STARKE AYRES®

SWEETCORN
PRODUCTION GUIDELINE

SWEETCORN

1. HISTORY AND BACKGROUND

Sweet corn (*Zea mays* convar. *saccharata* var. *rugosa*; is a variety of maize with a high sugar content. The specific time when *sweet* corn originated cannot be pin-pointed; however, sweet corn was grown by the American Indians and first collected by European settlers in the 1770's. Commercial or field corn is produced primarily for animal feed and prepared consumption. In contrast, sweetcorn is produced for human consumption as either a fresh or processed product. Vast differences occur when looking at management of sweetcorn versus normal corn.

2. ADAPTABILITY

2.1 CLIMATIC REQUIREMENTS

Corn can be grown under a range of climatic conditions. These conditions can vary from moderate to cool climates such as the Highveld region of South Africa to more subtropical regions like the Lowveld. It is important to note that even distribution of heat units is a key requirement for optimal production of corn.

Minimum temperature (atmospheric):	-	9-14C
Optimal temperature (atmospheric):	-	15-25C
Maximum temperature (atmospheric):	-	32C
Optimal soil temperature:	-	14-16° C

2.2 SOIL REQUIREMENTS

Sweetcorn 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

Sweetcorn are classed in three distinct genes. These are:

- Traditional types
- Supersweet types
- Augmented types

Early and traditional varieties were the result of the mutant *su* ("sugary gene").They contain about 5 – 10% sugar by weight.

Supersweet corn is varieties of sweet corn which produce higher levels of sugar. When compared to conventional sweetcorn, supersweet corn is currently the most popular by demand because of its long

shelf life and large sugar content. This has allowed the long-distance shipping of sweet corn and has enabled manufacturers to can sweet corn without adding extra sugar or salt.

Augmented or "sugary enhanced" types, have a longer storage life and contain 12–20% sugar compared to the supersweet varieties.

3. CULTIVATION PRACTICES

3.1 SOIL PREPARATION

Soil preparation improves the potential for profitable production of sweetcorn. 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 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.

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) – Aug to Dec
3. Highveld (cold areas) – Oct to Nov
4. Western Cape – Sept to Feb

3.3 PLANT POPULATION AND SPACING

The amount of seeds/kg varies from 3000-8000 seeds/kg depending on the seed size. With direct sowing, the grower will use 4-15 kg of seed depending on the seed size being sown. Under marginal

conditions a plant population of 35000 – 40000 plants/ha are planted to attain the required results. Under optimal conditions (well managed fields with adequate watering) a plant population of 55 000 plants are seen as ideal. Care must be taken not to go above the optimal threshold (approximately 55000 – 60000 plants/ha).This may result in the plants producing smaller cobs that may not be desirable for the markets. Allow up to 10 % over sowing to compensate for seedling failure which may be caused by various factors.
A general guideline for plant population and row spacing are as follow:

- Between rows: 81 cm
- Within rows: 22 cm

3.4 FERTILIZATION

The following program can be used as a nutrient guideline: (please note that all nutrients should be banned placed and a soil analysis should be taken into account)

Total Requirement: (pure element)
N - 240 kg/ha
P - 80 kg/ha
K - 140 kg/ha (if the final crop residue is to be fully removed from the land)
K - 80 kg/ha (if the final crop residue is ploughed back into the soil)

Preplant:
N - 48 kg/ha
P - 80 kg/ha
K - 28 kg/ha

At week 4-5:
N - 96 kg/ha
K - 56 kg/ha

10 Days prior to flowering: (when tassles can be first seen emerging from the whorl)
N - 96 kg/ha
K - 56 kg/ha

Application guidelines for secondary & micronutrients:
Sulphur (S):
Apply sulphur as part of a compound fertilizer or as part of the N source (e.g. Ammonium Sulphate Nitrate (ASN))

Calcium (Ca):
Normally the application of gypsum to the soils is adequate source of Ca. When fertigation is done and no gypsum has been applied to the field prior to planting, an application of $CaNO_3$ can be done (equivalent of 35-55 kg Ca/ha applied).

Magnesium (Mg):
Magnesium is applied when the Ca:Mg ratio is not within the specified parameters. When Ca levels are more than 5 times that of Mg in the soil tests, an application of Mg can be done. Foliar applications of Mg as $MgNO_3$ or $MgSO_4$ can be done as standard practice to supply the plant with small amounts of Mg.

Micronutrients (Bo,Mo,Zn,Cu,Fe,Mn):
Apply micronutrients as either part of the basal fertilizer dressing or as part of the top dressing. Applications of micro nutrients as foliar applications are also an option to supply the plant with adequate micro nutrients.

3.5 IRRIGATION

Corn need approximately 500-800 mm of water per growing cycle. The most critical times for water induced stress on corn are at seedling emergence, establishment, flowering and cob development

stage. A weekly irrigation requirement of 25-35 mm/ha can be used as a guideline. Where soils are sandier, the irrigation requirement must be increased and where soils have higher clay %, the irrigation requirement must de decreased to avoid over irrigation. Be careful not to over irrigate young corn seedlings – this can induce stress which will lead to seedling failure and subsequent lower plant populations.

3.6 WEED MANAGEMENT

Proper field selection and early field cultivation to terminate most of the weeds is the best way to control weeds. Use where possible, pre-emergent and post emergent herbicides which are registered on sweet corn and maize. Be careful using maize herbicides as some can effect sweetcorn growth. Mechanical cleaning with tillers is commonly used and the application of side dressed fertilizers is also done in conjunction with the tilling process. Make sure that weeds do not become problematic, as this may causes competition between weeds and the corn seedlings. Over weeded lands can also harbor serious pests and diseases like bollworm & leaf hoppers which may aid the spread of maize streak virus. Ensure that the cultivators are not working too deep into the soil as this may damage the shallow root system of the corn plant. It is highly advisable to firstly get expert advice on the use of herbicides on corn.

3.7 PEST MANAGEMENT

Aphids, bollworm, wireworm, cutworms, stalk borers and black beetles are the most important insect pests on corn. Control of these pests with registered products is the best way to optimize corn production. Make sure that your chemical representative use products with short withdrawal times and low residual levels. Get sound advice from the chemical representative in our area. It is important to use products that are registered on corn. There are also innovative and effective systemic insecticides applied as seed dressing. Speak to your seed supplier about these options, and what they are currently using as a standard dressing.

4. HARVESTING AND MARKETING

Sweetcorn are highly perishable with a narrow shelf life window, thus requiring very close management. The crop needs to be harvest as effective as possible without compromising quality. Normal procedure is to harvest sweetcorn early in the morning when temperatures are still low. Maintaining low temperatures help sweetcorn to slow down the conversion of breaking sugars down into starch. Keep the cold chain as far as possible.

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.