

***Caralluma adscendens* var. *fimbriata* (Wall.) Gravely & Mayur.: A Promising Medicinal Crop for Dry land Farming**

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Abstract

Caralluma adscendens var. *fimbriata* traditionally used by tribal and rural communities as a famine food and appetite suppressant. It has recently attracted scientific and commercial interest for its unique phytochemistry and a range of bioactivities anti-obesity, antioxidant and antidiabetic. This succulent cactus contains glycosides, tannins, flavonoids, phenols, hydrocarbons and saponins as major phytoconstituents and is reported for various biological activities such as rheumatism, diabetes, leprosy, antinociceptive, antipyretic, antihelmintic and antiobesity activities. This article aims to provide a comprehensive review on *Caralluma adscendens* var. *fimbriata* is particularly well suited to dryland and rainfed farming systems because of its succulent habit and low water demand. *C. adscendens* var. *fimbriata* is an edible, drought-resistant succulent primarily recognized as a traditional "famine food" and medicinal plant in the arid and semi-arid regions of India.

Keywords: Antidiabetic, Succulent, Phytoconstituents, Dryland, famine food

Introduction

Caralluma adscendens var. *fimbriata* (Family: Apocynaceae) is a perennial, succulent medicinal plant native to the semi-arid regions of peninsular India. It is an edible plant used by tribes in India to suppress hunger and enhance endurance [3]. Traditionally valued by tribal and rural communities as a famine food, it has long been consumed to suppress hunger and thirst during extended periods of

food scarcity and long journeys in arid & dry regions. India officially recognizes over 3000 plants for their medicinal value. It is generally estimated that over 6000 plants in India are in use in traditional, folk and herbal medicine [1]. The plant *C. adscendens* var. *fimbriata* has been used in different system of traditional medication for the treatment of disease and ailments of human being [2]. In recent decades, *C. adscendens* var. *fimbriata* has gained considerable scientific and commercial attention for its distinctive phytochemical profile, particularly the presence of pregnane glycosides. The species is an important for the nutraceutical and pharmacological industries because these constituents are reported a variety of pharmacological properties, such as anti-obesity, antioxidant, antidiabetic, antihyperlipidemic, anti-inflammatory activities, antidiabetic, anticancer, antireumatic, antimicrobial, antimalarial, antihypertension and skin infection [5]. It is frequently documented in botanical and ethnomedicinal literature as a "hunger quencher" and "thirst quencher" used by tribal populations during long, dry journeys. Wealth of India, the Indian Health Ministry's comprehensive compilation on medicinal plants, lists *C. adscendens* var. *fimbriata* is a vegetable, used in curries, pickles or eaten raw [1]. Nature has provided a complete storehouse of remedies to cure all ailments of mankind. This is where nature provides us drugs in the form of herbs to cure the incurable diseases without any toxic effect [3]. Due to its ability to thrive in marginal soils and drought-prone areas positions it as a promising crop for climate-resilient agriculture. Cultivation of *C. adscendens* var. *fimbriata* reduces pressure on wild populations [6]. The 260 species that comprise the genus *C. adscendens* var. *fimbriata* have all been widely used to treat a variety of illnesses [4]. It is used to treat rheumatism, diabetes, leprosy, tumours, fungal infections, snake bites, scorpion bites and antinociceptive activity. This chapter explores the botanical characteristics, photochemistry, traditional uses, pharmacological potential, cultivation prospects and importance of the plant as a medicinal crop for dryland farming, along with its increasing role in the modern herbal and nutraceutical industries.

Taxonomic Classification

Kingdom	: Plantae
Clade	: Angiosperms, Eudicots, Asterids
Order	: Gentianales
Family	: Apocynaceae
Genus	: <i>Caralluma</i>
Species	: <i>adscendens</i>
Variety	: <i>fimbriata</i> (Wall.) Gravely & Mayur.
Botanical name	: <i>Caralluma adscendens</i> var. <i>fimbriata</i> (Wall.) Gravely & Mayur.

Derivation of specific name : Latin 'fimbria', thread, fringe; and Latin '-fer, -fera, -ferum', -carrying; for the hairs on the corolla lobes.

Marathi : माकड (Makad Shing)

Sanskrit : Yugmaphallottama

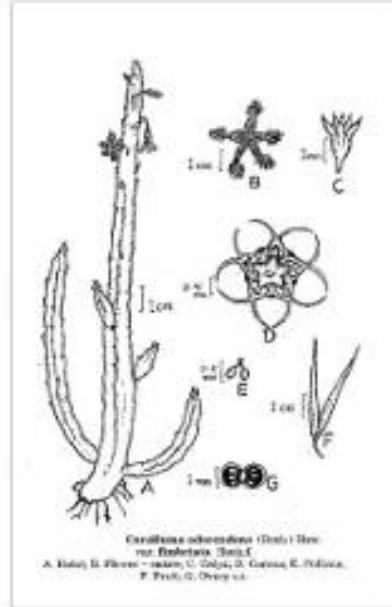


Fig. *Caralluma adscendens* var. *fimbriata* (Wall.) Gravely & Mayur

Botanical Description

- **Origin and Habitat:** *C. adscendens* var. *fimbriata* is found in peninsular India (Dekkan Peninsula, from the Konkan southwards)
- **Habitat and Ecology:** Arid rocky places.
- **Habit:** It is an erect shrubby perennial herb, up to 45cm tall, usually dichotomously branched, with xerophytic features and a cactus-like appearance. The stems are fleshy, almost leafless and green, often with brownish streaks.
- **Stems:** Stemlets leafless, creeping at first, then upright, tapering towards the apex and only green, often striped brownish, four-angled, with edges rounded slightly sinuate-dentate. Tubercles blunt, protruding, horizontally spreading. Sap watery.
- **Leaves:** Rudimentary, minute tooth-like, present only on young branches, soon falling off, leaving a tooth-like projection on the angles.
- **Inflorescences:** Borne at the end of branches, 1 to 3-flowered in the leaf-axils, loosely scattered.
- **Flowers:** About 20 mm across, drooping on short stalks bent downwards. Solitary calyx stellate glabrous, teeth lanceolate Corolla rotate, tube short lobes narrow, dark Purple, ciliate along margins frilly with hairs. Pollinia ovoid.
- **Blooming season (in habitat):** June to October
- **Fruits (follicles):** Paired, slender, 6-10cm long, cylindric with one of the pairs often suppressed, round in cross section, green with purple streaks, tapering towards apex.
- **Seeds:** Comose oblong brown, 2 cm long.

Chemical Constituents

- **Phytochemistry:** Bioactive Secondary Metabolites- Pregnane glycoside, quercetin, saponin, flavonoids, alkaloids, anthocyanins, coumarins, diterpenes, phytosterols, quinones, trigonelline. terpenoids, anthraquin,
- **Pharmacology and Therapeutic Potential** pregnane steroids, Appetite suppression, antiobesity activity, anti-inflammatory activity, analgesic activity, anxiolytic activity, antiatherogenic activity, antibacterial activity, and antifungal activity effects have been described but need stronger clinical validation [2]. Flavone glycosides, saponins, triterpenoids, phenolics and megastigmane glycosides are implicated in antioxidant, anti-inflammatory and antimicrobial actions.

Medical Uses: Anti-inflammatory, antipyretic, antinociceptive, antifungal, antidote and anthelmintic used in the treatment of rheumatism, diabetes, leprosy,

tumours, fungal diseases, snake and scorpion bites. Young stem ground with onion and tamarind and made into a paste used to cure digestive problems [5].

Traditional Applications: Indians has been consumed it for thousands of years fresh, seasoned or preserved in chutneys and pickles. It is also used for its ability to boost endurance and lessen hunger and appetite. Since tribe members typically only bring enough food for one day of hunting, it is used as a portable food. Indians are known to eat pieces of *C. adscendens* var. *fimbriata* to control their hunger when on a hunt. They sustain their livelihoods through activities such as hunting, collecting wood and plants and foraging; as a result, their basic needs for food and water are met. Caralluma is frequently referred to as a "famine food" in India [4]. In arid and semiarid regions, when no food is available then this is consumed as a substitute for food. Traditional medicine also employs *C. adscendens* var. *fimbriata* to treat several ailments including diabetes, pain, fever and inflammation [3]. The plant species is typically consumed to cure obesity, while ethnic populations in middle India utilize *C. adscendens* var. *fimbriata* as an appetite suppressor [4].

Cultivation and Propagation: *C. adscendens* var. *fimbriata* is a relatively quick growing species and not as difficult to cultivate as was originally thought. It can withstand drought for quite a period, which is the only time when it loses its leaves. Keep dry in winter. Water a little more than other succulents in summer.

- **Agronomy:** *C. adscendens* var. *fimbriata* fits dryland farming.
- **Drought Resilience:** As a xerophyte, *C. fimbriata* is perfect for arid and semi-arid areas since it can withstand poor, rocky soils and needs very less water than normal horticultural or field crops. Production expenses are lowered by low input needs (minimum irrigation, mild fertilization). Reduced annual planting work and possible multi-year harvests from established stands are two benefits of perennial growth habits. It is especially appealing to marginal farmers and as an intercrop in rainfed systems because of these characteristics.
- **Cultivation Practices (Practical Guide):** The first recorded cultivation of *C. adscendens* var. *fimbriata* was in Britain in 1830 [6].
- **Site Selection & Soil:** Choose well-drained, light to medium textured soils (sandy loam to shallow rocky soils). Avoid waterlogged or heavy clay sites.
- **Propagation:** Commonly propagated by stem cuttings (vegetative propagation) or by seed (seed germination can be slow and variable). Cuttings: select healthy 8-12 cm segments; allow callusing for 3-7 days, then plant in well-drained media. Rooting hormone can improve success. Spacing: 60-100 cm between plants for field stands; denser spacing for quicker canopy closure and weed suppression.

- **Planting Time:** In semi-arid India, planting at the onset of the monsoon gives advantages for initial establishment; in irrigated pockets, planting can be staggered.
- **Water and Irrigation:** Minimal irrigation after establishment. Water only during prolonged dry spells in the first year. Overwatering causes stem rot.
- **Nutrition:** Light top dress application of balanced NPK in early growth improves early vigor; excessive fertilizer is unnecessary and can reduce secondary metabolite accumulation.
- **Weed, Pest and Disease Management:** Generally low pest pressure. Monitor for common succulent pests (mealybugs, scale). Avoid overwatering to reduce fungal disease risk.
- **Harvest:** Harvest stems when plants reach commercial size; many growers harvest annually or biennially depending on yield and market needs. Traditional practice often targets dry months when photochemical concentration (pregnane glycosides) may be higher.
- **Post-harvest, processing and quality considerations- Drying:** Shade-drying or low-temperature drying preserves phytochemicals better than high heat. Intercropping: Plant *C. fimbriata* along field borders, rockier terraces, bunds or as an understory in agroforestry plots-using space that is otherwise marginal.

Economic Importance

Traditional medicine also employs *C. adscendens* var. *fimbriata* to treat several ailments, including diabetes, pain, fever and inflammation. The plant species is typically consumed to cure obesity, while ethnic populations in middle India utilize *C. adscendens* var. *fimbriata* as an appetite suppressor [7].

C. adscendens var. *fimbriata* is an economically valuable succulent medicinal plant of arid and semi-arid regions of India. Traditionally used as a famine food, its fleshy stems are consumed raw, cooked as a vegetable, or processed into chutneys and pickles [10]. The stems are an essential survival meal in drought-prone locations because tribal societies chew them to quell hunger and thirst during extended hunting or foraging excursions [1]. Pregnane glycosides are primarily responsible for the plant's appetite-suppressive and weight-management qualities, which have made it commercially significant. As a result, there is a growing demand for it both domestically and abroad in the functional food, herbal supplement and nutraceutical fields medicinally [9]. In traditional systems, *C. adscendens* var. *fimbriata* is used to treat rheumatism, inflammation, fever, pain, diabetes, digestive issues, fungal infections and even stings from snakes or scorpions. Its broad range of medicinal uses adds to its market potential in herbal medication compositions [10]. Agriculturally, it can be used for dryland farming due to its drought resistance, low water requirements and capacity to grow on

marginal soils, providing smallholder farmers with revenue potential. This species cultivation ensures a sustained supply of raw materials for medicine while reducing species on wild populations [10]. Overall, *C. adscendens* var. *fimbriata* is economically significant as a growing commercial crop in climate-resilient agriculture, a nutritional plant and a medicinal resource.

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