

contact should be ensured, using a press wheel if possible. Because of the high cost of seed and variation in germination rates, care should be taken when calibrating the equipment to achieve the proper plant population. The required spacing is 15 cm in the rows and 100 cm between rows. Chickpea seeds need to be treated with a fungicide mixture before planting.

### Fertilization

Any fertilizer application should be based on soil test recommendations, previous crop and expected yield. Chickpeas must be inoculated with a specific Bradyrhizobium strain for Cicer species to ensure effective nodulation and nitrogen fixing. Chickpea responds significantly well to phosphorus, potassium and sulfur applications but phosphorus is of utmost importance.

### Weed Control

Chickpeas are susceptible to weed competition, weed-free fields are therefore essential. It should be noted that there are no herbicides registered for use on chickpeas in South Africa.

### Crop utilisation

#### Human consumption

Chickpeas are high in protein, carbohydrates and fibre; low in fat and cholesterol and are considered one of the earliest cultivated vegetables. They are consumed as a dry pulse crop or as green vegetables. Chickpeas are added to many dishes to improve their taste, e.g. dessert, salads and soup. When mixed with other pulses, they can also serve as an appetizer. The white and yellow seeds can be roasted or boiled and be eaten plain or as salted or sugared seeds.

#### Industrial uses

Seeds are sold in markets either dry or canned. Kabuli chickpeas are also marketed as dry garbanzo beans and milled flour. Chickpeas are mostly used as source of starch for textile sizing giving a light finish to silk, wool, and cotton cloth. An adhesive

which is suitable for plywood may also be prepared; although is not water-resistant.

### Livestock uses

Animal feed is another use of chickpea in many developing countries. Gram husks, and green or dried stems and leaves are used for stock feed; whole seeds may be milled directly for feed. Chickpea seeds may be used for feeding domestic animals, while straw can be used for animal feeding only if it is chopped and mixed with other cereal straws.

### Agronomic purposes

Chickpea being a leguminous crop improves soil fertility by fixing intact atmospheric nitrogen into plant available form ( $\text{NH}_3$  and  $\text{NH}_4$ ) through the phenomenon of symbiosis. It can also allow diversification of agricultural production system through crop rotation.

### Acknowledgements

Agricultural Research Council-Grain Crops Institute and Protein research foundation.

Department of Agriculture and Land Administration.

Lowveld Research Unit.

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chickpea



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REPUBLIC OF SOUTH AFRICA

## Chickpeas

**Scientific name:** *Cicer arietinum* L.

**Family:** Fabaceae

**South African common name:** Garbanzo beans

## Background

Chickpea is one of the minor South African pulse crops; it is probably originated in South-Eastern Turkey. The crop has been cultivated in the Middle East, India, the Mediterranean and Ethiopia since antiquity, dating back to 7,500 BC and was brought to other countries through trade and conquests. The Indian subcontinent accounts for ± 70 % of world chickpea production. Currently, more than 7 million tonnes of chickpeas are produced in more than 45 countries, and the crop is made one of the widely grown grain legume in the world.

## South African production areas

Chickpea is one of the field crops which is not grown widely in the entire country, is just few stands of long-duration unimproved chickpeas which are grown as hedge plant in home gardens in few parts of Provinces such as Mpumalanga and Limpopo.

## Plant description

### Chickpea plant

Chickpea is an upright (erect) annual legume, ranging from 30 to 70 cm tall; with primary, secondary and tertiary branching, resembling a small bush. There are two types of chickpeas, namely:

- Desi type – is a small dark seeded with rough coat, it is Indian originated seed which is fairly drought tolerant, adapted to low rainfall areas and is of shorter height. Desi chickpeas account for about 10 % of the world's current commercial production

- Kabuli – it is a lighter coloured late-maturity type with a thin, white seed coat and is found mainly in areas of rainfall and is relatively taller in height. Kabuli has larger seeds with a smoother coat.

### Roots

The root system is robust, penetrating up to 2 m deep, however, the major portions are found in the top 60 cm. Chickpea has a large tap root which allows the plant to access deeper water supplies.

### Stems

Chickpea stems are branched, erect or spreading, sometimes shrubby. They can grow to a height between 0, 21 and 1 m. The stems are glandular, hairy and have an olive, dark green or bluish-green colour.

### Leaves

Some chickpea varieties have compound leaves (eight to 20 leaflets), while some have simple leaves which are pubescent in appearance and have a top rachis (ending in a leaflet). Leaflets are ovate to elliptic in shape and their length ranges from 0, 6 to 2, 0 cm. The colour of the leaf is olive, dark green or bluish.

### Flowers

Desi and Kabuli chickpea types can be identified easily by flower colour, with Desi types having purple/violet flowers while Kabuli types have white flowers. The flowers are solitary, sometimes 2 per inflorescence, auxiliary, pendulous 0, 6 to 3 cm long, pedicels 0, 5 to 1, 3 cm long. Chickpea flowers are profuse and have an intermediate growth habit, continuing to flower and set pods as long as conditions are favourable.

### Pods and seeds

Pods set occur on the primary and secondary branches, as well as on the main stem. Pods are short, pubescent and about 2 to 5 cm long and appear to be inflated. The individual round

Pods generally contain one seed in Kabuli types and often two seeds in Desi types. Kabuli chickpeas often have rounded and pale cream seeds, while Desi chickpeas are usually dark and odd shaped. Pods have a unique spherical shape with only a hint of a tail.

## Climatic requirements

### Temperature

During flowering stage, chickpea is more tolerant to high temperatures and susceptible to frost damage. The best temperature for germination is between 5 and 15 °C, while temperatures above 29 °C and frost could be harmful during flowering and pod formation.

### Rainfall

The plants grow well in areas with annual rainfall of between 400 and 600 mm; its productivity under marginal rainfall conditions may be increased through genotype selection and manipulation of planting density. Owing to its deep taproot, chickpea is fairly drought tolerant as it is able to extract moisture from deep layers of soil profile, but its productivity is reduced by the recurrence of the terminal droughts.

### Soil requirements

The plant requires fertile, sandy-loam soil with good internal drainage and they do not tolerate water-logged conditions. Chickpeas require a soil pH of 6, 0 to 7, 0. It prefers soil with good residual soil moisture content or storage.

## Production practices

### Planting

Chickpeas are usually grown as winter crops, between late April and May. Planting rates vary with seed size and variety. The proper seeding depth is 2, 5 to 5 cm. Chickpeas should be sown in moist soils to provide the necessary moisture for proper germination and inoculation. Good seed and soil