensland Government



Common **QUESTIONS**

This section contains the most commonly asked questions about growing lettuce. The answers as brief as possible. Where this is difficult and more detail is required, we refer you to other sections of the kit. Symbols on the left of the page will help you make these links.

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Varieties



Varieties
Section 4 page 16



Seed suppliers,
seedling nurseries
Section 6 page 4

What's the best variety to plant?

Lettuce varieties are changing constantly and the variety table in Section 4, *Key issues* is intended as a guide only. Contact a commercial seedling nursery or seed supplier for up-to-date information.

Temperature fluctuations throughout the growing period have the greatest impact on a variety's performance. Select varieties with recent weather patterns in mind. Nutrient level and time of application can also have a big impact on lettuce quality.

Lettuce varieties are bred to perform under a distinct temperature range. A cool weather variety grown under warm conditions, for example, will tend to bolt.

Here are some points to remember when choosing varieties.

- Warm weather varieties will not produce quality heads once temperatures exceed 28°C.
- Winter varieties will tolerate mild frosts but no varieties will withstand heavy frosts.

How do I test new varieties?

Test new varieties on your farm against the standard varieties. Try two or three new varieties every time you plant by planting them beside one of the standard varieties so that you can compare them easily. Every farm is slightly different and lettuce is sensitive to weather changes. If you test varieties over several seasons, you will develop a variety plan for your farm. Try only small quantities at first.

What varieties should I plant for autumn or spring harvest?

Some commercial growers 'hedge their bets' by planting two varieties, so that at least half the crop will perform well if the weather is cooler or warmer than usual. Refer to the comments under the previous question. It is particularly important to choose the right variety in the Lockyer Valley or Darling Downs where the difference in temperature at that time of year can vary from day to day. It is difficult to choose a variety for autumn and spring harvest because there is a chance of a light frost in autumn or some hot days in early spring.

Planting

Should I direct-seed or plant seedlings?

The decision to direct-seed or use transplanted seedlings is based on two considerations: to save money or to save time.



Direct-seed or
transplant
Section 4 page 10

If you decide on direct-seeding you will not have to pay for cell-grown transplants. Cell-grown transplants cost about \$35 per 1000 plants. Direct-seeded crops are planted two to three weeks earlier, increasing the amount of water used and greatly increasing the risk of weed, disease and pest problems. Cell-grown transplants have a shorter cropping cycle and this reduces some of the risks. A shorter cropping cycle may also reduce reliance on herbicides.

It is difficult to establish a lettuce crop using direct-seeding techniques under hot conditions, and the risk of failure is higher. We recommend new growers use cell-grown transplants from a commercial seedling nursery until they sort out their production system.



Germination
Section 4 page 13

My lettuce hasn't come up. What's gone wrong?

There are many reasons why direct-seeded lettuce may not emerge. Do not blame the seed in the first instance, as seed quality is usually very high.

Lettuce seed can germinate poorly or fail to emerge for three reasons.

- Damping-off, which is caused by a range of fungal diseases, will prevent the seedling from emerging even though the seed might germinate.
- Hot dry conditions can force lettuce seed into high temperature dormancy. Seed will take longer to break this dormancy and then germinate normally but unevenly.
- A range of soil insects, including earwigs, can attack the germinating plant and prevent it from emerging.

Weeds

I've got weeds in my lettuce. How do I get rid of them?

There is no registered chemical to control broadleaf weeds in lettuce once they have emerged, so your only alternative is to hand chip to get rid of them. If grass weeds are a problem you can use the herbicides Fusilade or Sertin up to 28 days before harvest.

Is there a good herbicide to control weeds?

There are few herbicides you can use in lettuce and they must all be applied at or before planting. It is important to reduce the number of weed seeds in the soil. Do this by rotating crops and reducing the weed population before planting.

The herbicides Kerb and Stomp are registered for pre-emergence use on lettuce. Stomp can only be used on transplants, not on direct-seeded lettuce. Herbicides control different weeds so the



Weed management
Section 4 page 55

herbicide you use depends on the weeds on your farm. Sowthistle and potato weed are the most difficult weeds to control.

How do I control sowthistle (milk thistle)?

Stomp is probably the best herbicide to suppress sowthistle. It can only be used in transplanted lettuce. You will probably need to hand chip to remove sowthistle that still comes up. It is important to minimise the number of sowthistle seeds in your lettuce paddock by controlling it in the previous crop and around your paddock, so that seeds do not blow in.

Irrigation

How do I use tensiometers in lettuce?

Place the tip of one tensiometer about 15 cm below ground level and another one about 45 cm deep. The shallow tensiometer tells you when to water, which in cool conditions is when the gauge shows about 25 centibars (kPa). In warmer conditions water more frequently, that is when the shallow tensiometer reads 15 or 20 kPa. The deep tensiometer should normally read between 10 and 15 kPa. If it drops to less than 5 kPa after irrigation, you have put on too much water. Apply less water next time and monitor what is happening using the deep tensiometer.

It is best to have a tensiometer site for each planting. Tensiometers are useful for scheduling irrigations once the crop is established 10 days to two weeks after transplanting.

more info



Growing the crop
Section 3

a key issue



Tensiometers
Section 4 page 39

How often do I need to water lettuce?

Lettuce has a shallow root systems and is highly sensitive to water stress and tipburn.

For cool season production, water lettuce every four to six days once the crop is established. In warm conditions irrigate every three to five days on clay soils. If using overhead sprinkler systems you may need to irrigate every day on sandy soils.

You may need daily irrigations to establish transplants. If you are using drip systems you may need to water more frequently. Tensiometers will help you make this decision once the crop is established.

a key issue



Irrigation
Section 4 page 35

Pests, diseases and disorders

How do I know how much chemical to use?

The label on the chemical container gives the registered rate of application for lettuce and the withholding period. The label also tells you how to use the chemical and how to mix and apply the

more info



 Problem solver
handy guide

product safely. The *Problem solver handy guide* will give you a guide to chemical registrations, but always read the label.

What is a withholding period (WHP)?

The withholding period is the number of days which must pass between the last chemical application and harvest. It will be on the label. Produce at the markets is randomly tested for pesticide residue. Farmers have been prosecuted when chemical residues were above the maximum acceptable level, or residues of non-registered chemicals were found.

Residues should be below the maximum acceptable level if the chemicals are used at the registered rate and frequency, and the withholding period is observed.

a key issue



 Tipburn
Section 4 page 34

How do I control tipburn?

You cannot cure tipburn but you can try to prevent it. Tipburn is mainly caused by calcium deficiency, but is associated with several other factors. These include hot weather, hot dry windy days, high nitrogen levels, water stress, and problems that prevent lettuce taking up enough water (for example root rot). The right choice of variety will prevent tipburn.

Check that you have planted the right variety for the time of year, as varieties have different tolerances to tipburn and warm weather. Check that the crop is getting enough water. Test your soil to determine the calcium level. Increase soil calcium by applying lime, dolomite or gypsum, depending on the soil pH.

more info



 Problem solver
Section 5

How do I control aphids and thrips to stop viruses spreading?

Methomyl is used to control cluster caterpillar and heliothis, and will give some control of aphids and thrips. For low levels of aphids or thrips use endosulfan, which is a lot softer on beneficial insects and causes less disruption. The broad spectrum pesticide dimethoate is also used for thrips and aphids but some aphids have developed resistance to it.

Both thrips and aphids spread from weeds around your fields and along creek banks, so controlling weeds around fields will reduce their spread and therefore virus diseases.

a key issue



 Pest and disease
management
Section 4 page 45

How do I control rust (lettuce mosaic virus)?

Rust is a term used by some growers when referring to lettuce mosaic virus. It is a brown discolouration that is found on the lower parts of the lower leaves. These symptoms are often not seen until the crop is harvested.

To control rust, use virus indexed seed, maintain good farm hygiene by destroying old lettuce crops and weed hosts, encour-



Problem solver
Section 5

age neighbours to control aphids and weed hosts, and control aphids in the seedling nursery.

What's causing the yellow brown spots on my leaves?

The most likely cause of yellow brown spots on leaves is downy mildew, the only major disease that lettuce growers may be able to control. The yellow brown spots appear on the upper surface of the lower leaves. Downy fungal spores appear on the underside of the spots but are only seen under cool moist conditions. Leaves become infected up to five or six days before the symptoms appear.



Downy mildew
Section 4 page 52

To control downy mildew you need a regular spray program to apply a protectant fungicide before the symptoms appear. If downy mildew is already in the crop, use a systemic fungicide. Restrict use of systemic fungicides as much as possible to delay development of resistance to them. Refer to the downy mildew strategy in Section 4, *Key issues* and investigate varieties that are less susceptible.

Why are my plants wilted and stunted?

Lettuce plants can be wilted and stunted for many reasons. Possible causes include necrotic yellows virus, corky root, ammonium toxicity, black root rot, lettuce big vein, and tomato spotted wilt. Insufficient water or fertiliser can also cause these problems.



Problem solver
Section 5

Nutrition

What's a good hydroponic solution?

There is probably no real answer, but you need to consider a range of points when determining what hydroponic solution to use. Several nutrient solution recipes have been published by researchers and hydroponic societies, and these could be the basis of a good hydroponic solution.

A hydroponic solution should be easy to make and use fertiliser grade nutrients, if possible. These nutrients are usually the cheapest and most readily available.

If you are buying a nutrient solution 'off the shelf', make sure it has a detailed nutrient analysis. If you have production problems, your knowledge of the nutrient make-up will help you find an answer. Published nutrient solutions often have a variance available for summer and winter production so that you can adjust your management.

How much nitrogen should I put on my lettuce?

Variety, soil type and season influence the nitrogen requirements of lettuce. The best way to determine how much nitrogen to apply

is to follow the recommendations of a soil analysis. Where a soil analysis is not used, 100 to 150 kg/ha of nitrogen is commonly used. Some growers produce very good quality lettuce using only 50 kg/ha of nitrogen. Pre-plant fertiliser is not always used.

High levels of nitrogen can be of concern for two reasons.

- Some varieties may not heart up properly with high nitrogen applications.
- High levels of nitrogen may endanger ground water quality, as excess nitrogen can be leached through the soil.

Discoloured lettuce heads

When I cut the head in half there are brown marks and streaks inside. What's causing this?

If you see brown marks and streaks inside the head, check if they also appear around the edges of the leaves, particularly the inner leaves. If they do, it could be tipburn.

Heliothis grub damage can look similar to tipburn, but instead of brown leaf edges you will find chewed leaves, pellets of grub excreta, and often the grub.

more info



Tipburn
Section 2 page 5

What's causing brown edges on the leaves?

The most likely cause of brown edges on leaves is hot weather, particularly if hot days follow cool days. Sclerotinia and varnish spot can cause similar symptoms.

Brown edges can also be caused by windburn, most likely on hot days, and by poor quality water (water high in either sodium or chlorides). If the outer leaves have brown edges and the lettuce are close to maturity, cut a few heads in half and check the inside. You may find some internal brown streaks. This condition is tipburn.

more info



Problem solver
Section 5

Money

Can I make money out of lettuce?

The market for lettuce is oversupplied and even experienced lettuce growers have had difficulty breaking even in recent years. Identify your market and use realistic costs to estimate returns before you decide to plant. The ability to supply consistently high quality lettuce is essential and can be difficult to achieve for first-time growers.

a key issue



A gross margin
Section 4 page 7

Harvesting

When is lettuce ready to harvest?

The time of harvest depends on the season and the variety you have planted. Ask your seedling nursery or the seed company how many days the variety normally takes from seeding or transplanting to harvest. If the weather is warmer than normal, your lettuce will be ready a few days earlier. In cold weather it might take six or seven days longer before the crop can be harvested.

About a week before your estimated harvest date, walk through your field and pick out a few lettuce that look ready to harvest. Cut them in half and check how closely leaves are packed in the head. If five or six heads out of 10 are tightly packed inside, the crop is ready for harvest. If a few of the heads you have cut open have a core, that is they are starting to elongate, start harvesting immediately, before the crop runs to seed. Consider recent weather patterns as you may have chosen the wrong variety.

Ideally, the whole planting is cut in one pass. Two cuts several days apart, however, may be necessary to maximise head quality.



Harvesting and marketing
Section 3 page 22

Why aren't the heads filling out or sizing up properly?

If the heads aren't filling out or sizing up properly you may have selected the wrong variety for that timeslot. Some winter varieties need cold weather to heart up properly and form a solid head. If lettuce is showing signs of splitting, bolting or stress, such as brown leaf margins or tipburn, the variety may be a cool weather variety planted out of season.

Too much nitrogen can cause 'fluffy' heads, because the heads are being grown too quickly and are not able to form a head before bolting. Stunted lettuce may look as though the heads are not filling out. If one area of the crop is better than another, you may have a problem with nutrition or irrigation.

To determine a possible cause refer to the pictures and descriptions of stunted plant symptoms in Section 5, the *Problem solver*.



Problem solver
Section 5

Why has my lettuce split opened or bolted?

Lettuce that is split open or bolted has started to flower. Either you chose the wrong variety for that time of year or the weather was a lot hotter than normal. You may also not be harvesting early enough.

If only some of the lettuce is bolting, the block may be variable in its maturity. You may be stressing the crop. Check your general management practices, irrigation, fertiliser and planting out.



Growing the crop
Section 3