



Cleome monophylla L. (Spindle pod)- An Overview

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Abstract

Cleome monophylla is an important medicinal plant effectively used by the Solagar tribes of Errati hills. The Macroscopical or morphological description of the plant is an important aspect and the basic step in medico botany. The plant has been associated with the prevention of many disease like head ache, ulcers, boils, antimicrobial activity, bile enlargement, anti HIV – showed repellent activity, and specifically used by the studied tribe to cure menstrual disorders, ovarian cyst (PCOS), rhinorrhoea, earache, boils, indigestion, ulcers and body heat. The ethnobotanical data obtained from the tribes through survey and questionnaires and the macroscopic character of the whole plant were studied to fix some of the pharmacognostical parameters for further studies.

Keywords: *Cleome*, macroscopic study, antimicrobial, anti HIV, PCOS, rhinorrhoea, pharmacognostical parameters

Introduction

Plants, the precious gift of nature, have been essential to human from the beginning of existence. Nature is always a magnificent witness to notable instances of harmony. Medicinal plants are often defined as having therapeutic qualities or positive pharmacological effects on human body. The massive expansion in the usage of herbal products has been one of the important advancement in recent three decades. Phytomedicine can be characterised as plant parts or extracts utilised as medicine for treatment of disease. The majority of products worldwide are herbal, often referred to as complementary and alternative medicine. These products range from “healthy foods” through “nutraceuticals” to “herbal medical” treatments, which are mostly used for curing or preventing disease. Each medicinal plant, as well as the specific parts of the plant that are used to make crude drugs, contains active or significant chemical elements with a characteristic profile find wide usage in the pharma industries.

In recent days, there is a demand for herbal medicine, and usage of plants is growing. Over 50,000 different plant species, or more than one-tenth of all plant species, are employed in medicinal and cosmetic products. It is possible to date the usage of therapeutic plant products to the dawn of civilization. The “Rigveda”, which is regarded as the “oldest reservoir of human knowledge” and is thought to have been composed between 4500 and 1600 B.C., contains the first descriptions of medicinal plants in India. (Deviprasad and Komalkumar, 2013) [5].

The socio cultural, spiritual, and medical aspects of rural and tribal life in India have long placed a high value on medicinal plants. A total of 8000 species of medicinal plants make up this group, which comprises about 50% of all higher flowering plant species in India. India is the fourth Asian nation and ranks tenth among nations with high floral diversity. Additionally, India is one of the world's 12 mega centres for biodiversity. More than 80% of people around the world depend on conventional medicine for their basic medical needs, according to the World Health Organization (WHO). The use of herbal medicines in Asia reflects a long history of environmental interactions among people and

their surroundings. In regions where the usage of plants is still highly valued, identification of a variety of compounds supports traditional medicine (Diallo *et al.*, 1999) [6].

The genus *Cleome*

The *Cleome* genus contains 180 to 200 species of herbaceous annual or perennial plants and shrubs, which are widely prevalent in tropical and subtropical countries. They are commonly known as spider plants, spider flowers or spider weeds. Only 150 species of *Cleome* have been reported in tropical climates, which are habitat to the majority of the species. (Raghavan, 1993) [21]. There are fifteen species of the genus known in India (Londhe, 2000) [13], 6 are reported in Tamil Nadu. *Cleome* and other related genera (*Gynandropsis*) were previously placed under the family Capparidaceae by earlier floristic researchers like Hooker and Thomson (1872) [9] and Cooke (1903) [3], but recently all these genera have been taxonomically split and placed into a separate family called Cleomaceae. Previously, several practitioners had dealt with this genus in the family Capparaceae. The majority of the Cleomaceae members are more similar to Brassicaceae than Capparaceae (Stevens, 2001) [23].

Cleome monophylla (Spindle Pod)

Cleome monophylla is a common weed in cultivated land at higher elevation, it is an only single leaved species in *Cleome* (compound leaf) genus (Plate-1 A).

Macroscopical Studies

It is an annual herb, aerial, erect, branched and has an unpleasant smell with acrid taste. It has a tap root system (Plate- 1B), the stem is cylindrical, ribbed, herbaceous with glandular hairs and the leaves are simple, alternate spiral, exstipulate, petiolate, linear oblong and entire with pinnately reticulate venation, inflorescence type is terminal racemes (Plate- 1C), flowers are dull purple or pink in colour, ebracteate, ebractiolate, complete, regular, bisexual, actinomorphic, tetramerous, tetracyclic and hypogynous, the flowering period is from July to October. The stamens are six, filaments free, anther ditheous, basifixed, introrse with

longitudinal dehiscence and the ovary superior, bicarbellary, syncarpous, bilocular with many ovules in each locule on parietal placentation, capsule 5 - 7 cm long, linear, two valves, beaked, strongly ribbed, glandular and hairy (Plate - 1 E). Seeds are reniform, dark brown, pubescent and approximately the pod containing 40 seeds ((Plate -1 F). the fruiting season from August to January (Gamble and Fischer, 1915 – 1936 ^[8] and Matthew, 1981, 1982, 1983, 1988 and 1991) ^[15-19]. The morphological characters of the study plant *Cleome monophylla* was noted and depicted in Table- 1.

The systematic position of the study plant based on the natural system (Bentham & Hooker) of classification is as follows:

Division	: Angiosperms
Class	: Dicotyledons
Sub-Class	: Polypetalae
Series	: Thalamiflorae
Cohort	: Parietales
Family	: Cappariaceae
Genus	: <i>Cleome</i>
Species	: <i>monophylla</i> L.

It is commonly known as “Spindle pod” and Tamil vernacular names are “Naai kadugu”, “Kaatu kadugu” and “Elluku sakkalathi” and it is widely distributed in India, Sri Lanka, tropical and subtropical regions of Africa and Nigeria.

Health benefits and other uses of *Cleome monophylla*

It is used to treat different ailments such as the whole plant paste is externally applied for swellings, crushed leaves are applied for head ache, the leaves and seeds alone or its mixture are applied to ulcers, boils, to prevent infections hence showing its antimicrobial activity (Kannan *et al.*, 2016) ^[1]. Its highly effective in the treatment of bile enlargement due to disease or infection (Bandhana and Sudhanshu, 2000) ^[2]. The leaf extract possess anti HIV - 1 reverse transcriptase activity (Hurinathan, 2013) ^[10] and an essential oil extracted from the seeds possess repellent activity (Ndungu *et al.*, 1995) ^[20].

The ethnobotanical uses of *Cleome monophylla* by Solagar tribes in Eratti hill are many. They use the plant decoction to cure menstrual disorders, ovarian cyst (PCOS), rhinorrhoea, earache, boils, indigestion, ulcers and body heat. The crushed leaf along with goat milk is administered to increase the lactation in mothers. The leaf paste is applied externally to cure inflammation. Solagar tribes traditionally believe that tying the root of *C. monophylla* in front of the door may prevent the entry of negative spirits, as well as tying the roots in the arms or in hip will eliminate the negative powers of spirits in humans and keeping the roots under the pillow will induce sleep.

The Malayali tribes used the leaf infusion to treat dementia, neurasthenia, breathing problems and rheumatism.

Siddha uses of *Cleome monophylla*

The Siddhars used *Cleome monophylla* leaves for the preparation of paste along with cumin seeds, pepper, salt and ghee to cure leprosy, all types of skin disorders, gas troubles, to purify the blood, to remove the intestinal worms and urinary infections. Inhaling the smoke of seeds along with ajwain seeds helps cure breathing disorders, cough, headache, paranoia (siddhapramai) and nervous disorders.

Agathiar documented the medicinal uses of *Cleome monophylla* in his Gunapadam. He reported that this plant is used to cure various diseases like stomach disorders, ear pain, running nose, inflammations, rheumatic pain and skin infections and relieves body pain.

Discussions

Macroscopical or morphological description of the plant is an important aspect and the basic step in medico botany. From early times, emphasis has been placed on the geometrical appearance of plant organs and many genera and species of plants have subsequently been named according to their morphological characteristics (Cervantes and Diego, 2010) ^[4].

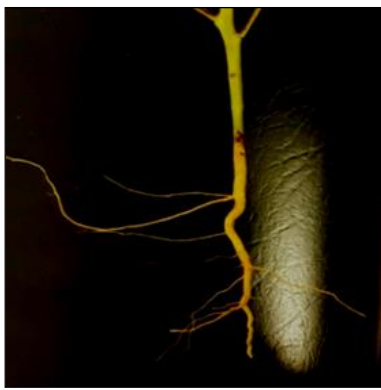
Cleome monophylla is an annual herb, aerial, erect, branched 50 cm high. It has a tap root system and the stem is cylindrical, ribbed and herbaceous with glandular hairs. The leaves are simple, alternate spiral, petiolate, linear oblong and entire with pinnately reticulate venation. Inflorescence is terminal racemes, flowers are dull purple or pink, complete, regular, bisexual, actinomorphic, tetramerous and hypogynous. The stamens are six, anther ditheous, basifixed, introrse with longitudinal dehiscence and the ovary superior, bicarbellary, syncarpous, bilocular with many ovules in each locule on parietal placentation and seeds are reniform (Abirami and Vijayashalini, 2018) ^[1]. Similar results and some species deviation were reported by Masuka *et al.* (2012) ^[14] in *Cleome gynandra*; Edeoga *et al.* (2009) ^[7] and Kasem, (2016) ^[12] in some *Cleome* species and Singh *et al.* (2017), Saroop and Kaul (2015) ^[22] in *Cleome viscosa*. Macroscopical analysis plays a key role in the identification of plants.

Table 1: Morphological characters of *Cleome monophylla* L.

S. No.	Characters noted	Observation
	Habitat	Common weed in cultivated land and in hills at 900 m to 1200m elevation
	Habit	Annual herb, aerial, erect, branched 50 cm high. It has an unpleasant smell and acrid taste.
	Root	Tap root
	Stem	Aerial, erect, branched, cylindrical, ribbed and herbaceous with glandular hairs
	Leaf	Simple, alternate spiral, exstipulate, petiolate, linear oblong, entire with pinnately reticulate venation
	Inflorescence	Terminal racemes
	Flower	Dull purple or pink in colour, ebracteate, ebracteolate, complete, regular, bisexual, actinomorphic, tetramerous, tetracyclic and hypogynous. Flowering from July to October
	Androecium	Stamens six, filaments free, anthers ditheous, basifixed, introrse with longitudinal dehiscence
	Gynoecium	Ovary superior, bicarbellary, syncarpous, bilocular with many ovules in each locule on parietal placentation
	Fruit	Siliqua 5- 7 cm long, linear, valves 2, beaked, strongly ribbed, glandular, hairy
	Seed	Reniform, dark brown, seeds -40, pubescent. Fruiting from August to January



(A) *Cleome monophylla* L.



(B) Root system



(C) Closure view of Inflorescence



(D) Closure view of Flower



(E) A twig with Fruits



(F) Few seeds



(G) Seedlings

Plate 1

Conclusion

Cleome monophylla L. is an annual, aerial, erect herb with tap root system. The stem is cylindrical, herbaceous with glandular hairs and the leaves are simple, alternate spiral. Inflorescence is terminal racemes with dull purple or pink flowers. The local ethnic communities use different plant parts for treating various illnesses such as fever, cold, cough, diarrhoea, skin disorders, inflammations, diabetes, stomach problems, ulcers etc. They formulate the medicine in the form of paste, juice and decoction and use the medicines taken orally or applied peripherally. The local traditional healers have a good knowledge about plants and this information is gathered through questionnaire and

discussions. From the survey, the sporadic medicinal plant *Cleome monophylla* L. belonging to the family Capparidaceae was selected for scientific studies, since the ethnic society of Burgur forest use this plant for various ailments such as menstrual disorders, ovarian cyst (PCOS), rhinorrhoea, earache, boils, ulcers, indigestion, body heat, inflammations, neurasthenia, respiratory disorders and rheumatism.

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