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Taxonomy and Ethnobotany of plant *Lepidagathis* of family Acanthaceae of Dausa Rajasthan

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Abstract

The paper enumerates the taxonomy and ethnobotanical uses of *Lepidagathis cristata* Willd and *Lepidagathis trinervis* Nees of family Acanthaceae used by local tribal people, bhopa (village priest), headman and informants of Dausa district of Rajasthan. Information on the medicinal uses gathered from the tribes together with their botanical identity, local name and mode of administration are presented.

Keywords: Ethnobotanical, traditional, Acanthaceae, tribe, Meena, Dausa, Rajasthan

Introduction

In India, traditional system of medicine (Ayurveda, Sidha and Unani Tibb) together with Homeopathy and folklore medicine continue to play an important role in the health care system of the population at large. Lately, there has been an all-round revival of the interest in the use of herbal medicines throughout the world. It is reported that more than 150 pure chemical compounds, derived from higher plants, find their place in modern medicines. Out of 250,000 – 300,000 total plants of the world, India harbour about 45,000 (18%) plants. Out of 20,000 medicinal plants of the world, India contributes about 15 per cent (3000 – 3500) medicinal plants. About 90 per cent of these are found growing wild in different climatic regions of the country. Out of 3000 medicinal plants occurring in India, about 200 species are used in bulk quantities as articles of commerce ^[1]. Traditional ethnomedicinal studies have in recent years received much attention due to their wide local acceptability and clues for new or lesser-known medicinal plants ^[2]. Ethnomedicine is an area of research that deals with medicines derived from plants, animals, minerals etc. used in the treatment of various diseases and ailments ^[3]. Very little work has been done on plants of Acanthaceae in Eastern Rajasthan. However, ethno-botanical and ethno-medicinal aspects have drawn the attention of several workers in Eastern Rajasthan ^[4-10]. Significant ethnobotanical/ethnomedicinal research has been done by several workers in India and in Rajasthan ^[11-29].

The district Dausa is situated in the north eastern region of Rajasthan, a region widely known as Dhundar and lies between 26°23' to 27°15' N latitude and 76°06' to 77°02' E longitude (Fig. 1). The total area of the district is 3414.28 km² which is 0.99% of the area of state and surrounded by 06 districts viz., Jaipur, Tonk, Alwar, Bharatpur, Karauli and Swaimadhopur ^[30]. The total population of the district is 16, 34, 409 out of which 2, 01, 793 urban and 14, 32, 616 rural populations as per census 2011. The soil of the district is yellowish to dark brown with fine texture generally suitable for all types of crops. It is characterized by a dry climate with the hot season. The maximum temperature is 47 C and minimum 4 C. Total annual rainfall varies from 450mm to 670mm. Agriculture practices mostly depends on monsoon rainfall. The district is dominated by Meena tribe and other backward caste Gurjar and Mali.

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Fig 1: Map of the study area

Methodology

Plant material collected from surveyed area. Plant specimens were identified consulting various flora, taxonomic books, Ethnobotany and medicinal plants books [31-48]. Collected plants were deposited in Herbarium, Department of Botany, University of Rajasthan, Jaipur and assigned RUBL, numbers. Detailed ethnobotanical investigation was conducted on medicinally important plants *Lepidagathis cristata* Willd and *Lepidagathis trinervis* Nees of Acanthaceae found in Dausa district.

Taxonomy

Acanthaceae is a large cosmopolitan family of ca. 250 genera and 2500 species distributed mostly in the tropical and subtropical areas of the world. Family Acanthaceae is a large family of dicotyledonous herbs, shrubs, or twining vines and some are epiphytes only flowering plants. The four main centers of distribution are tropical, subtropical and temperate regions of Indonesia and Malaysia, Africa, Brazil and Central America while also found in of Asia. Medicinally very important family includes about 68 genera and 250-300 species are found throughout India while in Rajasthan this family is represented by 30 genera and 81 species. The family has a large number of ornamental and

medicinal plants. A large number of crude drugs used in Ayurvedic system employ plants of family Acanthaceae. The systematic position (Table-1) and circumscription of the Acanthaceae has been controversial because of its complexity of habitat range and considerable variation in morphology and genetics. On the basis of pollen morphology several attempts for the classification of Acanthaceae are at the familial, sub-familial, tribal and sub-tribal levels by various workers, were conducted from time to time. The family is closely related to Scrophulariaceae sharing the features of zygomorphic flowers, pentamerous flowers, stamens less than 5, bicarpellate superior ovary and fruit a capsule. The Acanthaceae are distinct in absence of endosperm, anthers opening by two slits and the presence of retinaculum [49]. Thorne had earlier recognized 5 subfamilies: Nelsonioideae, Thunbergioideae, Mendoncioideae, Acanthoideae and Ruellioideae. The first two includes aberrant genera. Nelsonioideae with sometimes alternate leaves, presence of endosperm and absence of retinacula may represent a paraphyletic basal group within the family. Nelsonioideae have often been placed in Scrophulariaceae s.l. or considered intermediate between Scrophulariaceae and Acanthaceae but they are placed sister to rest of Acanthaceae s.l. [50]. The absence of retinacula or cystoliths, descending cochlear aestivation i.e. the adaxial petals overlapping the abaxial petals in bud are likely to be plesiomorphies [51]. Acanthoideae are clearly monophyletic and characterized by the absence of cystoliths, nodes not swollen, colpate pollen and monothealous anthers [52]. In Mendoncioideae, one of the carpel is often aborted, fruit is a drupe and style bifid. Mendoncioideae and Ruellioideae have subsequently been merged under Thunbergioideae and Acanthoideae, respectively [53]. APweb includes Avicennioideae as fourth subfamily, stressing that the position of Avicenniaceae within Acanthaceae s.l. is fairly well established; it shows a rather weakly supported sister group relationship with Thunbergioideae [54]. This placement based on molecular evidence is also supported by articulated nodes, inflorescence structure, flowers with bract and 2 bracteoles, a reduction in number of ovules and absence of endosperm [55].

Table 1: The placement of family Acanthaceae by various eminent botanist and angiosperm phylogeny group II

	Bentham and Hooker	Cronquist	Takhtajan	Dahlgren	Thorne	APGII
Division		Magnoliophyta	Magnoliophyta			
Class	Dicotyledons	Magnoliopsida	Magnoliopsida	Magnoliopsida	Angiospermae	
Subclass	Gamopetalae	Asteridae	Lamiidae	Magnoliidae	Lamiidae	
Series+/ Superorder	Bicarpellatae+		Lamianae	Lamianae	Lamianae	Euasterids I
Order	Personales	Scrophulariales	Scrophulariales	Lamiales	Lamiales	Lamiales

***Lepidagathis cristata* Willd. Local Name: Aewal Kangio**



Fig 2: A- Plant and B- Flowers of *Lepidagathis cristata* Willd

Distribution

A stiff undershrub with numerous branches procumbent from a perennial rootstock found in Delhi, Rajasthan, Gujrat, Konkan and the Deccan. Commonly found in rocky to sandy habitats throughout Rajasthan.

Morphology

Rootstock perennial, stem scarcely many; branches numerous, spreading on all sides close to the ground, sometimes rooting, slender, quadrangular (sometimes almost winged), glabrous or nearly so. Leaves opposite, sessile, linear-oblong or lanceolate-oblong, lineolate above, hairy on the nerves beneath (Fig. 2). Flowers in a subtropical globose head (sometimes with 1 or 2 smaller heads added) on the lower part of the leafy branches; bracts

8 mm. long, ovate, acuminate, spinous-pointed, hairy, bracteoles membranous. Calyx 8 mm long, 4-partite about 3/4 the way down, densely softly hairy on the both surfaces; the 2 larger outer segments 3 mm broad, elliptic, acute, the lower segment bi-fid, the 2- lateral segments, 1.2 mm broad, all ciliate and spinous-pointed. Corolla hairy outside, reaching 1.3 cm long, white or pale pink, dotted with brown or purple spots, 2-lipped about 1/2 - way down; tube narrow constricted below the limb and thus suddenly expanded upwards; upper lip 4 mm long, oblong, obtuse, notched at the apex lower lip 6 mm long, divided nearly to the middle into 3 obovate obtuse slightly crenulated lobes, the middle lobe the broadest. Stamens slightly exerted beyond the corolla-tube; filaments glabrous, anthers 2-celled, one of the cell rather higher up than the other. Ovary glabrous, style slightly pubescent. Capsule 5 mm long, ovoid, subacute, glabrous, grooved on the two sides, with scarious back, 2-seeded. Seeds large for the size of the capsule, 3 mm long, ovoid-oblong, rounder, densely clothed with long hygroscopic mucilaginous hairs.

Ethnobotanical uses

It is bitter herb used in fevers as a tonic. Ash of the dry plant is employed as on application to sores. The plant is considered to be used by the tribes in sores, adenitis, scabies and syphilis.

Lepidagathis trinervis Nees. Local Name: Pather-phor

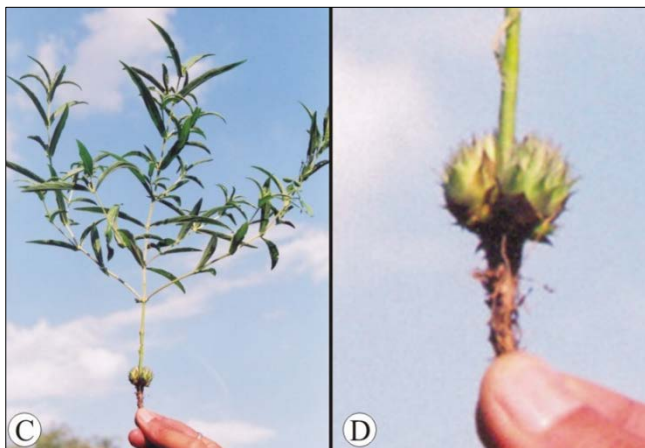


Fig 3: C- Plant and D- Flower of *Lepidagathis trinervis* Nees

Distribution

A small herb which occurs in Rajasthan desert, Central India, Chota Nagpur, N.W. Himalayas, W. Paninsula and South India. Common on low hillocks in rocky to gravelly habitats throughout Rajasthan.

Morphology

A small diffuse plant; rootstock woody; branches numerous, 12.5-25 cm long, slender, quadrangular, with many nodes. Leaves 2.5-4.5 cm by 3- 6 mm, sessile, linear, subacute, entire, glabrous, or nearly so, the margins often scabrous, 3-nerved from a slightly tapering base, the mid nerve stronger than the lateral ones which are close to the margin (Fig. 3). Flowers in axillary, sessile ovoid spikes 1.3-2 cm long, usually 2 or more closely packed together so as to appear like a single head; bracts often coloured, usually glabrous or nearly so, rather less than 1.3 cm long ovate or ovate-elliptic, with a recurved cuspidate spine almost as long as the

leafy part; bracteoles as long as the bracts, oblong lanceolate, Aristate-acuminate, membranous. Calyx membranous, 1 cm long, five-partite (the lower lobes scarcely at all connate above the base) to about 1.5 mm from the base; the 3 outer segments nearly equal in length, the upper slightly broader, all lanceolate, very acute, not spinous-pointed, densely hairy inside, nearly glabrous outside; inner lateral segments shorter and narrower, linear, acute, hairy on both sides. Corolla densely hairy in bud, white, spotted with yellow, brown and purple, 6-8 mm long; tube short; upper lip oblong, rounded at the apex; lower lip 3-lobed, the lobes obtuse, the lateral narrower than the middle one. Capsules 6 mm long, ovoid-lanceolate, subacute, compressed, 2-seeded, grooved on the sides, the back scarious, irregularly rupturing. Seeds 2.5-3 mm long, oblong rounded at the apex, clothed with long mucilaginous hygroscopic hairs many times longer than the nucleus.

Ethnobotanical uses

10 ml of the whole plant decoction is given once daily for fortnight and 12 ml of root juice or powder is given twice a day for two months to cure piles.

Results and Discussion

During the present investigation author has reported medicinally important plants *Lepidagathis cristata* Willd and *Lepidagathis trinervis* Nees of family Acanthaceae used by the tribal in the district in their day to day life. The plants enumerated in the text are wild and they have proved handy and easily available remedial material which quick result. It has been observed that the folklore and tribal herbalist still depend upon wild plants around them for meeting their needs and possess good knowledge of the medicinal uses of such plants. Due to constant association with the forest environment, they have evolved knowledge by trial and error and have developed their own way of diagnosis and treatment of different ailments. Both plants are being used to treat various ailments such as fever, sores, adenitis, scabies syphilis and piles. Now a day, population is expanding in villages, younger generations tend to discard their traditional life style therefore, much of this wealth of knowledge is being lost as the traditional culture is disappearing. Hence, documentation of traditional practices of herbal medicine will be coherence in future. With the help of earlier studies and the present day research data its exploration shows that these ethnobotanical studies can be greatly beneficial to human race for treating disease with cheap and best non side effect solutions.

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