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Growing eggplants

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Introduction

The eggplant (*Solanum melongena*) is native to the subtropical areas of south-eastern Asia. It is a member of the Solanaceae family, which includes other vegetable crops such as tomatoes, potatoes and capsicums. Eggplants have been widely grown in southern Europe, the Middle East and Asia for hundreds of years.

The fruit, also known as aubergine (France), melanzana (Italy) or brinjal (India), is considered something of a delicacy. It can be baked, grilled, fried or boiled, or used in stews or as a garnish.

Queensland is the main eggplant producer in Australia, followed by New South Wales (4,626 and 1,948 tonnes respectively in 2018). In the 2018–2019 season, total production value was $17.5 m while the fresh supply wholesale value was $20.5 m (2017–18 Australian Horticulture Statistics Handbook by Hort Innovation).

Climate

Eggplant is a summer-growing vegetable that requires warm to hot conditions during the 5–6 month growing period to produce high yields and quality fruit. Cool weather will retard plant growth and reduce yields. Affected plants seldom recover, even if favourable growing conditions return.

The optimal growing temperature range is 21–30 °C, with a maximum of 35 °C and a minimum of 18 °C. The optimal soil temperature for seed germination is 24–32 °C. Young seedlings are sensitive to frost. In Australia, most eggplants are grown outdoors along the east coast, with increasing volumes being grown year-round elsewhere in greenhouses.

Soil

Eggplants are moderately deep rooting and can be grown on a wide range of soils. They do best on light-textured soils such as sandy loams or alluvial soils that are deep and free draining.

These soils warm up quickly in spring and are suitable for early plantings. Avoid soils with high clay content. A soil pH between 6.0–7.0 is desirable.

Varieties

Eggplant can be perennial but in commercial production it is treated as an annual bush. Fruit shapes vary from the more common teardrop shape to a slim 'sausage' shape (Figure 1). Fruit is predominantly glossy dark purple to black although some varieties can be light purple, crimson and cream.

Black Label and Epic have replaced Market Supreme as the main teardrop shape varieties grown around Sydney. Both are high yielding with attractive smooth, glossy, black fruit that have good keeping quality.

The main long slim cylindrical varieties are Longo and Baby Fingers. They are also referred to as mini bunching (or Lebanese) eggplants.

Seedlings

Eggplants are usually planted in the field as seedlings. The seedlings are purchased from commercial nurseries and need to be ordered at least 10 weeks before planting. Transplant seedlings need to have 6–7 leaves and be 10–12 cm high. If growing your own seedlings, the following should ensure healthy plants:

- sterilise the growing medium beforehand with steam or registered fumigant

- sow seeds in seedbeds with a temperature above 24 °C
- place growing trays under glass or plastic covers during winter. Eggplants can be raised in seedbeds in the open only when the mean daily temperature is over 21 °C
- to produce 3,000 seedlings, sow seeds in rows 10 cm apart with 1.8–2.0 cm between plants in a 10 m^2 seedbed. Alternatively, use cell trays with peat moss and vermiculite as the growing medium. Between 100 and 150 seedlings are produced from 1 g of seed
- maintain care of seedlings to avoid stunting. Insects such as aphids and leafhoppers must be controlled to avoid introducing plant virus diseases.

Seedlings grown under cover will be ready for transplanting 8–10 weeks after sowing.

Establishment

In the Sydney Basin, eggplant seedlings are transplanted from early October to late December. Between 10,000 and 18,000 plants are needed per hectare, depending on the variety.

Figure 1. Black Bell, one of the main teardrop shape eggplant varieties (left) and Baby Finger, one of the main slim shape eggplant varieties (right).

Land preparation should start several months before transplanting. Eggplants are best transplanted into raised beds for better drainage and only when the soil temperature is above 20 °C. Black plastic mulch is widely used in early crops to help to raise soil temperatures and control weeds (Figure 2).

Plant spacing will depend on the vigour of the variety. For smaller growing varieties, plant spacing can be 50–60 cm apart within rows and 60–80 cm between rows. Larger growing varieties do best when planted 60–80 cm apart with 100–120 cm between rows in an alternate planting pattern.

Each plant is trained to three leaders forking from the base of the plant.

Eggplants can also be grown in various hydroponic systems. The most common system is in 20 L black plastic bags containing a commercial potting mixture, with one plant per bag. The bags are placed on raised beds covered with black plastic and irrigated by one dripper per bag. The drippers provide both water and plant nutrients (Figure 3).

A trellis support system is needed to keep the fruit off the ground and to reduce wind damage. The most common system used in two-row plantings is stakes (steel or wood) on the outside rows with one or two lines of wire (2 mm) or heavy-duty twine supported by ties. Stakes are placed 3–4 m apart with a strainer post at each end of the row. Branches with fruit are trained up between the wires or twine.

Figure 2. Eggplants beds with black plastic mulch and star pickets for trellis support.

Figure 3. Drip irrigation providing both water and nutrients to Black Bell eggplants growing in 20 L plastic bags. Note the heavy duty plastic mulch on the ground and twine supporting branches with fruit.

Weed control

Several knockdown herbicides are registered for use on eggplants but weed control is mainly by shallow inter-row cultivation until the plants are sufficiently established to smother the weeds. Black plastic mulch is now widely used to assist in managing weeds within rows.

Irrigation

Irrigation is essential while the eggplants are growing. Excessive dry periods can cause shedding of flowers and developing fruit. The amount of irrigation needed will depend on soil type, growing conditions and crop growing methods such as using plastic mulch.

As a guide, crops planted in late October around Sydney using trickle irrigation might require up to 2–3 ML of water per hectare. Irrigation water should be good quality with an electrical conductivity (EC) of less than 2.0 mS/cm.

Soil moisture sensors, such as tensiometers, can be used to measure root zone moisture level and assist in developing an irrigation program. Irrigation should be applied when tensiometers show readings of 30–35 centibars.

Fertiliser

It is advisable to have your soil analysed 3–4 months before planting, especially if the soil nutrient status is unknown. This gives you time to implement any treatments necessary. Leaf analysis of mature leaves in the first crop can help to fine-tune a fertiliser program.

Adjust soil pH to 6.0–6.8 by applying and incorporating agricultural lime or dolomite several weeks before transplanting.

Eggplants have similar nutrient requirements to tomatoes. The aim is to maintain a balanced level of nutrition while the fruit are growing.

Organic manure, such as poultry manure, applied at 12–15 t/ha 4–6 weeks before transplanting will supply organic matter, add nutrients, improve soil structure and help to retain soil moisture. Combined with 200–300 kg/ha superphosphate, this should be sufficient as a pre-plant fertiliser program. If using only artificial fertilisers, apply a low-analysis N:P:K mixture, such as 5:7:4 at 1,200–1,500 kg/ha, before transplanting.

Apply nitrogen at 25–30 kg/ha (60–70 kg urea) during the growing season, starting when plants are 30 cm high, then after the first fruit set and repeat at 1–2 week intervals, depending on the growing conditions.

On lighter soils, which are readily leached, extra nitrogen and potassium should be applied. Several applications of potassium nitrate at up to 200 kg/ha can be used.

Eggplants grown around Sydney benefit from molybdenum and calcium foliar sprays. Apply a 0.1% solution of ammonium molybdate at 1 g/L at the five-leaf stage and again 15 days after transplanting. Alternatively, sodium molybdate can be used at 1.5 g/L. Calcium nitrate or commercial products containing calcium can be applied after fruit set.

Fertigation (applying soluble fertilisers via an irrigation system) is common in most plantings. Technology is now available to accurately apply

nutrients into the root zone for optimum plant growth and yield. The benefits include savings in labour and fertiliser cost, more efficient water and nutrient use, and reduced leaching of nutrients such as nitrogen into waterways and groundwater.

Diseases and pests

Diseases

Diseases cause fewer losses in eggplants than do insect pests.

Verticillium wilt is the most serious disease. Symptoms include discolouration of the conducting tissues in the roots and lower stem, wilting and eventual plant death (Figure 4). Avoid planting in areas known to be affected or after tomatoes, potatoes or capsicums. Practise crop rotation with vegetables such as peas and beans.

Anthracnose is the main disease that attacks ripening fruit, causing circular sunken spots (Figure 5).

The main leaf diseases are target spot and leaf blight.

Figure 4. Eggplant with verticillium wilt.

Figure 5. Anthracnose and bitter rot on eggplant. Photo: Cesar Calderon, Cesar Calderon Pathology Collection, USDA APHIS PPQ, Bugwood.org.

Pests

The main pests affecting eggplants are:

- fruit and flowers – tomato caterpillars, eggplant caterpillars (Figure 6), fruit flies, aphids and looper caterpillars
- leaves – leaf-eating ladybirds, spider mites and tomato russet mites
- roots – cutworms (Figure 7) and root-knot nematodes (Figure 8).

There is a limited range of plant protection products registered for use on eggplants in New South Wales. Check with the APVMA database or your nearest NSW agricultural retailer for products that can be used to manage pests and diseases in eggplants.

Figure 6. Eggplant caterpillar moth. Photo: Kurt Ahlmark, Microlepidoptera on Solanaceae, USDA APHIS PPQ, Bugwood.org.

Figure 7. A common cutworm.

Figure 8. Root-knot nematode.

Harvesting and marketing

Fruit size is determined by variety and market requirements. Traditional teardrop shape fruit varieties are ready for harvest 50–70 days after transplanting or one month after fruit set. These varieties can crop for up to five months. Market trends have been towards smaller size fruit of 7–10 cm diameter and 12–15 cm long.

Long, slim, cylindrical varieties can be picked when 1–2 cm in diameter and 5–10 cm long.

The fruit is harvested when it reaches a glossy deep purple but before seeds begin to harden and turn brown. Over-mature fruit have a dull colour, crinkled skin, spongy feel and wrinkled stem.

Cut the stem with a sharp knife or secateurs, leaving a short piece of stem attached to the fruit. Protective clothing should be worn when harvesting as there are small spines around the calyx and on leaves.

Handle fruit carefully, avoiding damage to other fruits, particularly from the spiny stems. Pick fruit in the cool part of the day and avoid prolonged exposure to the sun. Place in a cool room if not packed immediately at 7–10°C and 90–95% relative humidity. Eggplants do not store well. The maximum life in a cool room is 5–7 days.

Eggplants will crop over a long period and yield 5,000–8,000 18 L cartons (6–8 kg) containing 12–20 fruit per carton.

Eggplants from New South Wales are usually available from late December through to May and are mostly sold for domestic consumption via the Sydney markets.

Eggplant consumption in Australia is expected to increase moderately over the next decade.

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