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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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- Financial information—costs and returns listed in this publication are out of date.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

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 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 solution, if there is one.

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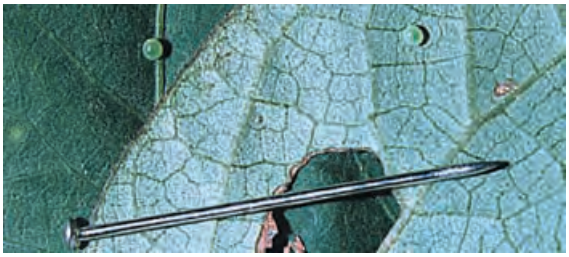
Holes in leaves

Distinct holes

Cause. Damage by flea beetles, leafeating beetles, grasshoppers or looper caterpillars. This does not normally cause economic loss.

Management. Spray if necessary with an appropriate chemical from the *Problem Solver Handy Guide*.

Leaves have ragged edges



Chewed edges

Upper: leaf damage. Centre: Eggs compared to pin. Lower: Young larva which grow to 9 cm. Below: Three different coloured larvae.

Cause. Larvae of the Convolvulus hawk moth *Agrius convolvuli*. The damage is usually observed in newly established crops. Larva over-winter in the soil as 5-cm-long pupa.

Management. Spray if necessary with an appropriate chemical from the *Problem Solver Handy Guide*. For low infestations, handpicking the larvae as you see them in the field may also be helpful.

Irregular torn edges

Cause. Wind damage.

Management. Do not plant in exposed areas. Bana grass or permanent windbreaks will reduce damage.

Tunnelling in leaves

Tracks and blotches on leaves

Upper: Early damage. Lower: severe damage on upper surface (note webbing). Below: Damage on under surface.

Cause. Feeding by larvae of the sweetpotato leafminer *Bedellia somnulentella*. Damage does not normally cause economic loss in commercial crops, but a serious outbreak can reduce yield.

Management. Use insect-free planting material. Spray with an appropriate chemical from the *Problem Solver Handy Guide*.

Spots or marks on leaves

Leaf surface partly eaten

Left: Close-up of damage. Centre: Note holes in leaves. Right: Adult beetle about 3 mm.

Cause. The flea beetle *Xenidia* sp., and leafeating beetles and grasshoppers. Adults feed on the leaves and can defoliate the plant in severe cases. Flea beetle larvae (up to 12 mm) tunnel in the stems. Worse in spring.

Management. Maintain active growth. No chemical controls are registered.

Irregular yellow spots

Cause. Sweetpotato feathery mottle virus. Spots are usually surrounded by purple pigmentation in the varieties Beerwah Gold and NC-3. Spread by aphids or infected planting material.

Management. Use virus-free planting material. Do not take cuttings from plants with virus symptoms. Renew virus-free planting stock every two to three years. Spray to control aphids with an appropriate chemical from the *Problem Solver Handy Guide*.

Spots or marks on leaves

Undersurface of leaf partly eaten

Upper left: Larva which grow to 4 to 5 cm. Upper right: Window damage, upper surface still present. Lower left: Note the cocoon of the parasitic wasp *Microplitis demolitor*. Lower right: Adult wasp.

Cause. Cluster caterpillar *Spodoptera litura*. The larvae feed on young and mature leaves, and can consume the whole leaf blade, leaving only the veins. Moths (3 to 4.5 cm wingspan) lay clusters of eggs on the underside of the leaf; older larvae move away from the cluster when they are small.

Management. Eliminate alternative hosts such as *Ipomoea* spp. Spray with an appropriate chemical from the *Problem Solver Handy Guide*. Some beneficials, such as the parasitic wasp *Microplitis demolitor*, will attack the larvae.

Brown spots on leaves

Cause. Boron (B) toxicity. Too much boron applied.

Management. Do not apply too much Solubor or borax. Use soil, leaf or sap tests to determine how much, if any, to apply.

Alternaria leaf spot

Cause. The fungus *Alternaria* spp. The fungus thrives on plant debris and the spores can be transferred from infected planting material by wind, and rain and water splash. Humid weather favours the disease. It rarely causes significant production loss.

Management. Use healthy and disease-free planting material. Spray with an appropriate chemical from the *Problem Solver Handy Guide*.

Yellow tracks on leaves

Cause. Feeding by jassids, *Austroasca* spp.

Management. A minor problem; treatment is not required.

Spots or marks on leaves

Herbicide damage

Cause. Spray drift from herbicide application.

Management. Use shielded spray nozzles. Do not spray in windy weather.

Light feathering of veins

Note the feathery effect on the veins.

Cause. Sweetpotato feathery mottle virus. Spread by aphids or infected planting material.

Management. Use virus-free planting material. Do not take cuttings from plants with virus symptoms. Renew virus-free planting stock annually or at least every three years. Spray to control aphids with an appropriate chemical from the *Problem Solver Handy Guide*.

Distorted leaves

Leaf cupping with scabby brown lesions on vines

Upper: Normal leaves on right; cupped leaves on left. Lower: Close-up of cupping.

Cause. Scab caused by the fungus *Sphaceloma batatas*. It is carried over on regrowth, on plant residue from infected crops, and spread by infected planting material.

Management. Practise good farm hygiene; destroy regrowth. Use clean planting material. Plant resistant varieties, for example Centennial or Beerwah Gold.

Distorted leaves

Reduced expansion of tip leaves

Upper left: Leaf distortion. Upper right: Aphids on growing tip. Lower: Brown lacewing adult and nymph. Below: Green lacewing.

Cause. Feeding by aphids, which can also spread feathery mottle virus. Aphids are usually more common in cool dry conditions.

Management. Apply an appropriate chemical from the *Problem Solver Handy Guide*. Some predators, for example, lacewings, can reduce aphid numbers.

Older leaves turn yellow

Nitrogen (N) deficiency

Note nitrogen deficient pale green and yellow leaves.

Cause. Insufficient nitrogen available to the plant, due to continuous cropping without adding nitrogen, leaching from heavy rain and irrigation, soil with low organic matter content and sandy soils that have a low nutrient content.

Management. Check maturity if storage roots are developing. Apply a light application of a nitrogenous fertiliser if more growth is required. Use soil, leaf and sap tests. Refer to 'Nutrition' in Section 4, for details.

Magnesium (Mg) deficiency

Cause. Insufficient magnesium available to the plant. Excessive applications of calcium (Ca) or potassium (K) can make magnesium unavailable.

Management. Apply dolomite before planting if pH is low. If the pH is correct or alkaline, apply magnesium sulfate ($MgSO_4$) at 100 to 250 kg/ha before planting, through irrigation, or as a foliar spray at 2 kg/100 L. Use soil, leaf or sap tests.

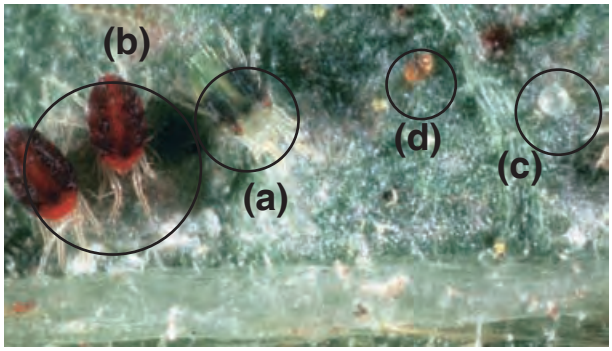
Older leaves turn yellow

Yellowing or bleaching along leaf veins

Upper: Top of leaf. Lower left: Under leaf. Below: (a) twospotted mite; (b) bean spider mite; (c) twospotted mite eggs; (d) bean spider mite eggs. Adult mites are about 0.5 mm long and eggs about 0.15 to 0.2 mm in diameter.

Cause. Feeding by mites, either the twospotted mite *Tetranychus urticae* or the bean spider mite *Tetranychus ludeni*. Usually associated with fine webbing under the leaf. Worse in hot dry weather.

Management. Use predatory mites, particularly in the nursery block. Allow natural predators to build up. Spray if necessary with an appropriate chemical from the *Problem Solver Handy Guide*.



Yellow or purple blotching between leaf veins

Cause. Feeding on the undersides of the leaves by adults and nymphs of silverleaf whitefly *Bemisia tabaci*. Varieties with purple pigmentation may show purple discolouration.

Management. Maintain good farm hygiene and destroy old crops. Allow beneficial insects to build up. If you need to spray, use an appropriate chemical from the *Problem Solver Handy Guide*, preferably one that is not harmful to beneficial insects.

Salt damage

Cause. Using saline (salty) irrigation water or growing in sodic soils.

Management. Check water quality and use another source if possible. Schedule irrigation to supply plant requirements without overirrigating. Consider using trickle irrigation to prevent wetting leaves. Do a soil test and seek professional advice.

Young leaves turn yellow

Zinc (Zn) deficiency

Deficiency on left half of leaf; right half painted with zinc sulfate ($ZnSO_4$).

Cause. Insufficient zinc available to the plant. Worse under wet or cold conditions, if phosphorus levels are high and when the pH is above 7 or below 5.

Management. Apply two to three foliar sprays, one to two weeks apart of zinc, for example as zinc sulfate at 500 g/100 L. Use soil, leaf or sap tests. Refer to 'Nutrition' in Section 4, for details.

Iron (Fe) deficiency

Deficiency on left half of leaf; right half painted with iron sulfate ($FeSO_4$).

Cause. Insufficient iron available to the plant. An iron deficiency may be induced by high levels of manganese (Mn), particularly in acidic soils.

Management. Apply a foliar spray of iron sulfate ($FeSO_4$) or chelate at 100 g/100 L. Use soil, leaf or sap tests and check soil pH.

Leaves change colour

Natural pigmentation

Cause. Many varieties contain purple pigmentation. Young leaves of some varieties, for example Beerwah Gold, are naturally purple but then turn green. These varieties often turn purple when under stress from cold, dry winds or nutrient disorders.

Management. None for natural pigmentation. If possible, correct the cause of the stress.

Feathery mottle virus

Inset: Note purple markings around yellow spots.

Cause. Sweetpotato feathery mottle virus. Spread by aphids or infected planting material.

Management. Use virus-free planting material. Do not take cuttings from plants with virus symptoms. Renew virus-free planting stock annually or at least every three years. Spray to control aphids with an appropriate chemical from the *Problem Solver Handy Guide*.

Leaves change colour

Phosphorus (P) deficiency

Note yellow leaves and purple petioles.

Cause. Insufficient phosphorus available to the plant. Older leaves turn red-brown or purple. When deficiency is more severe, the older leaves begin to die, with uneven yellowing from the tip or one-half of the leaf blade. Some varieties show a combination of yellow, orange and purple pigment.

Management. Apply a phosphorus fertiliser before planting, based on a soil test. Use leaf and sap tests. Refer to 'Nutrition' in Section 4, for details. The application of organic matter, such as animal manure and plant material, also increases the availability of phosphorus.

Cold damage

An overlapping leaf protected the green area.

Cause. Temperatures below 15°C. Leaves may turn purple.

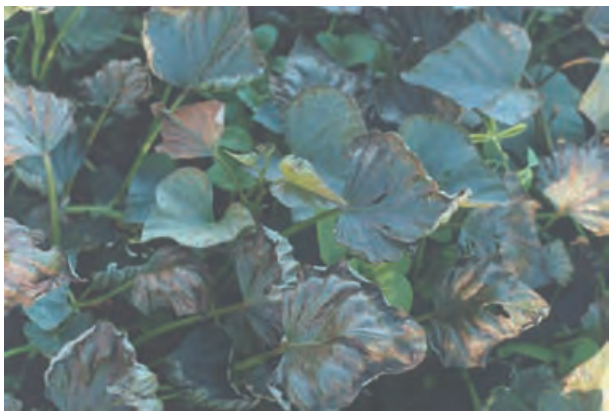
Management. Do not grow under cold conditions.

Leaves turn black or mottled

Upper: White Abundance. Lower left and right: Travis. Note: These plants were severely chilled; the temperature did not drop below 0°C.

Cause. Frost damage or severe chilling. The leaves of plants that have been chilled, but not frosted, may show light or dark necrotic areas, depending on the variety.

Management. Do not grow in frost-prone areas in winter.



Leaves change colour

Black sooty mould on leaves

Cause. Mould growing on the sticky secretions (honeydew) of silverleaf whitefly *Bemisia tabaci*.

Management. Maintain good farm hygiene and destroy old crops. Allow beneficial insects to build up. If you need to spray, use an appropriate chemical from the *Problem Solver Handy Guide*, preferably one that is not harmful to beneficial insects.

Yellow, chlorotic distorted leaves

Cause. This problem is referred to as chlorotic leaf distortion. The cause is not known. Symptoms appear during bright, sunny periods, go into remission during prolonged cloudy periods with low light intensity, and return after a few sunny days. Symptoms may disappear after a while.

Management. No control available or necessary.

Little leaf (big bud, witches broom)

Affected, stunted plant on right. Inset: Little leaf symptom.

Cause. Sweetpotato little leaf phytoplasma. Spread by leafhoppers or infected planting material. It can coexist with feathery mottle virus, causing severe reductions in yield.

Management. Use disease-free planting material. Do not take cuttings from plants with little leaf symptoms. Renew planting stock at least every two to three years.

Many white flying insects

Silverleaf whitefly

Adults (left) are 0.8 to 1.2 mm, nymphs (right) 0.3 to 0.6 mm.

Cause. Adults and nymphs of the insect *Bemisia tabaci* feed on the undersides of the leaves. They can occur in very high numbers and are resistant to most insecticides.

Management. Maintain good farm hygiene and destroy old crops. Allow beneficial insects to build up. If you need to spray, use an appropriate chemical from the *Problem Solver Handy Guide*, preferably one that is not harmful to beneficial insects.

Problems with stems

Distorted tips with corky lesions on stems

Left: Infected cutting (left); healthy cutting (right). Right: Symptoms on stems and leaves.

Cause. Scab caused by the fungus *Sphaceloma batatas*. It also appears on leaf stalks and leaves. The fungus is carried over on regrowth and on plant residue from infected crops, and spread on infected planting material.

Management. Practise good farm hygiene; destroy regrowth. Use clean planting material. Plant resistant varieties, for example Centennial or Beerwah Gold.

Distorted leaf stalks and short internodes

Note boron was applied at the point of the cutters. Vine is twisted before the application.

Cause. Boron (B) deficiency. Worse in coarse sandy soils, soils that have recently had heavy applications of lime or dolomite, or alkaline soils.

Management. Apply two to four foliar sprays of Solubor at 200 to 500 g/100 L. Take a soil test six to eight weeks before planting and follow recommendations. Where soil boron levels are known to be low, apply a soil treatment of Solubor or borax for future crops. Use soil, leaf and sap tests. Refer to 'Nutrition' in Section 4.

Storage roots growing on vines

Cause. Either vines were covered with soil during hilling, or soil surface stayed wet too long. Some varieties are more prone to this.

Management. Do not cover vines during hilling. Do not overwater. Grow during drier weather.

Flat, strap-like stems

Cause. This is called fasciation. The cause is not known and the problem is not important. Some varieties, for example L0-323, are more prone to it.

Management. Do not take planting material from affected plants.

Problems with stems

Hollow crown or stems

Upper: Damaged crown. Lower: Stem showing exit hole and adult weevil (6 mm). Inset: Hollowed stem and larva (9 mm).

Cause. Feeding by larvae of the sweetpotato weevil *Cylas formicarius elegantulus*. Severe infestations in the crown may reduce the plant's ability to bulk-up storage roots by reducing translocation of nutrients. Morning glory vine and related species are also hosts. Spread through infested planting material. Adult weevils can fly at least 1.5 km and lay eggs on established crops.

Management. Do not plant infested planting material. Maintain a good crop rotation and good farm hygiene. Destroy old crops immediately after harvest and cultivate to destroy all volunteer plants. Spray with an appropriate chemical from the *Problem Solver Handy Guide*.

Whole plant wilts

Water stress

Cause. This may be due to either insufficient water or too much water causing waterlogging. Any disease that restricts the plant's ability to take up water, for example root diseases, will cause similar symptoms.

Management. Check soil moisture condition; use an irrigation-scheduling device, for example tensiometers. Use of these devices to determine irrigation frequency can also reduce the risk of root rots. Plant on hills and ensure good drainage from the fields. Refer to 'Irrigation management' in Section 4.

Feeder roots rot

Soil rot (pox)

Note resistant varieties in background.

Cause. The actinomycete (bacteria-like organism) *Streptomyces ipomea*. Plants are stunted. Soil rot is less active at a low pH. The variety Centennial is susceptible. Most recent varieties from the USA have some resistance.

Management. Maintain good farm hygiene and crop rotation. Plant resistant varieties. Use clean planting material. Adjust pH down to below 6.0.

Feeder roots rot

Fusarium root rot

Left: Stunted plant. Right: Close-up showing flaking outer skin of rotting root (arrowed).

Cause. The soil-borne fungus *Fusarium* spp. It is worse in wet conditions. Most recent varieties from the USA have some resistance.

Management. Maintain good farm hygiene and crop rotation. Use clean planting material. Do not plant susceptible varieties.

Blemishes on storage roots

Ribs on roots

Cause. Cool soil temperatures during early root development. Some varieties, for example Beerwah Gold, are more susceptible.

Management. Do not plant crops timed to bulk-up storage roots in cool weather.

Veins on roots (subcutaneous roots)

Cause. The development of secondary roots under the skin. It is associated with older crops. Some varieties are more susceptible, but these are mostly older varieties that have been replaced.

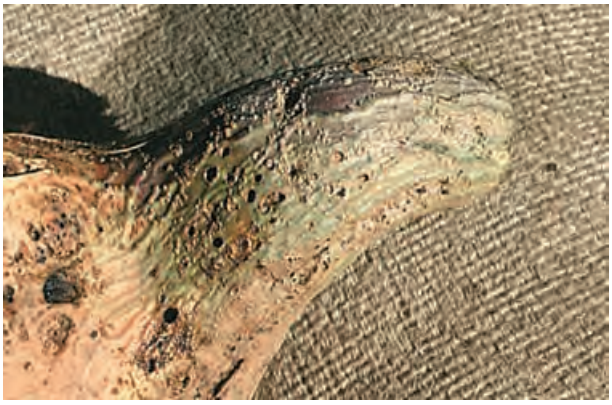
Management. Harvest roots as soon as possible. Plant less susceptible varieties.

Sprouting

Cause. Field-stored roots sprout when warm weather follows cool growing conditions. Worse in spring. Roots can also sprout during storage and transport to market.

Management. Harvest roots as soon as possible. Cooling for transport will reduce sprouting.

Blemishes on storage roots



Sunburnt storage roots

Cause. Exposure to sun. Some varieties tend to grow with part of the storage roots exposed above ground. These varieties are more prone to sunburn damage and sweetpotato weevil infestation. A soil compaction layer may force storage roots to emerge above the ground.

Management. Grow another variety. Make sure plants are well hilled up; you may need to plant into deeper hills. Ensure that there is no compaction layer preventing roots from growing down into the soil profile. Deep rip soil before hilling if necessary. Do not remove tops earlier than necessary.

Skinning

Cause. Damage during harvest, washing and packing.

Management. Harvest slowly and carefully. A light irrigation just before harvest will help break down clods and soften the soil surface. Remove the roots from the elevator as soon as possible. Reduce irrigation two to three weeks before harvest and slash vines five to seven days before harvest.

Wind damage

Cause. Exposure to wind after harvest.

Management. Collect storage roots as soon as possible after harvesting to get them out of the field.

Note this variety, WSPF, has purple flesh. Note purplish brown to black irregular patches of corky tissue on the skin and dark discolouration under these areas. There may also be dark brown spots in the flesh.

Alligator skin

Cause. The cause is not known. Alligator skin is a physiological disorder that occasionally affects storage roots in a crop. Most severely affected areas in a crop appear to be associated with hot, wet conditions which influence pH and nutrition.

Management. Ensure that the crop is well drained, check the pH before planting and maintain adequate levels of nutrients.

Cracks on storage roots

Growth cracks

Cause. Fluctuating growth, particularly due to rapid changes in soil moisture, temperature and nutrition.

Management. Maintain uniform moisture conditions during bulking-up of storage roots from 10 to 18 weeks after planting.

Nematodes

Cause. Heavy infestations of nematodes, particularly root-knot *Meloidogyne* spp. during early root development.

Management. Fumigating seedbeds with methyl bromide, or ensuring sprouts and cuttings are free of roots and soil, will result in nematode-free sprouts. Before planting apply an appropriate chemical from the *Problem Solver Handy Guide*. Nematode-resistant varieties may be an option in the future. Rotate with cover crops, for example forage sorghum, that are resistant to nematodes.

Fresh cracking

Cause. Storage roots dug from cold soil and exposed to warm air may crack, normally lengthways. Some varieties, for example Centennial, are more prone to cracking.

Management. Handle with extreme care. Harvest in the cool of the day. Harden-up storage roots by reducing irrigation two to three weeks before harvest.

Boron deficiency

Note cracking similar to that in the photo can result from severe boron deficiency.

Cause. Boron (B) deficiency. Worse in coarse sandy soils, soils that have recently had heavy applications of lime or dolomite, or alkaline soils.

Management. Take a soil test six to eight weeks before planting and follow recommendations. Where soil boron levels are known to be low, apply a soil treatment of Solubor or borax for future crops. Use soil, leaf or sap tests. Refer to 'Nutrition' in Section 4, for details.

Rough skin

Armillaria rot

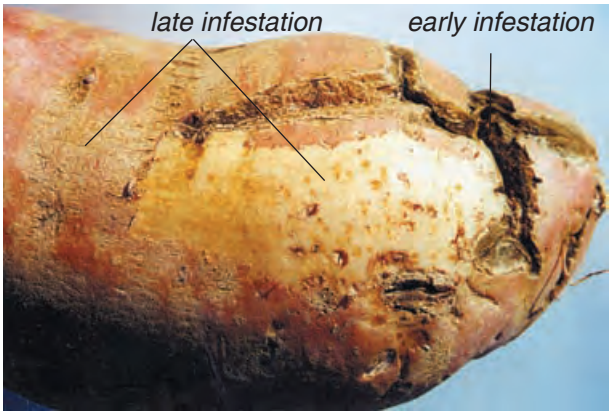
Cause. The fungus *Armillaria* sp. Black, shoe-lace-like strands appear on the storage roots. It only occurs in newly cleared land.

Management. Remove all tree stumps and large roots before planting.

Enlarged lenticels

Cause. Pores in the skin enlarge in excessively wet soil conditions, giving a raised, corky appearance. Some varieties, for example Hernandez, are more susceptible.

Management. Grow in well-drained soils. Ensure good water management; do not overwater. Select less susceptible, smooth-skinned varieties.

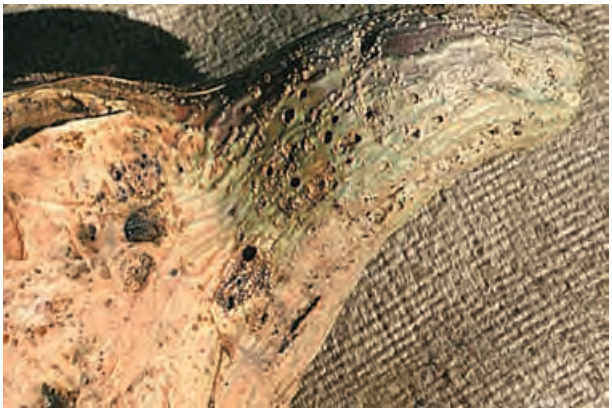


Nematodes

Cause. Heavy infestations of nematodes—root-knot *Meloidogyne* spp., or root lesion *Pratylenchus* spp.—during early root development causes severe cracking. Late infestation of nematodes can cause fine cracking and small dark spots to appear beneath the skin.

Management. Fumigating seedbeds with methyl bromide, or ensuring sprouts and cuttings are free of roots and soil, will result in nematode-free sprouts. Before planting apply an appropriate chemical from the *Problem Solver Handy Guide*. Resistant varieties may be an option in the future. Rotate with cover crops, for example forage sorghum, that are resistant to nematodes.

Small holes in storage roots

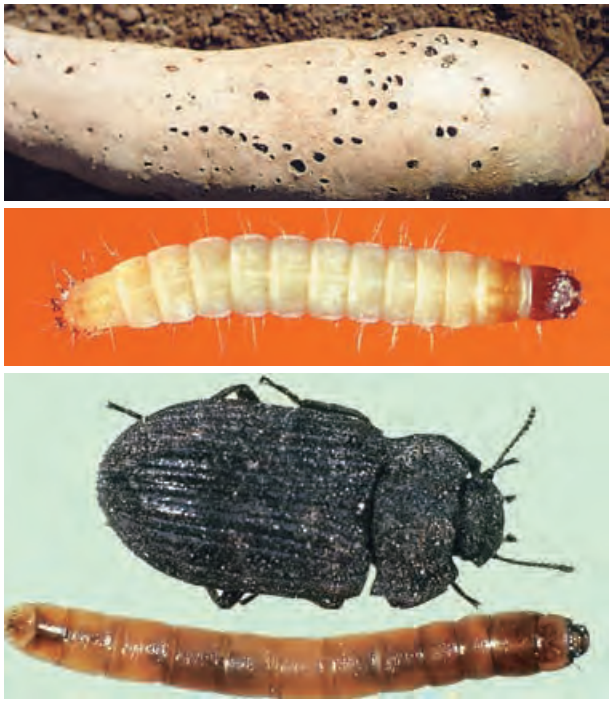


Small holes in top or exposed area

Cause. Sweetpotato weevil *Cylas formicarius elegantulus*. Adult weevils can fly at least 1.5 km. The top end of storage roots and exposed areas are most affected. Adults may also feed on the surface. Morning glory vine and related species are also hosts. Spread in planting material.

Management. Practise good farm hygiene; destroy all regrowth. Use clean planting material. Use a good crop rotation. Spray with an appropriate chemical from the *Problem Solver Handy Guide*.

Small holes in storage roots



Small deep holes (shot hole)

Upper: shot hole damage. Centre: wireworm (20 mm). Lower: false wireworm (adult 10 mm, larva 15 to 20 mm).

Cause. Tunnelling by wireworms, larvae of the click beetle (family Elateridae), and larvae and adults of the beetle *Gonocephalum* spp., the false wireworm or northern false wireworm. Worse in spring, and where high levels of organic matter were present but are declining.

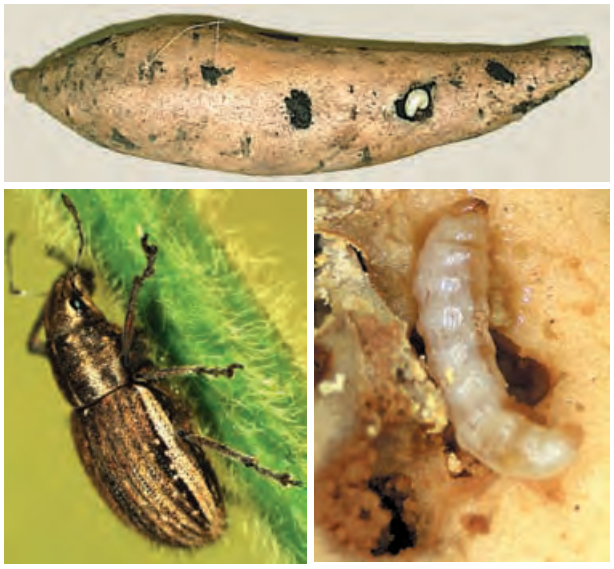
Management. Prepare the land thoroughly to reduce organic matter and insect populations. Cultivation exposes larvae and pupae to predators, for example birds. At planting apply an appropriate chemical from the *Problem Solver Handy Guide*.

Medium-sized holes

White grub

Cause. White grubs, larvae of scarab beetles, for example cane grub or pasture grub. Mature larvae (up to 35 mm), do most of the damage and are usually present in winter and spring. Worse when organic matter levels are declining.

Management. Prepare the land thoroughly to reduce organic matter and insect populations.



Shallow chewed surface

Upper: External damage showing larva (about 13 mm). Lower left: Adult (10 to 13 mm). Lower right: Internal damage and larva (have no legs).

Cause. Larvae of the whitefringed weevil *Graphognathus leucoloma*. The eggs are laid in summer and the larvae over-winter in the soil until the following summer.

Management. Prepare land thoroughly to reduce insect populations. Use crop rotations to reduce the number of adults emerging.

Large shallow holes

Crickets

Left: African mole cricket (30 mm). Right: Hole damage.

Cause. Feeding by the African mole cricket *Gryllotalpa africana*. Crickets feed at night and hide in the soil during the day. Worse in summer. Crickets also chew holes in thin, plastic, trickle irrigation tube.

Management. If crickets are a problem, place baits in the field before planting. Refer to the *Problem Solver Handy Guide*. Use a heavier gauge irrigation tube if tubing is being damaged.

Animals

Upper left: Rat damage. Upper right: Hare damage. Lower: Kangaroo damage.

Cause. Mice, rats, hares, pigs, kangaroos and wallabies. The soil is noticeably disturbed.

Management. Use electric fences for hares and electric fences with an offset live wire outside the fence for wallabies and pigs. Contact the Rural Lands Protection Service and National Parks and Wildlife for further advice. Remove cover from around the field by slashing or burning.

Shallow tracks on surface

Flea beetle

Top left: Adult is about 3 mm. Right: Damage from flea beetle.

Cause. The flea beetle *Xenidia* sp. Adults feed on the leaves, while larvae (up to 12 mm) feed on the storage roots. Worse in spring.

Management. No chemical controls are registered.

Colasposoma beetle

Adults are 6 to 9 mm.

Cause. Feeding by larvae (up to 12 mm), of the beetle *Colasposoma sellatum*. Damage is similar to flea beetle damage, but deeper. Adults feed on the foliage. Only known to occur in north Queensland.

Management. No chemical controls are registered.

Spots or marks on storage roots

Black marks

Cause. Soil rot or pox caused by the actinomycete (bacteria-like organism) *Streptomyces ipomea*. Plants are stunted. The variety Centennial is susceptible. Most recent varieties from the USA have some resistance.

Management. Practise good farm hygiene and crop rotation. Plant resistant varieties. Use clean planting material. Adjust pH to below 6.5.

Brown circular spots

Cause. The soil-borne fungus *Sclerotium rolfsii*. It survives in the soil for years as hard sclerotes, on plant residue, or on host plants, which include many vegetable crops. It is spread in soil or planting material and is worse in warm, moist conditions.

Management. Practise good farm hygiene. Allow plant residue to decompose before planting. Deep plough to bury plant residue and sclerotes. Maintain good crop rotations. Use clean planting material. Before planting apply an appropriate chemical from the *Problem Solver Handy Guide*.

Irregular grey areas

Damage is only skin deep; there is no internal breakdown.

Cause. Scurf, caused by the fungus *Monilochaetes infuscans*. It survives on infected sweetpotato plant material in the soil and can be spread on planting material. It is worse in sandy soils with high levels of organic matter.

Management. Use disease-free roots to produce planting material which should be free of roots and soil. Maintain a good crop rotation.

Pink discolouration

Cause. Anthocyanin, a pigment produced by a mutation that affects skin colour. The more common types are chimeras, where only a portion of the periderm (skin) is changed. It is more common among white or cream-skinned varieties. Not a serious problem.

Management. Use vine cuttings instead of storage roots in propagation. Do not select planting material from affected plants.

Root death

Dead root tips

Left: Healthy roots. Right: Ends of the root die off; small roots may proliferate from 'behind' the dead area. Storage roots are short and dumpy.

Cause. Boron (B) deficiency. Worse in coarse sandy soils, soils that have recently had heavy applications of lime or dolomite, or alkaline soils. There may also be some internal brown spots.

Management. Take a soil test six to eight weeks before planting and follow recommendations. Where soil boron levels are known to be low, apply a soil treatment of Solubor or borax for future crops. Use soil, leaf or sap tests. Refer to 'Nutrition' in Section 4, for details.

Soft rots of storage roots in the field

Bacterial soft rot

Cause. Bacteria of the *Erwinia* spp. They enter the storage root through injuries and spread in contaminated water.

Management. Discard infected roots in the field. Do not recycle washing water. Provide good aeration to dry storage roots.

Pythium

Left: External damage. Right: Internal damage; note healthy tissue at the right.

Cause. The soil-borne fungi, *Pythium* spp. are found in most soils and can cause problems in warm, wet soils. *Pythium* spp. are spread in contaminated soil and water.

Management. Plant in well-drained soil. Use a good crop rotation.

Sclerotium rolfsii

Cause. The soil-borne fungus *Sclerotium rolfsii*. It survives in the soil for years as hard sclerotes, on plant residue, or on host plants, which include many vegetable crops. It is spread in soil or planting material, and is worse in warm, moist conditions.

Management. Practise good farm hygiene. Allow plant residue to decompose before planting. Deep plough to bury plant residue and sclerotes. Maintain good crop rotations. Use clean planting material. Fumigate seedbeds with methyl bromide.

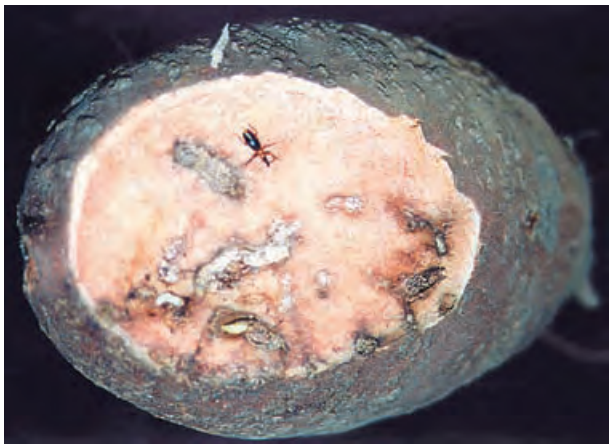
Potassium (K) deficiency

Note pale colour of flesh.

Cause. Not enough potassium available to the plant. This may be because not enough potassium was applied in fertiliser, heavy rainfall has leached it below the root zone, or heavy applications of calcium (Ca) or magnesium (Mg) have made the potassium unavailable to the plant.

Management. Ensure adequate potassium is applied as a pre-plant application and as side dressings, particularly if it rains heavily. Do not make heavy applications of calcium or magnesium. Use soil, leaf and sap tests.

Internal discolouration Pale skin colour



Sweetpotato weevil

Upper:Internal damage. Lower: Close-up of adults (6 mm) and larvae (9 mm).

Cause. Feeding larvae of the sweetpotato weevil *Cylas formicarius elegantulus*. Adult weevils can fly at least 1.5 km. Exposed areas are most affected, for example the top end of storage roots forced out of the soil by a compaction layer. Adults may also feed on the surface. They reach the storage roots through cracks in the soil and lay eggs on the surface of the storage roots. Morning glory vine and related species are also hosts. Spread in planting material.

Management. Practise good farm hygiene; destroy all regrowth. Use clean planting material. Use a good crop rotation. Use rippers to break up compaction layers. Do not allow soil to crack, hill up or overhead irrigate. Spray with an appropriate chemical from the *Problem Solver Handy Guide*.

Copper (Cu) deficiency

Note discolouration under skin. Surface may also be discoloured and sunken.

Cause. Not enough copper available to the plant. Worse on sandy soils. May be induced by liming.

Management. Apply a foliar spray of 500 g/100 L of copper sulfate ($CuSO_4$). Use soil and leaf tests.

Postharvest problems

Irregular surface discolouration

Cause. Skin damage during harvesting and handling.

Management. Handle storage roots with care. Use an appropriate postharvest treatment from the *Problem Solver Handy Guide*. Cure roots immediately after harvest by holding at 30°C and 95% relative humidity for five to seven days.

Shrivelled roots

Left: Cured storage roots. Right: Uncured, shrivelled storage roots.

Cause. Moisture loss due to low humidity during storage.

Management. Store at 16°C and 85 to 90% relative humidity.

Storage rots

Note black spores and margin of healthy and diseased storage root.

Cause. Usually a species of the *Rhizopus* fungus. Spores are common in soil and in the atmosphere. Infection is through wounds and is favoured by high humidity.

Management. Handle storage roots with care to reduce injury. Use an appropriate postharvest treatment from the *Problem Solver Handy Guide*.

Postharvest problems

Phomopsis dry rot

Left: External damage. Right: Internal damage; note dark discolouration.

Cause. The fungus *Phomopsis phaseoli*. It can survive on trash and enters and infects the storage root tissue through a wound, usually at one end. This pathogen does not usually cause significant damage except in roughly harvested storage roots. More common in warm, humid conditions.

Management. Take care to avoid damaging storage roots when harvesting and during postharvest handling, as injury may allow the fungus to infect the storage roots.

Fusarium root rot

Left: External damage. Right: Internal damage; note brown discolouration and cavity.

Cause. The soil-borne fungus *Fusarium* spp. It is worse when soil moisture is low, and nematodes or soil insects have damaged storage roots. Most recent varieties have good resistance to Fusarium.

Management. Maintain good farm hygiene and crop rotation. Use clean planting material. Plant resistant varieties. Do not allow soil to dry out.

Bacterial soft rot

Note dark internal discolouration and also under the skin.

Cause. Bacteria of the *Erwinia* spp. They enter the storage root through injuries and spread in contaminated water.

Management. Discard infected roots in the field. Do not recycle washing water. Provide good aeration to dry storage roots. Use an appropriate postharvest treatment from the *Problem Solver Handy Guide*.