

**MONOGRAPH
ON
ALECTRA CHITRAKUTENSIS (RAU) PRASAD & DIXIT**



**FOREST BOTANY DIVISION
STATE FOREST RESEARCH INSTITUTE
JABALPUR (M.P.)**

**MONOGRAPH
ON
ALECTRA CHITRAKUTENSIS (RAU) PRASAD & DIXIT**

**O. P. CHAUBEY
Scientist & Head Forest Botany Division**

**A.K. SHARMA
Research Officer**



**FOREST BOTANY DIVISION
STATE FOREST RESEARCH INSTITUTE
JABALPUR (M.P.)**

FOREWORD

Alectra chitrakutensis (Rau) R. Prasad & R.D. Dixit (Scrophulariaceae) is a drug plant, indigenous to India, which had been used in the treatment of leprosy for centuries in traditional ayurvedic medicinal practice. It is a root parasite on white-flowered *Vitex negundo* L. (*Verbenaceae*). It is an endemic and critically endangered plant locally known as 'Nirgundi' or *Midaki* and found in confined localities of Madhya Pradesh, and also in Uttar Pradesh, India.

Nirgundi rhizomes having this root parasite are considered hot. They destroy gas (Vatanashaka), increase bile (Pitta vardhaka) and correct the disorders of blood (Rakata doshanashaka).

This monograph provides useful information on the distribution and habitat, morphology, flowering and fruiting, natural regeneration, artificial regeneration, utilization, chemical constituents, threat status and conservation measures etc., of this species for promoting its conservation and for the benefit of interested medicinal practitioners and overall development of medicinal plant sector.

Financial assistance from the Ministry of Environment and Forests, Govt. of India, New Delhi for printing this educational material is gratefully acknowledged. Thanks are due to Shri Koushal Tiwari, Computer Operator for neatly typing of this manuscript.

(C.P. Rai, IFS)
Director

CONTENTS

	FOREWORD	(i)
I.	DISTRIBUTION AND HABITAT	1
II.	MORPHOLOGY	2
III.	FLOWERING AND FRUITING	3
IV.	NATURAL REGENERATION	3
V.	ARTIFICIAL REGENERATION	3
VI.	UTILIZATION	4
VII.	CHEMICAL CONSTITUENTS	5
VIII.	THREAT STATUS AND CONSERVATION MEASURES	5
IX.	SOURCE INSTITUTIONS FOR DETAILED INFORMATION	5

ALECTRA CHITRAKUTENSIS (RAU) PRASAD & DIXIT**I. DISTRIBUTION AND HABITAT**

The genus *Alectra* of the family Scrophulariaceae includes more than 50 species of parasitic herbs, distributed in India, Africa, South America, and Australia. A majority of the species are found in tropical Africa and some are common to Australia. Two species are recorded from Brazil, one from Arabia and three from Madagascar. The three members known from India are

(1). *Alectra indica* Benth, (2) *A.thomsonii* Hook.f., and (3) *A. parasitica* A.Rich. var. *chitrakutensis* M. A. Rau.

Alectra chitrakutensis (Rau) R. Prasad & R.D. Dixit (Scrophulariaceae) is a root parasite on white-flowered *Vitex negundo* L. (Verbenaceae). It is an endemic and critically endangered plant locally known as 'Nirgundi' found in confined localities of Chitrakoot region, Madhya Pradesh, and also in Uttar Pradesh, India. The species grows as a parasite on the thread-like roots of white-flowered *V. negundo* L. It is a small parasitic herb of 15–30 cm height, stem rhizomatous, well developed, orange–yellow, black on drying; leaves linear or oblong, up to 6 mm long, obtuse at apex; flowers in terminal racemes, yellow with purple streaks; capsules globose, ca. 5 mm across; seeds minute, cuneiform, black. Plants grow from October to April mainly on sandy soils. Chitrakoot is a holy town of pilgrimage for the Hindus. It is situated at the border of Satna District, Madhya Pradesh and Chitrakoot District, Uttar Pradesh. According to the epic *Ramayana* Lord Rama, Sita and Lakshmana had stayed in this region on Kamadgiri hill during their 14 years of exile. This region is rich in medicinal plants since antiquity, as mentioned in the most ancient epic, *Valmiki Ramayana*. The genus *Alectra* Thunb., family Scrophulariaceae is represented by more than 50 species of parasitic herbs which are distributed in tropical regions of Africa, South America and Asia. Three species are so far known from India, viz. *Alectra sessiliflora* (Vahl) Kuntze, *A. thompsoni* Hook. f. and *A. chitrakutensis* (Rau) R. Prasad & R.D. Dixit. *A. chitrakutensis* (Rau) R. Prasad & R. D. Dixit, was first described by Rau in 1961 from Chitrakoot as a variety of *A. parasitica* A. Rich. Prasad and Dixit carried out a detailed taxonomic study and raised the status of the plant from varietal to species level. State Forest Research Institute, Jabalpur had explored its distribution in Madhya Pradesh during 1967-1968 and collected

Alectra parasitica A.Rich. var. *chitrakutensis* Rau from following places –

1. Chitrakut (M.P. region) : Sirsavan, along the banks of river Mandakni in sandy soils, parasite on the roots of generally old shrubs of *Vitex negundo*, which is gregarious in patches. The parasite is generally not found on those shrubs which grow on pure sandy places, directly exposed to sun apparently because it cannot withstand the high soil temperature in such conditions. It is again collected during 2010 from Chillaghat, Ludwara, Majhgawan of Chitrakut region. Its population has been found declining due to over exploitation of the rhizomes by indigenous people.
2. Jabalpur: Between Tilwaraghat and Bhedaghat along the banks of river Narmada in sandy soils, parasite on the roots of old shrubs of *Vitex negundo*
3. Guna: Chanderi, along the bank of the Betwa river in sandy soils on the roots of *Vitex negundo*

The soils around the root zone of *Vitex negundo* having parasitic infestation with *A. chitrakutensis* have been tested and found with following physico-chemical characteristics: Color – light brown shade, texture loamy sand or coarse loamy sand, soil pH 8.0, organic matter 1.25%, total soluble salt from 0.05 to 0.075% pre-dominantly sodium salts like sodium carbonate and sodium bi – carbonate.

It is also recorded from Assam in the east to HP in the west, including the Imphal Valley in Manipur and is found under considerable anthropogenic pressure, for developmental activities or expansion of agriculture. In addition, the 'hide and seek' of the species in Indian bryoflora can also be ascribed to the lack of awareness and intensive bryological explorations in the country. The chronology of its collections in India reveals a progressively narrowing gap between two encounters, which is directly related to intensification of bryological activities in recent years.

II. MORPHOLOGY

Genus

Herbs, erect, stout, usually scabrid, turning black on drying. Leaves opposite or alternate, dentate, sometimes reduced to scales. Flowers axillary,

solitary or in terminal spikes or racemes, bracteate, bracteolate. Calyx campanulate, subfoliaceous, 5-toothed or 5-partite, lobes valvate. Corolla 5-lobed, lobes spreading, limb oblique, tube broad. Stamens 4, didynamous, filaments glabrous or bearded, anthers paired, cells parallel, mucronate at base. Style long, inflexed, stigma elongate, spatulate. Capsules globose or subglobose, loculicidal. Seeds minute, reticulate.

Species

Small herbs, parasitic, stems rhizomatous, underground part 2-3cm thick, with numerous axillary buds, rhizomes orange yellow, black on drying. Leaves linear or oblong, up to 6 mm long, obtuse at apex. Flowers sessile, filaments glabrous.

III. Flowering and Fruiting

The flowers and seeds have been found during February- March, and New plants growing in the month of March.

IV. NATURAL REGENERATION

The minute rhizome could have germinated only in few days. The aerial portion of this plant is short lived. The new plant grows rapidly, bears flowers and fruits, develops its rhizomes, and dies out soon. Germination of seed, development of rhizome, flowering, fruiting, dispersal of seeds-everything is completed in about 6 weeks time. The Nirgundi plant is grazed by goats and cows also eat it, Wild pigs also dug out the root and rhizomes of growing plant. It is also susceptible to attack by fungi and insect pests.

V. ARTIFICIAL REGENERATION

A. chitrakutensis is a total root parasite and therefore, it is difficult to grow the plant using *ex situ* methods. However, to conserve *A. chitrakutensis* in herbal gardens, the roots of *V. negundo* with a few minute seedlings of *A. chitrakutensis* attached, were collected from natural habitat and planted in herbal garden. Within 20 days *A. chitrakutensis* started growing simultaneously with the sprouting of *V. negundo* plants. This critically endangered and endemic plant has been saved using *ex situ* methods.

VI. UTILIZATION

The plant is of vital use in the treatment of leprosy, constipation, malaria, oedemic swelling, piles, paralysis and as a tonic, anthelmintic and blood purifier.

In constipation:

Use of fresh rhizome in the treatment of constipation is common in Chitrakut. It is ground and made into a pest which is given with milk early in the morning. The patient has one or two loose bowel movements, then he is given khichari in diet. People whose bowels are impacted are given one dose daily for two or three days.

Intestinal Worms

Both children and adults are given Nirgundi dose to expel Worms.

In Fever

The fresh rhizome with cow urine is reported to be given to patients suffering from Malaria.

Oedematous swellings

The Nirgundi powder with honey is reported to be beneficial in case of Oedema.

Paralysis

Nirgundi is given to patients with paralysis of lower and upper extremities and other parts.

In Tuberculosis

The crude drug is reported to be beneficial against *Mycobacterium tuberculosis* in a concentration of 6% are above.

In Leprosy

The leprosy patients are given traditionally this drug for at least one year. Salt, pepper, chillies, acids, sweets and oil are prohibited during the course of treatment.

VII. CHEMICAL CONSTITUENTS

The plant contains an alkaloid, the nature of which is still to be determined.

VIII. THREAT STATUS AND CONSERVATION MEASURES

The species is fast vanishing from its natural habitats due to over-exploitation of the rhizomes. The local people collect the entire plants in bulk quantity from natural habitats and sell them to the local traders @ Rs 150/kg, which is ultimately sold to traders @ Rs 1500/kg in trade markets. Added to this, the host plant, *V. negundo* L. ('*Medhaki*' in Chitrakoot region) is also being exploited by the indigenous people and its population has also declined from the natural habitats.

IX. SOURCE INSTITUTIONS FOR DETAILED INFORMATION

1. State Forest Research Institute, Polipathar, Jabalpur 482008 (M.P.)
2. Botanical Survey of India, Central Circle 10 Chatham Lines, Allahabad 211002 (UP).
3. Deendayal Research Institute, Chitrakut, M.P.
4. Forest Research Institute, PO – New Forest, Dehradun (Uttaranchal).



