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Growing leeks in Western Australia

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Leeks (*Allium ampeloprasum* var. *porrum*) belong to the onion family (Alliaceae) and are closely related to chives, garlic, onion and shallots. They originate from the Mediterranean area, and have been cultivated for up to 4000 years. The crop is mainly grown in the Perth Metropolitan Area. Consignments of leeks to Market City, Canning Vale were 632 t in 1998/1999, but this does not represent total production in Western Australia. The main area for leek production in Australia is in Victoria.

The leek is grown for its thickened cylindrical 'stem' or shank which is made up of long leaf bases. Leeks are biennial, but are grown as a short-lived annual in commercial cropping.

Leeks are mainly used to flavour soups and casseroles and they can also be used raw in salads. Leeks are a good source of vitamins, minerals and fibre.

A problem with the crop is that it takes 21 to 30 weeks to reach maturity from transplanting and plants also spend 8 to 16 weeks in the nursery or seedbed before transplanting. Two crops can be grown in a year. Some growers crop consecutively, as there is less build-up of soil diseases compared with other vegetables. However, crops should preferably be rotated with other types of vegetables to obtain the highest yields and quality.

Climate

Leeks grow best with temperatures between 15 and 25°C. It is more difficult to produce good quality leeks in hot climates. Although quite frost tolerant, they may flower ('bolt') in spring following low winter temperatures.

Soils

Leeks will grow on a range of soil types, but well drained neutral to slightly alkaline soils are preferred.

Nursery planting

The main production season is April to November, but the crop is grown all year round in the Perth Metropolitan Area.

Leeks are normally established in a seed-bed or nursery using either bare root or cell transplants. Seed is cheap and may be planted from May to February. Transplanting (at 15 cm high) is the preferred planting technique in the field, as this gives accurate spacing which is essential for even sizing, and also gives the best use of land.

Seed can be sown into seedbeds and thinned to 25 mm apart. However, cell grown seedlings establish more quickly and there are fewer losses in hot weather.

Field planting

Raised 1.5 m wide beds may be used to improve drainage, although for sandy soils it is possible to use flat beds. Each bed accommodates four plant rows, 40 cm apart, with spacing between plants in the rows of approximately 20 cm. Bare root transplants are normally topped to ensure a better establishment. Transplants should be planted 10 to 15 cm deep in holes made by hand or machine. This deep planting gives increased length of white stem. In Perth, the holes made by the planting machine are often not filled in immediately, as this may choke the plants. The normal frequent irrigations will replace soil gradually around the stems.

Varieties

Open pollinated varieties such as Elephant have been the mainstays of the leek industry for many years. However, these varieties are prone to bolting and hybrid varieties such as Rhino and Harpoon are now being more widely planted. Check with the suppliers for new varieties. Red varieties are also occasionally planted. Some growers maintain seed stocks of their own open-pollinated varieties.

The aim of leek breeders is to develop varieties with increased length of the shank ('stem'), decreased size of the bulb and with dark green leaves.

Fertilisers

Apply the following rates of magnesium and trace elements to the soil before planting.

50 kg/ha magnesium sulphate to supply magnesium;
20 kg/ha manganese sulphate to supply manganese;
18 kg/ha borax to supply boron;
18 kg/ha iron sulphate to supply iron;
18 kg/ha copper sulphate to supply copper;
18 kg/ha zinc sulphate to supply zinc; and
2 kg/ha sodium molybdate to supply molybdenum.

The use of compost at up to 50 m^3/ha, will be beneficial before planting or in the rotation. This will add organic matter to the soil, supply nutrients for the first weeks and retain moisture in the soil.

Apply double superphosphate at 0.6 t/ha before planting. Levels of superphosphate may be reduced if a soil test shows that phosphorus levels are more than 80 ppm or if compost is used. Double superphosphate is preferred to single superphosphate as it contains less cadmium, which is a toxic heavy metal.

After planting, apply weekly top dressings of nitrogen (25 kg urea or 35 kg ammonium nitrate per hectare) and potassium (25 kg muriate of potash per hectare) in the irrigation water. Reduce the rates for nitrogen if the irrigation water contains more than 10 ppm of nitrate nitrogen. Apply magnesium sulphate at 50 kg/ha at four weeks after planting.

Apply zinc sulphate at 4 g/L and iron sulphate at 2 g/L if there are deficiency symptoms on the plants.

It is recommended that nutrient analyses are made of the soil and irrigation water before planting, plus one to two analyses of the youngest mature leaves after planting. This will enable some adjustments to the fertiliser program and provide information on nutrients that are deficient or toxic. Some of the suggested nutrients in the programs in this publication may be deleted or reduced, if it is obvious that they are sufficiently high in the irrigation water and soil, including sources from compost and fertilisers from previous cropping.

Do not apply excess fertilisers, because nitrogen, phosphorus and potassium are easily washed through sandy soils by rainfall and irrigation. This may lead to groundwater pollution in rivers and estuaries.

Irrigation

There have been no trials to obtain information on the watering requirements of leeks. Growers use overhead irrigation systems and keep the plants well watered. Water below 1000 ppm in total soluble salts is preferred to produce good yields and quality.

Pests and diseases

There are no major problems with soil borne diseases or nematodes, so metham sodium is not normally used as a soil fumigant before planting. However, if Fusarium basal rot (*Fusarium* spp.) is noted, it would be necessary to introduce a good rotation with other crops. Bacterial soft rot is sometimes a problem in the autumn and cooler months, especially in the leaves and shanks below ground. Downy mildew (*Perenospora destructor*) is the most common disease of leeks.

A minor off-label until 2002 allows the use of mancozeb (Dithane®) to control downy mildew.

Few problems are experienced with pests in leeks. Onion seedling maggot, two spotted mite and grubs can occasionally be a problem. Thrips and snails can cause significant damage to young seedlings if present in large numbers. Root-knot nematode is not a problem with leeks.

Weeds

Good control of weeds by hand weeding is essential, because of the lengthy period from planting to harvesting.

A minor off-label permit until 2002 allows the use of linuron (Linuron®) for the control of emerged weeds. This must be applied when the leeks are 15 cm or greater in height.

A minor off-label permit until 2002 allows the use of pendimethalin (Stomp®) to control weeds. It may be applied just before or after sowing, or from the first true leaf until the third leaf stage of the crop.

Harvesting and storage

Leeks are normally hand pulled after a skimmer blade has been passed under the bed to cut roots and loosen plants. They are normally roughly trimmed, then stacked in bulk for transport to the packing shed. The crop may also be harvested mechanically.

Excess outer leaf sheaths are removed and roots trimmed in the packing shed. The tops of the leaves are trimmed to leave about 10 to 15 cm of leaf. This is followed by thorough washing to remove all soil.

Leeks for the domestic market are mainly bunched (10 to 15 leeks), or packed in 36 litre cartons which contain 20 leeks. Small leeks can also be marketed as ‘gourmet’ leeks.

Good quality leeks have a long white shank (10 to 20 cm), with only a slight bulb, a diameter of 2 to 5 cm, a weight of 200 to 300 g and dark green leaves. Large leeks are preferred for marketing. Leeks are longer, but with thinner shanks in summer.

Store at 0 to 2°C and 90 to 95 per cent relative humidity.

Exports

Small quantities of leeks are exported to Singapore. There is potential to export leeks to Japan from April to September. There was formerly an export market to the UK in April and May, but this has decreased since 1995, due to problems with maintaining good quality for the lengthy sea journey.

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