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Delicate, fragrant, lady of the night- A medicinal gift

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Abstract

Night blooming jasmine, botanically known as *Cestrum nocturnum* is an evergreen shrub that grows in tropical and sub-tropical regions throughout the world. *Cestrum nocturnum* is a popular ornamental plant due to its showy and fragrant white flowers. It is also used as a hedge plant and cultivated as a medicinal plant. The medicinal properties of night blooming jasmine include antioxidant, anti-hyperlipidemic, hepatoprotective, analgesic, antibacterial, antifungal, anti-convulsant, anti-HIV and larvicidal activities. The present paper reviews the geographical distribution, history, cultivation, uses, side effects, synonyms, botanical description, taxonomical classification, phytochemical constituents and pharmacological activities.

Keywords: *Cestrum nocturnum*, antibacterial, antioxidant, anti-inflammatory, larvicidal

Introduction

Cestrum nocturnum is a garden shrub from the family Solanaceae, commonly known as "lady of the night" which is used as a remedy for different health disorders. This sprawling shrub has glossy simple leaves, vine like stems, greenish-creamy white tubular flowers and fleshy berries. The berries are marfil white or aubergine in colour. The species name 'nocturnum' refers to the species' habit of opening its small, heavily-scented flowers at night. The flowers release powerful sweet perfume at night. It is made into a rare attar (raat ki rani) which is used in Indian and Middle East perfumery. It is said to be the world's strongest smelling plant. Indeed the scent can reach up to 165 feet away from the location of plant^[1]. The genus name *Cestrum* is thought to be derived from the Greek word 'kestron', for similarity to a plant of that name, or 'kestrum', a tool used for engraving, which the plant's anthers resemble^[2]. Like several other members of the *Cestrum* genus, *C. nocturnum* is of Neotropical origin. While night blooming jasmine is a gorgeous plant with charming blooms, the scent also produces severe allergic reactions in some individuals.

According to WHO, more than 80% of developing country's population depends on plant based medicines for their health care needs. From the time immemorial, this shrub is used as a traditional medicine. In India the Malasar people use its juice for cataracts. It contains secondary metabolites such as saponins, flavonoids, cardiac glycosides, alkaloids, steroids and tannins which have biological activity, kindling scientific interest.



Night blooming jasmine



Flowers



Fruits

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Geographical distribution

It is widely cultivated in tropical and subtropical regions of the world.

World scenario: *C. nocturnum* is cultivated in China, Hong Kong, Iraq, Indonesia, Japan, Singapore, Myanmar, Pakistan, Philippines, Mexico, USA, West Indies and India.

Indian Scenario: It is cultivated in Maharashtra, Karnataka, Tamil Nadu, Haryana, Punjab, Chandigarh, Uttar Pradesh, and Madhya Pradesh.

Impact on ecosystem

Cestrum nocturnum has a negative impact on native ecosystems due to its invasive traits. It reproduces profusely through seeds, which are small and easily transported through soil movement, flooding, and vegetation dumping leading to formation of dense impenetrable thickets that crowd out native flora.

Prevention and Control of uncontrolled growth- Small plants and seedlings can be hand pulled all year round and left on site to rot down; since stems can re-sprout and re-infestation can occur through the seed bank, cleared sites should be replanted to prevent regrowth. Cutting and painting the cut surface with a herbicide solution can be done all year round. Good control results have been reported using triclopyr ester at 20% in crop oil applied to basal bark, with *C. nocturnum* being sensitive to foliar applications of triclopyr [2].

History

It is believed that night blooming jasmine has originated in Central America [2], although some sources report the species to be native to the Antilles West Indies [3]. It was reported for Puerto Rico in 1881 by Bello Espinosa that although night blooming jasmine is common on the island, it does not seem to be native there [4]. Schulz in 1909 reported the same for Caribbean, Haiti and Jamaica. Early specimens of the species in the Smithsonian US National Herbarium include a specimen collected in Puerto Rico in 1885. It now grows in all parts of the world as an ornamental plant.

Cultivation

Climate: *C. nocturnum* thrives in moist or wet forests, dense lowland forests and is commonly cultivated in gardens [5]. It does not tolerate frost and drought. Optimal growth occurs at about 80°F. Though night blooming jasmine blooms in night, it requires at least 6 hours of sunlight and partial shade every day to bloom. However excessive sun exposure causes leaves to wilt.

Soil: It grows best in average to moist soil that is light and sandy with a neutral pH of 6.6 to 7.5, and hardy to hardness zone 8. It can adapt to a variety of soil types and conditions, but has low salt and waterlogging tolerance. *C. nocturnum* can be fertilized biweekly with a weak dilution of seaweed and fish emulsion fertilizer.

Altitude: *C. nocturnum* grows well at low-to-mid elevations. In Nicaragua the species occurs between 40 and 1000m [6]. In Antioquia, Colombia, the species has been reported for elevations of 1000-1500 m [7]. In Madagascar, the species grow

in between 1500 and 1999m in humid to sub-humid climate [8]. In Panama, the species has been observed both at elevations below 100 m and above 2500 m [9].

Propagation

The easy and cost effective method of propagation of night blooming jasmine is by sowing seeds. Seeds are few and encased in white berries which have 8-10 mm diameter [10]. They are produced after 18 months of establishment and can remain dormant in the soil for many years [5]. Soaking of seed in water for 24 hours improves germination. The species also propagates readily through cuttings of roots and stems [5, 11].

Uses

Medicinal uses

- In traditional medicine, leaves of *Cestrum nocturnum* have been used for their pharmacological significance in burns and swellings.
- It is also used for treating epilepsy [12].
- Pharmacological studies on the plant proved that the leaves have significant analgesic and bactericidal activity [13, 14].
- The volatile oil is known to be mosquito-repellent and hence *C. nocturnum* is used to prevent malaria in several African Nations [15].
- Local anaesthetic effect, inhibitory effect on central nervous system and cardiac arrhythmic effect of plant are also documented.
- Zhong *et al.*, in 2008 reported that n-butanol and polysaccharide extracts from *C. nocturnum* has tumor inhibition ability [16].

Traditional uses

- *Cestrum nocturnum* flowers are presented as offerings to Shiva and Ganesh in Kathmandu.
- Napalese shamans create a ritual incense from the leaves and fresh flowers, eat the fresh flowers and smoke them when dried to increase the spiritual healing energies.
- The plant is also used as a stupefying charm medicine in West Indies.
- The Yucatec Maya use *C. nocturnum* leaves and flowers in hot baths as a treatment for night sweats.
- The plant is occasionally added to liquor in Kalinchok, a region north of Kathmandu.

Side effects

People with respiratory sensitivities or asthma, have reported difficulty in breathing, irritation of the nose and throat, headache, nausea, or other symptoms when exposed to the blossom's powerful scent. Some *Cestrum* species contain chlorogenic acid, and the presence of this potent sensitizer is responsible for this effect in *C. nocturnum*. Ingesting plant parts especially fruit results in elevated temperature, rapid pulse, excess salivation, gastritis, hallucinations, nervous irritability, tachycardia and paralysis.

Table 1: International synonyms of *Cestrum Nocturnum* [17]

S/No	Name	Language	Country/ Region
1	Nox Aenean Virent	Latin	Italy
2	Ye Xiang Shu	Chinese	China
3	Night Blooming Jasmine; Queen of the night	English	England, USA, New Zealand
4	Jasmin de Nuit; Galant de Nuit	French	France
5	Nacht Jasmin; Nacht- Hammerstrauch	German	Germany

6	νόχτα γιασεμιά	Greek	Greece, Cyprus
7	Raat ki Rani	Hindi	India
8	Jasmin da Noita; Dama da Noite	Portuguese	Portugal
9	Dama de noche; Huelo do noche; Heirbahedionda; Galan de tarde	Spanish	Spain
10	Yakokwa	Japanese	Japan
11	Nya-hmwe-pan; saung-taw-ku	Burmese	Myanmar
12	Cotí; Fedora; Galan de noche	Lucumi/Cuban Spanish	Cuba
13	Ai pua e pogi; Kara; Thauthau; Thauthaunimbongi	Fijian	Fiji
14	'Alaamoe; Kupaoo; Onaonalapana	Hawaiian	Hawaii
15	Vitnattjasmin	Swedish	Sweden
16	Jonoulruoawa	Marshallese	Marshall Islands
17	Sedap malam	Malay	Malaysia

Table 2: Indian synonyms of *Cestrum nocturnum* [18]

S/No	Name	Language	State/Region
1	Hasnahana	Bengali	West Bengal
2	Raat ki rani	Hindi	North India
3	Theibal lei	Manipuri	Manipur
4	Raat rani ; Raatrirani	Tamil	Tamil Nadu
5	Raat rani	Marathi	Maharashtra

Table 3: Botanical Description of *cestrum nocturnum* [18]

Plant Type	Perennial Shrub
Leaves	Lanceolate-elliptic
Flowers	Spicate; congested racemes; greenish yellow
Calyx	Campanulate
Corolla	Vespertine
Berries	White
Seeds	Prismatic

Table 4: Taxonomical classification of *Cestrum nocturnum* [17, 18]

Kingdom	Plantae
Phylum	Spermatophyte
Subphylum	Angiospermae
Class	Dicotyledonae
Order	Solanales
Family	Solanaceae
Genus	Cestrum
Species	Cestrum nocturnum

Table 5: Phytoconstituents of *Cestrum nocturnum* [19, 20, 21, 31]

S. No.	Phytoconstituents	Plant Part
1	Carbohydrates	Flower; Stem
2	Glycosides : Pregnane glycosides, Cholestane glycosides, a Pregnane-Carboxylic acid ζ -Lactone glycoside, Nocturnoside A and Nocturnoside B, Phenol glucosides (casternosides A and B)	Leaves
3	Triterpenes and sterols: Quassinoids	Stem
4	Coumarins	Aerial parts
5	Alkaloids	Leaves; Stem
6	Flavonoids	Stem
7	Taninns	Stem
8	Volatiles	Flower
9	Saponins: Spirostanol saponin, Furostanol saponin, Pseudo-furostanol saponin,	Stem

Table 6: Volatile oils of *C. nocturnum* [22, 27]

S. No.	Volatile oil	Percentage
1	Linalool	3.1%
2	Benzaldehyde	2.5%
3	Benzyl alcohol	2.4%
4	Phenylacetaldehyde	2.4%
5	Cis-jasmone	2.1%
6	Benzyl acetate	1.8%
7	Phenol	1.6%
8	Methyl jasmonate	1.5%
9	1,8-cineole	1.4%
10	Borneol	1.3%
11	Eugenol	1.3%

12	Linalyl acetate	1.2%
13	Citronellyl propionate	1.1%
14	α phellandrene	9.2%
15	B phellandrene	12.1%
16	(E)- β -ocimene	9.1%

Table 7: Pharmacological activities of *Cestrum nocturnum*

S. No	Pharmacological Activities	Extract	Plant part	Phytoconstituents	References
1	Antifungal	Alcoholic extract, Aqueous extract	Whole plant	Glycosides, carbohydrates	20
2	Anti-bacterial	Alcoholic extract, Aqueous extract	Whole plant	Flavonoids, carbohydrates, glycosides	20
3	Antidiabetic	Hydroalcoholic extract	Leaves	Flavonoids	21
4	Anti-HIV	Aqueous extract, ethyl acetate extract and butanol extract	Aerial parts	Saponins, triterpenes, flavonoids, tannins	23
5	Analgesic	n-butyl alcohol extract	Leaves	Flavonoids	13,14,30
6	Hepatoprotective	Aqueous-ethanol extract	Leaves	Flavonoids	26
7	Anti-tumor	Aqueous extract	Leaves	Steroidal saponins	16,28
8	Wound healing	Ethanol extract	Leaves	Flavonoids, saponins, triterpenes	29
9	Anti-inflammatory	Methanolic extract	Leaves	Flavonoids, saponins, triterpenes	14
10	Anti-oxidant	Methanol extract, aqueous extract, butanol extract, ethyl acetate extract	Stem	Flavonoids, Saponins, Tannins, Triterpenes and Carbohydrates	20
11	Anti-malarial	Methanol extract	Whole plant	Saponins, glycosides	15
12	Anti-epileptic	Aqueous extract	Leaves	Not specified	12
13	Cytotoxic	Methanolic extract	Leaves	Steroidal saponins, flavonoids	32
14	Anti-pyretic	Methanolic extract	Leaves	Saponins, flavonoids	14

Conclusion

Night blooming jasmine is a fragrant plant with multifaceted medicinal properties like antioxidant, antibacterial, antifungal, anticancer, hypoglycemic, antimalarial, antiepileptic, cytotoxic, analgesic, anti-inflammatory, anti-HIV, hepatoprotective, antipyretic and wound healing effect. In addition night blooming jasmine is also used as an ornamental plant due to its showy and fragrant white flowers. The leaves of *C. nocturnum* are used in Chinese folk medicine for the treatment of burns and swellings, being applied externally. Further research work and clinical trials need to be done to establish the above mentioned effects in human beings.

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