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GENERAL

Classification

Scientific name: *Cleome gynandra*
Family: Cleomaceae
Common name: Cleome (English), Oorpeultjie (Afrikaans), Lude (Ndebele), Lerotho (Pedi), Murudi (Tshivenda), Amazonde (Zulu)

Origin and distribution

Cleome gynandra is reported to have originated in tropical Africa and South East Asia. It is probably a native of Africa and now widely distributed throughout the world in tropical and subtropical regions. Cleome is a common, widespread herb occurring in southern Africa from the Limpopo to Namibia. Being semi cultivated, as for instance in the Kentani District of the Eastern Cape, has probably extended its distribution.

Production levels

South Africa

Cleome is not formally cultivated in South Africa, but rather found commonly growing naturally under disturbed soils, especially in the homestead backyard. Women have occasionally raised it as a natural weedy population by broadcasting seed or by practising selective weeding. Production levels are not known yet.

Internationally

Other countries that are producing/consuming the crop are Kenya, Uganda, Botswana, Zambia, Zimbabwe, Malawi, Cameroon, Namibia, Swaziland, Tanzania and Ghana. Production figures are not known as the crop is not formally cultivated as a commercial crop yet.

Major production areas

Major production areas in South Africa are the KwaZulu-Natal, Free State, Northern Cape, Limpopo and North West provinces.

Cultivars

No cultivars have been developed in South Africa as yet.



Description

Mature plant

Cleome belongs to the Capparaceae family and it is an herbaceous, erect, and annual plant that grows to a height of between 0,5 m and 1,5 m, depending on the environment. It is a branched plant, sometimes becoming woody with age.

Roots: It has a long taproot which has few secondary roots with root hairs.

Stem: The stem is sticky with glandular hairs and is marked with longitudinal parallel lines. Pigmentation on the stems varies from green to pink and purple.

Leaves: Leaves are palmately compound with three to five leaflets, petiolate. The leaf stalk is 20 mm to 50 mm long with glandular hairs. The leaves vary from obovate to elliptic in shape and are 2 cm to 10 cm long and 2 cm to 4 cm wide. They are sparsely hairy and the leaf margin is toothed or round.



Flower and seeds: The inflorescence is a terminal raceme, many-flowered, and elongating in fruit; the bract is trifoliate, resembling the leaves but smaller and sessile. The flower stalk is 10 to 20 mm long with glandular hairs. Petals are white, sometimes fading to rose pink, 10 to 20 mm rounded at the apex, abruptly narrowed to a basal claw. The capsule is linear, sub-erect to spreading, 3 cm to 15 cm long and 2,5 mm to 5 mm wide; the persistent style is 2 mm long and the valve is thin-textured, glandular with hairs. The seeds are brown, circular in outline, measuring 1,5 mm in diameter, with an obscurely netted surface.

Essential parts

The essential parts are the leaves and the growth tips.

Climatic requirements

Temperature

Cleome requires temperatures of 18 °C to 25 °C and high light intensity as it is sensitive to cold. Because of its tropical origin, cleome is believed to be day-length insensitive, but some cleome species are facultative long-day species. It grows well up to about 1 000 m above sea level in semiarid, sub-humid and humid climates. The plant performs poorly when shaded and is unable to compete with weeds.

Water

Cleome grows best when adequately supplied with water. It does tolerate a degree of water stress, but prolonged water stress hastens flowering and senescence. Therefore cleome can grow in areas with short periods of useful rainfall. Water stress reduces leaf yield and quality. The plants cannot withstand flooding.

Soil requirements

Cleome prefers well-drained medium-textured soils and does not grow well in poorly drained or heavy clay soils. The soil must have a pH range of 5,5 to 7,0. The soil types range from sandy loam to clay loams.

CULTIVATION PRACTICES

Propagation

Cleome types are cultivated from seed.

Soil preparation

Though adapted to many soil types, the soil has to be prepared to a deeper depth and harrowed to a fine tilth and it must be well drained. Level the seedbed before planting.

Field layout and design

Seeds are densely sown directly at 30 cm inter-row spacing and later thinned out to 10 cm to 15 cm between plants.

Planting

Seeds are planted at a shallow depth to ensure emergence and a good field stand.

Fertilisation

Application of fertilisers containing considerable quantities of nitrogen delays flowering and increases the number and size of leaves. Seed yield was reported to be unresponsive to nitrogen application because at higher rates, stems become too succulent and regeneration is reduced, a disadvantage where plants are periodically harvested. Soil fertility may affect the nutritional composition of the raw leaves. Application of farmyard manure,



compost or inorganic fertilisers is necessary. Diammonium phosphate is reported to give better results than double or triple superphosphate as the nitrogen gives the plant a good early start.

Irrigation

In rural areas it is known as a self-seeding herb of cultivated land and other disturbed areas, requiring little attention so that it is rarely irrigated. However, during inadequate rainfall, frequent irrigation is necessary, especially during the vegetative growth period. Frequency of irrigation would be determined by the water-holding capacity of the soil.

Weed control

Cleome does not have dense foliage and therefore it cannot smother the weeds, which renders it vulnerable to weed competition. The critical stage for weed control is during the first six weeks of development. Weeds can be hand-picked or shallow cultivation can be done, but care should be taken to avoid root damage.

Pest control

At planting, close inspection should be carried out to spot slugs and snails that can devour entire seedlings. Other pests that attack cleome are: pentatomids (*Acrosternum gramineum* and *Agonoselis nubilis*) and their parasitoids, locusts (*Schistocera gregaria*), nematodes (*Meloidogyne* spp.) flea beetles (*Podagrica* spp.), green vegetable bugs (*Nezara* spp.), cabbage sawfly (*Athalia* spp.), cotton jassids (*Empoasca* spp.) and hurricane bugs (*Bagrada* spp.). Applications of insecticide can be used to control the pests.

Disease control

The plant is also host to mildew fungus (*Sphaerotheca fuliginea*, *Oidiopsis taurica* and *Cercospora uramensis*).

Other cultivation practices

Deflowering is reported to decrease plant height significantly and increase the number of branches per plant and leaf yield. Deflowering also significantly increases leaf ascorbic acid content, but has virtually no effect on leaf beta-carotene and total phenolic content.

Harvesting

Harvest maturity

Cleome is harvested in summer during the first rains and can be harvested until autumn. Leaf harvesting starts four to six weeks after seedling emergence and it may last four to five weeks. Leaves can also be picked when the plants have reached a height of about 15 cm. Fruit development and maturation take three to four months.

Harvesting methods

Do this by uprooting the entire plant, or by topping, cutting back to ground level, or picking individual leaves or leafy branches at frequent intervals.



Frequent picking and deflowering encourages lateral growth, thereby extending the harvesting period. Biweekly removal of tender leaves allows regeneration of branches. After several successive leaf harvestings from a plant, it should be left to flower and produce capsules.

POST-HARVEST HANDLING

Preparation methods

Leaves are boiled with a little water for an hour to an hour and a half. Food items added during preparation are mostly tomatoes and salt and sometimes onions, oil and minestrone soup. The leaves are eaten with maize meal or sorghum porridge or peanut butter.

The leaves and flower buds are washed, boiled in water with a little salt and cooked well to remove the bitter flavour. Because the leaves are bitter, they can be cooked with other leafy vegetables such as cowpea, amaranth and black nightshade. In some instances, milk is added to the boiled leaves and the mixture is left overnight to reduce bitterness. Sometimes the leaves are boiled briefly, the water is discarded and the leaves are then combined with other ingredients in a stew. It is believed in some areas that when this plant is eaten for the first time, charcoal must be eaten first to prevent constipation or stomach upsets.



Preservation

The fresh leaves may be dried in the sun after they have been washed or sun-dried after cooking for consumption in winter. New preservation technology, including the blanching and freezing of leaves, has been introduced.

Packing and storage

Sun-dried leaves can be packed in fibre bags or picked plastic bags and stored in a well-ventilated place.

Transport

No specialised transport is required.

Marketing

Cleome is currently sold in the local markets and at taxi terminuses.

PRODUCTION SCHEDULES

Activities	January	February	March	April	May	June	July	August	September	October	November	December
Planting												
Harvesting												

UTILISATION

Cleome is predominantly used as a leafy vegetable. Throughout Africa, the tender leaves or young shoots, and often the flowers as well, are boiled as a pot herb, tasty relish, stew or side dish. In India, it is eaten as a pot herb and used as a flavourant in sauces, and in Thailand it is consumed fermented in a product called “pak-sian-dong”.

Recommended as vitamin and mineral supplement

The vegetable is a rich source of nutrients, especially vitamins (A and C) and minerals (calcium and iron). It also contains some protein, and apart from the normal recommended adult daily allowance of vitamins A, C, the leaves also contain minerals (calcium and iron). They are rich in magnesium, iron and nicotin acid.

Medicinal purposes

In many cultures the boiled leaves of cleome are also regarded as a medicinal meal. Also, sap from the leaves is used as an analgesic, particularly for headaches and earaches, and the leaves also have anti-inflammatory properties. A decoction or infusion of boiled leaves and/or roots is administered to facilitate childbirth and treat stomachache, constipation and conjunctivitis or thread-worm infection. The seeds and roots also have these anthelmintic properties.

Insecticidal characteristics

Cleome has insecticidal, antifeedant and repellent characteristics. The plant has an antifeedant action against the tobacco caterpillar and the extract from the mature seeds is toxic to brinjal aphid and *Heliothis larvae* (*Heliothis armigera*).

The leaves have anti-tick properties, an ethanol extract is toxic to insect pests of cruciferous vegetables and the volatile oils repel diamond back moth larvae from cabbage leaves.

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