# Sweet potato information kit

## Reprint – information current in 2000

## 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 2000. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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 2000. 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 sweet 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.

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Queensland Government

# *Common* QUESTIONS

*This section contains the most commonly asked questions about growing sweetpotatoes. The answers are 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.*

## Contents

## Varieties

### What variety should I plant?

Orange-fleshed varieties, for example Hernandez, Beauregard, Beerwah Gold, Centennial and NC-3, are the most popular sweetpotatoes, but new varieties are being evaluated. The white-fleshed varieties have a smaller market than the orange-fleshed. Northern Star is the most commonly grown white-fleshed variety.


Varieties
Section 4 page 32

Centennial is susceptible to soil rot and should be replaced with a resistant variety, for example Hernandez or Beauregard, if soil rot has caused problems.

### What is the difference between dessert and staple types?

The dessert-type of sweetpotato has orange flesh, is moist and sweet and has a lower dry matter content than the staple (white) type. It is preferred for sweet dishes, but is used mainly as a vegetable in Australia.

The staple-type has cream, white or purple dry flesh, and is firm and starchy. It is used as a fresh vegetable, in savoury dishes such as curries, baked with seasoned meat or in stews.

### What is kumara

Kumara is the Maori name for sweetpotato.

## Planting material

### How often should I buy clean planting material?

Ideally, you should buy fresh, clean material every year, but at least every three years.

### Where do I get cuttings?

Small quantities of virus-free planting material can bought from the Queensland Department of Primary Industries' research station at Redland Bay. These cuttings are used as mother plants to produce planting material for commercial plantings.


Buying cuttings
Section 6 page 4

Depending on availability, 200 cuttings of up to four varieties, with a maximum of 100 cuttings per variety, can be bought from Redlands from the first week of October until the end of April. Larger supplies may be available after December. From 100 cuttings it will take about 24 weeks in warm weather to produce enough cuttings to plant 2 ha of crop.


Planting material
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### What are sprouts?

Sprouts are the tip cuttings produced from storage roots planted in beds. Roots used for sprouts are called seed roots. Sprouts are produced from seedbeds and are then used to plant nursery areas, or are planted directly into the field for a commercial crop. Cuttings are normally taken from a nursery area established on the farm. Sometimes tip cuttings are taken from a mature crop before harvest.

### How do I prepare the cuttings?

From the tips of the vines take cuttings about 25 cm long for machine planting and up to 45 cm long for hand planting. Remove the mature basal leaves, leaving only the immature leaves. Wrap the cuttings in moist hessian and hold them, standing on their cut ends, for two to three days under cool conditions to promote root growth. It is best to plant them within four days of cutting.

## Planting

### When can you plant sweetpotatoes?

Sweetpotatoes can be planted year-round in north and central Queensland, but March to June plantings are preferred in north Queensland to meet higher prices in the spring. In central Queensland the main plantings are from September to March, while in southern Queensland planting is normally from late September to January, because cold conditions reduce growth and hence yield.

### How are they planted?

Vine tip cuttings or sprouts are planted using a vegetable seedling transplanter. Plant so that at least three nodes are in the ground. Some growers prefer to plant by hand.

### What is the optimum plant spacing?

Optimum spacing will depend on variety and climatic conditions, but about 27 000 plants per hectare is considered ideal. With experience you will be able to work out the optimum spacing on your farm to maximise marketable yield.

Row spacing depends on the equipment available. The common range is from 80 cm to 1.5 m. Plant spacing in the row varies from 20 to 45 cm, with 30 to 40 cm being most common. High-density plantings require more planting material, whereas low densities produce lower yields with fewer, but larger, storage roots.

## Pests and diseases

### What are the main pests?

Sweetpotato weevil is the major pest. Soil-borne insects such as white grubs, wireworms and crickets can also cause problems. Leaf-feeding insects include grasshoppers, hawk moth larvae, beetles, leafminer, aphids (which spread virus), silverleaf whitefly and mites. Nematodes can cause severe losses, as can rodents, wallabies and pigs.

more info
*Problem Solver*
Section 5

### How do I control sweetpotato weevil?

Farm hygiene is most important. Use cuttings free from weevil larvae. Destroy crop residues and alternative hosts, such as morning glory. Rotation of sweetpotatoes with other crops is essential. Hilling up and overhead irrigation to prevent soil cracking will help reduce storage root infestation by weevils.

Current research is evaluating the use of pheromone traps that attract the male sweetpotato weevils, variety resistance and the effectiveness of some chemicals.


### What diseases are important?

Apart from virus and phytoplasma (virus-like) problems, diseases are not normally of economic importance in new ground if optimum growing conditions are provided and planting material is clean. However, in land that has previously grown sweetpotatoes, soil-borne diseases, for example soil rot, scurf and nematodes, and vine diseases such as scab, Alternaria, Cercospora leaf spots and Fusarium, can cause problems.

### Are viruses important?

Yes. Yield reductions of at least 15% can be expected if foundation stock for planting material is not renewed regularly. In association with the phytoplasma little leaf, yield reductions of up to 80% can be expected.

### How do I know if I have virus?

Virus is difficult to detect because not all varieties show leaf symptoms. The common method of testing for sweetpotato feathery mottle virus is to graft the suspect sweetpotato plant onto an indicator plant (for example *Ipomoea setosa*) and look for characteristic symptoms in the new growth of the indicator plant. It may take up to six weeks for symptoms to appear.

## Weed control

### How can I control weeds?

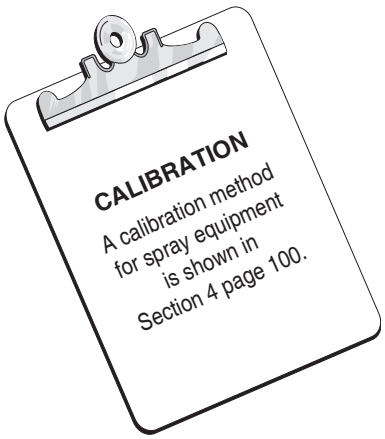
more info
Weed control
Section 3 pages 22, 33

Pre-plant management to reduce weed seeds is the first step, so destroy weeds before they seed. Several herbicides can be applied to the soil to prevent the emergence of some grass and broadleaf weeds. Sethoxydim can be used to control very young grasses.

Mechanical weed control is necessary during early growth and hand weeding is normally necessary later in the growth cycle. Sweetpotatoes are a vigorous crop and compete with weeds, making weed control late in the crop generally unnecessary. Large weeds should be pulled out before they seed.

## Using chemicals

### What is the best spray equipment to use?




Boom sprays are most commonly used, but there is no one best type. Buy spray equipment that suits your situation and budget. Select equipment based on its ability to give good coverage; droplet size is very important, as is the volume of active ingredient per hectare to be applied.

### How do I calibrate my spray equipment?

To work efficiently spray equipment needs to be calibrated. Document the results of this calibration as part of your quality management system, and keep it with your spray diary.

### What is an MRL?

The abbreviation MRL stands for maximum residue limit, which is the maximum level of a chemical permitted to be present in a food. It is expressed as milligrams of chemical per kilogram (mg/kg) of the food.

Produce at the markets is randomly tested for pesticide residue. Farmers have been prosecuted when chemical residues were found above the MRL, or residues of non-registered chemicals were found.

### What is a withholding period (WHP)?

The withholding period is the number of days that must pass between the last chemical application and harvest for human consumption, grazing for livestock, or cutting for stockfeed; or for postharvest treatments, the number of days from treatment to consumption. It will be on the chemical label.

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

## How do I get spray accreditation?

Spray accreditation can be obtained by attending a course provided by an accredited trainer. Accreditation is given to people with a valid National ChemCert (previously Farmcare) Chemical User Certificate issued by ChemCert Australia trainers.

In Queensland this certificate is known as ChemSmart Training Queensland Certificate or Certificate of Agricultural Chemical Application issued by Queensland Agricultural Chemicals Accreditation Committee and in Victoria as the Victorian Farm Chemical Users Course.


ChemSmart
Section 6 page 5

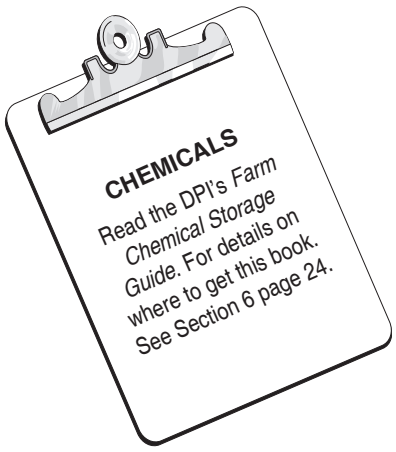
At present, no other certification is recognised by the National Registration Authority. State-based ChemCert committees are responsible for delivering training in each state.

## Do I need training in the safe use of chemicals?

In some states you cannot buy chemicals unless you have a current spray accreditation. In Australia, endosulfan can now only be supplied to or used by an authorised person. An authorised person is one who conducts the business of selling or supplying agricultural chemical products, or is a state licensed spray contractor, or is certified by ChemCert Australia.

Currently, by law in Queensland, you only need training in safe use of chemicals if you are a contractor spraying on other people's land or you want to buy restricted chemicals.

However, most customers now see it as highly desirable for their growers to be able to demonstrate safe, responsible use of chemicals. One of the best ways to demonstrate this is to obtain a ChemSmart or ChemCert accreditation. Remember spray accreditation must be renewed every five years.




## How should I store my chemicals?

Chemicals need to be stored in accordance with the AS2507-1998 standard. This does not mean you will have to spend a fortune on elaborate storage facilities. You do, however, need to be aware of several safety, environmental and food safety factors whenever you deal with chemicals.

Further information on correct use of chemicals is covered in the chemical user course. Agsafe or ChemSmart accredited trainers also understand these requirements and employees of farm chemical resellers with Agsafe accreditations are also a useful source of information.

## Do I need to keep a diary of spraying records?

Yes, you do! Records of chemical application are now one of the most important pieces of documentation you will need to be able

to prove what you have done with chemicals. Most merchants and agents supplying the retail sector now expect you to keep spray records showing **at least** what was applied, how much, by whom, and when the application took place.

## Fertiliser

### What fertiliser do sweetpotatoes need?

Although sweetpotato has a relatively low fertiliser requirement, this will depend on the soil type and the cropping history of the block. A fertiliser application schedule should be based on the results of a complete soil analysis taken six to eight weeks before planting. This will also indicate if lime or dolomite is required to increase the pH to the optimum of between 5.5 and 6.0. These products should be applied at least four weeks before planting.


Nutrition
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Use leaf and sap tests during plant growth to monitor nutrient levels. Excessive amounts of nitrogen applied before initiation of storage roots will make vines grow too vigorously and reduce yield.

## Irrigation

### What water quality can I use?

Sweetpotatoes are susceptible to saline irrigation water but poorer quality water can be used on sandy soils with good drainage. Irrigation water should be low in sodium (Na) and chlorides, and have a low conductivity; have it checked by a laboratory. Acceptable conductivity, measured in deciSiemens per metre (dS/m), varies with soil type (Table 1). Conductivities above these figures may cause serious reductions in yield.


Irrigation management
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***Table 1.*** *Water conductivity above which yield may be reduced*

| Soil type | Sand | Loam | Clay |
|---|---|---|---|
| Conductivity | 3.0 dS/m | 1.7 dS/m | 1.0 dS/m |

Source: DNR Water Facts, W55

### How much water do sweetpotatoes need?

Sweetpotatoes need up to five megalitres of water per hectare. Thorough watering is required to establish the cuttings. Following establishment it is important to maintain uniform soil moisture conditions after initiation of storage roots. Excessive watering produces large lenticels and root rots whereas irregular irrigation will result in growth cracks, malformed roots and a lower marketable yield.

### How do I know when to irrigate and how much to apply?

To manage irrigation accurately you will need a scheduling instrument, such as tensiometers, or capacitance probes, for example Enviroscan or Gopher.

Tensiometers are relatively cheap instruments that measure the availability of soil moisture to plants. Two tensiometers should be installed per site: one with the tip in the main root zone 20 cm deep and one with the tip below the main root zone at about 60 cm deep.

The stage of crop will determine how much the soil can be allowed to dry out, but generally tensiometer readings of between 10 and 30 on sandy loams indicate optimum soil moisture. Readings above 30 indicate the need to irrigate. On clay soils optimum levels of moisture occur between 10 and 40, with higher levels indicating a need to irrigate.

Two sets of tensiometers per block or 5 ha generally give adequate indication of soil moisture. Where soil types differ within a block, a set should be used in each soil type.

Capacitance probes are expensive and are usually operated by consultants.

## Harvesting

### When is the crop ready to dig?

The crop is ready to dig when the bulk of the roots are of marketable size. This can vary from 16 weeks onwards. Digging normally starts just before the optimum size so that each planting can be finished before the roots grow too large.

### Why and how do I remove the tops?

The tops are removed to toughen the skin and reduce damage during harvest and handling. Five to 10 days before harvest remove tops using a flail forage harvester or slasher.

### How are sweetpotatoes dug?

Many growers use a modified potato digger with a conveyor attached. This allows some sorting for over or undersized storage roots and defects before the roots go to the shed in plastic bins or bulk crates for washing. This machine is often referred to as a harvester.

Smaller growers use a single-row potato digger to lift the roots, which are then collected by hand into 30 L plastic crates.

Both machines must be operated with great care to minimise damage to roots. Slower harvesting speeds will help reduce damage. Soil should be moist enough to cushion the storage roots as they are being lifted and to soften any clods.

### What about washing?

Roots must be thoroughly washed to remove soil before sale. High-pressure water jets are normally used, but roller brushes may also be necessary in heavier soils. A postharvest spray or dip is recommended to prevent rhizopus rot, scurf and bacterial soft rot, and to preserve the root quality.


Registered chemicals
*Problem Solver Handy Guide*

## Marketing

### How are sweetpotatoes graded?

Grade standards no longer legally apply in Queensland; however, roots are usually graded into small, medium and large. The medium grade is preferred and is usually divided into large and small–mediums, to enhance the appearance of the pack. The most desirable root size on the market ranges from 45 to 90 mm in diameter and 150 to 250 mm long.

### How are sweetpotatoes packed?

Sweetpotatoes are usually packed into wilm-lined cardboard cartons, though cartons with a waxed inner perform better, especially if wet roots are packed. Wilm-lined cartons have a wax sprayed onto the inner liner and fluting during manufacture. The minimum weight must be clearly marked on the carton. The standard now is 18 kg, however, this is likely to be reduced to 15 kg, and there has been some demand for a 10 kg pack.

Pack roots of uniform size and shape in the one carton and pack the top layer in an orderly manner to improve the appearance of the pack. Pack over the net weight to allow for shrinkage.

### What level of quality assurance (QA) do I need?

You will need different levels of quality assurance (QA), depending on to whom you supply your sweetpotatoes. If you supply a retailer indirectly, for example through an agent or merchant, you will need at least an approved supplier program. If you supply direct to a retailer, you may need a full quality management system accredited by a third party. Check the QA requirements of any customer you supply.


Marketing
Section 4 page 21

## General

### Why do we use one word for sweetpotato, not two?

The decision to use one word for sweetpotato was made at an international workshop held in Lima, Peru in June 1994. It was made to help differentiate between sweetpotatoes, *Ipomoea batatas,* and the common English or Irish potato, *Solanum tuberosum*, which is a member of a different botanical family.

It is important to differentiate between sweetpotatoes and ordinary potatoes because they can be used in different ways and they require different management for growing and postharvest handling. To many people a sweet potato would be a potato with a high sugar content.

Using sweetpotato as one word should help in marketing sweetpotatoes as a distinct product with different uses to normal potatoes.

## What are the differences between sweetpotatoes, English potatoes and yams?

Sweetpotatoes, English potatoes and yams are different and belong to different plant families. Table 2 shows some of the more important differences.

***Table 2.*** *Comparison of sweetpotatoes, English potatoes and yams*

| | Sweetpotato | English potato | Yam |
|---|---|---|---|
| Scientific name | *Ipomoea batatas* | *Solanum tuberosum* | *Dioscorea* spp. |
| Plant family | Convolvulaceae | Solanaceae | Dioscoreaceae |
| Plant group | Dicotyledon | Dicotyledon | Monocotyledon |
| Edible part | Storage root | Tuber | Tuber |
| Taste | Sweet and moist (orange-fleshed) | Bland and mealy | Dry and starchy |
| Number per plant | 4 – 10 | 2 – 6 | 1 – 5 |
| Growing season | 16 – 25 weeks | 16 – 18 weeks | 24 – 32 weeks |

## Are sweetpotatoes worth growing?

Prices can fluctuate dramatically, but there is a seasonal trend, with the best prices from about August to January. Sweetpotatoes require specialised equipment. They are labour intensive and planting material must be maintained, making this a crop for a long-term commitment. Growing and marketing costs vary from $10 to $16 per carton.

more info
Economics
Sections 1, 4

## What is the best soil type for growing sweetpotatoes?

Deep well-drained sandy to sandy loams are preferred, but any deep well-drained soil is suitable.

## What growing conditions are required?

Sweetpotato is a tropical crop and warm sunny conditions are ideal. The plants are susceptible to frost; cool conditions reduce vigour and can result in malformed storage roots. The growing season is 16 to 25 weeks, depending on variety and temperature.

## What causes misshapen sweetpotatoes?

Low soil temperatures during early development of storage roots cause ribbing. Growth cracks result from fluctuating growth,

often caused by varying soil moisture. Early infestations by high populations of nematodes can also cause cracking of the storage roots. Veining (subcutaneous roots) is a disorder associated with older roots and is secondary growth. Poor land preparation, soil type and nutritional disorders can also affect root shape.

more info
Misshapen roots
Section 5
pages 13–19

## What machinery and equipment do I need?

At least two tractors are needed: one large tractor (about 45 to 60 kW) for primary tillage and digging, and a smaller one (about 26 kW) for planting, interrow cultivation and spraying.

Other equipment required includes a planter, interrow cultivators, a chemical boom spray, a digger or harvester for harvesting, and a washer for washing the roots. Some of this machinery will be specific to sweetpotato production while some can be used for producing other crops.

more info
Equipment
Section 1 page 7