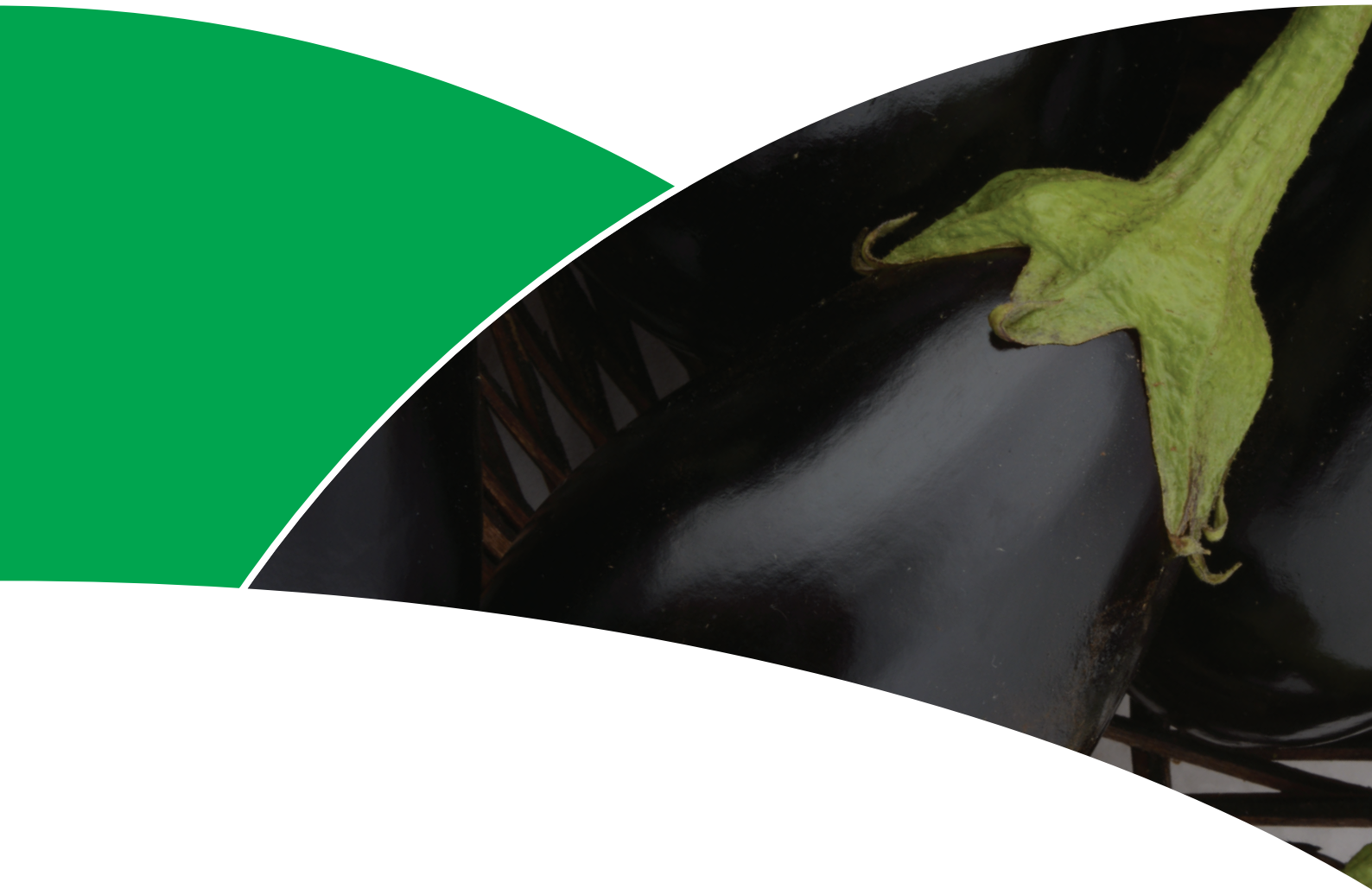
STARKE AYRES®



EGGPLANT
PRODUCTION GUIDELINE

EGGPLANT

1. HISTORY AND BACKGROUND

Eggplant (*Solanum melongena*) is a species of nightshade and native to the Indian continent. It is commonly known in British English as aubergine and also known as melongene, garden egg, or guinea squash. It is known in South Asia, Southeast Asia and South Africa as brinjal. It bears a fruit of the same name (commonly either "eggplant" in American and Australian English or "aubergine" in British English) as a member of the genus *Solanum*, it is related to both the tomato and the potato. It was originally domesticated in India and Bangladesh from the wild nightshade, the thorn or bitter apple.

2. ADAPTABILITY

2.1 CLIMATIC REQUIREMENTS

Climate is one of the most important factors when determining planting times. The wide variation in climate in South Africa allows the planting and production of good quality eggplant in open fields in various parts of the country all year. Eggplants are known to be a warm season crop. It can survive certain amounts of cold units, but are intolerant of very low temperatures. A eggplant crop requires very stable temperature ranges with minimums and maximums not being too wide apart. Temperature variation might result in poor fruit quality or reduced yields. The minimum temperature is around 10°C with the maximum being 34°C. Optimum temperatures are around 26 - 29°C.

2.2 SOIL REQUIREMENTS

Eggplant requires well drained loam to sandy loam soils, but will grow moderately well over a wide range of soil types. However certain criteria have to be satisfied in terms of the soil structure and content to make it commercially viable. These factors include:

Nutrient composition
Compaction
Effective soil depth
pH
Crop rotation
Herbicide residues
Water holding capacity

2.3 PRODUCT TYPES

Different varieties of the plant produce fruit of different size, shape, and color, though typically purple. The most widely cultivated varieties (cultivars) in Europe and North America today are elongated ovoid, 12–25 cm long and 6–9 cm in a dark purple skin. Colours vary from white to yellow or green, as well as reddish-purple and dark purple.

3. CULTIVATION PRACTICES

3.1 SOIL PREPARATION

Soil preparation improves the potential for profitable production of eggplant. Any primary soil preparation must be aimed at creating growing conditions for plants to develop the optimal root system in a specific soil profile. The highest percentage roots will be found in the top 600mm of the soil. The advantages of soil preparation are:

No restrictions on root development.
Less chance of compaction.
More oxygen in the soil creating better root development.
Higher yield.
Reduction in production costs.
More vegetative growth.
More tolerance to drought and stress.
Less root disease prevalence.
Horizontal and vertical compaction layers broken.
Better water retention.
Increased uptake of moisture and nutrients.

The choice of preparation systems should be determined by the plant requirements and the soil type. Thereafter, economic factors should be considered. No standard system can be recommended on all soil types. The choice of preparation method should be made based on the clay content of the soil. For example on sandy soils the focus should be to reduce compaction and erosion, where on heavier soils it will be to reduce crust formation. Soil preparation should be done to depths varying between 200 - 400mm. Ridging is highly recommended, and should be done according to the land contours. The main advantage of ridging is to keep excess water away from the plant, improved oxygenation of the root zone, increased soil depth in the growing bed, to promote root development.

3.2 PLANTING PERIODS

The **earliest period** for seedling establishment would be when the soil and air temperatures at least meet the minimum requirements for plant growth.
The **latest seedling** establishment period would be after allowance has been made for the growth and harvest periods to be completed before adverse conditions sets in.

Due to the effect of certain factors being prevalent at specific locations, within each of these areas the planting times may be earlier or later than the times given below.

Establishment periods for the main production areas of South Africa will then be:

1. Lowveld (frost free areas) – Feb to May
2. Middleveld (moderate areas) – Sept to Dec
3. Highveld (cold areas) – Oct to Nov
4. Western Cape – Oct to Dec

3.3 SEEDLING PRODUCTION

Seedling establishment:

Model 128 or 200 seedling trays are the most popular.
Although more expensive, larger seedling trays lead to better and more root developme
Seedlings take 4 - 6 weeks in summer to reach transplant maturity.
Seedlings take about 8 weeks in winter to transplant maturity.
Deep sowing: More advantageous in warmer conditions.
Seed takes longer to surface due to cooler temperatures and longer growing distances.
Shallow sowing: More advantageous in cooler conditions.
Seed surface quicker due to warmer temperatures and short growing distances. Efficient levels of moisture are necessary.

Seedlings should be grown in a well-aerated medium, which has good water holding capacity and at a pH of around 6.5. Generally, peat, bark and vermiculite mixes are used. Media problems typically include excessive tannins and low air filled porosity, which results in poor drainage and the buildup of green mould. The medium should be pre-enriched and the seedlings should be fertilized.

Seedling management is a critical factor, and the following points may result in physiological disorders:

Incorrect sowing time.
Cold temperatures, particularly below 7 °C.
Cold grown seedlings.
Over-fertilization of seedlings.
Oversized seedlings at transplant.
Temperature differences between the seedling nursery and the farm.

A precision seeder is recommended to place single seedlings at a uniform depth.

3.4 PLANT POPULATION AND SPACING

Plant population should be between 20-25 000 plant p/ha. The single most important factor when making a decision around plant population is the type of chemical spraying system- or method that the grower is going to use for the duration of the crop. Everything should be designed around this implement so as to get in between rows to effectively control pests and diseases. It is highly recommended to try and keep the between row spacing at 1.8 to 2.5 meters.

Table 1: Plant population guide

Between Rows (cm)	Between plants (cm)					
	20	**25**	**30**	**35**	**40**	**50**
150	33 000	26 400	22 000	19 000	16 500	13 200
175	28 500	22 800	19 000	16 300	14 285	11 400
200	25 000	20 000	16 700	14 300	12 400	10 000
225	22 000	17 600	14 600	12 700	11 000	8 800
250	20 000	16 000	13 300	11 400	10 000	8 000

The plant population table above can be used as a quick guideline. For example: if the distance between rows is 2 meters with the distance between plants 30 cm, one will have a plant population of 16 700 plants per ha.

3.4.1 TRANSPLANTING SEEDLINGS

The production of good quality, healthy seedlings require the correct choice of both variety and seedling grower. The correct soil preparation, analyses and fertilizer application prior to planting also needs to be done. Before seedlings are collected from the nursery, land preparation should be completed and irrigation systems should be in place. At this point some growers already install the trellising system such as poles and first wires. Seedlings must be hardened off before leaving the nursery. This is done by making sure that excessive nitrogen and irrigation is kept to a minimum. Two to five days before collecting the seedlings, they must be taken out of the nursery and placed in a position where more sunlight is prevalent.

It is highly recommended to always establish seedlings in wet soil. Always make sure that the holes on the ridges where seedlings are about to be transplanted are exactly the same size as the seedling plugs. This will prevent issues such as J-rooting where seedling plugs are forced into the soil and roots are bent over resulting in seedling uniformity issues and yield losses. Although it is not recommended to establish these plants, it happens from time to time that a grower receives over mature or taller plants than normal. In this instance it is recommended to sterilize the stem with a fungicide and plant the seedling deeper into the soil than normal. This is not the best thing to do, but

lateral roots will shoot from the stem to help the plants. Sometimes seedlings are received with flowers or buds already setting, it is recommended to remove them at planting in order to give the plant more energy to establish itself.

3.5 FERTILIZATION

3.5.1 FERTILIZATION GUIDELINE

OPTION 1	PRODUCTS	PER/HA	N	P	K	OPTION 2	PRODUCTS	PER/HA	N	P	K
Preplant						Preplant	2:3:2	1000 kg/ha	62.9	94.3	62.9
	Compost	30 t/ha	55								
	Superphosfate	600 kg/ha		63							
Topdressing 1	1:0:1(36)	70 kg/ha	25.2		25.2	Topdressing 1	LAN / ASN	140 kg/ha	38		
Topdressing 2	1:0:1(36)	70 kg/ha	25.2		25.2	Topdressing 2	LAN / ASN	140 kg/ha	38		
Topdressing 3	1:0:1(36)	70 kg/ha	25.2		25.2						
TOTAL			**130.6**	**63**	**75.6**	TOTAL			**138.9**	**94.3**	**62.9**

3.6 IRRIGATION

Under- or over irrigation can have a devastating effect on the outcome of a crop. It is therefore very important to apply water at optimal times.

Too little water might lead to:

- Sub-optimum yields.
- Decrease in the photosynthetic rate.
- Plants developing stunted growth.
- No production of flowers.
- Low percentage fruit set.
- Slow fruit development.
- Small fruit sizes.
- Poor quality.
- Flower abortion.

Too much water might lead to:

- Not enough oxygen in the soil.
- Plants becoming wilted.
- Root diseases becoming prevalent.
- No plant development.

When scheduling irrigation, the size of the root system at the time of irrigation needs to be taken into account. In general, the root system can be compared to the aerial growth of the plant. The roots spread into the soil at a similar rate to which the aerial growth develops. Most roots occur in the top 500 – 600 mm of soil level, even at maturity. For this reason irrigation should be monitored at this level with irrometers. Deep, thorough irrigations are preferable to light and regular watering intervals. Drip or flood irrigation is preferable to overhead irrigation, due to susceptibility to foliar diseases. The amounts of water used will vary depending on the climatic conditions. During the cooler months eggplant require about 25mm per week and this might increase to 50mm under very hot, windy and dry conditions. For irrigation purposes, the growth can be divided into four growth stages.

Stage 1: Establishment

- Can last up to 4 weeks.
- Seedling establishment takes place and plants start to grow actively.
- Low amounts of water are used.

Stage 2: Vegetative growth

- Development of first flowers and fruit.
- Double the amount of water is used compared to the previous stage.

Stage 3: Fruit set

Growth is at its highest.

Water usage at this stage is at its highest during the lifespan of the crop.

Stage 4: Ripening and harvesting

Very high loads carried on the plant.

Water usage starts to decrease.

4. HARVESTING AND MARKETING

Eggplant should be harvested once the fruit are fully matured, very firm and the desired colour achieved. Most new generation varieties available on the markets today have what is called a spineless calyx. The stem attachment has the advantage of not having any thorns present. This helps with the ease of picking, packing and increases the pack out percentage as other fruit does not get damaged.