



**STARKE
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BEETROOT

PRODUCTION GUIDELINE

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SEEDS OF SUCCESS

BEETROOT

1. INTRODUCTION

1.1 HISTORY AND BACKGROUND

Beetroot (*Beta vulgaris*) is an indigenous species to Europe and spread eastwards into the Western regions of Asia. It is thought to have developed from *B. maritima* the sea-beet which is native to Southern Europe. In its first season beetroot produces green tops and an enlarged taproot which serves as a storage organ for nutrients. The following season the stored nutrients in the taproot are used to produce flowers and seeds.

2. ADAPTABILITY

2.1 CLIMATIC REQUIREMENTS

Optimum growing temperature: 12 - 19°C

Maximum growing temperature: 35°C

Soil temperatures for germination: > 7°C

2.2 SOIL REQUIREMENTS

The ideal pH for beetroot production is between 6.0 and 8.0. Beetroot prefer deep, friable, well drained, sandy loams to silt loams. The use of beds is preferable to lower the water table and ensure good drainage.

2.3 PRODUCT TYPES

Beetroot produces a globe shaped or cylindrical root. Varieties differ with speed to maturity, colour, disease resistance and adaptability.

3. CULTIVATION PRACTICES

3.1 SOIL PREPARATION

As seed is sown directly, fields need to be prepared correctly and thoroughly. The soil must be well tilled, free of old plant material and have a good crumb structure. Good soil preparation can be achieved by ploughing, harrowing and levelling prior to sowing.

3.2 PLANTING PERIODS

Beetroot is generally a widely adaptable crop that can be grown under most conditions throughout South Africa. Beet can be planted all year round but as a rule of thumb areas where there could be frost conditions around planting time or the possibility of scorching from excessive heat should be avoided.

3.3 SOWING

The seed is generally large with a corky exterior. It is a seed cluster or glomerule containing 2 - 6 seeds. One seed (cluster) can therefore give rise to more than one seedling. This seed is known as multi-germ seed. The corky exterior provides both a physical barrier to germination and contains a phenolic compound which inhibits germination. Germination usually takes between 10 to 24 days.

3.3.1 PLANT POPULATION

For early harvest and or larger roots a planting density of between 250 000 and 350 000 plants per Hectare is ideal. For fresh market or standard beet planting, populations usually number from between 350 000 to 500 000 per hectare. For the mini beet plant population of 1.0 to 1.2 million can be used.

3.3.2 PLANT SPACING

Due to the fact that most seed is multi-germ, the use of precision seeders is considered unnecessary. However recent studies have shown that even with precision planters population stands of beet appear more uniform in shape compared with conventional row plantings. Seed is usually sown in slit trenches 2cm deep. Planting in rows is to facilitate the mechanical removal of weeds without disturbing the beet crop. In-row spacing is between 5 and 10cm depending on the size requirement needed at harvest and between row spacing ranges from 20 – 45cm.

3.3.3 PLANTING DEPTH

Beet seed can be planted between 1.0 and 2.5 cm s depending on variety. Early sowings can be planted shallower to optimise the emergence rate for early maturing beet.

3.4 FERTILIZATION

3.4.1 SOIL ACIDITY AND LIMING

A soil pH range of 6.0-6.8 is adequate for beets.

3.4.2 FERTILIZATION GUIDELINE

It is important not to give too few or too many plant nutrients, therefore the soil must first be analysed so that the plants will not be burned, or show poor growth.

3.4.2.1 NITROGEN

On sandy soils, apply between 110 kg - 200 kg N/ha. Broadcast 50% of the N should be applied prior planting and incorporated. The remainder of the nitrogen should be applied as a side-dressing 10, 20, 30 and 40 days after sowing. On heavy soils, apply between 40 kg 60kg N/ha.

3.4.2.2 PHOSPHORUS

No limit is normally set for the safe rate at which phosphates may be applied, however, a rate of 50 - 100kg P/ha will cover any possible shortfall.

3.4.2.3 POTASSIUM

Potassium fertilizer should be added based on a reliable soil test as it can cause plant injury if applied at an incorrect rate. Beetroot in general require a total of 150kg K/ha applied over an 8 week period.

3.4.2.4 BORON

Boron deficiency shows up as a breakdown and corky, dark discolouration of internal and external tissues. Foliar sprays have generally given faster and more effective results. Spray when the young plants are about 8 cm high.

3.5 IRRIGATION REQUIREMENTS

As with most vegetable crops it is very important to keep the soil moist until the plants emerge. In the case of very hot weather, a layer of mulch can be used to prevent the soil drying out too rapidly. Beetroot has shallow roots, with an effective depth of 300mm, and it is important to water the plants regularly and frequently. . As a guideline 300-350 mm of water is required throughout the growing cycle, an average of 4mm per day. This is dependent on the season, the varieties water requirements and soil type.

3.6 OTHER CULTIVATION PRACTICES

3.6.1 WEED CONTROL

Weeds compete with beetroot for space, light, water and nutritional resources in the soil, particularly during the early part of the season. They can reduce yield if left unchecked. Regular cultivating prevents weeds competing with beetroot. Applications of weed-killers (herbicides) provide control in larger-scale and commercial plantings. Perennial weeds should be eliminated prior to planting beets.

4. HARVESTING

Beetroot is normally ready for harvest between 75 and 90 days in summer and 100 and 120 days in winter. Due to the variable nature of beetroot and uneven spacing from multi-germ seed, harvesting generally occurs in stages. The first harvest is a thinning out process where beetroot sized between 3.0 and 4.0 cms in diameter. The majority of the beetroot can be harvested when it attains a width of 7.5cm. This can be done manually or mechanically using modified potato harvesters.

The harvested yield will vary significantly as a result of climate, fertilization, disease infestation and variety planted, but average yields range between 15 and 25 tons per hectare. Some growers can achieve yields of 40 - 45 tons.

5. GRADING AND MARKETING

There are 3 distinct market segments in South Africa for beetroot.

The largest is the pre-pack fresh market segment. Here beetroot is harvested either mechanically or by hand, the tops are then removed, the roots washed, graded and packed into plastic bags. Packing sizes include a 10 x 1kg pre-packed pocket, 10kg, 5kg and a 3kg pocket.

The other large segment is the bunching market where beet, usually harvested by hand to ensure tops do not get damaged, is sold as a bunch of 4 -5 roots with the tops still attached. The quality of the tops is indicative of the freshness of the roots.

The final market segment is the specialised, processing market. The quality standards set for this market segment are very stringent. Colour and fibre/sugar content are very important to processors. Smaller, softer beetroots are washed, blanched and canned/bottled whole, whilst the larger roots are suited to slicing and dicing as they tend to be more fibrous and less tender as a result of their age.

6. POSTHARVEST

Beetroot quality indices are based on root shape, root size, uniform and intensive colour (with minimum zoning), firmness, smoothness, cleanness, trimming of rootlets and freedom from defects. Beetroot can be stored quite successfully under certain conditions. Prior to storage, beets should be topped and sorted to remove all diseased or mechanically damaged roots. Large roots store better than smaller ones, as they shrivel relatively slower.

6.1 STORAGE

Bunched beets should be pre-cooled to below 4°C within 4 6 hours after harvest. They can be kept for around 10 14 days at 98% relative humidity (R.H.). Mature beetroot should be pre-cooled within 24 hours of harvest to below 5 °C. These should be topped and may be stored at 1 2 °C, at 98% R.H. for 4 6 months. Freezing injury occurs from -0.5 °C.

INDEMNITY

All technical advice and/or production guidelines given by STARKE AYRES or any of its personnel with reference to the use of its products, is based on the company's best judgement. However, it must be expressly understood that STARKE AYRES does not assume responsibility for any advice given or for the results obtained.

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