



agriculture,  
forestry & fisheries

Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA



# *Aloe ferox*

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**DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES**

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## GENERAL ASPECTS

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### Classification

Scientific name: *Aloe ferox* Mill

Common names: Bitter aloë; cape aloë; red aloë (English); bitteraalwyn; bergaalwyn (Afrikaans); iNlaba (isiZulu); iKhala (isiXhosa)

The name *Aloe* is derived from the Greek word for the dried juice of aloë leaves, and *ferox* refers to the spiny edged leaves. *Aloe ferox* is a succulent plant belonging to the Aloaceae family, including the dwarf aloës (*Haworthia*, *Poelnitzia* and *Astroloba*) and gasterias (*Gasteria*), which are also aloë-like in appearance and growth. The genus *Aloe Linneus*, with around 360 species, occurs predominantly in Africa with centres of species richness in South Africa, East Africa and Madagascar. Many of the species are woody and branching. The *Aloe ferox* derives its name from the ferocious thorns (*ferox* in Latin) that cover the leathery surface of the leaves.

### Origin and distribution

*Aloe ferox* is one of the most widely distributed species, it originates from the Swellendam area in the south-eastern parts of South Africa and is distributed throughout the Western Cape, Eastern Cape, KwaZulu-Natal, south-eastern part of the Free State, with a few localities in south-western Lesotho. It grows in a wide range of habitats, on mountain slopes, rocky places and flat, open areas.



The species shows a remarkable adaptability in terms of rainfall and flourishes in the extremely dry areas of the Karoo but also in relatively wet parts of the eastern section of the distribution area.



## Major production areas in South Africa

*Aloe ferox* or Cape aloe is found growing in abundance in the Albertinia area of the Southern Cape and KwaZulu-Natal, particularly between the midlands and the coast in the Umkomaas and Umlaas river catchment areas.

## Description

### *Mature plant*

The plant can reach 2 to 3 metres in height. The stem has a robust, single, unbranched, woody stem.

### *The roots*

It has a perennial, strong and adventitious/fibrous root system.

### *The leaves*

The leaves are arranged in a rosette. They are broad, dull green to greyish green, but turn reddish in colour when under drought stress. Dark-brown spines are present along the edges and sometimes also on the upper and especially the lower surface of the leaves. The old leaves remain after they have dried, forming a petticoat on the stem.



### *The flower*

There are usually between five to eight branches, each carrying a spike-like head of flowers. The flowers are usually bright orange-red, bright red, yellowish and even white forms are found. Flowering occurs between autumn and winter (May and August), but in colder parts of the country this may be delayed until spring (September).





### *Essential part*

The leaves are the essential part of the *Aloe ferox* plant.

### **Climatic requirements**

#### *Temperature*

*Aloe ferox* grows well in warm climates with a temperature ranging between 12 °C and 21 °C. The plant can tolerate low humidity but may not grow well in high humidity conditions. A chilling effect may occur below 7 °C.

#### *Water*

*Aloe ferox* can indeed tolerate long periods of drought but they will thrive and flower better if adequate water is provided in summer.

#### *Soil requirements*

Because of its hardy nature, the plant can be grown on a variety of soils, including sandy, loamy sands, and silty loams that are moderately fertile and well drained. Waterlogged, saline and alkaline soils are unsuitable for aloe cultivation.

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## **CULTIVATION PRACTICES**

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### **Propagation**

There are different methods that are used when propagating *Aloe ferox*.

#### *Seed*

The plant germinates well from seed. Propagation of seed is relatively easy and should be used more often, particularly to ensure the survival of some of the rare species. In addition, it is very rewarding to grow it by this method.

#### *Offsets or cuttings*

Propagation by cuttings is the most popular method. The side branches or basal sprout are removed and allow the wound to dry off for a time.

### **Soil preparation**

The field should be prepared well before heavy rainfall to achieve a fine tilth.



### Field layout and design

A bed width of 0,9 m and a furrow of 0,3 m summing up to 1,2 m is recommended. The bed height should be maintained at about 15 to 20 cm. Accommodate two rows on each bed, maintaining a distance of 60 cm between rows and 50 cm between plants. This planting pattern will give an average plant population of 33 333 plants/ha with an effective distance between two laterals of 1,2 m. The drip line should be placed between two rows on each bed. Adopt an emitter spacing of 0,5 cm.

### Planting

*Aloe ferox* can be planted in spring, 1, 5 to 2 m from each other in the nursery. When the seedlings have three or four leaves, or are about 3 cm tall, they should be planted into 1-kg bags containing a well-drained mixture of sand and compost and after two years they can be planted out into open ground. About 15 to 18-cm long root suckers or rhizome cuttings should be planted in such a way that a two-third portion of the planting material is underneath the soil.

### Fertilisation

A small quantity of manure is required to enhance the growth of the plant. Organic compost can also be used when making planting holes to speed up growth.

### Irrigation

Although the plant is drought tolerant, it thrives and flowers better if adequate irrigation is provided in the summer months. The land should be irrigated immediately after planting.

### Weed control

The land should be kept weed free by weeding the field when necessary.

### Pest control

The major insects identified in *Aloe ferox* include aloe snout beetle, scale insects, mealy bug and mites.



### *Snout beetle*

Symptoms: This insect tunnels into the heart of the crown where it lays its eggs. The larvae tunnel into the stems, so that the plant starts to rot and ultimately collapses. Unfortunately, damage is often detected only when it is too late.

Control: Plants can be treated by injecting recommended insecticide into small holes drilled into the stem.

### *Scale insects*

Symptoms: One of the most unsightly aloe infestations is caused by white scale insects that become visible as neat white rows on the leaves, especially on the lower surfaces. If untreated, the insects will eventually cover the entire plant and it may die off.

Control: These and other scale insects can easily be killed off by the use of recommended insecticides.

### *Mealy bug (Planococcus citri)*

Symptoms: The mealy bug is a small, sucking insect which is covered with numerous fine white fluffy threads.

Control: Recommended pesticides can be used.

### *Mites*

There are a number of different mites which attack aloes. The most common one is red spider (*Tetranychus cinnabarinus*). Mites are wind borne and scouting should be done particularly in early summer.

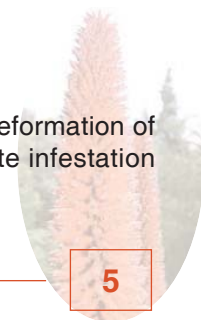
Control: Mites tend to become resistant with repeated use of the same substances, e.g. pesticides.

## **Disease control**

*Aloe ferox* is also prone to a variety of diseases, including aloe canker (also called galls), leaf spots, bacterial infections and aloe rust (*Uromyces aloes*). Few of these will lead to the rapid fall of the plants, but will certainly spoil their appearance.

### *Aloe canker*

Symptoms: Aloe canker (also called galls) causes severe deformation of the leaves or inflorescences. This problem results from mite infestation that stimulates unnatural cell growth.



Control: The infected areas should be removed with a sharp knife, taking care not to infect other plants and the wounds should be treated with a registered insecticide.

### *Galls and maformations*

These may be caused by mites or insects which lay their eggs in the plant tissue. Roll galls, or distorted growth, and rot may be the result of nematodes (eelworms).

Symptoms: Nematodes will occur in the soil and in decaying organic matter and are spread by digging-tools, feet, irrigation water and by the transporting of affected plants from one area to the other.

Control: Soil fumigation may be necessary when the attack is severe.

### *Crown gall*

Crown gall is caused by a bacterium and by rapid proliferation of the cells of the plant, the bacterium providing the stimulus for the overdevelopment.

### *Aloe rust (Uromyces aloes)*

Symptoms: Aloe rust is caused by a rust fungus that leaves black spots on the upper and lower leaf surfaces of aloe plants. The first signs of rust are small orange-yellow spots on the leaves. Aloe rust become larger and appears on both surfaces of the leaves, eventually bursting open to form a black-and-yellow scaly crust.

Control: Treatment with systemic fungicides is very effective. In cases of severe infection, the use of antibiotics is advised. The best way to address the problem is to cut away the diseased leaves and immediately burn them, or paint each spot with an oily or bitumen mixture, thereby preventing the fungus from spreading.

### *Rot*

Rot is commonly caused by weevil-like beetles belonging to the *Brachycerus* genus. These beetles vary in size, depending on the species, from about 1 cm to 3 cm long. They lay their eggs in the aloe leaf near the centre of the plant. No damage is noticed until the centre of the aloe drops out.

Symptoms: An early sign of rot is seen on plants that do not grow and form new leaves during a season or two. The bases of the leaves near the centre of the rosette may become blackened, or the leaves may begin to sag, losing their firmness and becoming spongy and rotted, resulting in the

eventual collapse of the plant. The condition may be caused by a number of agents such as overwatering, bad drainage, or damage to the plant, which permits bacterial invasion.

Control: The centre part, which has been affected, should be carefully cleaned out and then treated with a registered insecticide.

### *Leaf spots*

These can be caused by a number of fungi, including *Montagnella maxima*, *Placoasterella rehmi*, *Phyllosticta* spp. and *Macrophoma* on aloes. The spots are often black and may be very large and unsightly and sometimes increase very quickly.

Control: Recommended pesticides can be used.

### *Bacterial infections*

A bacterial infection is any type of infection that is caused by bacteria.

Symptoms: These may show up as leaf spots, rots, wilts or blights.

Control: Healthy cultivation is advocated for control of bacterial disease, and the use of copper compounds as protective sprays may be effective. Several antibiotics are also being used widely as protective sprays.

### *Soil deficiencies*

Symptoms: Discolouration of the leaves caused by a lack of chlorophyll (chlorosis) or plants becoming shrivelled and plants not flowering are sometimes the result of insufficient nourishment or lack of trace elements in the soil.

Control: It may be advisable to have the soil tested by an expert.

## **Harvesting**

### *Harvest maturity*

The crop is ready for harvesting after 18 months of cultivation. Harvesting is done in winter, thereby ensuring that the plant is reserved for the next season.

### *Harvesting methods*

The common method of harvesting is manual, that is leaf cutting. Only 10 to 15 of the lower leaves of an adult plant are harvested once a year, there-

fore enabling the plant to continue to grow. The leaves are cut with a sickle as close to the stem as possible.

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## POST-HARVEST HANDLING

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### Processing

#### *Primary processing*



Take approximately 20 to 30 leaves from a mature aloe plant and place these in a circle around a plastic-lined hollow in the ground, with the cut end towards the centre of the circle. This allows the dark brown, bitter sap to drain out of the leaf, where it is later collected and processed into “aloe lump” or “aloe crystal”. This sap occurs in tiny capillaries which are situated between the outer green skin of the leaf and the white, inner flesh.

The key feature of the aloe “crystal” is one of the components called “aloin” which has extremely strong laxative properties. This harvesting method has the advantage that harvesting can be done in the wild without doing any damage to the plants.

#### Secondary processing

The exudate is boiled in drums on open fires to remove the water, after which it solidifies to form a dark-brown solid, or aloe lump. Today it still forms part of local tradition.

The rest of the leaf is then taken back to the factory and processed into juice and gel.

The fleshy part of the leaf (white inner part) is tasteless and is used to produce gel and gel powder.

#### Storage

Some parts of the plants can only be used fresh and many can be dried and stored. Plant material may be dried in the sun or shade or may be cut

into slices and left to dry. Once dry, the plant material may be stored as it is, or may be reduced to powder. Dry plant material is stored in paper bags, glass jars or tin cans to ensure that the active ingredients remain stable and do not decay and contaminate the medicine.

### Packing

The inner flesh is packed into drums and sent to Totally Wild in Cape Town, where it is processed into aloe products.

### Marketing

The extracts are sold to traditional healers, cosmetics companies, processing factories and phytomedicine companies. Exports are destined for Europe, Asia and North America, with the main importing countries being the US, Japan and Germany, where it is refined and used in many laxative products, produced in these countries as well as in South Africa. Local demand has been kept low by the lack of secondary and tertiary processing facilities and most of the product is imported into this country.

## 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

*Aloe ferox* is used in beverages and for medicinal purposes. It is processed into juice and gel to be used in cosmetics.



### Medicinal uses

*Aloe ferox* is a major ingredient of various traditional medicines and is sold in its original form or as a powder. The leaves boiled in water are taken for arthritis, eczema, toothache, sinusitis, conjunctivitis, hypertension, stress and stomach-ache. Aloe bitters are widely used as a laxative and are taken in many ways. The leaf sap is applied to relieve skin irritations, burns and bruises. It is known for its anti-inflammatory and antiseptic qualities.

### Cosmetic and tonic use

There has been a growing interest in aloe products. In addition to tonic drinks, numerous hair and skin care products are manufactured, including ointments, soaps, shampoos, skin moisturising creams, sun-tan lotions and wound-healing preparations. The latter has application in the cosmetics industry as a natural skin-lightener. It inhibits the formation of melanin in the skin.

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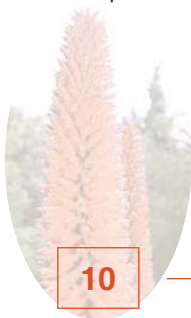
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