

• PRODUCTION GUIDELINES •

Chicory

(*Chicorium intybus*)



agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
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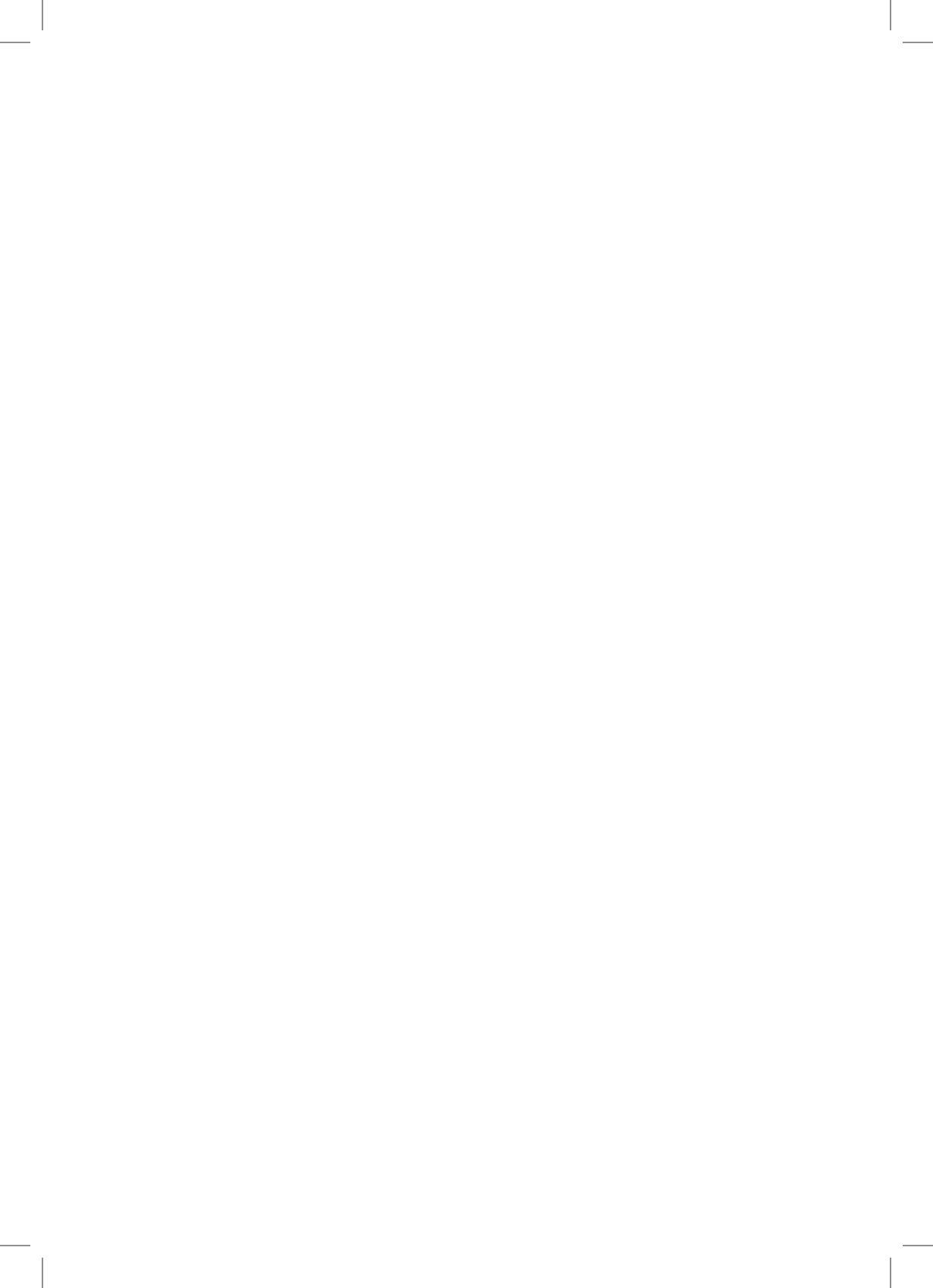
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GENERAL ASPECTS

Classification

Scientific name: *Chicorium intybus*

Common names: Blue sailors, succory, coffeeweed, cornflower, chicory (English), witloof (Afrikaans)

Origin and distribution

Chicory is native to Europe and originally grew only there. However, it has been transplanted to other places and is now found growing in the wild on the side of roads as well as in fields in North America and other temperate regions of the world. The major production is in Belgium where over a hundred years ago 13 000 ha were grown under cultivation. This decreased to less than 100 ha in 1970, and currently some 5 000 ha are cultivated annually in Belgium and the Netherlands. Production is also reported in France, Germany, Hungary, Poland and South Africa. Yields are generally comparable with beetroot, up to 50 t/ha of fresh roots being produced, giving about 9 t/ha. In South Africa chicory was first produced in Alexandria in 1895. Production soon expanded to the Albany and Bathurst districts situated along the Sunshine Coast.

Production levels

South Africa

Cultivation of chicory took place in 1895 at Alexandria, and by the seventies the industry was mostly limited to the districts of Alexandria, Albany and Bathurst. Until 2003, the supply of chicory to our South African business was monopolised by one local supplier, however, price increases led to the import of 80% of our chicory from India at a lower cost.



However, as Indian exports to Europe rise, the shifting of supply and demand suggests the price of imported chicory will increase too.

The South African chicory project started in 2008 with emerging farmers in Weenen, KwaZulu-Natal Province. The first large-scale trials



were focusing on finding committed farmers, understanding of local diseases and pests, and recording water absorption, soil type and climate. In the first planting season of 2009, 13 farmers planted 19 ha. In 2010, around 440 tons of raw chicory were produced and 90 tons of roasted chicory at the Estcourt factory. In 2011/12 the factory is expected to produce 505 tons of roasted chicory from 70 ha, rising to 565 tons from 120 ha in 2012/13.

South Africa is the world's second largest producer of chicory after France. Altogether 96% of the roasted chicory is sold by Chicory SA to coffee-producing companies in South Africa.

MAJOR PRODUCTION AREAS IN SOUTH AFRICA

Chicory is produced in Alexandria, Albany and Bathurst in the Ndlambe Local Municipality of Eastern Cape, on the Sunshine Coast of South Africa.

Internationally

The production of chicory in France for the 2009/10 season is expected to remain low. The main cause is the bad root production during the summer of 2009. This was caused by the long-lasting drought in combination with a very high incidence of root aphids. Consequently, the chicory root production area in France has been experiencing a decrease in production for

a number of years already, resulting in a 10% decrease compared to the previous year and 18% over the last 5 years. The present area amounts to 11 200 ha.

Cultivars

There are three main types of chicory grown for their leaves, there are many cultivars of each form:

- A bitter-tasting loose-leaved form is grown as a green winter vegetable, especially in southern Italy;
- A narrow-leaved, witloof or Belgian form has a compact, elongated head (chicon) which is blanched for use in salads or cooked dishes;
- A broad-leaved (usually red) form produces cabbage-like hearts, these are generally less bitter than the other forms and are eaten raw or cooked. These forms are often used as a winter salad crop.

Description

Chicory is a woody, perennial herbaceous plant and it is a member of the daisy family of plants called Asteraceae. It produces tubers or roots in the first year and develops a flower only in its second year.

Mature plant

The mature chicory plant may grow to 150 cm tall in cultivated land.

THE STEM

Stems are hollow, up to 30 cm tall, often rough-hairy, becoming woody and reddish.

THE ROOTS

Chicory is a perennial herb with a fleshy, deep taproot, sometimes branched and with a milky sap. It has a long stout taproot which penetrates deeply into the soil.

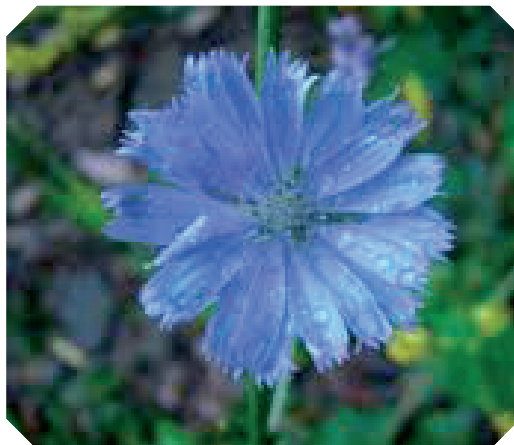
THE LEAVES

Leaves are alternate and long petioled, mainly clustered near the base, often forming a rosette near the ground.

THE FLOWERS

The flowers are large and azure blue occasionally, but rarely pink or white. Flowers open successively upwards, though they will often close during dull weather.

Flower heads are 2 to 4 cm wide borne on upper parts of leaves on very short individual stalks. It has strap-shaped ray flowers appearing in mid to late summer.



THE FRUIT

The fruit is an achene 2 to 3 mm in length.

Climatic requirements

Temperature

It is a cool weather crop that tolerates only moderate summer temperatures and requires well-distributed rainfall, with good soil drainage. Chicory is reported to tolerate an annual mean temperature of 6° to 27 °C though it is not frost tolerant when young.

Water

Chicory requires 75 to 90 mm of water per month for 160 000 to 180 000 plants per hectare, and then increasing to 120 to 140 mm per month during the last 2 months before harvesting.

Soil requirements

Chicory grows on any type of soil, but when cultivated, grows best on deeply tilled, fertile soil or sandy loam. Deep, well-drained sandy or loamy soils are ideal, with a pH of between 6,5 and 6,9 (H₂O) for the optimal absorption of nutrients.

CULTIVATION PRACTICES

Propagation

Chicory is most commonly propagated using seed. Seed may be either drilled or broadcast. Drilling is preferred because it provides a more uniform depth of planting. If chicory is to be broadcast seeded, the seedbed should be cultipack before and after seeding.

Soil preparation

When preparing the soil for the chicory plantation the cultivation of too wet and shallow soils should be avoided. The deep loosening of soils should be conducted beforehand, while tine cultivation is necessary for aeration and levelling of the field. Soil should be ploughed to a good depth to permit root development. Chicory grows best in a well-manured soil enriched with organic matter. The ground should be forked over lightly and then tamped down.

Planting

The best time to plant chicory is in the spring season. Seed should be sown in a fine-textured seed bed, at a depth of not more than 6 cm in rows spaced 45 to 60 cm apart. When the plants reach the four-leaf stage they are thinned to stand 20 to 25 cm apart in the row. The plant density is about 150 000 plants per hectare. For the production of endives the plant density is closer to 300 000 plants with a row width of 35 cm and in-row spacing of 10 to 15 cm. With sufficient soil moisture the ideal planting time for the sandy coastal regions (dryland) is from February to May. The up country dryland plantings are mainly dependent on enough available soil moisture and can be planted from March to middle September.

Plant population should be 15 to 20 plants per square metre in rows that are 45 to 50 cm apart. Seed may be either drilled or broadcast. Plant chicory seeds must be 063 to 127 cm deep in the soil. This will ensure that the seeds are not planted too deep and that there is good seed-to-soil contact.

Fertilisation

Chicory does not require heavy fertilisation, and fertiliser may actually damage the seeds if strongly applied. A soil test should be conducted before fertilisation. Fertiliser at planting is necessary and should be applied in early spring or summer.

Irrigation

Irrigation periods should not be longer than 4 hours at a time; 3 to 4 hours are ideal. Some irrigation is needed for chicory in drier areas.

Weed control

Early development is slow, which often means excessive hand labour to control weeds, therefore rotating with crops where weeds are more easily suppressed would be desirable. Some herbicides are available for use in chicory. Control broadleaf weeds before sowing, with a registered post-emergent herbicide.

Pest control

Chicory has no serious pest and disease problems. However, pests and diseases that need to be controlled are as follows:

DREADED SLUG

There are many organic controls to avoid slugs in the garden. One of the most effective ways of controlling slugs is through nematodes. Nematodes are very small organisms which cannot be seen, with the naked eye. Nematodes need to be bought in plastic packages and then put into a watering-can, water added and the areas affected by slugs watered. The nematodes will enter the slugs and release bacteria which will kill the slugs.

POWDERY MILDEW

The powdery white or grey fungus is usually found on the upper surface of leaves or fruit. Leaves will often turn yellow or brown, the edge will curl up, before the leaves drop off. New foliage emerges crinkled and distorted. Fruit will be dwarfed and often drops off early.

Control: Plant resistant varieties and space plants properly so that they receive adequate light and air circulation. Always water from below, keeping water off the foliage. Apply registered fungicides. Sanitation—clean up and remove all leaves, flowers, or debris in the fall and destroy.

LEAF SPOTS

Leaf spots are caused by fungi or bacteria. Brown or black spots and patches may be either ragged or circular, with a water-soaked or yellow-edged appearance.

Control: Remove infected leaves when the plant is dry. Leaves that collect around the base of the plant should be raked up and disposed of. Avoid overhead irrigation if possible; water should be directed at soil level. For fungal leaf spots, use a recommended fungicide. Prior to storage the roots should be treated with fungicides to prevent post-harvest disease.

Disease control

The main diseases of chicory are sclerotinia (*Sclerotinia sclerotiorum*) and charcoal rot caused by *Fusarium* spp. where the lower stem and taproot darken in colour until they appear black.

Control: Avoid sowing chicory following crops susceptible to sclerotinia, such as the pulse crops and canola in order to control infestation of chicory crops.

Harvesting

Harvest maturity

Chicory roots are collected during the fall or in the spring. Roots will be ready for harvest about 120 days after planting. Chicory is ready for cutting when the tops, known as chicons, start showing through the soil or chicory becomes ready for harvest when a good “heart” has formed. The chicory will be about 30 to 45 cm high when it is ready for harvest.

Harvesting methods

Generally chicory’s power lies in the root, so dig up the entire plant. Another method is to cut off the leaves to within 25 mm of the crown in the autumn. Tops are cut off and the roots lifted, usually mechanically. In some cases the plants are more carefully harvested and usually pulled up by hand.

POST-HARVEST HANDLING

Drying

Raw material is processed over a 3-month drying campaign.

Roasting

Once dried, the chicory root slices are roasted *via* a controlled process to obtain sweet and well-balanced chicory. During this process the aroma, colour, humidity and density are perfectly controlled.

Packing

Chicory can be packed in a 500 g punnet, a 500 to 2 000 g plastic bag and a 2,5 to 5 kg crate with blue sheets of paper between the various layers of chicory to give better protection and prevent greening from exposure to light.

Storage

The roots of chicory should be stored in bulk in the crates and placed in the storeroom.

Marketing

Chicory is being marketed to manufacturers and consumers in South Africa and internationally (Portugal and France). It is also sold to retailers in packs of 60 bags (200 g pack) or 20 bags (65 g pack).

PRODUCTION SCHEDULES

Activities	January	February	March	April	May	June	July	August	September	October	November	December
Soil sampling						X	X					
Soil preparation							X	X				
Planting		X	X	X	X	X	X	X	X			
Fertilisation	X	X							X	X	X	X
Pruning											X	X
Harvesting									X	X	X	

UTILISATION

Chicory can be eaten in several forms; coffee, leaves, flowers and roots. Leaves and flowers can be added to salads. Roots are cooked like parsnips and are eaten as a vegetable. Chicory may be cultivated for its leaves,

usually eaten raw as salad leaves. Roots are baked, ground and used as a coffee substitute and additive in coffee. Chicory (especially the flower) was used as a treatment for everyday ailments. It is variously used as a tonic and as a treatment for gallstones, gastroenteritis, sinus problems and cuts and bruises. Chicory contains inulin, which may help humans with weight loss, constipation, improving bowel function, diabetes and general health. The root was also employed as a general herbal diuretic remedy and is particularly valued for its laxative effect.

Traditionally, chicory is stated to benefit the liver by protecting it from the effects of excess coffee, it is also said to be a counter-stimulant alleviating the deleterious effects of drinking excessive volumes of coffee. Chicory leaves, which have been bruised, are seen as a good poultice for external complaints on the skin and bruised chicory leaves are often applied to bring relief from local swellings and inflammation of the skin. A decoction of the root has proven to be of benefit in the treatment of jaundice, liver enlargement, gout and rheumatism. A blue dye has also been obtained from the leaves. The roots of the chicory plant are used for coffee



mixtures, pure chicory drinks, chocolates, breakfast foods and pet food. Dried chicory also functions as stock feed replacement for maize, provided the protein is supplemented. The leaves of the chicory plant are also utilised as fodder.

ACKNOWLEDGEMENT

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REFERENCES

<http://www.chicory.co.za>

<http://www.wikipedia.org/wiki/chicory>

Further information can be obtained from:

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NOTES

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