SWISS CHARD

Swiss chard , *Beta vulgaris* L.*cicla*, also known as spinach beet, is a biennial but is grown as an annual. It is commonly, but incorrectly, called spinach, and is a very close relative to beetroot. It belongs to the Chenopodiaceae, or goosefoot family. The leaves are prepared like spinach and the leaf stalks sometimes like asparagus or celery. Swiss chard is a popular substitute for true spinach *(Spinacia oleracea* L.*)*; it furnishes a considerably higher yield, is grown with less trouble and has a similar flavour to spinach.

ENVIRONMENTAL REQUIREMENTS

Climate
Swiss chard thrives in a comparatively cool climate and does best at a temperature range of 7°C to 24°C. It is half-hardy and can withstand light frosts, although growth will be retarded at low temperatures. 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. In late summer, particularly, foliage of plants is subject to a fungal leaf spot which may be a production limiting factor, given climatic conditions conducive to its development.

Soil
Swiss chard can be grown on a wide variety of soil types, provided they are well-drained, free of root knot nematodes, reasonably fertile and amply supplied with water.

CULTURE

Cultivars
The main variety is Fordhook Giant. Fordhook Giant has darker green leaves and broader leaf stems than Lucullus. which is less popular.

Seeding and spacing
As with beetroot, the "seed" is actually a fruit containing anything from 2 to 8 fine seeds. They are normally drilled directly into the land in rows spaced 450 to 600 mm apart and plants are later thinned to a spacing of 250 to 300 mm within the row. Thinned seedlings may be used for transplanting to fill any gaps. The depth of sowing should not exceed 20 mm. Between 7 and 9 kg of seed is sufficient to plant one hectare. Sometimes the seedlings are produced in seedbeds or seed-trays for later transplanting.

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

Irrigation
The plant has a moderately 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 never be limiting.

Fertilization
The crop responds well to organic manuring. The type of fertilizer and the rates needed should be determined by soil analysis. Swiss chard will also respond well to periodic side-dressings of nitrogen to ensure continuous, rapid growth. As a general guide, use 500 to 1000 kg 2:3:4 (30) per hectare, depending on soil fertility at planting, followed by 175 to 225 kg LAN / ha at 4 weeks and again at 8 weeks.

Weeds
The herbicide chloridazon, sold as Pyramin , is registered for use on Swiss chard. Its main use is for the control of annual broadleaf weeds. It should be used as a pre-emergent application immediately after sowing, the dosage being dependent on the clay content of the soil.

Mechanical cultivation or hand weeding can also be practised. Such cultivation should be shallow and not too close to the plants, as they are easily damaged.

Pests
Nematodes (eelworm) can be controlled before planting by fumigating the soil. However, it is best to avoid lands with high nematode populations.

Cutworms are relatively easily controlled with the use of a cutworm bait.

Various caterpillars and, to a lesser extent, aphids, can sometimes be troublesome. No chemicals are registered for caterpillar control on Swiss chard.

Diseases
Cercospora leaf spot is the more important of two fungal foliage diseases affecting Swiss chard. It can be particularly important from mid-summer to early autumn.

The causal fungus is favoured more by interrupted wetting (heavy dew at night with dry days) than during continuously wet or dry periods. The optimal temperature range for fast development of leaf spots is between 25°C and 30°C. The leaf spots, which are light grey necrotic spots with a darker outline, also occur on other plants in the family, such as beet. Apart from quality loss because of cosmetic appearance, severe infection can result in death of leaves.

Sanitation and crop rotation are very important practices for control of this disease. At the end of cropping, infected debris should be destroyed by deep ploughing. Plantings of Swiss chard should not be established in the immediate vicinity of beetroot plants, and should not follow this crop in a rotation.

HARVESTING AND MARKETING

The crop can be marketed from about two months, when the leaves have attained a good size. The outer leaves are successionally harvested as soon as they are large enough. They are usually cut with a sharp knife about 5 cm above the ground, taking care not to harm the younger leaves, or are simply wrenched off the plant with a sideways twist. 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. Old leaves should not be marketed, as fibre content increases with age; the leaves should be picked as soon as they reach full size. Harvesting from the same plants can continue for several months, often until leaf-spot disease becomes too severe or the plants run to seed. After picking, the leaves are generally washed before being tied in bunches for marketing. Bunches should retain a fresh appearance on the greengrocer's shelves and have good eye appeal.

Yields of 40 tons and more per hectare can be obtained, but normally yields vary between 20 and 30 tons.

NUTRITIONAL ASPECTS

Swiss chard is a good source of magnesium, iron and potassium, as well as vitamin A and ascorbic acid (vitamin C), but it is low in calories (21 cal per 100 g) and fat. Half the ascorbic acid is lost in cooking, and some of the minerals and vitamins are released to the cooking water, so the volume of water could be reduced.