



# BUTTERNUT

## PRODUCTION GUIDELINE

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# BUTTERNUT

## 1. HISTORY AND BACKGROUND

Butternuts belong to the cucurbit family and are produced world-wide. They are frost- sensitive and grow best under warm conditions. Various forms and colours exist, the most common being pear-shaped with a tan skin colour. Plants have a vine-type habit and extensive root systems. Male and female flowers are separate, males being borne on long stalks, females being borne on shorter stalks much closer to the stem. Pollination, usually by bees is important for normal fruit development. Butternuts are increasingly used locally in place of pumpkins and are also becoming more important in processing and prepared foods.

## 2. ADAPTABILITY

### 2.1 CLIMATIC REQUIREMENTS

Ideal soil temperature for germination : 20 - 25 C (minimum 16 C )

Ideal temperature for growth : 18 – 24 C

### 2.2 SOIL REQUIREMENTS

pH 6.0 – 6.5

Best results are obtained with well-drained soils. Low salt level and high organic matter content are preferred.

### 2.3 PRODUCT TYPES

Size and form of fruit may vary, the most common shape being an elongated pear-shape. Some varieties will produce a more “peanut” shaped fruit. This is not so popular in South Africa. Some varieties will tend to produce fruit with thinner, curved necks and these are more decorative in function. Large fruited varieties are preferred by the processors. Most commercial varieties have tan-coloured skins, but some striped or mottled variations are also used.

## 3. CULTIVATION PRACTICES

### 3.1 SOIL PREPERATION

Soil should be thoroughly prepared and deeply loosened before planting. Any residue from previous crops should be well-rotted. The use of raised beds should be considered if high rainfall that could lead to waterlogging is expected.

### 3.2 PLANTING PERIODS

Butternuts are sensitive to cold temperatures and frost will kill young plants and damage older ones. The crop can be planted anywhere there is no danger of frost during the growing period.

### 3.3 PLANTING

Most butternuts are direct-sown, that is the seed is planted directly into the soil. Early in the season, some growers use seedlings in order to establish an early crop. Seedlings must be transplanted before they become root-bound in seed trays.

### 3.4 SPACING

A variety of spatial arrangements may be used, but a final population of 14 - 18,000 plants per hectare is normally targeted. An in-row spacing of 40 cm and between rows of 1.5m is most common.

### 3.5 FERTILIZATION

For accurate and most effective use of fertilizers a soil analysis is needed. Butternuts and other squashes respond well to organic fertilization but will most often also need supplementary inorganic applications to obtain best results. After a few years of building up the soil with organics, the inorganic component will become less important.

#### 3.5.1 FERTILIZATION GUIDELINE

N – 130 Kg. 50% pre-plant, remainder applied equally as 3 top dressings at 3-weekly intervals..

P – 50Kg. All applied pre-plant.

K – 150 Kg. 30% pre-plant, 30% at 4 weeks, 30% at first flower, 10% after fruit set.

Precise requirements should be determined by means of a soil analysis. Exact programmes will have to be tailored according to this and incidence and severity of diseases which may shorten the crop cycle.

### 3.6 IRRIGATION

Butternuts can be produced under dryland conditions but will produce much better results where irrigated. Water requirement will vary with soil type, season and growth stage. Avoid over-irrigation and waterlogging. The amount of water needed is generally 25 – 40 mm per week. Drip irrigation is preferred as the leaves remain dry.

### 3.7 OTHER CULTURAL PRACTICES

- 1) Plastic mulching is often used in winter production. This increases soil temperature and speeds growth. Weed control is also facilitated.
- 2) A 4 year rotation is recommended.
- 3) Weed control is by hand and is particularly important in early growth stages.
- 4) Natural bee populations may be supplemented if low.
- 5) Windbreaks can reduce damage in some areas.

## 4. HARVESTING AND MARKETING

A sharp knife is used to cut the fruit from the plants. The stem should not be broken off as this can provide an entry point for post harvest pathogens. Most fruit is sold through fresh produce markets in 10, 7 or 3Kg bags. Fruit is graded by size with smaller fruit being used for the 3Kg bags. The processing types are harvested into bulk bins and delivered to the customer in these. Fruit that is harvested in wet conditions and may have mud on the skin should be washed and thoroughly dried before packing. Butternuts can be stored for some time before marketing. Any fruit that is to be stored must be clean, dry and undamaged.

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# **GEM SQUASH**

## **PRODUCTION GUIDELINE**

# GEM SQUASH

## 1. HISTORY AND BACKGROUND

Gem squash belongs to the cucurbit family and are produced mainly in Africa. They are frost-sensitive and grow best under warm conditions. The majority of varieties are round and dark green in colour though some variants are known. Internally the fruit shows a relatively large seed cavity and flesh develops a yellow colour when mature. Plants have a vine-type habit and extensive root systems. Male and female flowers are separate, males being borne on long stalks, females being borne on shorter stalks much closer to the stem. Pollination, usually by bees is important for normal fruit development.

## 2. ADAPTABILITY

### 2.1 CLIMATIC REQUIREMENTS

Ideal soil temperature for germination : 20 - 25 C (minimum 16 C )

Ideal temperature for growth : 18 – 24 C

### 2.2 SOIL REQUIREMENTS

pH 6.0 – 7.0

Best results are obtained with well-drained soils. Low salt level and high organic matter content are preferred.

### 2.3 PRODUCT TYPES

The form of gem squash does not vary greatly, most are round to slightly oval with a dark green colour. A certain amount of yellow speckling may be seen. The size depends on picking stage with market requirements varying from a baby (2-3cm diameter) up to the larger, mature fruit of 10cm diameter or more.

## 3. CULTIVATION PRACTICES

### 3.1 SOIL PREPERATION

Soil should be thoroughly prepared and deeply loosened before planting. Any residue from previous crops should be well-rotted. The use of raised beds should be considered if high rainfall that could lead to waterlogging is expected.

### 3.2 PLANTING PERIODS

Gem squash is sensitive to cold temperatures and frost will kill young plants and damage older ones. The crop can be planted anywhere there is no danger of frost during the growing period.

### 3.3 PLANTING

Most gem squash is direct-sown, that is the seed is planted directly into the soil. Early in the season, some growers use seedlings in order to establish an early crop. Seedlings must be transplanted before they become root-bound in seed trays.

### 3.4 SPACING

A variety of spatial arrangements may be used, but a final population of 12 - 15,000 plants per hectare is normally targeted. Some of the newer hybrids show a more restricted growth habit and these can be planted at populations of 18-20,000 plants per Hectare.

### 3.5 FERTILIZATION

For accurate and most effective use of fertilizers a soil analysis is needed. Gems and other squashes respond well to organic fertilization but will most often also need supplementary inorganic applications to obtain best results. After a few years of building up the soil with organics, the inorganic component will become less important.

#### 3.5.1 FERTILIZATION GUIDELINE

N – 120 Kg. 50% pre-plant, remainder applied equally as 3 top dressings at 3-weekly intervals..

P – 60Kg. All applied pre-plant.

K – 170 Kg. 30% pre-plant, 30% at 4 weeks, 30% at first flower, 10% after fruit set.

Precise requirements should be determined by means of a soil analysis. Exact programmes will have to be tailored according to this and incidence and severity of diseases which may shorten the crop cycle.

### 3.6 IRRIGATION

Gem squash can be produced under dryland conditions but will produce much better results where irrigated. Water requirement will vary with soil type, season and growth stage. Avoid over-irrigation and waterlogging. The amount of water needed is generally 30 – 40 mm per week. Drip irrigation is preferred as the leaves remain dry.

### 3.7 OTHER CULTURAL PRACTICES

- 1) Plastic mulching is often used in winter production. This increases soil temperature and speeds growth. Weed control is also facilitated.
- 2) A 4 year rotation is recommended.
- 3) Weed control is by hand and is particularly important in early growth stages.
- 4) Natural bee populations may be supplemented if low.
- 5) Windbreaks can reduce damage in some areas.

## 4. HARVESTING AND MARKETING

A sharp knife is used to cut the fruit from the plants. The stem should not be broken off as this can provide an entry point for post-harvest pathogens. Most fruit is sold through fresh produce markets in bags. Grading of fruit by size enhances the appearance of the final product. Some growers will also wax fruit in a similar way to citrus fruit in order to create a shiny effect. It is possible to store gem squash for short periods of time but they tend to start becoming lighter in colour quite quickly, especially under warm conditions..

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# MARROW & SCALLOP

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# MARROW AND SCALLOP

## 1. HISTORY AND BACKGROUND

Marrows and scallops are both members of the cucurbit family and are grown throughout the world. They are sensitive to frost and cold conditions result in slow growth and low production. Where cool conditions prevail artificial heating can be used to produce these crops.

## 2. ADAPTABILITY

### 2.1 CLIMATIC REQUIREMENTS

Ideal soil temperature for germination : 20 - 25 C (minimum 16 C )

Ideal temperature for growth : 18 – 24 C

### 2.2 SOIL REQUIREMENTS

pH 5.8 – 7.0

Best results are obtained with well-drained soils. Low salt level and high organic matter content are preferred.

### 2.3 PRODUCT TYPES

Marrows (or summer Squash) come in many different shapes and colours. The commonest in South Africa is the dark green, cylindrical type of fruit. Lighter shades of green, yellow, striped and mottled fruit are common in other countries. Some markets prefer club-shaped fruit. Scallops are most commonly yellow or green, but other colours are also known.

## CULTIVATION PRACTICES

### 3.1 SOIL PREPERATION

Soil should be thoroughly prepared and deeply loosened before planting. Any residue from previous crops should be well-rotted.

### 3.2 PLANTING PERIODS

All marrows are sensitive to cold temperatures and frost will kill young plants and damage older ones. The crop can be planted anywhere there is no danger of frost during the growing period.

### 3.3 PLANTING

Most marrows are direct-sown, that is the seed is planted directly into the soil. Early in the season, some growers use seedlings in order to establish an early crop. Seedlings must be transplanted before they become root-bound in seed trays.

### 3.4 SPACING

A variety of spatial arrangements may be used, but a final population of around 16,000 plants per hectare is normally targeted. An in-row spacing of 40 cm and between rows of 1.5m is most common.

### 3.5 FERTILIZATION

For accurate and most effective use of fertilizers a soil analysis is needed. Marrows and other squashes respond well to organic fertilization but will most often also need supplementary inorganic applications to obtain best results. After a few years of building up the soil with organics, the inorganic component will become less important.



### 3.5.1 FERTILIZATION GUIDELINE

N – 110 Kg. 70% pre-plant, remainder applied as top dressing throughout crop cycle.

P – 50Kg. All applied pre-plant.

K – 80 Kg. 30% pre-plant, 30% at 2 weeks, 30% at first flower, 10% at later flowering.

Precise requirements should be determined by means of a soil analysis. Exact programmes will have to be tailored according to this and incidence and severity of diseases which may shorten the crop cycle.

Marrows and scallops show low sensitivity to Mn, Cu, Zn and Fe but are highly sensitive to B and Mo.

### 3.6 IRRIGATION

Water requirement will vary with soil type, season and growth stage. Avoid over-irrigation and waterlogging. The amount of water needed is generally 25 – 40 mm per week. Drip irrigation is preferred as the leaves remain dry.

### 3.7 OTHER CULTURAL PRACTICES

- 1) Plastic mulching is often used in winter production. This increases soil temperature and speeds growth. Weed control is also facilitated.
- 2) A 4 year rotation is recommended.
- 3) Weed control is by hand and is particularly important in early growth stages.
- 4) Natural bee populations may be supplemented if low.
- 5) Shelf-life is extended by cold storage.

## 4. HARVESTING AND MARKETING

A sharp knife is used to cut the fruit from the plants. The fruit stems can later be trimmed in the pack house. Fruit should be washed and thoroughly dried before packing. Most marrow and scallops are packed into punnets of varying sizes. The size of the fruit at picking is largely determined by market requirements. In general, export markets require smaller fruit, while local markets will accept larger fruit.

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