

age is caused to young plants, which may die off or have the growth points severely damaged. Significant damage may also be caused to older plants. The bugs, especially in the early stages of development, gather in masses and suck the sap from plants. Feeding by the bugs causes small puncture marks visible as white patches starting on the edges of leaves. Eventually the leaves wilt and become dry. Heavily attacked plants may have a scorched appearance. Cleome is host to the mildew fungus (powdery mildews *Sphaerotheca fuliginea*, *Oidiopsis taurica* and *Cercospora uramensis*).

Control pests and diseases by regular monitoring of the crop. It is important to detect Bagrada bug before they cause damage to the crop. Crop hygiene is vital, in particular removal of old crops and destruction of weeds. Handpicking and destruction of the bugs help to reduce damage. This is particularly important in the early stages of the crop. Growing strong smelling plants such as a garlic, onion or parsley near the crops is reported to reduce infestations. Encourage natural enemies: Eggs of Bagrada bugs are parasitised by tiny wasps.

A mixture of chilli, soap, garlic and paraffin has been shown to be an effective control method in trials in Namibia or spraying plants with a soapy solution (bar soap) has been found effective against Bagrada bugs. It helps to wash off young bugs.

Harvesting

Individual leaves and growth tips can be harvested or the entire plant can be cut back. Seeds can be harvested when pods are fully ripe and yellow but before they open naturally to prevent shattering.

Uses

Cleome is predominantly used as a leafy vegetable. The tender leaves or young shoots, and often the flowers are boiled in stew or as a side dish.

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Cleome

Scientific name: *Cleome gynandra*
Common names: Cat's whiskers, Cleome, African cabbage, Oorpeultjie, Lerotho, Murudi, Rirudzu, Bangala, Ulude, Spider plant



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Origin and distribution

Cleome is reported to have originated in tropical Africa or South-east Asia. It was distributed to other tropical and sub-tropical countries in the Northern and Southern hemisphere.

Production areas in South Africa

Cleome is found growing naturally in the Limpopo, North West, Gauteng, Mpumalanga, KwaZulu-Natal, Free State and Northern Cape provinces.

Description

It is an erect, annual herb which can grow 0,6 m to 0,9 m high.

Roots

Cleome has a long taproot, which has few secondary roots with root hairs.

Stem

The stem is glandular and rarely hairless, with longitudinal parallel lines. Pigmentation varies from green to pink or violet to purple. It has many branches, sometimes becoming woody with age.

Leaves

Cleome has compound and lobed leaves with 3 to 5 leaflets.

Flower

The flower is showy, white or purple in a long terminal flower cluster with the separate flowers attached by short, equal stalks at equal distances along a central stem, up to 30 cm.

Seeds

The seeds are brown, circular in outline measuring 1,5 mm in diameter, with an obscurely netted surface.

Climatic and soil requirements

Temperature

Cleome requires temperatures of 18 °C to 25 °C. Because of its tropical origin, cleome is believed to be day-length insensi-

tive. However, some cleome species are facultative long-day species (not restricted to a particular function). The plant does not grow well in shade.

Rainfall

Cleome can grow in areas with short periods of useful rainfall and the plants can tolerate some degree of drought. However, this may speed up maturity and senescence (ageing) of the plant. Water stress reduces leaf yield and quality. The plants cannot withstand flooding.

Soil

Cleome is adapted to many soil types and a pH range of 5,5 to 7,0. The soil types range from sandy loam to clay loams.

Cultural practices

Propagation

Cleome is cultivated from seed.

Planting

Plant seeds in a seedbed or sow directly in rows in the field. Mix seed 1:10 with sand or dry soil before planting. Desired spacing is 25 to 50 cm between rows and 15 cm between plants.

Fertilisation

When using chemical fertiliser, purchase 3:2:3 or 3:2:1 NPK mixture. Using a hoe, open up a furrow and apply the fertiliser mixture in the bottom of the furrow at the rate of 40 g/m. A normal-size teacup takes about 200 g chemical fertiliser and would cover 5 m. After spreading the fertiliser evenly in the furrow, use a stick to mix the fertiliser with soil. Water the furrow and then make the holes for the transplants. For really good growth, add limestone ammonium nitrate (LAN) at the rate of 20 g/m when the plants have about 5 to 6 leaves. One teacupful of LAN should be spread along a row of 10 m. When applying LAN to the growing crop, open up a furrow with a hoe about 10 to 15 cm away from the row of plants, mix the fertiliser with the soil a stick, water the furrow and then close it.

When applying poultry or pig manure, use a 10-ℓ bucket in a band of about 20 cm wide over a length of 15 m, work the manure into the top soil, water the band thoroughly and wait

one or two weeks before transplanting. When you use kraal manure, follow the same procedure but use a 10-ℓ bucket over a length of 5 m.

Irrigation

Water requirements vary with the crop's growth stage, soil type and weather condition (hot or cold). Frequent irrigation will be required for sandy soils as these drain quickly. Clay soils, on the other hand, drain quite slowly and hold more water than sandy soils. There are few 'rules of thumb' to use as a starting point for irrigation frequency and volume. First, sandy soil should be irrigated three times a week. Second, sandy loam should be irrigated twice a week. Third, clay, clay loam and loam soils should be irrigated once a week. Cleome favours water throughout its growing period and one can apply 6 ℓ of water a day for a plot size of 1 m x 1 m. Irrigation can be applied using a drip and sprinkler irrigation system. Sprinkler and drip irrigation can be used to irrigate cleome; however, water savings with drip are substantial and roughly half as much water can do the same or better job than a sprinkler system. Excess water application leaches nutrients away from the roots of the plants, therefore careful planning of irrigation volume and frequency is required to prevent crop stress to help produce large, healthy green cleome.

Weed control

Weeds can be hand-picked or shallow cultivation can be done. However, care should be taken to avoid root damage.

Pest and disease control

The most important pests are beetles and hurricane bugs (also known as Bagrada or painted bugs) (*Bagrada hilaris*). The hurricane bug can render establishment virtually impossible. Other pests are: pentatomids (*Acrosternum gramineum* and *Agonoselis nubilis*) and their parasitoids; locusts (*Schistocera gregaria*); nematodes (*Meloidogyne* spp.); flea beetles (*Phyllotreta mashonana* Jacq.); green vegetable bugs (*Nezara* spp.); cabbage sawfly (*Athalia* spp.); cotton jassids (*Empoasca* spp.) and aphids that cause leaf damage.

Bagrada bugs (*Bagrada hilaris*) damage plants by feeding on young leaves. Both adults and nymphs suck sap from leaves, which may wilt and later dry out. Considerable dam-