

Production guidelines for

Pumpkin



agriculture,
forestry & fisheries

Department:
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Part I: General aspects

CLASSIFICATION

Scientific name: *Curcubita pepo* and *Cucurbita maxima*
Family: Cucurbitaceae
Common names: Pumpkin (English), fhuri (Tshivenda), ithanga (isiZulu), litsanga (SiSwati), pampoen (Afrikaans)

ORIGIN AND DISTRIBUTION

Some botanists believe that two of the species of *Cucurbita*, *C. pepo* and *C. moschata*, are of American origin and that a third, *C. maxima*, is of Asian origin.

PRODUCTION LEVELS AND AREAS

South Africa

According to the Abstract of Agricultural Statistics, during the year 2003/04, about 225 000 tons of pumpkins were produced in South Africa. About 40 000 ha of pumpkins are grown yearly in South Africa. Pumpkins are being produced countrywide in South Africa.

Major producing areas in South Africa

Pumpkins are produced on a larger scale in the Mpumalanga Highveld and Lowveld; Vryburg in North West; Western Cape and Vereeniging in Gauteng.

DESCRIPTION OF THE PLANT

Roots

Pumpkins have many important feeder roots near the surface, and roots grow to about the same spread as vines. These are called lateral roots. The roots can grow as deep as 1,5 m.

Stem

Pumpkin has an almost square woody stem as opposed to the rounded, less tough stem of winter squash.

Leaves

The plants have larger leaves and sprawling vines with coiled, modified leaves called tendrils, although they may be absent on some bush varieties.



Flowers

Pumpkins are characterised by bright yellow flowers.

Fruit

The pumpkin fruit is more fibrous and less sweet than that of winter squash.

Seed/Nut/Pods

Pumpkins seeds vary significantly in size, depending on variety and type.

CULTIVARS

Recommended cultivars are:

- Carving: Autumn Gold, Gost Rider →takes 90 days to mature
- Small/Pie type: Amish Pie, small sugar →takes 90 days to mature
- Giant pumpkin: Big Max, Big Moon →takes 120 days to mature

Growers supplying wholesale markets want heavy and uniformly sized pumpkins with strong, dark-coloured stems and a deep, bright colour.

One of the major differences in pumpkin varieties is fruit size. The above categories are based on this characteristic. Varieties include a genetic trait that encourages pumpkins to develop colour while they are still maturing. Common examples of this type are the Autumn Gold and Big Autumn varieties. One drawback is that their stems are often weaker and brown in colour, lacking the characteristic large and dark green stems that many markets prefer.

Growers should keep track of the many new varieties of pumpkins available each year, consider the market, and plant varieties that are best suited to their operations.

Grey-skin pumpkins are a clear favourite on the markets because of consumer preference for their improved flavour, texture and shelf life.

CLIMATIC REQUIREMENTS

Temperature

Pumpkins are warm weather crops that are damaged easily by light frosts. They require a temperature range of 18°C to 27°C for growth, the ideal being 18°C to 20,5°C. Therefore, a prolonged warm season is essential to obtain quality pumpkins. At temperatures above 35°C, male flowers sometimes predominate, resulting in fewer fruit for that period.

Rainfall

Pumpkins prefer a generous water supply. Overwatering is often harmful. Every



effort should be made to maintain a uniform moisture supply during the growing season. During the seedling stage, the top 5 cm of soil should be moist. Later on, the top 5 cm layer should be dry but the lower 25 cm should be kept moist.

SOIL REQUIREMENTS

Pumpkins grow well and produce excellent quality fruit in rich, light-textured soils. Sandy loam or well-drained loamy fertile soils, ideally deeper than 1 000 mm, are ideal for pumpkins. However, heavier soils can also be used as long as the drainage is adequate. The optimum soil pH is between 6 and 7,5.

Part II: Cultivation practices

PROPAGATION

Pumpkins are propagated by seed sown directly in the field where the plant will mature. Seed can also be sown early in small pots under protection and set out later when the weather and soil have warmed up.

SOIL PREPARATION

Prepare a planting station by digging a round hole at least 45 cm in diameter and 25 cm to 30 cm deep. Mix a forkful or two of manure, compost or manure and a handful of 2:3:2 thoroughly with the soil removed from the hole; replace this material in the hole; tread it down slightly, and fashion the surface into a dish-like depression. During wet seasons the planting stations can be in the form of hills of similar diameter to ensure adequate drainage.

On larger open fields, the soil should be ploughed to a depth of 15 cm, especially if it contains sods or clay, at least one month before planting. Special care should be taken to remove from the land any portion of diseased plants which might affect the new plants. About two weeks before planting, the soil should be harrowed, rolled and dragged until it is smooth and mellow. It is then ready to be laid off in rows properly spaced to accommodate the vegetable.

PLANTING

Planting on a raised bed promotes drainage, so the roots do not have to deal with constant wetness, which leads to disease problems. The seeds can be planted directly in the site where they will mature. Pumpkins are usually planted in hills. Plant two to three seeds per hill, about 2,5 cm deep and later thin to one plant per hill. Spacing varies with variety and vine size. Plant bush or short-vined varieties (these must be 0,5 m to 1 m apart in the row and 1 m to 1,5 m between rows).



The seeds can also be grown occasionally in seed trays. Sowing can begin outdoors in August, although September to November is the most favourable period countrywide, except for the Lowveld where seed is sown in autumn and winter.

Depending on the region or area in South Africa (cool, warm or hot area) the following suggestions are recommended for each area:

Area	Ideal time	Possible time
Cool	October	September to December
Warm	September to November	August to September
Hot	August to September	July to March

FERTILISATION

The plants respond to liberal dressings of manure and compost, which also help the soil to retain moisture. Pumpkins appreciate to be treated generously throughout their growth period. Good feeding for pumpkins is liquid manure applied at intervals of 2 weeks to 3 weeks, starting when the first flower buds open. Apply 5 l per planting station following a good watering. A bit of additional feeding with 2:3:2 or 2:3:4 at a rate of 25 g to 50 g per plant when flowering starts and then again four weeks later will be beneficial. With a new hybrid pumpkin cultivar, STAR 7001, fertilisation with a mixture of 2:3:2 (22) and superphosphate in a ratio of 6:4 at a rate of 600 kg/ha, followed by two potassium nitrate (KNO₃) topdressings of 75 kg each hectare, has proved to produce yields of 70 t/ha.

On larger fields the following fertiliser applications are recommended:

Fertiliser application (kg/ha)

Fertiliser	Application time	Fertile soil	Infertile soil
1. 2:3:2 (30)	At planting	400	800
2. LAN	At 6 weeks	250	150

IRRIGATION

The first irrigation should be given immediately after planting, with the second and subsequent irrigations given at weekly intervals or even more frequently, depending upon the need. However, waterlogging should be avoided at all times. In the absence of rain, the plant should be watered generously. Pumpkins prefer their water applied under the foliage. Regular wetting of the foliage encourages mildew and also removes bait deposits once the fruit has set.



WEED CONTROL

Pumpkins require frequent weeding. The first weeding may be performed 15 days to 20 days after seed sowing. A total of three weeding operations will be required. Herbicides can also be used for this purpose.

For annual and perennial grasses on pumpkins, apply 1,5 l/ha of haloxyfop-R methyl ester. Dosage depends on grass species. Apply when annual grass species are in the 2 leaf to 6 leaf stage.

PEST CONTROL

Pumpkin flies

Damage

Adults sting young fruit to lay eggs and cause sunken brown spots. White maggots develop inside the fruit.

Control

As the adult flies neither suck nor chew the foliage, they are controlled by baiting. The bait mixture is splashed onto the leaves in coarse droplets. To obtain satisfactory control, it is most important to begin baiting when the first flowers appear and to do it consistently each week and after heavy rain. The following bait is effective:

Apply mercaptothion at a rate of 35 l to 40 l mixture per hectare as a coarse droplet spray on the underside of the foliage, that is, 300 g mercaptothion and 8 kg sugar in 35 l to 40 l water.

Proper crop rotation is essential in pumpkins to reduce potential pest problems. Never grow pumpkins on land that has been planted with any other cucurbit crops such as watermelons, squash, etc, within the last three years. Proper rotation with no-cucurbit crops will help prevent potential problems from carryover of disease organisms on plant material.

APHIDS

Damage

Curling of leaves is noticed.

Control

Apply either one of the following sprays when a pest is noticed, and repeat when necessary: mercaptothion 15 kg to 30 kg/ha, mevinphos (690 ml/ha), fenthion or dimethoate.

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Thrips

Damage

Newly emerging plants become deformed.

Control

Spray or wet both sides of the leaf with endosulfan or mercaptothion. Proper crop rotation is essential in pumpkins to reduce potential pest problems.

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DISEASE CONTROL

Powdery mildew

Symptoms

The first sign of disease appears as whitish leaf spots on the lower leaf surface, increasing in number and size. The spots eventually merge and progress to upper surfaces, finally covering the entire leaf with white powdery growth. This condition is severe in dry, warm weather.

Control

Apply copper oxychloride/sulphur at a rate of 10 kg/ha to 30 kg/ha. One can also apply 300 ml/ha of cyproconazole but only on cucurbits grown in tunnels. Benomyl can also be applied at the rate of 250 g/ha to 500 g/ha but this may not be applied more than three times per season.

Control of viral disease is difficult. Certain viruses have a broad host range, so it helps to control perennial weeds near pumpkin fields and to control aphids in the crop that carry the virus. Resistant varieties should also be used.

Downy mildew

Symptoms

Symptoms appear as small yellow, often angular spots on the upper surface of the leaves. On the underside of these spots a greyish mildew will eventually form. This condition usually develops on cucurbits during wet conditions such as heavy dew or rains.



Control

Spray with bravo, cupravit or dithane as soon as the disease is noticed.

Control of viral disease is difficult. Certain viruses have a broad host range, so it helps to control perennial weeds near pumpkin fields and to control aphids in the crop that carry the virus. Resistant varieties should also be used.

Anthracnose

Symptoms

On the leaves, small, yellowish or water spots appear and these rapidly enlarge and turn brown. Oblong lesions may occur on the stems and black sunken areas on the fruit.

Control

Weekly applications of bravo or dithane will control the disease if the spraying is started in time.

Cucumber wilt

Symptoms

Plants wilt as a result of rotting of the root system. They also become soft and often covered with white fungus growth.

Control

Apply dichlorophen as a pre-plant application. This should be applied as a drench at a rate of 400 mℓ spray mix per 10 ℓ container of soil.

OTHER CULTIVATION PRACTICES

Plastic mulch

Pumpkins can be grown with black plastic mulch. The black plastic absorbs warmth from the sun, allowing the soil to warm quickly. To plant, punch a small hole into the plastic and plant the seed or transplant. The advantages of the plastic are that it will warm the soil faster in the spring and will also conserve moisture throughout the season. This type of mulch also helps with weed control and the reduction of fruit rot.

It is best to use drip irrigation when using plastic mulch. Compared to sprinkler irrigation, drip irrigation helps keep the foliage dry and therefore reduces disease problems. It is also possible with this system of irrigation to inject the required nutrients and “spoon-feed” your plants.

Organic mulch

Mulching with organic matter like pine straw or wheat straw helps control weeds,



conserves moisture and keeps the fruit from direct contact with the soil, where they could be infected by diseases. If wheat straw is used as mulch, apply an additional half-cup of calcium nitrate when side-dressing.

Pruning roots and vines with cultivating equipment slows plant development and reduces yield.

HARVESTING

Harvest maturity

Most pumpkins reach maturity at 3 months to 4 months after sowing. The fruit is harvested when the skin becomes hard and lose its shiny appearance. Pumpkins should not be left on the ground too long after the foliage has died down, because wet soils and sun scald can cause damage and reduce storage qualities. However, gathering the pumpkins should be delayed until the vines have completely dried off, retaining the stem.

Several methods can be used to identify if the pumpkins have matured and are ready for harvesting:

The stems develop cork-like cracks, which are the clearest signs of harvesting maturity; skin colour changes from dark, glossy green to a dull grey; you can press the pumpkin fruit with your thumb and if a dark bruise appears then it is not ready for harvest yet; or pierce the skin with your thumbnail, if it is tough and makes a cracking sound the fruit is ready for picking.

Harvesting methods

Harvesting is done by hand, using secateurs or a sharp knife, and the fruit is removed with 5 cm of stalk attached.

Part III: Post-harvest handling

It is extremely important that the fruit be handled carefully from harvesting until marketing, as any injury to the skin will promote rotting.

Pumpkins are graded according to uniformity in size, shape and colour as well as appearance. Those that are injured or overmature are discarded. Most markets prefer the small to medium-sized fruit, while canners and bakers prefer the large ones.

Usually, pumpkins are handled in bulk or loaded into bulk bins directly from the field. Pumpkins are normally packed in cardboard containers. The fruit may also be packed in sacks with a content of 14,34 kg or 54 kg. The most commonly used bags are sugar pockets or green net bags with a mass of 34



kg. Approximately 10 pumpkins with an average mass of 3,4 kg fill these bags. To promote sales appeal that will affect the price favourably, the bag is filled to capacity to leave the top of the last fruit exposed.

Storage

Ideally pumpkins can be stored for a period of 1 month to 3 months when matured. Winter varieties can be best kept at relatively higher temperatures, 10°C to 13°C. For the best results with storing, the air-moisture content should be 50% to 70% and the temperature 6°C to 13°C. Pumpkins can be stacked on their sides in a single layer next to each other under a tree with a fairly dense leaf canopy but which is open at the sides. Air movement under a tree must be free. Pumpkins are moved in large boxes by bulk trucks.

Marketing

The market value of pumpkins is determined by their size, shape, maturity and, in particular, the lack of blemishes and decay. Supermarkets may sell pumpkin sections or whole fruit.

The Wit Boer pumpkins are mainly marketed when ripe. When very scarce, they may be marketed in an unripe but mature stage. Although the Flat White Boer remains the firm favourite, other pumpkin varieties are enjoying a very good market share.

PART IV: PRODUCTION SCHEDULES

ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Soil sampling								X	X			
Soil preparation								X	X			
Planting			X Lowveld	X Lowveld	X Lowveld	X Lowveld		X	X	X	X	
Fertilisation				X	X	X	X	X			X	X
Irrigation			X	X	X	X	X		X	X	X	
Pest control	X							X	X	X	X	X
Disease control	X							X	X	X	X	X
Weed control											X	X
Pruning												



ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Leaf sampling												
Harvesting		X	X									
Marketing		X	X	X	X	X	X	X	X	X	X	X

PART V: UTILISATION

Young, fresh leaves are used as vegetables, the same way as spinach. The fruit can be used in several ways: It can be cooked and eaten as a vegetable. It can be canned and stored for use in the later stage or dried. Pumpkin seeds can be roasted and eaten as a snack.

Disclaimer

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