



Department of Agriculture

Farmnote



Growing Parsnips in Western Australia

By John Burt, Development Officer, South Perth

Parsnips (*Pastanica sativa*) belong to the Apiaceae family, which also includes carrots, celery and parsley. Parsnips are biennial, but are grown commercially as an annual. The edible portion is the enlarged fleshy tap root.

Consignments to Market City, Canning Vale were 1,200t in 2000/2001 but this does not represent total production of parsnips in Western Australia. There is a good demand for parsnips throughout the year, especially in the cooler months. Production is mainly from growers in the Perth Metropolitan Area. The crop is not liked by some growers because it has a long maturity time and the roots are difficult to harvest.

Most parsnips are sold on the domestic market, but in recent years there has been a small export market to the United Kingdom from March to May, and also to Singapore.

Soil

Parsnips have an effective rooting depth of 35 to 50 cm and grow well in deep, sandy soils. A soil pH of 6.0 to 7.0 (water system of measurement) is adequate for growth. Acid soils should be limed before planting. Heavy soils and stony soils are not suitable for parsnips.

Climate

The optimum temperatures for growing parsnips are 16 to 20°C. The crop may be scorched above 30°C. Roots are not harmed by frost, but cold weather may result in losses of roots due to flowering or 'bolting'.

Rotation

The optimum rotation is to include one crop of parsnips in the rotation every four years to avoid diseases such as *Rhizoctonia* and canker. In practice, if these diseases are not present, growers may grow one crop of parsnips on the same ground each year, but this should be avoided if possible. Do not include too many crops of carrots, celery and parsley in the rotation as these are in the same family as parsnips.

Parsnips are often grown following a leafy crop such as brassicas or lettuces which have been well fertilised.

Varieties

There has been little development of hybrid varieties and open-pollinated varieties are mainly used. The major varieties in Western Australia are Yatesnip No. 1, Melbourne Whiteskin and Hollow Crown. Check with your supplier for information on new varieties.

Culture

Parsnips can be seeded throughout the year in Perth and the south-west of Western Australia, but germination is better during the cooler months. Seed remains viable for one year if kept cool and stored in a dry container.

The spacing between the rows may depend upon the type of harvester to be used. Sow the seed *in situ* 5 to 20 mm deep in rows 30 to 40 cm apart. This requires a total of 3.3 to 4.6 kg of seed to sow one hectare. Parsnips may also be planted in double rows with 40 cm centres, with the two lines in the double rows at 6 cm apart and plants at 8 to 10 cm within the rows. If seeds are hand sown, thin seedlings three weeks after germination to 75 mm apart. Roots may be deformed if the plants are crowded. If the seed are sown with a vacuum or air seeder, this results in precise spacing and the plants are usually not thinned.

At optimum temperatures, germination takes about 14 days, but in cold conditions it may take four weeks. Establishment is better in the cooler months. The seed is more difficult to germinate than carrots and requires regular moisture for establishment.

Parsnips may be seeded with a nurse crop such as cereal rye, which germinates quicker than parsnips and protects the seedlings from wind and sand-blast. The cereal rye may be sprayed-off when the parsnips have three leaves.

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Fertilising

The use of compost at up to 50 cubic metres per hectare to other crops in the rotation will be beneficial. It will supply organic manure, add nutrients and help to retain moisture in the soil.

Apply the following trace elements and magnesium per hectare before planting:

- 11 kg borax to supply boron;
- 18 kg copper sulphate to supply copper;
- 18 kg ferrous sulphate to supply iron;
- 25 kg manganese sulphate to supply manganese;
- 2 kg sodium molybdate to supply molybdenum;
- 16 kg zinc sulphate to supply zinc;
- 50 kg magnesium sulphate to supply magnesium.

The program in Table 1 shows the main fertiliser requirements for a crop planted on the Swan Coastal Plain and which is harvested 21 weeks after planting.

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.

Table 1. Fertiliser program for parsnips						
Kilograms per hectare						
Week	Nitrogen Urea (right) or ammonium nitrate (left)		Double superphosphate	Muriate of potash	Magnesium sulphate	Borax
pre-plant			650			
1						
2	40	30		40		
3	40	30		40		
4	40	30		40	30	5
5	40	30		40		
6	60	45		60		
7						
8	60	45		60	40	5
9						
10	60	45		70		
11						
12	60	45		70	40	
13						
14	50	35		70		
15						
16	50	35		70	30	
17						
18	40	30		50		
19						
20						
21 (harvest)						

Notes: This program refers to a Spearwood or Karrakatta soil with a soil phosphorus level of 50 ppm (Colwell test). As a guide, if the soil phosphorus level is above 50 ppm, reduce the rate of double superphosphate which is applied to the soil. The latter is preferred to ordinary superphosphate, which has higher levels of cadmium (toxic heavy metal)

Reduce rates for nitrogen if water analysis shows a level above 10 ppm of nitrate nitrogen in the irrigation water.

Fertilisers are best applied by fertigation, providing sprinklers apply water uniformly.

Table 2. Daily irrigation requirements for parsnips, using butterfly sprinklers (based on 170 per cent evaporation replacement)			
Month	Average evaporation (mm/day) at Medina Research Station	kL water per hectare per day at 170 per cent replacement	Minutes per day (with butterfly sprinklers)
January	8.6	159.1	38.3
February	8.1	149.9	36.1
March	6.2	114.7	27.6
April	3.8	70.3	16.9
May	2.3	42.6	10.3
June	1.8	33.3	8.0
July	1.7	31.5	7.6
August	2.2	40.7	9.8
September	3.1	57.4	13.8
October	4.5	83.3	20.1
November	6.2	114.7	27.6
December	7.8	144.3	34.8

Irrigation

Parsnips have shallow roots and the crop has higher moisture requirements than other vegetables. As a guide, apply 170 per cent evaporation replacement on the Swan Coastal Plain. Use overhead butterfly sprinklers as knocker sprinklers will not apply enough water to parsnip crops in summer. In warmer months, apply half the water between 7 to 9 a.m. and half between 2 to 3 p.m. In cooler months, apply all of the water in early to mid morning. Do not allow the roots to dry out in order to avoid splitting.

Water used for irrigation should preferably contain less than 500 ppm of total dissolved salts, or have an electrical conductivity (EC) reading of less than 0.9 millisiemens per centimetre (90 mS/m).

Table 2 shows the amount of irrigation water required in the Perth area in different months, based on average evaporation at Medina Research Station. The irrigation data have been adjusted to compensate for the average efficiency rating (85 per cent) of butterfly sprinklers, spaced at 277 per hectare with an output of 15 litres per minute or 4.15 kilolitres per hectare per minute. Adjust the irrigation time if the sprinklers have a different output to the above and for marked changes in temperatures, humidity, effective rainfall and wind speeds.

Diseases

Canker (*Itersonila pastinaceae*) is a disease which can be identified by small spots on the leaves and may cause some loss of yield and quality in February and March planted crops, and to a lesser extent in April and early May planted crops. The following control measures are recommended:

- Harvest the crop as soon as possible after maturity is reached. Periods of storage in the soil as short as six weeks can cause considerable increase in canker.
- There are no effective registered pesticides for

control of canker. Applications of a copper hydroxide fungicide which is used for the control of leafspot will slightly reduce the incidence of canker.

- Adopt a rotation of four years between parsnip crops and, two weeks before planting, use metham sodium at 500 L/ha every year in the rotation. However, if parsnips are to be grown in the same bed twice during a year, all leaf trash and especially all cankered roots should be removed from the bed and destroyed.

Powdery mildew causes a powdery white appearance of the leaves, especially when plants are watered in the evening. Products containing sulphur are registered for the control of powdery mildew in vegetables.

Various leaf spots caused by fungi such as *Alternaria* may cause some damage to the leaves, and copper hydroxide (Kocide® or Spectrum®) may give some control.

Pests

Root knot nematode and other nematode species may be serious problems. Soils with a history of root knot nematode should be fumigated with metham-sodium before planting.

Two spotted mite is a major pest of parsnips, especially from February to June. Infested foliage looks unhealthy and mottled. They are visible to the naked eye and are recognised by a dark spot on either side of the back.

Control aphids, leafhoppers, red-legged earth mite and thrips with dimethoate (Rogor®).

Weevils and black beetles may cause problems to the roots. Use chlorpyrifos to control weevils.

Disorders

Parsnips are often seriously affected at any time of the year by an orange discolouration on the roots. The cause is not known.

Weed control

Parsnips compete poorly with weeds and weeds must be controlled early in the life of the crop.

For broadleaf weed control, apply linuron (Afalon® or Linuron®) at 2.2 to 4.5 kg/ha immediately after seeding.

Harvesting and marketing

The time from sowing to harvest varies from 3.5 to 6 months. At harvest, roots should be 250 to 400 mm long and 30 to 70 mm in diameter. The harvest period may extend for up to two months without damage to the crop in cool weather. In spring, harvest promptly as flowering (bolting) occurs and adversely affects root quality of ground stored crops. There is also a small market for miniature 'gourmet' varieties.

Harvest with care by hand or machine to avoid damage. It is possible to use a modified carrot harvester (top-puller) or potato harvester (digger-elevation) for harvesting parsnips. If this is not used, a modified blade can be used to loosen the soil 30 cm below the soil surface. The crop is then harvested manually. The standard system is to slash half the tops and then use a carrot harvester to lift the leaf-stalks and pull up the roots. A good yield is 25 to 35 t/ha.

Wear protective clothing for harvesting parsnips. Parsnip roots and leaves contain compounds (furanocoumarins) which may cause inflammation of the skin.

After lifting, wash parsnips in crates or on benches. Do not allow the parsnips to dry out at any stage, as this can result in discolouration of the roots, similar to carrots. Grade according to condition and length. Remove leaves and market only straight, sound, white roots. Pack in 22 L or 36 L crates which have a plastic sheet on the bottom and sides or pack in 10 kg cartons. Produce exported to the UK (by ship) is 'topped and tailed'.

Parsnips can be successfully stored for two to six months at 0°C and a relative humidity of 90 to 95 per cent. At 0 to 2°C, the starch in the roots is converted to sugars and results in a high quality product after two weeks of storage. Do not store with ethylene-producing crops (such as apples, bananas and tomatoes), as this may impart a bitter flavour to the roots.

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