

Production guidelines for Swiss chard



agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA



*Production guidelines
for Swiss chard*

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

Directorate Plant Production

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Part i: General aspects

1. Classification

Scientific name: *Beta vulgaris* var. *cicla*

Family: *Chenopodiaceae*

Common names: Swiss chard, spinach beet, silver beet, seakale beet, chard, leaf beet, also referred to as 'spinach' by most people in South Africa

2. Origin and distribution

Swiss chard has been cultivated since 300 B.C. and roots of the wild chard were used as medicine. The wild form is found in the Canary Islands, Mediterranean region, and east to southern Asia. The first records of Swiss chard cultivation suggest the Mediterranean area, perhaps Italy as the centre of origin.

3. Major production areas

3.1 South Africa

In South Africa the crop is grown mainly in KwaZulu-Natal, but other provinces produce it as well.

3.2 South Africa

Italy is one of the major producing areas internationally. It is also grown in large quantities in California.

4. Description of the plant

4.1 Leaves

Swiss chard is a biennial plant with large dark green leaves. The large, glossy, crisp leaves can grow to 37 cm long and 25 cm wide.

4.2 Roots

The plant has a moderate deep root system. The roots are hard and woody.

4.3 Stem

The stalks resemble those of spinach but are fleshy and white or red in colour. cm wide.

4.4 Seeds

The seed is actually a fruit containing anything from 2 to 8 fine seeds.

5. Cultivars

Some cultivars are upright with crumpled dark green leaves and a broad leaf stalk, whilst some have long, light green leaves and thin stalks.

6. Climatic requirements

6.1 Temperature

Swiss chard is a cool season crop that grows best at temperatures ranging from 7 to 24°C. It is half-hardy and can withstand light frosts. Prolonged exposure to temperatures less than 5°C will induce seed production (bolting), usually in spring. During hot weather, leaves remain small and are of inferior quality.

6.2 Rainfall

The plant has a moderate deep root system, but like other leafy vegetable crops, it should not be allowed to suffer moisture stress. It thus requires fairly frequent irrigation to ensure that the soil does not dry out to less than 50% available water. Soil moisture should not be limiting.

7. Soil requirements

Swiss chard can grow in any soil provided it is well drained and well supplied with organic manure but sandy loams or loams are ideal. The optimum soil pH is between 6 and 7.

Part II: Cultivation practices

1. Propagation

The plant is propagated from seed.

2. Soil preparation

The plant will not tolerate acid soil; if the pH is too low a dressing of dolomitic lime should be applied a month before (30) adding manure or compost. Prior to sowing, incorporate a dressing of 2:3:2 or 3:2:1 at a rate of 60 to 90 g per square meter in the topsoil to encourage rapid growth. Before planting, 5 to 10 cm of well-composted organic matter should also be incorporated.

3. Planting

In warmer, frost-free areas, Swiss chard is generally sown from February to August. In very cold regions it is sown in August or September until February. In most other parts of the country, Swiss chard is sown from January to April or from July to September.

Generally direct seeding is being practiced and later thinned to stand. Seeding rate should be 7 to 9 kg/ha for direct seeding, with the plant spacing of 200 to 300 mm and 450 to 600 mm spacing between rows. The depth of sowing should not exceed 20 mm. The total population should be 60 000 to 80 000 plants/ha.

4. Fertilisation

The crop responds well to organic manuring. Swiss chard will also respond well to periodic side-dressings of nitrogen to ensure continuous, rapid growth.

Apply 500 kg/ha of 2:3:2 (30) at planting on fertile soil but 1 000 kg/ha on infertile soil. At 4 and 8 weeks, apply 225 kg/ha of LAN on fertile soil and 175 to 225 Kg/ha on infertile soil. It should be noted that this serves as a general recommendation.

5. Irrigation

During non-rainy periods irrigation in 14 to 21 day cycles will insure continuous yield and quality chard. Chard prefers moist soils to encourage production of new leaves. Moisture fluctuations will cause leaves to become tough and leaf development will also be slow. Mulch around the plant will help to con-

serve soil moisture. Overhead sprinkler irrigation is not advisable due to increased incidence of foliar diseases experienced with this method.

6. Weed control

Weeds can be controlled chemically or mechanically. Chemical weed control can be achieved by applying registered chemicals. Mechanical cultivation should be shallow and not too close to the plant to prevent damaging the plants.

7. Pest control

Leafminer

DAMAGE

Larvae can produce discoloured patches on leaves. As larvae feed on the mesophyll tissue, they create extensive tunnelling within the leaf. The width of these tunnels increases as the larvae grow. These mines cause direct damage by decreasing photosynthesis and the puncture wounds provide an entry way for pathogenic infection. The disfiguration of the leaves renders the Swiss chard unmarketable. Leafminers will pupate between the Swiss chard leaves, contaminating the plant. These bodies may also die and rot, providing a medium for the growth of pathogens

CONTROL

Leafminer may be controlled chemically by applying registered chemicals. It is best to avoid planting near cotton, alfalfa and other host fields, because leafminers will migrate from these fields into the Swiss chard field. A field that has a leafminer infestation should be disked immediately following harvest. Affected leaves should be removed and destroyed early to prevent spreading.

Nematode (eelworm)

CONTROL

- The crop should not be grown on fields with high infestations of nematodes.
- The soil should be fumigated before planting.

Cutworms

DAMAGE

Newly hatched larvae feed on the leaves temporarily, but then drop to the soil surface and burrow underground. The larvae emerge at night and feed on the Swiss chard plants. Seedlings are the most significantly impacted by cutworm attack. The cutworm cut the stem at, or just below the soil surface. A single cutworm is capable of damaging several plants in one evening and a large population can destroy an entire Swiss chard stand. When cutworms have been active, one might observe several wilted or cut off plants in a row. A stand that has recently been thinned is especially sensitive to cutworm attack.

CONTROL

Control may be achieved chemically by applying registered chemicals. Cutworms tend to reoccur in the same area of a field and in the same fields. It is important to control weeds that can act as hosts to cutworms, in the field and surrounding the field. The field should be plowed a minimum of two weeks prior to planting, in order to kill cutworms, hosts and food sources

Caterpillars

DAMAGE

The saltmarsh caterpillars feed on seedlings and can skeletonize older plants. The larvae often feed in groups on older plants. If populations are high, they can destroy an entire seedling stand.

CONTROL

Registered chemicals may be applied to control caterpillars. The simplest way to control saltmarsh caterpillars is to prevent their migration into a field. Monitoring any surrounding cotton and alfalfa fields prior to Swiss chard emergence will help assess the degree of risk for the crop. Saltmarsh caterpillars do not like to cross physical barriers. A 15 cm high aluminum foil strip or irrigation pipes that the larvae cannot crawl under will provide a suitable barrier to the field. These barriers can also be used to herd the larvae into cups of oil. A ditch of water containing oil or detergent that surrounds the perimeter of the field can also be used as a barrier.

Aphids

DAMAGE

Aphids are green or black soft-bodied insects that feed on the underside of leaves. Affected leaves become crinkled and curled.

CONTROL

Use insecticidal soaps, appropriate insecticides, or strong water stream to dislodge insects

Loopers

DAMAGE

Loopers will attack all stages of plant growth. These larvae feed on the lower leaf surface, chewing ragged holes into the leaf. Some loopers will burrow into the Swiss chard head from below. Excessive feeding on seedlings can stunt growth or even kill plants. Leaves that have been damaged by looper feeding or that are contaminated with larvae or excrement of larvae are unmarketable.

CONTROL

Registered chemicals may be applied for the control of looper. Weeds growing within the field or surrounding the field must be controlled because they can act as hosts for loopers. Weeds on ditch banks and adjacent fields should be monitored for eggs and larvae during seeding. Fields need to be ploughed immediately following harvest to kill larvae and remove any host material.

8. Disease control

Cercospora leaf spot

SYMPTOMS

Infected plants develop light grey spots with a darker outline. Infection affects the appearance of leaves and such leaves are rendered to be of poor quality. Severe infection results in death of leaves.

CONTROL

Sanitation- destroying infected debris by deep ploughing after harvesting. Also practice crop rotation.

Leaf spot

SYMPTOMS

Symptoms initially appear as brown spots, turning grey with reddish purple borders at a later stage.

CONTROL

Spray with a registered chemical.

Curly top

SYMPTOMS

Infection is characterised by clearing of veins in the leaves and leaf curling with sharp protuberances from the veins on the leaf under-sides. Leaves may be thickened and somewhat brittle.

CONTROL

Rotating the crop from one location to another in subsequent years and using good cultural practices such as proper watering and good fertility will help in controlling this disease. Resistant varieties may be planted.

9. Other cultivation practices

9.1. Mulching

Cover the soil with partially decomposed compost after soil has warmed, to prevent weeds, keep soil evenly moist, and provide disease protection.

9.2. Thinning

It is important to thin seedlings out to 10 cm apart, not later than 3 (three) weeks after the seedlings have emerged.

10. Harvesting

10.1. Harvesting maturity

Swiss chard can be harvested after two months when the leaves have reached 10 to 12.5 cm long.

10.2. Harvesting methods

The leaves are usually harvested by hand by cutting with a sharp knife about 5 cm above the ground. Care should be taken not to harm the younger leaves. Harvesting can also be done by simply wrenching off the leaves off the plant by twisting sideways. Plants should not be over-harvested at any one picking, to avoid weakening them and affecting the size of later picks, as well as reducing total yield. Harvesting from the same plant can continue for several months, often until leaf spot becomes too severe or the plants run to seed. Outer leaves should be harvested first.

Part iii: Post-harvest handling

1. Sorting and grading

Swiss chard is trimmed, cleaned and tied into bunches in the field. The leaves must be free of insect injury, worms, mold, decay or other serious injury that affects its appearance.

3. Packing

One or two dozen Swiss chard are packed into wax cardboard boxes.

4. Storage

Swiss chard can be stored for 10 to 14 days if stored at 0 °C and 95 to 100 % relative humidity

6. Marketing

Bunches should retain a fresh appearance on the greengrocer's shelves and have good eye appeal. Old leaves should not be marketed, as fibre content increases with age.

Part iv: Productive schedules

ACTIVITIES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Soil sampling	X	X	X				X	X	X			
Soil preparation	X	X	X				X	X	X			
Planting		X _{LV}	X _{LV}	X _{LV}	X _{LV}	X _L	X _{LV}	X _{HV}	X _{HV}	X _{HV}	X _{HV}	X _{HV}
Fertilisation		X		X	X		X	X		X	X	X
Irrigation		X	X	X	X	X	X	X	X	X	X	X
Pest control		X	X	X	X	X	X	X	X	X	X	X
Disease control		X	X	X	X	X	X	X	X	X	X	X
Weed control		X	X	X	X		X	X				
Harvesting	X			X	X	X	X		X	X	X	X
Marketing	X		X	X	X	X	X	X	X	X	X	X

Part v: Utilization

The leaves are cooked and served like spinach and the petioles can be cooked and served like asparagus.

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Notes

A series of 25 horizontal dotted lines for writing notes.

