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Ethnobotanical Study of *Phlogacanthus thyriformis* Nees: A Conserved Medicinal Plant of Manipur, Northeast India

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ABSTRACT

Phlogacanthus thyriformis (Roxb. ex Hadrw.) Mabb., locally known as *Nongmangkha* is a quite popular as an ethno-botanical important plant for the *meetei* community in Manipur. Information presented in this paper was gathered from 68 informants using semi structure questionnaires on the utilization, taboos, folk medicine and conservation of the species. The plant forms an integral part of rites & rituals, myths, food items, taboos, medicinal, customs and traditions with the *meetei* community. Folk medicinal uses are cold, cough, influenza, easy deliver of child birth, abortion, irregular menstruation, diarrhea, dysentery, cholera, high blood pressure control, boils, small pox, skin problems, sprains, body ache, constipation and burns. The plant is found to be grown in every house who owns a kitchen garden. There is a superstitious belief, which is still in practiced by local people till today is not to pluck any part of the plant on Sunday.

Keywords: *Nongmangkha*, *meetei*, Informants, Folk medicine.

1. Introduction

The state of Manipur lies in the North-eastern part of the India subcontinent and falls under the Indo-Burman (IBR) hotspot region which ranks 8th amongst the 34 biodiversity hotspots region of the world. It is situated between 23°50'N and 25°41'N latitude and between 93°2'E and 94°47'E longitude and has a total area of 22, 327 km² [1]. The state is inhabited by different communities belonging to Mongoloids, Austro-Asians and Indo-Aryans. The people in the state are commonly known as *Manipuris*. The *meetei* is the major community which is 70% of the total population residing in the four valley districts [1]. Since time immemorial kings of Manipur had started systematically use of folk medicine. They used to employed *maibas* (male) and *maibis* (female) who were professionals in the field of folk medicine. The *manipuris* continue the use of folk-medicine, even though modern scientific has got its amendments developments. The two basic branches of *meetei* folk medicine system is (i) natural folk medicine (herbal therapy) (ii) and, magico-religious (psychotherapy) folk medicine as a traditional healing method by also practiced in this small community. The folk-medicine of a people is governed by the type of vegetation, climate and socio-economic conditions as well as ethnic perspective of the people. Traditional healers of Manipur were found to play great roles in the primary healthcare systems and curing some diseases with greater success and greater preference from the people than that of modern medications [2].

The genus *Phlogacanthus* is represented by 15-17 species which were found in India (Himalaya), Burma, Indo-Chinese, Malaya peninsular, Indonesia regions of the World with 10 species in sub-tropical India [3]. It is represented by 5 species in Manipur [4]. The species is distributed abundantly in Manipur and its folk-medicinal uses and traditional knowledge were conserved from generation to generation through oral tradition. Many customs, myths are related with this plant which are perpetuated from generation to generation and well dispersed into the valley districts. Some of them reflect intelligent approaches for its sustainable uses and preservation. Several works on have been published on magico-religious, botanical folklores, folk-medicine and ethno-botanical aspects of the *manipuris* [5-16]. However, very few publications had proper documentation on the details of mode of preparation, administration and doses of the healing properties of plants made on a single uses of a plant without mentioning the ingredients used in particular. Keeping this in view the present paper is an attempt to sensitize the plant multifaceted uses on the issue of culture & tradition in health and healing respective of the state.

The indigenous people of the study area are called *meetei* and constitute 60% of the total population of the state. They are plain (valley) dwellers, inhabiting in the Imphal East, Imphal West, Thoubal, Bishnupur districts of the state Manipur. *Meetei's* when compared to others communities in Manipur constitute relatively large in population, more literate and occupied the urban area as well as rural areas of the state. The language of *meetei's* is *manipuris* which is the common medium for communication for others communities of the state

2. Materials and methods

2.1 Ethno botanical survey

Ethno-botanical survey was conducted during 2010-2013 in the urban and rural zones of valley districts of Manipur for better understanding of local beliefs, habits and uses of the plant. Different categories of people like family heads, healers, witchcrafts doctors, old aged experience and knowledgeable informants were repeatedly interviewed. Besides this, other methods were also used such as observation, enquires and participation in ceremonies. Respondent were selected randomly representing both sexes and age groups. In total 68 informants (31 male 37 female) between the ages of 35 to 86 in the study zones were interviewed. Among them 24 were herbal healers, 9 witchcraft doctors, 15 housewives and 20 knowledgeable informants were interviewed. The survey focused on the investigation of local name of the species, parts used, processing methods, the purpose of use, and how people conserved the species with time. Specific questions were asked based upon the type of informants and were recorded. To get an estimate of the presence index for the species in the survey area, each informant was asked whether he/she had at least one individual on their courtyard or kitchen garden and was asked to indicate the part of the plant that was used most frequently. Interviews were conducted in the local language *manipuri*. The specimen collected is deposited in the Manipur University Museum of Plants, Department of Life Sciences, Manipur University, Canchipur, Manipur.

2.2 Data analysis

To analyze the answer rates per specific use defined as the fidelity level (FL) [5] in each study area have been expressed as:

$$FL (\%) = n/N \times 100$$

Where n is number of informants related to a specific use and N = total number of informants. We used the Fisher exact test (PROC FREQ in SAS) to test whether fidelity levels differed between study areas. The index of presence was taken as the percentage of informants having *P. thyrsifloris* plant grown in their courtyard.

3. Results & Discussion

3.1 *Phlogacanthus thyrsiformis* (Roxb. ex Hadrw.) Mabb.; Synonyms: *Phlogacanthus thyrsiflorus* (Roxb.) Nees. (Acanthaceae).

Evergreen shrub 2-4 m high. Bark yellowish-brown, striate. Branchlets quadrangular. Leaves oblanceolate to elliptic-oblong 6-20 x 3-6 cm, apex acute or acuminate, entire, closely punctuate, dark glossy green above, pale beneath; lateral nerves 10-12 on either half, arcuate; base tapering towards petiole. The leaves on short branches smaller, at lower portion caducous. Cymes axillary, 1-4 fld, peduncle short, quadrangular, ca 10-15 cm long, pubescent. Bract small 1.8 x 0.5 cm long, linear, apiculate,

caducous. Calyx 5- partite, split towards the base 1 x 0.1 cm, linear-lanceolate, pubescent outside, with one distinct mid-rib. Corolla yellow, ca 2.3 cm, pubescent outside, slightly two lipped, tube ca 1.8 cm long, minutely curved, upper lip 2-fid, lower lip deeply 3-fid, densely pubescent outside. Stamens 2, inserted near tube base, filaments ligulate, glabrous, ca 2.1 cm long, much exerted from the tube, anthers 2- celled, oblong, parallel, longitudinal dehiscence. Style 2 cm terete, stigma extended. Capsule elongated, clavate, obtuse, long and glabrous, 1 – 2 cm long, 12 -14 seeded.

3.3 Flower and Fruiting: December - April

3.4 Chemistry: Phloganthoside—a diterpene lactone glucoside [1], antimicrobial activity [8], Genotoxicity using plant cytogenetic assay [19] and analgesic activity of ethanol extract of the species on experimental animals models [7]. Poses anti hyperglycaemic effect in streptozotocin induced diabetic mice which justifies the traditional use of this plant as ethnomedicine in treatment of diabetes [2].

3.5 Specimen examined: Manipur, Imphal East district, Andro, alt. ca 720 m, Ningombam, 00912; Imphal West district, Singjamei, alt. 780m, Singh, 01200; Bishnupur district, moirang, alt. ca 610 m, Ningombam, 01208; Thoubal district, Kaina, alt. 1100 m, Ningombam & Singh, 01256.

3.6 Distribution

In Manipur the species is widely distributed in wild as well as cultivated forms. It is fast growing species and is usually found in kitchen garden, sides of pond, landscape of fields and foothills. This species is confined to North east India, Burma, Malaya peninsula and Indonesia. It grows suitably in moist tropical climate and extended its altitudinal range from 650- 1300 m above sea level and sometimes reaching upto temperate regions.



Fig 1: Showing *Phlogacanthus thyrsifloris* Nees plant with inflorescence.

3.7 Profile of informants

The informants were herbal healers, witchcraft practitioner, housewives and elderly persons who have knowledge about the ethno-botanical aspects of *P. thyriformis*. The study was based on the informants of these informants.

Table: 1 Types of informants and their gender from the urban and rural areas of the study community in Manipur.

Type	Urban		Rural	
	Male	Female	Male	Female
Healers	9	2	8	5
Witchcraft	3	1	3	2
Housewives	Nil	8	Nil	7
Knowledgeable persons	8	2	6	4
Total	20	13	17	18

3.8 Myths and folktales

The story, origin and naming of the plant was given in the *puyas*. The then king Nongpok Ningthou wife was in love with another god. One night king's queen Panthoibi ran away to love with the god at a particular place as fixed, she was quietly left the place but the king realized and was after her in a close range. Knowing the distance she hides at a shrub bushes and thus escaped. At that instance she just chews one leaf of the plant which was bitter in taste, so she named the plant as nongmangkha, nong= one day, mang = bussy and kha = bitter, the present *Phlogacanthus thyriformis*.

3.9 Taboos

Superstitious beliefs of botanical folklore are still in practiced by local people. There is belief which is still very much in practiced about this plant is that local people do not to pluck any part of the plant on Sunday and any days on mid-noon. There is a saying that on this restricted day or time period devil sits on the plant. If someone happens to pluck the plant or used it for any purpose, it cause evil effect on the human health or may cause bad effect on health. Majority, 90 % of the people population both in urban and rural are still practicing it and nobody dares to break it. It is a significant approach to investigate to the indigenous cultural practiced of this plant as it was revealed that this might be a system of conserving biodiversity through ancestors by following superstitious folklores.

3.14 Folk-medicinal uses

Table 2: Showing the folkmedicinal uses of *P. thyriformis* by the *meetei* community.

Name of Local health tradition	Health condition	Part used/ ingredients used	Mode of preparation	Mode of administration & Dosages
Agang mayoknaba	Easy deliver of child birth	Root	Powdered 200 gm is mixed with water and made paste	The porridge is applied externally on sex organ, buttock and abdomen.
Angang yeithaba	Abortion	Leaf	35-45 leaves into 1 liter is boiled upto 1/3 of the volume	50 ml of the decoction is taken orally for 3-4 days
Khonghamthaba	Diarrhoea, dysentery & cholera	Leaf, rhizome of <i>Zingiber officinalis</i>	Leaves crushed mixed smashed rhizome of Zinger with little salt is dissolved in water.	100 ml of the mixture is orally taken twice daily.
B.P control	High Blood pressure control	Leaf & <i>Clerodendron colebroekiana</i> leaf	Leaf of both plants decoction is taken	250 ml of the decoction is orally taken daily is for 3 days
Yairong	Boils	Young shoot, salt & rhizome of zinger.	Young shoots is smashed with ginger and little salt is added	The porridge is applied on the affected area.

3.10 Witchcraft or Sorcery

The art of witchcraft or sorcery is still is practiced as evidence by presence of witchcraft doctors in the society. The plant is used on different purposes to evade or to tame evil spirits.

Alocosia macrorrhizos (L.) G. Don (*Hangoo*) rhizome, *Cynodon dactylon* Pers. (*Tenthou*) leaf with *Phlogacanthus thyriformis* leaf is used to tame spiritual evil spirits.

Phlogacanthus thyriformis leaf with *Oryza sativa* L. (*Changhee*) rice infusion is also used to tame evil spirits.

Phlogacanthus thyriformis leaf with *Bambusa nutans* Wall. ex Munro (*Wootang*) rhizome for evading away evil spirit.

3.10 Cultural rituals

On rituals of the *meetei* customs, a traditional lunch is a must to serve guest who came for the giving blessing to the host. Before that food items are offered previously to the god. One such compulsory food item is of called *suktane* which is prepared from the plant leaves, fried adding with sugar. It is revealed that the purpose of serving the food item is it neutralizes all the effects of the food and helps digestion. Moreover, it also make the taste buds refresh after eating it and one can get the taste of different food stuffs.

3.11 Food recipes

The flower with young inflorescence is fried and taken as favorite food item by the community. The young leaf is mixed with powdered dal and fried in vegetable oil to prepare a special item called *bora* which is commonly taken in Manipur. Again, the boiled leaf, fermented fish, salt and chili is mixed definite proportion to prepare an item called *kangshu* and serve. The flower are sold in the markets, one patch cast 10-15 rupees.

3.12 Recreational purposes

The plant is planted as fencing boundary for house and as well as an ornamental plant in gardens simultaneously for source of food and medicine. It is found commonly grow in kitchen garden for medicinal and food items. There is also a psychological approach that growing this plant in the campus/ courtyard protect from evil spirit.

3.13 Medicinal uses

The whole plant has multipurpose uses as folk-medicine. It is stimulant, astringent, aphrodisiac, diuretic, anti-dysenteric and antipyretic properties. Leaf juice is used in cough, asthma, rheumatism (Table: 2).

Nupi thage khongkap	Irregular menstruation	Leaf	Leaf decoction of plants is taken	300 ml of the decoction is orally taken twice daily for 3 days
Malaria	Malaria	Leaf	30 grams of dry leaf powdered is dissolved in water	100 ml of the decoction is taken orally thrice for 7 days.
Lai thokpa	Small pox & Skin problems	Leaf	Decoction of leaf	Leaf decoction is taken bath for 4 days
Lok khoubu	Cold & cough	Leaf	Boiled / Decoction mixed in 2:1 with honey	The steam is inhale twice daily for 5 days / 50 ml three times daily for 3 days.
Lok laihou	Viral influenza	Leaf	Boiled in a container and covered with banana leaf making a hole to make the steam out.	A cotton cloth is made to cover for some time and the cloth is pressed on chest, shoulders and back for several times before sleep for 5 days
Meina pokpa	Burns	Leaf	Crushed juice of leaf	Cool fresh water is applied first then the Juice applied at the affected area 3-5 times daily.
Chickpa naba	Sprains and body ache	Leaf	The leaf is boiled and smashed	The poultice is applied to the affected area.
Khonghamba yanaba	Constipation	Leaf	The fried is leaves and smashed	30 gm put inside the anus.

Table 3: Showing the form of use of *P. thyriformis* with fidelity level at urban and rural areas of Manipur.

Sl no	Form of use	Fidelity Level (%)		
		Urban (n= 33)	Rural (n=35)	Total (n=68)
1	Easy deliver of child birth	9.090909	22.85714	16.17647
2	Abortion	18.18182	40	29.41176
3	Diarrhoea , dysentery and cholera	30.30303	48.57143	39.70588
4	Irregular menstruation	24.24242	40	32.35294
5	Malaria fever	21.21212	28.57143	25
6	Small pox and dermatological problems	100	100	100
7	Cold and cough	100	100	100
8	Viral influenza	84.84848	91.42857	88.23529
9	Boils	21.21212	25.71429	23.52941
10	Burns	15.15152	40	27.94118
11	High Blood Pressure	24.24242	31.42857	27.94118
12	Sprains and body pains	24.24242	34.28571	29.41176
13	Food recipes	100	100	100
14	Witchcraft or sorcery	12.12121	14.28571	13.23529
15	Cultural rituals	87.87879	85.71429	86.76471
16	Taboos	100	100	100
17	Tradition and myths	51.51515	85.71429	69.11765

3.15 Diversity of uses

Although about 17 specific uses were recorded for the species throughout its distribution range only four 4 uses is highly fidelity (100%) viz. for treatment of small pox & dermatological problems, Cold & cough and Food recipes and the last is taboo not to pluck any part of the plant on Sunday and mid-noon of every day which is still strictly practiced. The number of significant uses was greater in rural than in the urban. *P.thyriformis* was a multipurpose species with almost all organs used. The leaf was the most frequently used organ, being used to treat ailments which are mostly bacteria-related (stomachache, diarrhea, wounds and coughs) (Table 3). The flowers, on the contrary, were used almost exclusively for a single purpose and showed the highest fidelity level (up to 100%). The processing form, the use form, and the specific purpose of uses were fairly similar across study zones but there was a significant difference in the fidelity level of uses across study zones (Table 3).

There was a significant difference in the overall use value and use values per category between study zones (Table 3). Utilization of organs such as flower is seasonal while the leaves and roots could be used year-round. In this scientific world the cultural myths or taboos is widespread and still in practiced in the *meetei* society till today.

3.16 Conservation strategies

In general the community was conscientious and motivated regarding conservational plan issues and had adopted sound measures for the rational use of the plant. Conservation in home garden was performed. Additionally, the intensity and frequency of exploitation was controlled as there is a local rule not to pluck any part of the plant on sunday and any days on mid-noon to protect native plant species. Various ethno-conservation practices, in the form of tradition, myths and folktales have made the survival of plant for some many years. The most important part of the conservation strategy is to make people aware about its various

beneficial medicinal properties that are why every household having a kitchen garden have at least one plant of *P. thyrsoformis* in it.

4. Conclusion

This study shows the social importance of the species in Manipur, particularly regarding the significance of folk-medicine in primary healthcare. Uses and ethno-ecological knowledge *P. thyrsoformis* showed a multiple use pattern. Leaves use for sprains appears to be a new finding in this study. Our study revealed that the highest uses of the species were found to be almost same in both zones. This suggests a positive relationship between plant and *meetei* community. The study zones display similarity in use value or in the method of use, importance of the species and implications for sustainable use. We can conclude that this plant is one of the most important plant species associated with the *meetei* community of Manipur. The data compiled in this study area contribution to documentation at regional level and national level and can serve as a basis to develop larger scientific study.

5. Competing interest.

The authors declare that they have no competing interests.

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