



## Growing silverbeet in Western Australia

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Silverbeet (*Beta vulgaris*) belongs to the Chenopodiaceae family and is closely related to beetroot and also to true spinach. It supplies useful amounts of carbohydrates, fibres, vitamin A, vitamin C and riboflavin from the fleshy green cooked leaves. The cooked stalks are also sometimes eaten.

As a wild plant, silverbeet is a biennial and produces flowers and seeds after the winter of the second year after planting. Under cultivation, it is treated as an annual and is harvested before the plants 'bolt' into flower.

### Production

Consignments of silverbeet to Market City, Canning Vale were 765 t in 1998/1999, but this does not represent total production in Western Australia. All production is located in the Perth Metropolitan Area. There is no consistent seasonal effect with production and prices, which fluctuate throughout the year.

### Soils

A slightly acid to neutral soil is preferred (pH 6.0 to 7.0 by the water system of measurement), and well supplied with organic matter.

### Climate

Silverbeet grows well in the Perth Metropolitan Area, where it is usually grown under frost-free conditions. The crop is grown throughout the year. Cold conditions in winter may cause the plant to run to seed in spring. Plants will produce fairly well during summer, but must be kept well watered to prevent wilting and leaf burn.

### Plantings

Plantings may be made at any time in the year. Plants will crop for many months so that replanting is only needed at four-monthly intervals. In practice, sowings in December, March and July should give good results for establishment, growth, yields and quality throughout the year.

Seed may be direct sown in the field at 6 to 9 kg per hectare and thinned out. Rows are 40 to 80 cm apart and plants are thinned to 20 to 40 cm in the row. Often, several plants arise from each seed and these must be thinned. The use of transplants is increasing. These may be home-grown or purchased from a proprietary nursery.

### Varieties

Few varieties are available. The main cultivars are Fordhook Giant and Yarralong Special, which have dark green heavily blistered or crumpled leaves and mainly white stems. Check with the suppliers for new varieties.

Seed often contains a small percentage of off types.

Red, pink, yellow and orange stemmed varieties are also available. These are not as popular as the white-stemmed varieties and are often grown as ornamental vegetables.

### 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 ferrous 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 cubic metres per hectare before planting or 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 double superphosphate at 600 kg/ha before planting. The rate of phosphorus can be reduced on old vegetable ground and if compost is used. Do not use ordinary superphosphate as this contains higher levels of cadmium which is a toxic heavy metal. Silverbeet absorbs cadmium at a high level compared with other vegetables.

After planting, apply weekly topdressings of nitrogen and potassium (see Table 1) preferably in the irrigation water.

Supplementary nutrients, preferably through the irrigation water, may be needed as in Table 2.

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.

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**Table 1. Weekly nitrogen and potassium rates for silverbeet per hectare**

Season	Nitrogen	Potassium
Summer	40 kg urea or 55 kg ammonium nitrate	20 kg muriate of potash per hectare as a solid fertiliser or 25 kg sulphate of potash through the irrigation water
Winter	30 kg urea or 40 kg ammonium nitrate	15 kg muriate of potash as a solid fertiliser or 20 kg sulphate of potash through the irrigation water

**Table 2. Rates and effects of other nutrients on silverbeet**

Nutrient	Time of application	Rate per hectare	Effect
Borax	2 and 6 weeks after planting	20 kg	Prevents cracks across the stems and distorted stems and leaves.
Manganese sulphate	Monthly	15 kg	Controls stunting and mottling on young to fully emerged leaves (especially on alkaline soils). Can also be applied at 8 grams per litre to leaves.
Magnesium sulphate	Monthly	50 kg	Prevents yellowing of older leaves.

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

The crop is not suitable in areas with a high iron level in the water supply as this will result in browning of the stems. Silverbeet may have a slightly higher tolerance to salinity in the water compared with most vegetables.

Plants must be kept well watered, with one watering per day in early morning from April to October, dependent on rainfall and two waterings per day, half between 7 to 9 am and half between 2 to 3 pm from November to March. Table 3 is a guide for watering, but there has been no research work with silverbeet to obtain the precise watering needs of the crop.

Data from Medina Research Station represents average conditions, and adjustments must be made for marked changes in temperatures, humidities, effective rainfall and

**Table 3. Irrigation data for butterfly and knocker sprinklers on rain-free days based on average evaporation at Medina Research Station**

Month	Average evaporation mm/day at Medina Research Station	Average water kilolitres per hectare per day at 140% evaporation replacement	Average minutes per day for a typical butterfly sprinkler	Average minutes per day for a typical knocker sprinkler
January	8.6	120.4	32.5	89.0
February	8.1	113.4	31.5	86.0
March	6.2	86.8	25.0	66.0
April	3.8	53.2	15.0	40.0
May	2.3	32.2	9.5	25.5
June	1.8	25.2	7.0	19.0
July	1.7	23.8	6.5	18.0
August	2.2	30.8	8.5	23.0
September	3.1	43.4	12.0	33.0
October	4.5	63.0	17.5	47.5
November	6.2	86.8	25.0	66.0
December	7.8	109.2	30.0	82.5

wind speeds. Use evaporation data from the nearest meteorological station if your property is not situated near Medina.

Typical butterfly sprinklers are spaced at 277 per hectare with an output of 15 litres per minute or 4.15 kL/ha/minute. Typical knocker sprinklers are spaced at 69 per hectare with an output of 22 litres per minute or 1.52 kL/ha/minute. The irrigation time has been adjusted to compensate for the efficiency rating of butterfly (85 per cent) and knocker (80 per cent) sprinklers.

## Weeds

Weeds may be controlled by hand weeding or by using herbicides.

Chloridazon (Pyramin®) may be applied at sowing to just before emergence at 2.2 to 6.5 kg/ha. After emergence, phenmedipham (Betanal®) may be applied at 5.5 to 8.5 L/ha.

## Pests and diseases

Silverbeet may be seriously affected by rootknot nematodes. Sugarbeet nematodes may also damage silverbeet. The use of metham sodium at 500 L/ha two weeks before planting should help to control nematodes.

A range of other pests may also attack silverbeet, including snails, slugs, webworm, cutworm, budworm, loopers, weevils and two spotted mites.

A number of diseases have been recorded on silverbeet, but they are often of minor significance. These include leafspot and various root-rotting diseases.

## Harvesting and storage

A crop may take from two to three months to mature. The size of the plant and leaf development is the guide to maturity. The outer two to three leaves are twisted off from the base of the stem, leaving five to six leaves on the plant. Sometimes all leaves are stripped off and there is a longer interval between picks. In the field, tie about 20 leaves into bunches of about 750 to 1500 g. The weight depends upon the age of the crop, crop vigour, the size of the leaves, and the length of the stalk. The length of stalk on a bunch may be 400 to 500 mm long after trimming.

Crops may be picked for four to six months. Eventually, plants show pronounced stems devoid of lower leaves and leaf size becomes smaller. The number of plants which 'bolt' into flower may also increase. At this stage, the crop is discarded.

Wash the bunches in a bath of clean water or hose down the bunches, especially with silverbeet grown in sandy soil.

Pack mainly into 84 litre crates, but 72 litre crates are also used.

Yields vary from three to seven bunches per plant over the life of the crop.

**Table 4. Registered pesticides on silverbeet**

Pest	Active ingredient	Trade name	Rate/100 litres	Withholding period (days)
Leaf spot	Mancozeb	Mancozeb	150-200 g	14
Aphids	Dimethoate	Rogor 400	75 mL	7
Bugs	Dimethoate	Rogor	75 mL	7
Leafhoppers	Dimethoate	Rogor 400	75 mL	7
Spider mites	Dimethoate	Rogor Diostop EC	75 mL	7
Thrips	Dimethoate	Rogor Diostop EC	75 mL	7