Ethnobotanical Study of *Phologacanthus thyrsiformis* Nees: A Conserved Medicinal Plant of Manipur, Northeast India

Deshworjit Singh Ningombam* and Potsangbam Kumar Singh

**ABSTRACT**

*Phologacanthus thyrsiformis* (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 sensititize 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) in each study area have been expressed as:

\[ FL(\%) = \frac{n}{N} \times 100 \]

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 Hadr.) Mabb.;
Synonym: 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, penduncle short, quadrangular, ca 10-15 cm long, pubescent. Bract small 1.8 x 0.5 cm long, linear, apiculate, caducous. Calyx 5- partite, spilited 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 analgestic 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 [3].

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. thyrsiformis. 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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Healers</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Witchcraft</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Housewives</td>
<td>Nil</td>
<td>8</td>
</tr>
<tr>
<td>Knowlegeable persons</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>13</td>
</tr>
</tbody>
</table>

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 alove 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 god at a particular place as fixed, she was quietly left the place but god. One night king’s queen Panthoibi ran away to alove with the god. The informants were herbal healers, witchcraft practitioner, housewives and elderly persons who have knowledge about the ethno-botanical aspects of P. thyrsiformis. The study was based on the informants of these informants.

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.

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).

3.14 Folk-medicinal uses
Table 2: Showing the folkmedicinal uses of P. thyrsiformis by the meetei community.

<table>
<thead>
<tr>
<th>Name of Local health tradition</th>
<th>Health condition</th>
<th>Part used/ ingredients used</th>
<th>Mode of preparation</th>
<th>Mode of administration &amp; Dosages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agang mayoknaba</td>
<td>Easy deliver of child birth</td>
<td>Root</td>
<td>Powdered 200 gm is mixed with water and made paste</td>
<td>The porridge is applied externally on sex organ, buttock and abdomen.</td>
</tr>
<tr>
<td>Angang yeithaba</td>
<td>Abortion</td>
<td>Leaf</td>
<td>35-45 leaves into 1 liter is boiled up to 1/3 of the volume</td>
<td>50 ml of the decoction is taken orally for 3-4 days.</td>
</tr>
<tr>
<td>Khonghamthaba</td>
<td>Diarrhoea, dysentery &amp; cholera</td>
<td>Leaf, rhizome of Zingiber officinalis</td>
<td>Leaves crushed mixed smashed rhizome of Zinger with little salt is dissolved in water.</td>
<td>100 ml of the mixture is orally taken twice daily.</td>
</tr>
<tr>
<td>B.P control</td>
<td>High Blood pressure control</td>
<td>Leaf &amp; Clerodendron colebroekiana leaf</td>
<td>Leaf of both plants decoction is taken</td>
<td>250 ml of the decoction is orally taken daily is for 3 days.</td>
</tr>
<tr>
<td>Yairong</td>
<td>Boils</td>
<td>Young shoot, salt &amp; rhizome of zinger.</td>
<td>Young shoots is smashed with ginger and little salt is added</td>
<td>The porridge is applied on the affected area.</td>
</tr>
</tbody>
</table>
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 khouba
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>
<thead>
<tr>
<th>Sl no</th>
<th>Form of use</th>
<th>Fidelity Level (%)</th>
<th>Urban (n=33)</th>
<th>Rural (n=35)</th>
<th>Total (n=68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Easy deliver of child birth</td>
<td>9.090909</td>
<td>22.85714</td>
<td>16.17647</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Abortion</td>
<td>18.18182</td>
<td>40</td>
<td>29.41176</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diarrhoea, dysentery and cholera</td>
<td>30.30303</td>
<td>48.57143</td>
<td>39.70588</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Irregular menstruation</td>
<td>24.24242</td>
<td>40</td>
<td>32.35294</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Malaria fever</td>
<td>21.21212</td>
<td>28.57143</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Small pox and dermatological problems</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cold and cough</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Viral influenza</td>
<td>84.84848</td>
<td>91.42857</td>
<td>88.23529</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Boils</td>
<td>21.21212</td>
<td>25.71429</td>
<td>23.52941</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Burns</td>
<td>15.15152</td>
<td>40</td>
<td>27.94118</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>High Blood Pressure</td>
<td>24.24242</td>
<td>34.28571</td>
<td>27.94118</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sprains and body aches</td>
<td>24.24242</td>
<td>34.28571</td>
<td>29.41176</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Food recipes</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Witchcraft or sorcery</td>
<td>12.12121</td>
<td>14.28571</td>
<td>13.23529</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Cultural rituals</td>
<td>87.87879</td>
<td>85.71429</td>
<td>86.76471</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Taboos</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Tradition and myths</td>
<td>51.51515</td>
<td>85.71429</td>
<td>69.11765</td>
<td></td>
</tr>
</tbody>
</table>

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.thrysiformis* 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. thysiflorus* 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. thyrsiformis* 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.

6. Acknowledgements
The authors are grateful to the Head, Centre of Advanced studies, Department of Life sciences, Manipur University, Canchipur, Manipur for facilities and also to the informants for their cooperation.

7. Reference:
15. Singh HT. A manual on the medicinal plants of Manipur. Published by Institute of Bioresources and Sustainable Development, Dept. of Biotechnology, Govt. of India. Printed at Sangai offset Printers, Imphal, Manipur. India. 2009, 67.