APPENDIX I

SEMI-STRUCTURED QUESTIONNAIRE ON ETHNOMEDICINE

Locality of the Medicinal Plants collection site : 

Date : 

Collection No. : 

Scientific Name of the species collected : 

1. Name of the respondent : 

2. Age : 

3. Sex : 

4. Tribe : 

5. Education level of the respondent : 

6. Is he/she a professional (full time) healer of the area : 

7. Profession of the respondent : 

8. Any other source of income : 

9. Since when did he/she started practicing : 

10. From whom did he/she acquired the knowledge : 

11. Who is going to inherit this knowledge. 
   is he/she giving any training to any others : 

12. Any specialisation : 

13. Any particular community treated or all : 

14. How many he/she has treated successfully : 

15. Any use of material other than plant parts 
   (eg. Animal parts, insects etc) : 

16. Who collects the plant : 

17. Did he/she cultivate the plants for ease of availability 
   (Name of the species if any) : 

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APPENDIX II

INFORMATION ON THE PLANT

1. Local name of the plant : 
2. Plant type : 
3. Degree of management (wild or cultivated) : 
4. Distribution (rare or abundant stating reasons why) : 
5. Changes in abundance of the plants for the last 10 years (more abundant/same/rare) : 
6. Habitat : 
7. Part used : 
8. Dried or fresh : 
9. Disease treated : 
10. Method of preparation of medicine : 
11. Dosage : 
12. Used singly or in combination with other plant parts etc : 
13. Any side effects reported : 
14. What kinds of traditional methods are being used for the processing of medicinal plants after harvesting : 
15. Any food value : 
16. Any other uses other than medicine : 

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## MARKET SURVEY

1. Local name of the plant:  
2. Plant type:  
3. Degree of management (wild or cultivated):  
4. Habitat:  
5. Part used:  
6. Dried or fresh:  
7. Distribution (rare or abundant stating reasons why):  
8. Changes in abundance of the plants for the last 10 years (more abundant/same/rare):  
9. Culinary process in detail:  
10. Used singly or in combination with other plant parts etc:  
11. Is it sold:  
12. Quantity sold per day/month/year:  
13. Amount collected per year:  
14. Buyers (particular community or all including non-tribals):  
15. Price/kg:  
16. Condition of the plant sold (dry/fresh):  
17. Brought to the market (daily/weekly/monthly):  
18. Percentage of the people in the area doing the business:  
19. Availability:  
20. How much sold now as compared to the past 10 years (more/same/less):  
21. Why? (less available for harvest/any other reason):  
22. What kinds of traditional methods are being used for the processing after harvesting:  
23. What are the problems faced in this business:  
24. Any other uses:  
PUBLICATION

Research Paper Published


Research Paper (in press)


Others


Seminar/Conference attended


Traditional use of medicinal plants by the Jaintia tribes in North Cachar Hills district of Assam, northeast India
Albert L Sajem*1 and Kuldip Gosai

Abstract
The study of ethnobotany relating to any tribe is in itself a very intricate or convoluted process. This paper documents the traditional knowledge of medicinal plants that are in use by the indigenous Jaintia tribes residing in few isolated pockets of northeast India. The present study was done through structured questionnaires in consultations with the tribal practitioners and has resulted in the documentation of 39 medicinal plant species belonging to 27 families and 38 genera. For curing diverse forms of ailments, the use of aboveground plant parts was higher (76.59%) than the underground plant parts (23.41%). Of the aboveground plant parts, leaf was used in the majority of cases (23 species), followed by fruit (4). Different underground plant forms such as root, tuber, rhizome, bulb and pseudo-bulb were also found to be in use by the Jaintia tribe as a medicine. Altogether, 30 types of ailments have been reported to be cured by using these 39 medicinal plant species. The study thus underlines the potentials of the ethnobotanical research and the need for the documentation of traditional ecological knowledge pertaining to the medicinal plant utilization for the greater benefit of mankind.

Background
Plants are the basis of life on earth and are central to people's livelihoods. Tribal people are the ecosystem people who live in harmony with the nature and maintain a close link between man and environment. Indian sub-continent is being inhabited by over 53.8 million tribal people in 5000 forest dominated villages of tribal community and comprising 15% of the total geographical area of Indian landmasses, representing one of the greatest emporia of ethno-botanical wealth [1]. The Northeastern states of India that comprises of eight sister states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura harbors more than 130 major tribal communities of the total 427 tribal communities found in India (2001 census). In general, the tribes of North East India have been categorized into two broad ethnic communities Khadi and the Jaintia tribes of Meghalaya, who belong to 'Monkhemar' culture of Austro dialect and the rest of the tribal groups are basically Mongoloid, who belongs to Tibeto-Burman subfamily of Tibeto-Chinese group [2-4].

The Gateway of North East India, Assam with its stunning scenic grandeur entices the adventurer and tourist alike with its verdant valleys, rolling tracts of paddy and tea, misty mountain peaks, swift rivers comprises 12.8% of the total tribal population of India (2001 census). The Census enumerates 14 hill tribes, 12 of these are tribes whose settlements go back to the days of undivided Assam and include pockets of Khadi, Jaintia, and related tribes, Caro.
Jaintia inhabited villages of North Cachar Hills, Meghalaya, and Dimapur (14.4%) form the major hill tribal population of Assam (1991 census). A rich diversity of both population and flora in the state has provided an initial advantage to its inhabitants since times immemorial for observing and scrutinizing the rich flora and fauna for developing their own traditional knowledge. The history reveals that most of the tribal economies have been engaged in subsistence agriculture or hunting and gathering. With the passage of time, they have developed a great deal of knowledge on the use of plants and plant products in curing various ailments. They have a deep belief in their native folklore medicine for remedies and they rely exclusively on their own herbal cure.

Although different workers have documented the uses of various medicinal plants from different parts of India [3, 5, 11-40] information on the traditional and cultural practices of the varied tribes residing in the North Cachar Hills district of Assam is unavailable. Therefore, a need was felt to gather in-depth information on the plant species used by the Jaintia tribal group and document their traditional knowledge and cultural practices which may be under threat due to the influence of modernization.

Study area: Jaintia group of villages

The Jaintias or the Pans who bear the history of migration to around 1905 in Jaintia are among the prominent inhabitants of the North Cachar Hills (25°35'N - 25°47'N latitude and 92°37' - 93°17'E longitude) situated at the southern part of Assam and bounded by Nagaland and Manipur in the east, Cachar district of Assam in the south, Meghalaya state and the part of Karbi Anglong & Naga district in the north (Figure 1). They are concentrated mainly at Latunga and the rest of the communities are scattered all over the district inhabited villages like Borolukha, Khoyong, Randarkhral, Dimbrucherra, Harang وأوضح, Dinekhera, Mailongalsa etc., situated at an altitude of about 700-1100 meters. Jaintia dialect has 12 spoken forms: Jowai, Shangpung, Batau, Ralang, Suraga, Sumer, Maritiki, Barato, Bymbai, Lakadong, Mynso and Nongtalang. Jowai is the standard spoken form among all these [6].

The pattern of Jaintia villages is that of scattered settlements (village houses are distributed throughout) and homes are made of bamboo and timber. Rong Khla is the most important festival of the Jaintia tribes. Most of the people in this village are still in their traditional religion. Among their festivals include Rong Be Dein Khiam, a festival to drive away evils. Another festival the Rong Phyri or the Tiger festival is also an important one and the Phur, which is connected with the home collection ceremony of the dead. Rong means festival and Khla means tiger, in the local dialect, so Rong Khla means the Tiger Festival.

Methodology

A survey was carried out during 2000-2002 to collect information on the medicinal uses of plants found in the Jaintia inhabited villages of Borolukha, Khoyong, Randarzhral, Dimbrucherra, Harang%Bawc, Dinekhera and Mailongalsa located in the hills (Figure 1). The above villages lie between (25°35'N - 25°47'N latitude and 92°37' - 93°17'E longitudes) and belong to the North Cachar Hills district of Assam, northeast India. Routine methods of plant collection and herbarium techniques [7] have been followed in the study. The plants were collected in its flowering stage as far as possible, from its natural habitat.

While collecting information on ethno medicinal plants, information have been gathered from the village chiefs (Carin Burchu), medicine man, and even local man and women and cultivators using semi-structured questionnaires. Analysis of data was made with the help of group discussions among different age classes of Jaintia villagers that include both the genders of the society. A total of 1258 villagers (759 men and 499 women) participated in the study, but only 781 (or 62% of the 1258) provided information for all the methods of data collection. The permanent sample was almost evenly split between women (n = 433, or 55.7%) and men (n = 446, or 44.3%), the average age of which was 43.9 years. Based on these information, a consensus index was determined (by calculating the percentage of informants who have quoted a given specific use of a given plant taxon) that can later be used for further scientific investigations. Some medicinal plants have also been procured which are domesticated by
the local tribes for day to day use and for the treatment of common ailments.

Information about the plants were recorded with regards to their vernacular names, plant part used, process of preparation of medicine either individually or in combination with other plant parts, and mode of application and dosage for the treatment of a particular disease or diseases. All the voucher specimens were identified using relevant floras and standard literature [8] and were deposited in the Department of Botany [DoB], Hailong Government College [HGC], Hailong. The collected information was analyzed, and correlation was made between different genera and species of the medicinal plants in order to understand the pattern in medicinal plant uses and occurrences.

Results and discussion

The Jaintias of North Cachar Hills district depends on jhum or slash and burn cultivation. Jhum is a major component of the larger agro-ecosystem that comprises of agriculture, forestry, hunting & fishing and is a land use system described as to be based on a traditional, year round, community wide, largely self contained and ritualistically sanctioned way of life [9]. Jaintias make sustainable use of available natural resources that includes bamboo, cane, pine and trees like A. heterophyllus and M. indica A. chang, A. lakoocha, Garcinia sp., Litchi chin. Sapanas mahosari, Tectona grandis, Tectona champaca, Caryota urens, Cissus sicyoides etc for different domestic as well as construction purposes. Bambous species like Phyllostachys bambusoides and Dendrocalamus hamiltonii are also cultivated for construction of houses and other domestic uses.

The present course of investigations has revealed the usage of 39 medicinal plant species used by the Jaintias tribes from the North Cachar Hills district of Assam. The information on scientific name, local name of the plant part used to cure and method of dosage has been provided. The specimen number of the plant that has been deposited in the herbarium [DoB] of HGC has also been provided (Table 1).

Table 1: Medicinal plants used by Jaintia tribes of the North Cachar Hills district of Assam, northeast India. (Continued)

<table>
<thead>
<tr>
<th>Taxonomy</th>
<th>Scientific name</th>
<th>Local name</th>
<th>Plant part</th>
<th>Method of application and Dosage</th>
</tr>
</thead>
</table>
| Morinda citrifolia L. (498, 
Cucurbitaceae) | Doup | Leaf and fruit | Leaves are crushed then orally or applied to the injured tissues for curing rabies and are also taken along with other vegetables to get rid from chest pain and other rheumatic pain (61%) |
| Nictandra tabescens VV. (535, 
Solanaceae) | Duma-sla | Aerial parts | Entire plant is ground and applied to the infected area thrice daily against skin infections (60%) |
| Ocimum sanctum L. (712, 
Lamiaceae) | Lapani | Leaves | Leaves (ca 200 g) are crushed and is later filtered through a cloth-10 ml of the extract is taken twice daily to curing stomach ache and head ache (79%) |
| Oxalis corniculata L. (765, 
Oxalidaceae) | Sakha-paleh | Whole | Entire plant is crushed and the extract is taken thrice daily to counteract dyspepsia and pneumonia (85%) |
| Phyllanthus nirura L. (803, 
Euphorbiaceae) | Santu-plan-jarmi | Leaves & roots | Leaves (ca 500 g) are crushed and are later filtered-20 ml of the extract is taken thrice daily to cure diarrhoea; roots (ca 200 g) are crushed and filtered-20 ml of the extract is taken thrice daily to cure fever (88%) |
| Piper longum L. (815, 
Piperaceae) | Samaran | Fruit & Roots | Crushed fruit mixed with jaggery and ginger powder is boiled (with ca 200 ml water) and is taken thrice daily before food for curing malaria; dry roots (ca 500 g) are crushed and taken with tea twice daily to cure body ache (69%) |
| Plantago major L. (880, 
Plantaginaceae) | Chhotak-blong | Leaves | An equal proportion of crushed leaves and raw milk (wiv) is mixed and taken in an empty stomach for almost a week to cure pneumonia; leaf extract is used for curing ear ache, tooth ache and gum bleeding (73%) |
| Polygonum chinense L. (912, 
Polygonaceae) | Salandem | Leaves | Leaves are ground and the extract is taken thrice daily to counteract dyspepsia (79%) |
| Polygonum officinalis L. (912, 
Polygonaceae) | Jaron | Leaves | Leaves are crushed and applied on the wounds to stop bleeding (72%) |
| Scoparia dulcis L. (1028, 
Scrophulariaceae) | Gymbat-palap | Whole | Aerial parts are boiled and decoction is used for gargles; root extract (ca 200 g) is prepared and applied twice daily to prevent cavity formation (65%) |
| Solanum indicum L. (1043, 
Solanaceae) | Sabangang | Fruit | Dried fruits are boiled, decoction used to prepare pills (ca 10 g) each and is taken twice daily for curing high blood pressure (54%) |
| Spathicarpa notabilis DC. (1059, 
Asclepiadaceae) | Santussem | Flowers | Flowers (ca 200 g) are crushed and applied twice daily to relieve tooth ache and cure cavity formation (76%) |
| Tabernanthe iboga (L.) R. Br. (1146, 
Apocynaceae) | Santu-pi-yiong | Latex | Latex is applied twice daily to prevent cavity formation (65%) |
| Urena lobata L. (1234, 
Malvaceae) | That-thu | Leaves | Decoction of the leaf is taken twice daily to reduce blood pressure; and also is taken before sleep to relieve rheumatic pain and body ache (69%) |

http://www.ethnobiomed.com/content/2/1/33
Table I: Medicinal plants used by Jaintia tribes of the North Cachar Hills district of Assam, northeast India.

<table>
<thead>
<tr>
<th>Scientific name (voucher specimen number and botanical family)</th>
<th>Local name</th>
<th>Part(s) used</th>
<th>Ethnomedical preparation and use (consensus index)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acmella aspera L. (21, Acanthaceae)</td>
<td>Soh-berthid</td>
<td>Leaf</td>
<td>Pills (1–2 g each) made out of crushed leaves and each pill is applied twice daily on boils till it heals (49%)</td>
</tr>
<tr>
<td>Acmella vesco Mill. (25, Acanthaceae)</td>
<td>Ton-phaslang</td>
<td>Flowers &amp; Leaves</td>
<td>Fresh flowers and leaves are boiled in water and decoction is prepared which is consumed once in a day to cure nose bleeding, dysentery and blood vomiting (63%)</td>
</tr>
<tr>
<td>Ageratum conyza L. (32, Asteraceae)</td>
<td>Tuah-dain</td>
<td>Leaves</td>
<td>Crushed leaves are used directly on cuts and wounds (69%)</td>
</tr>
<tr>
<td>Alstonia scholaris (L.) R. Br. (41, Apocynaceae)</td>
<td>Gumbuthen</td>
<td>Bark</td>
<td>Fresh barks are cut into small pieces and decoction is prepared which is later filtered through a cloth, concentrated and dried in shade. Out of this small pills (each of ca 1–1.5 g) are made, three pills a day (for adults) is the recommended dosage for curing asthma (75%)</td>
</tr>
<tr>
<td>Annona muricata L. (48, Zingiberaceae)</td>
<td>Salaphiah</td>
<td>Roots/Rhizome</td>
<td>Leaves or roots are crushed and then fried lightly with mustard oil and it is applied to cure joint pains (71%)</td>
</tr>
<tr>
<td>Arum maculatum L. (53, Araceae)</td>
<td>Wang-yoyng</td>
<td>Stem</td>
<td>Stems are crushed and the extract is applied directly to cure boils (58%)</td>
</tr>
<tr>
<td>Asparagus racemosus Wild. (61, Asparagaceae)</td>
<td>Lamrudoh</td>
<td>Leaves</td>
<td>Dried leaves are powdered and are taken orally to cure stomach ache and urinary disorders (83%)</td>
</tr>
<tr>
<td>Bambusa nana L. (71, Aracaceae)</td>
<td>Sohja</td>
<td>Aerial parts</td>
<td>Entire plant is crushed, boiled in water and filtered, 2–3 drops of decoction is used against skin infections (56%)</td>
</tr>
<tr>
<td>Begoniurn rhizobulhm (Miq.) J. D. (75, Begoniaceae)</td>
<td>Japau-mo</td>
<td>Rhizome/Bulb</td>
<td>It is crushed and applied on the body parts where the thorns are stuck to prevent further infection and allow it to come out by itself (80%)</td>
</tr>
<tr>
<td>Byrsonima chrysophylla Salisb. (82, Malpighiaceae)</td>
<td>Dawaiein</td>
<td>Leaves</td>
<td>Leaves are crushed and are applied on burns and bruises, eye sores, eye pain or eye itching twice daily (71%)</td>
</tr>
<tr>
<td>Caesalpinia pulcherrima L. (103, Caesalpiniaceae)</td>
<td>Dain-trut</td>
<td>Leaves, barks &amp; roots</td>
<td>Leaves, barks and roots are applied externally on skin diseases such as ring worms, leprosy (52%)</td>
</tr>
<tr>
<td>Cataria fuscata roeset (L.) J. Don. (122, Apocynaceae)</td>
<td>Santuran</td>
<td>Leaves</td>
<td>Leaves are taken directly (about a handful) for diabetes and high blood pressure, 2–3 drops of this extract is poured in the nostrils to cure nasal bleeding (67%)</td>
</tr>
<tr>
<td>Centella asiatica (L.) Urban (132, Apasaceae)</td>
<td>Wingslake</td>
<td>Whole</td>
<td>Decoction of leaves is used against conjunctivitis and other eye injury. Crushed leaves are mixed in a cup of water with a tablespoon of salt and taken once daily for stomatitis, indigestion and flatulence (78%)</td>
</tr>
<tr>
<td>Clerodendrum grandiflorum L. (163, Verbenaceae)</td>
<td>Jhr-enght</td>
<td>Leaves</td>
<td>Leaves are taken raw or are prepared along with vegetable for curing diabetes and high blood pressure (63%)</td>
</tr>
<tr>
<td>Clerodendrum serratum (L.) Moench. (163, Verbenaceae)</td>
<td>Jhr-enght</td>
<td>Leaves</td>
<td>Whole body parts are ground with water to prepare paste which is applied to cure fever (56%)</td>
</tr>
<tr>
<td>Cnidoscolus aconitifolius Vent. (163, Verbenaceae)</td>
<td>Loruphi</td>
<td>Fruits</td>
<td>Leaves are taken raw or are mixed with vegetable for curing diabetes, high blood pressure and asthma (82%)</td>
</tr>
<tr>
<td>Curcuma longa L. (185, Zingiberaceae)</td>
<td>Chymmit</td>
<td>Rhizome</td>
<td>Dried fruits are powdered and taken orally to cure stomach ache (60%)</td>
</tr>
<tr>
<td>Cuscuta reflexa Roxb. (199, Convolvulaceae)</td>
<td>Jarma</td>
<td>Whole</td>
<td>Whole plant parts are crushed and applied on the scalp to prevent premature hair fall, graying of hair and control of dandruff (79%)</td>
</tr>
<tr>
<td>Derris racemosa (L.) DC. (221, Leguminosae)</td>
<td>Yeyjur</td>
<td>Leaf &amp; seeds</td>
<td>Leaves as well as seeds are crushed; pills (ca 1–2 g each) prepared and used as Vermifuge: two pills daily with empty stomach is the recommended dosage (69%)</td>
</tr>
<tr>
<td>Gossypium herbaceum L. (249, Malvaceae)</td>
<td>Kampihat</td>
<td>Seeds</td>
<td>Pills (1–2 g each) are made out of crushed rhizomes and each pill is taken orally before food to counter-act dyspepsia (80%)</td>
</tr>
<tr>
<td>Melastoma malabathricum L. (383, Melastomaceae)</td>
<td>Sarudong</td>
<td>Leaves/Young twigs</td>
<td>Leaves are taken raw or are prepared along with vegetable for curing diabetes and high blood pressure (63%)</td>
</tr>
<tr>
<td>Mikania micrantha Kuntz (457, Asteraceae)</td>
<td>Jarma repuri</td>
<td>Leaves</td>
<td>Leaves are crushed, a tablespoon of the extract is taken thrice daily to cure nose bleeding and dyspepsia (83%)</td>
</tr>
<tr>
<td>Nipponica fluctuosa L. (463, Menispermaceae)</td>
<td>Klin-rchakw</td>
<td>Roots</td>
<td>Fresh roots (ca 500 g) are crushed and soaked in (ca 500 ml) water, 100 ml of the extract is taken twice daily for curing piles (93%)</td>
</tr>
</tbody>
</table>
workers from the North East India itself have contributed to the knowledge of 1953 ethno medicinal uses of plants (Table 2). This whopping figure enriches the earlier report from this part of the country [3]. Different plants used by the Thottamanackans of Tamil Nadu, Miris of Assam, Nagas of Nagaland, tea tribes of Assam, Chakma community in Arunachal Pradesh, Meitei community in Manipur, Nishi tribes of Arunachal Pradesh, Mizo tribes of Mizoram, Mimos of Arunachal Pradesh, Mikirs of Assam, Shan tribes of Assam, Khonds of Andhra Pradesh, Bhot tribes in Madhya Pradesh, Apatani tribes of Arunachal Pradesh etc. [3,11,14,17,20,37] has some or the other relevance with the plants that are found to be in use by the lairtia tribe residing in this remote part of India. The use of Ascyphyllum asperum L. against urinary disorders has been also reported amongst the Chakma community in Arunachal Pradesh [37] while the same species is used against eye burns in the Coastal region of Cape Comorian in India [38]. The root powder of Asparagus racemosus Willd also known as Shatavari has been found to be effective in chronic peptic ulcer [23] while the lainitias use it for urinary disorders as well as stomach ache that could be due to high peptic juice secretion Cattaranthus roseus (L.) Don. also known as an anti cancer drug yielding plant [39] too finds its usage in Arunachal Pradesh against diabetes and the use of Centella asiatica (L.) Urban against stomach disorder is common to different tribes and communities of India [5,11,14,17,20,37] and [39] and is also used as a brain tonic [38]. Besides this, the inherent property of this plant to act against conjunctivitis and other eye injury has never been reported earlier. Similarly, the use of Cleomestrum varium (L.) Month against asthma has never been reported earlier; only its use against diverse form of skin diseases was found in the Coastal region of Cape Comorian in India [38]. Ocimum sanctum L. has a long Indian history of bearing an antiutisive property but its analgesic use has never been reported earlier.

Thus it can be said now that the discovery of different plant species used by the lainitias of North Cachar Hills district of Assam paves way the need to undertake a detailed ethnobotanical study of the whole hill districts of Assam involving as many tribes as possible. In spite of the rich wealth of bio-resources and potential, development is far from meeting the expectations of local people in Assam mainly in terms of existing health care facilities and herbal industries.

Conclusion

The information generated from the present study regarding the medicinal plant use by the lainitia tribes need a thorough phytochemical investigation including alkaloid extraction and isolation along with few clinical trials. This could help in creating mass awareness regarding the need for conservation of such plants and also in the promotion of ethno-medico-botany knowledge within the region besides contributing to the preservation and enrichment of the gene bank of such economically important species before they are lost forever.

Acknowledgements

We thank all the faculty members of the Department of Botany, Hailong Government College for guiding during the entire period of investigation. Villagers of Borolukha, Khyong, Bondarking, Dimphascherra, Harangajao, Delpokhera and Malaoqsa from the North Cachar Hills district of Assam. India deserve appreciation for their immense help and cooperation during the field work. We also thank the two anonymous referees whose comments were useful in improving the quality of the manuscript.

References

Table 2: Ethnobotanical uses of plants reported from different parts of India.

<table>
<thead>
<tr>
<th>Tribes/Ethnic Groups/Indigenous people/Region</th>
<th>Number of plants reported</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apatani</td>
<td>158</td>
<td>Kala C P (2005)</td>
</tr>
<tr>
<td>Assam</td>
<td>464</td>
<td>Haridasan K et al (2002)</td>
</tr>
<tr>
<td>Assam</td>
<td>35</td>
<td>Islam M (1996)</td>
</tr>
<tr>
<td>Cappo Comorin</td>
<td>89</td>
<td>Jeeva S et al (2005)</td>
</tr>
<tr>
<td>Chakma</td>
<td>63</td>
<td>Sarmah K et al (2006)</td>
</tr>
<tr>
<td>Chhetris</td>
<td>51</td>
<td>Udyan PS et al (2005)</td>
</tr>
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<td>Dimasa</td>
<td>5</td>
<td>Dutta PK and Dutta BK (2000)</td>
</tr>
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<td>Dev Barma</td>
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<td>Jaintia</td>
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<td>Sajen AL and Gosai K (present study)</td>
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<td>Kasdor</td>
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<td>Orang Polka</td>
<td>27</td>
<td>Mitra S and Muhkherjee SK (2005)</td>
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<td>Naga</td>
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<td>Jamir N S (1999)</td>
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<td>Rao RR (1997)</td>
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<td>Rongmer</td>
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<td>Borah HK and Pandey AK (1996)</td>
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<td>Tai Aton, Tai Khamyang, Tai Turung and Sonowal Kachari</td>
<td>22</td>
<td>Pandey AK et al (1996)</td>
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<td>These Norths of India</td>
<td>115</td>
<td>Ganesan S et al (2006)</td>
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<td>Yobins</td>
<td>20</td>
<td>Yobin Y S H (1999)</td>
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</table>

The medicinal plant species used by the Biantias were found to be distributed across 27 families and 37 genera. Different parts of medicinal plant species were used by them as medicine. For curing ailments, the use of aboveground plant parts was higher (76.39%) than the underground plant parts (23.61%). Of the aboveground plant parts, leaf was used in the majority of cases (23 species), followed by fruits (4). Different underground plant forms such as root, tuber, rhizome, bulb and pseudo-bulb have also been found to be in use as a source for curing ailments. The whole plant of 5 species [e.g. Ceratostigma plumbaginoides (L.) D.Don, Cassia tinctoria Roxb., Ocimum tenuiflorum L. and Cheroendendron serratum (L.) Moench and Scrophularia dulcis L.] were used as medicine. These 30 medicinal plant species were used in curing about 30 types of ailments, of which the highest numbers of plant species (20 species) were used for the treatment of gastrointestinal disorders such as indigestion and constipation. About 8 medicinal plant species were used in curing cough and cold, and 5 medicinal plant species were used for healing cuts and wounds (Table 1).

Different researchers from the country have reported altogether 2146 ethno medicinal uses of plants. Out of these,
Traditional Tribal knowledge and Status of some Rare and Endemic Medicinal Plants of North Cachar Hills district of Assam, Northeast India.

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Abstract

An ethnobotanical survey carried out in the district of North Cachar hills, Assam, North East India during the period of February 2006 – November 2006, has revealed 34 species of plants to be threatened in several parts of the country, and in the district itself. More than 6 species of plants are included in the red Data Book of Indian Plants, 5 numbers of species have already been included in the Red Data List of the IUCN. 13 species documented in the present paper have not been reported about its threat status earlier, but are now threatened in the district. These plants are used in various ways such as, medicinal, wild edibles, ornamentals, building materials and other miscellaneous uses in their daily life. Because of the declining population of species like, *Cephalotaxus griffithii*, *Renanthera inschootiana*, *Swertia chirata* etc, the area warrants conservation in order to preserve them from extinction. The present paper documents on the botanical name, parts used, local name, and also compares the threat status relative to other regions of the country as per IUCN Guidelines.

Key words: Traditional healthcare system, North Cachar Hills, Threat Status.

Introduction

Plants have been used in the traditional healthcare system from time immemorial, particularly among the tribal communities. Numerous wild and cultivated plants play a vital role in their culture, customs, traditional healthcare system, rituals etc, and this interrelationship has evolved over generations of experience and practice. Ayurveda, which is one of the oldest system of traditional healthcare system and yet living traditions practiced widely in India, Sri Lanka and other countries has a sound philosophical and sound basis. Atharvaveda (around 1200 BC), Charak Samhita and Shusrut Samhita (1000-500 BC) are the main classics that gives a detailed description of over 700 herbs. Herbal medicines are becoming popular worldwide due to its growing recognition of natural products being cheaper and without any side effects. Demands for medicinal plants are increasing in both developing and developed countries. As per WHO estimate, about 80% of the population in the developing countries depends directly on plants for its
Out of the 20,000 medicinal plants listed by the WHO globally, India’s contribution is 15 – 20%. In India, about 2,000 drugs used are of plant origin.

India contains over 5% of the world’s diversity though it covers only 2% of the earth’s surface but it is also one of the biodiversity hotspots of the richest and highly endangered eco-regions of the world. At present, there is a worldwide movement for assessing the plant resources and researches for new plants which are of medicinal and economical value and importance. Researchers are focusing mainly on ethnobotanical and ethnomedicinal investigation to fulfill the increasing demand of herbal products. Medicinal plants are now under great pressure due to their excessive collection or exploitation. Continuous exploitation of several medicinal plant species and substantial loss of their habitats have resulted in the population decline of many high value medicinal plant species over the years. The degree of threat to natural populations of medicinal plants has increased because more than 90% of medicinal plant raw material for herbal industries in India and also for export is drawn from natural habitats. The primary threat to medicinal plants is those used by human beings that affect any kind of biodiversity. The weakening of customary laws has often proved to be easily diluted by modern socio-economic forces. There are many other potential causes of rarity in medicinal plant species, such as habitat specificity, narrow range of distribution, land use disturbance, introduction of non-natives, habitat alteration, climatic changes, heavy livestock grazing, explosion of human population, fragmentation and degradation of population, population bottleneck and genetic drift.

The North Eastern States of India comprising 8 states harbour more than 180 major tribal communities of the total 427 tribal communities found in India. Assam itself shares 12.8% of the total tribal population of India (2001 census). The tribal people of the region still practice their own traditional healthcare system. They have a vast and in-depth understanding about plants, both conventional and non-conventional for food and for medicine. In continuance of our studies on the ethnomedicinal plants on the district of North Cachar Hills of the state of Assam, India, we have documented several threatened plants species which have been declared rare, endangered or extinct in the wild in other states of the country. Some species documented here have also been found to be listed in the Red Data Book of Indian Plants. At present, some of these plants are on the verge of being rare in the district due to extensive indiscriminate collection either for medicine or for food. Urgent attention is needed to conserve and preserve these medicinally important
plants. The present paper seeks to highlight some of the rare and endangered species of plants from the North Cachar Hills district of Assam.

Methodology

Study Area:

![Map of the Study area.](image)

The North Cachar Hills district is one of the hill districts of Assam, covering an area of 4890 sq. km. It is located between 92°37' E - 93°17'E longitude and 25°3' N - 25°27' N latitudes. It is a place of immense interest and potential for Ethnobotanist as well as Anthropologist. More than 12 ethnic tribes namely Dimasa, Zeme, Biate, Jaintia, Hrangkhol, Hmar, Kuki, Vaiphei, Khelma etc live harmoniously with one another. Most of the villages are situated far from modern conveniences and inaccessible by road or rail. The entire district has only one Civil Hospital with a few community healthcare centers and modern medical facilities are lacking. Thus the tribal villagers have deep faith in their traditional healthcare system and in most cases prefer them to the modern system of medicine. ‘Jhum’ or Shifting cultivation is the traditional means of agriculture practiced by the tribal villagers. Besides these, they raise livestock such as cows, goats, pigs, chicken etc and also grow a variety of both wild and cultivated plants in their residential compounds. Although the region is one of the richest regions in the world in terms of natural resources, it is the abode of one of the poorest groups of people. The district face problems like drinking water, healthcare, transportation, electricity and to make it worse, insurgency in the small hill district is causing a halt to developments in the entire district.
The present paper reports on the plants species documented from the surveys carried out during the period February 2006 – November 2006. First hand information about the medicinal use of plants was collected from the traditional healers and the *jhum* cultivators. The age of the respondents ranges between 27 years to 78 years and the number of male respondents was higher (67%) as compared to the female respondents (33%). Most of the traditional healers were reluctant to reveal any information but a few consented for collection from the forest. The *jhum* cultivators also reveal many plants used for daily ailments and also agreed for field trips to collect the plant species. The respondents were selected randomly and prior informed consent was obtained from each respondents. The plants were collected in its flowering state and data concerning its method of use, plant type, mode of preparation, doses, local name etc have been recorded with a photograph of all specimens. The plants samples were collected and processed following the routine method of plant collection and herbarium technique [20]. The specimens have been identified using relevant floras and standard literature [21-23]. All voucher specimens have been deposited at the Department of Ecology and Environmental Science, Assam University, Silchar, India. In course of the collection we came across a few rare and endangered species which have been included in the Red Data Book of Indian Plants [24], CITES plants [25], IUCN Red List of threatened species [26] and several other papers from the country. Other plants which have not been listed in the Red Data Book but are now rare or endangered in the study area are also documented. Rarity of species is determined by field study, visual estimation, literature, herbaria and from discussions with the traditional healers and the aged citizens. The criterion for categorization of threatened species is based on the IUCN [27]. A total of 32 species of plants belonging to 29 genera and 25 botanical families have been documented. These plants are used in various ways such as medicinal, wild edibles, ornamentals, building materials and other miscellaneous uses in their daily life.

**Result**

Out of the 32 species of plants documented, 19 species have also been reported from other regions of the country about its threat status. More than 6 species of plants are included in the Red Data Book of Indian Plants [24], 5 number of species have already been included in the Red Data Book of the IUCN [26]. 13 species documented in this paper have not been reported about its threat status earlier, but the study has revealed that these plants are now being threatened in the district due to its excessive collection from the wild. It has
also been observed that a few plants that have been declared, rare or endangered or extinct in the wild in other regions of the country are still found in abundance in the wild in the district. The plant species are enumerated in alphabetical order, giving information on its botanical name, family, local name in different languages, uses and threat status of the plants in the study area relative to other regions as per IUCN Guidelines.

01. Botanical Name : *Alsophila costularis* Bak.

**Family** : Cyatheaceae  
**Local name** : Kokicha (*Biate*), Thingkokcha (*Hmar*), Kokpuizikzial (*Vaiphei*).  
**Uses** : The stem is used in making flower vase, ash trays, pots and other decorative.  
**Threat status** : 1. It is included in Appendix II of Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES)* which restricts its export.  
2. Near threatened (NT) in the district.

02. Botanical Name : *Alsophila gigantia* Wall ex Hook.

**Family** : Cyatheaceae  
**Local name** : Kokicha (*Biate*), Thingkokcha (*Hmar*), Kokpuizikzial (*Vaiphei*).  
**Uses** : The stem is used in making flower vase, ash trays, pots and other decorative.  
**Threat status** : 1. It is included in Appendix II of Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES)* which restricts its export.  
2. Near threatened (NT) in the district.

03. Botanical Name : *Alstonia scholaris* R. Brown.

**Family** : Apocynaceae  
**Local name** : Gumbuthlen (*Jaintia*), Chongpereng (*Hmar*), Thingdonkai (*Vaiphei*), Henampuatungduipa (*Zeme*).  
**Uses** : Bark is used in the treatment of malaria (*Jaintia*) and dysentery (*Hmar*).  
**Threat status** : 1. Near threatened (NT) in the Red List of IUCN (ver.2.3, 1994).  
2. Least concerned (LC) in the district.

04. Botanical Name : *Angiopteris evacta* Forst.

**Family** : Marattiaceae  
**Local name** : Kokicha (*Biate*), Partlunlo (*Hmar*).  
**Uses** : Rhizome is used in the treatment of infected wounds (*Biate*).  
**Threat status** : 1. Endangered (EN) in the Red Data Book of IUCN  
2. Near Threatened (NT) in the district.
05. Botanical Name: *Aralia sikkimensis* Parry.

**Family:** Araliaceae  
**Local name:** Rakadap chheh (Jaintia), Thingkokcha (Hmar), Chimchok (Vaiphei), Namturebang (Zeme)  
**Uses:** Young leaves are used as vegetables. The bark is used as medicine.  
**Threat status:** 1. Near threatened (NT) in the district.

06. Botanical Name: *Artocarpus lakoocha* Roxb.

**Family:** Moraceae  
**Local name:** Chham (Jaintia), Tat (Biate), Tatthei (Vaiphei), Tabelechi (Zeme)  
**Uses:** Seeds and barks are used in the treatment of tumour and dysentery (Biate). Fruit is edible and the tree is used for timber and firewood.  
**Threat status:** 1. Near threatened (NT) in the district.

07. Botanical Name: *Canarium bengalense* Roxb.

**Family:** Burseraceae  
**Local name:** Umchhiang (Jaintia), Berothing (Hmar), Bero (Biate), Keruta (Zeme)  
**Uses:** Latex is used in the treatment of wounds and gum infection (Jaintia). It is also collected and sold in the market by the tribals.  
**Threat status:** 1. Near threatened (NT) in the district.

08. Botanical Name: *Cinnamomum tamala* Nees & Ebern.

**Family:** Lauraceae  
**Local name:** Lapanriang (Jaintia), Thingdogimtui (Vaiphei), N'teumaneu (Zeme)  
**Uses:** Leaves and barks are used in the treatment of stomach disorder (Jaintia).  
**Threat status:** 1. Near threatened (NT)/Low Risk (LR) in Darjeeling Himalaya.  
2. Endangered (EN) in Himachal Pradesh  
2. Least concerned (LC) in the district.

09. Botanical Name: *Cinnamomum obtusifolium* Nees.

**Family:** Lauraceae  
**Local name:** Lapanriang sniang (Jaintia), Thingbaithum suak (Vaiphei), N'tumapali (Zeme)  
**Uses:** Bark is used in the treatment of fever (Zeme) and roots in body ache (Vaiphei)  
**Threat status:** 1. Vulnerable (VU) in the district.

10. Botanical Name: *Citrus medica* Linn.

**Family:** Rutaceae  
**Local name:** Sauphria (Jaintia), Serte (Hmar), Gareuchi cheibezet (Zeme)  
**Uses:** Bark is used in the treatment of malaria (Jaintia) and dysentery (Hmar)  
**Threat status:** 1. Rare in the Eastern Ghats.  
2. Near Threatened (NT) in the district.
   - **Family**: Cycádaeae
   - **Local name**: Snikor (Jaintia), Thapin (Dimasa).
   - **Uses**: Female cone is used as medicine (Dimasa). The stem is cut to pieces to make brush for cleaning floors. (Jaintia)
   - **Threat status**: 1. Near threatened (NT) in the Red List of IUCN (ver.3.1, 2001).
   2. It is included in Appendix II of Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES)* which restricts its export.
   3. Vulnerable (VU) in the district.

12. Botanical Name: *Cissampelos pareira* Linn.
   - **Family**: Menispermaceae
   - **Local name**: Khauchhim (Hmar), Nampi Heuria (Zeme).
   - **Uses**: Root used in the treatment of fever (Hmar)
   - **Threat status**: 1. Vulnerable (VU) in Darjeeling Himalaya
   2. Least Concerned (LC) in the district.

   - **Family**: Dioscoreaceae
   - **Local name**: Ram bahra (Hmar), Baha (Vaiphei).
   - **Uses**: Tuberds are edible, also used as medicine (Hmar)
   - **Threat status**: 1. Vulnerable (VU) in the Assam (Red Data Book of Indian Plants. Nayar & Shastri, 2000)
   3. Vulnerable (VU) in the district.

   - **Family**: Mimosaceae
   - **Local name**: Tangnot (Jaintia), Hgaria (Zeme), Poi (Biate & Hmar).
   - **Uses**: Seeds are used in the treatment of scorpion’s sting. Seeds are used by the tribal children (Hmar, Biate, Hrangkhol, Vaiphei, Kuki, Zeme) for playing traditional game.
   - **Threat status**: 1. Endangered (EN) in the Eastern Ghats.
   2. Vulnerable (VU) in the district.

15. Botanical Name: *Gloriosa superba* Linn.
   - **Family**: Liliaceae
   - **Local name**: Khindaula (Dimasa).
   - **Uses**: Leaves are used to remove intestinal worms (Dimasa). Ornamental.
   - **Threat status**: 1. Extinct (EW) in the wild in Darjeeling Himalaya.
   2. Endangered (EN) in Himachal Pradesh.
   3. Endangered plant of Asia and Africa.
   4. Least concerned (LC) in the district.
16. **Botanical Name**: *Helicia robusta* Wall.  
- **Family**: Proteaceae  
- **Local name**: Pasaltakaza (*Hmar*), Pasalpa kutizia (*Biate*).  
- **Uses**: Used as timber and firewood. Bark is used in the treatment of gastric (*Hmar*)  
- **Threat status**: 1. Vulnerable (VU) in the district.

17. **Botanical Name**: *Hedyotis scendens* Roxb.  
- **Family**: Rubiaceae  
- **Local name**: Lochangdum (*Vaiphei*), Tamringma (*Zeme*), Kelhrangdon (*Hrangkhol*), Jarmadawai (*Jaintia*).  
- **Uses**: Root used in the treatment of malaria (*Jaintia*), fever (*Vaiphei & Hmar*), and leaves are used to remove kidney stone.  
- **Threat status**: 1. Vulnerable (VU) in the district.

18. **Botanical Name**: *Ipomoea coccinea* Linn.  
- **Family**: Convolvulaceae  
- **Local name**: Nipuipak (*Vaiphei*), N’retpa (*Zeme*).  
- **Uses**: Ornamental. Root used in the treatment of piles. (*Zeme*)  
- **Threat status**: 1. Near threatened (NT) in the district.

19. **Botanical Name**: *Ipomoea quamoclit* Linn.  
- **Family**: Convolvulaceae  
- **Local name**: Gei N’kiapa (*Zeme*), Lengchonghoi (*Kuki*).  
- **Uses**: Ornamental. Root used in the treatment of piles. (*Zeme*)  
- **Threat status**: 1. Vulnerable (VU) in the district.

20. **Botanical Name**: *Messua ferrea* Linn.  
- **Family**: Clusiaceae  
- **Local name**: Seise (*Vaiphei*), Ngaibang (*Zeme*), Laternga (*Jaintia*).  
- **Uses**: Ornamental. Leaves are also used as medicine, stem used as firewood  
- **Threat status**: 1. Endangered (EN) in Darjeeling Himalaya.  
- 2. Vulnerable (VU) in the district.

21. **Botanical Name**: *Milletia pachycarpa* Benth.  
- **Family**: Papilionaceae  
- **Local name**: Chheh pli (*Jaintia*), Rulei (*Hmar*), Tebamria (*Zeme*), Rujao (*Dimasa*).  
- **Uses**: Bark used in skin disease (*Hmar & Dimasa*). The barks are used for catching fishes (crushed barks are thrown in the streams in large quantity).  
- **Threat status**: 1. Vulnerable (VU) in the district.
<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Family</th>
<th>Local name</th>
<th>Uses</th>
<th>Threat status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>22. Myrica farquhariana Wall.</strong></td>
<td>Myricaceae</td>
<td>Makei (Biante).</td>
<td>Fruits edible, used in the treatment of constipation (Biante). The tree is used for firewood.</td>
<td>1. Near threatened (NT) in the district.</td>
</tr>
<tr>
<td><strong>25. Renanthera inschootiana Rolfe.</strong></td>
<td>Orchidaceae</td>
<td>Senri (Biante), Nauban (Vaiphei).</td>
<td>Ornamental, high value in the market.</td>
<td>1. Endangered (EN) in Manipur. 2. It is included in Appendix II of Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES)* which restricts its export. 3. Vulnerable (VU) in Mizoram, Nagaland. 4. Rare in eastern Himalayas and North East Region of India. 5. Critically Endangered (CR) in the district.</td>
</tr>
<tr>
<td><strong>26. Rhus semialotii</strong> Murr.</td>
<td>Anacardiaceae</td>
<td>Sama (Jaintia), Gembao (Dimasa), K’meu (Zeme), Khongma (Biante &amp; Hmar).</td>
<td>Fruits used in the treatment of stomach ache. (Dimasa, Hmar, Biante, Jaintia, Zeme, Hrangkhol, Kuki, Vaiphei etc.)</td>
<td>1. Vulnerable (VU) in Darjeeling Himalaya. 2. Least Concern (LC) in the district.</td>
</tr>
</tbody>
</table>
27. Botanical Name: *Sapindus mukorossi* Gaertn.

**Family:** Sapindaceae  
**Local name:** Lingsi (*Vaiphei & Kuki*), Lingseru (*Biate*), Smubi (*Jaintia*), Tegauchibang (*Zeme*), Sukathaiphang (*Dimasa*).  
**Uses:** Fruits used as medicine. It is also used as a substitute for soap in the villages by the tribals.  
**Threat status:** 1. Vulnerable (VU) in the district.

28. Botanical Name: *Swertia chirata* Buch Ham.

**Family:** Gentianaceae  
**Local name:** Chirota (*Jaintia*).  
**Uses:** Whole plant is used in the treatment of High blood pressure and Diabetes.  
**Threat status:** 1. Vulnerable (VU) in Darjeeling Himalaya.  
2. Endangered (EN) in Himachal Pradesh.  
3. Extinct in the wild (EW) in the district.


**Family:** Cephalotaxaceae  
**Local name:** Ksheh (*Jaintia*).  
**Uses:** Stem used in the treatment of septic wounds.  
**Threat status:** 1. Endangered (EN) in Central Himalaya.  
2. It is included in Appendix II of Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES)* which restricts its export.  
3. Critically Endangered (CR) in the district.  
5. Data Deficient (DD) in the Red data List of IUCN (Ver. 2.3, 1994).

30. Botanical Name: *Terminalia chebula* (DC) W&A.

**Family:** Combretaceae  
**Local name:** Gilpina damdoi (*Vaiphei*), Sohartaki (*Jaintia*) Leuciduichibang (*Zeme*).  
**Uses:** Fruits used in the treatment of stomach ache.  
**Threat status:** 1. Near Threatened (NT) in the district.

31. Botanical Name: *Vanda coerulea* Griff ex Lindl.

**Family:** Orchidaceae  
**Local name:** Trutlo/Ilunpui (*Hmar*), Nauban (*Vaiphei*).  
**Uses:** Ornamental, high value in the market  
**Threat status:** 1. Rare in Meghalaya.  
2. Rare in Arunachal Pradesh, Eastern Himalaya and North East regions of India.  
3. Vulnerable (VU) in the district.
32. Botanical Name: **Zanthoxylum armatum** DC.

**Family**: Rutaceae  
**Local name**: Yejur (Jaintia), Yaulaishak (Dimasa), Neuneiyi (Zeme).  
**Uses**: Leaves and fruits are used in the treatment of intestinal worms. It is also eaten as vegetable.  
**Threat status**: 1. Near Threatened (NT) in the district.

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* Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES) regulates the removal of species from the wild conditions and trade across international borders. Appendices are of 3 categories, Appendix I list the Threatened species, Appendix II include those that are Vulnerable and Appendix III include species which are close vigil.

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**Discussion**

North Cachar Hills district is a region characterized by diverse physiography ranging from plains, plateaus to hills and valleys of various dimension. The area is rich in flora and fauna and it lies in one of the most biodiversity rich regions of the world. The forest is of sub-tropical type which harbours different varieties of plants and animals. Most of the tribal villagers in the hill district are jhum cultivators and hunters and greatly depend on forest based products for their livelihood. Wild edible plants are a necessary supplement in their daily diet. The tribal villagers also have great faith in their traditional system of medicine and prefer them to allopathic medicine.

From the enumeration of the plant species collected it can be inferred that many threatened plants are being routinely used by the tribal villagers of the area for the treatment of ailments and also for other purposes. A perusal of the available literature has revealed that at least 19 species of plants have been reported elsewhere and also mentioned in the Red Data Book of Indian Plants to be rare, endangered or vulnerable in various parts of the country. Some are still found abundantly in the study area, as for example *Cissampelos pareira* is vulnerable (VU) in Darjeeling Himalaya but is least concerned (LC) in the present area. Similarly, *Gloriosa superba* is extinct in the wild (EW) in Darjeeling Himalaya, or endangered (EN) in Africa and other parts of Asia but is least concerned (LC) in the study area. On the contrary, species like *Swertia chirata* while vulnerable (VU) in Darjeeling Himalaya and endangered (EN) in Himachal Pradesh are now extinct in the wild in the district and are found cultivated in home gardens or jhums. Several critically endangered (CR) species like *Renanthera*
inschootiana, *C. griffithii* needs immediate conservation in order to prevent extinction in the district. Many near threatened (NT) species like *Terminalia chebula*, *Ipomoea coccinea*, *Pinus roxburghii* and vulnerable species like *Ipomoea quamoclit*, *Mesua ferrea* needs conservation.

The study has shown that continuous exploitation of several individual plant species from the wild, legally or illegally and substantial loss of their habitats has resulted in the population decline of many high value medicinal plant species in the district. As for example, it was learnt from the Jaintia villagers of Jatinga village that in the early 1980s different establishments paid money to the local people to collect indiscriminately the raw biomass of *Cephalotaxus griffithii* which was abundant at that time. Presently the natural population of *C. griffithii* is critically endangered and has almost been obliterated due to that practice. Most of the villagers in the district are illiterate and they have no idea or consequences or loss if a species become extinct. The forest department and a few NGOs have been working to preserve the rich flora and fauna with little success. The present study has also revealed some information on a few conservation strategies, that can be applied to give a more or atleast some effective result.

In the district, forest is under the control of the Autonomous council or the *Gaon Burah* (village headman) and it makes little or no meaning to classify land as reserved forest, because, the tribals are dependent on the forest and forest products. Besides, the legislation recognizes *jhum* cultivation in this area as a customary right. Therefore, it would be more agreeable to them if they are taught on using the forest resources in an economical way. The idea of inter-cropping, silviculture, and crop rotation should be encouraged so that shifting of *jhumland* is done after longer intervals. It was also found out that the recent system of *jhum* practice is not only having low output but are also eco-hazardous. The present farmers lack the knowledge that their fore fathers have. Forest is burned indiscriminately without even cutting or making a boundary. Therefore steps have to be taken in this direction and educating the minds of the people and teaching proper *jhuming* techniques to stop large scale deforestation.

Another thing that’s comes to highlight to safe guard the forest is by rehabilitation of the biodiversity of the area. Those species on which the tribals mostly depend such as, wild edibles and timber trees, firewood species etc. can be planted in large scale or cultivated. This would rejuvenate the eco-system with maximum indigenous floral and faunal elements. This will also bring in several associated species which will automatically sustain the traditional lifestyle of the tribals as well as protect the forest.
There is also several forests which are related to myth and some of them are sacred to the tribals and these forests are preserved by them. Scientific and modern methods are not known to them and very often difficult to explain to them. Therefore, the message of conservation would be more meaningful to them through myth, faith and traditions rather through scientific approach.

And most important of all is spreading awareness among the people, and active initiation from policy makers, NGO's, research workers etc, is a must to bring a permanent solution to the ever increasing environmental problems. People participation in general and the younger generation in particular will bring about changes in their mindset. And tribals have to be educated on the need of sustained utilization and regeneration of the species related to their traditional lifestyle. With their active involvement in rehabilitation programmes and other such steps, coupled with more effective protection of the forest and education, the conservation of the biodiversity of the area can be achieved.

**Conclusion**

It can be thus concluded that the study area having rich flora and fauna, is in urgent need of conservation. Some rare and endangered species of plants are still found abundantly in the region, but without protection, these may, in the near future, become endangered. The present study has shown that the area warrants a detail and more scientific floristic studies to identify the threatened plants. Besides these, taxonomy and studies on the wild edibles and medicinal plants have immense potential for researchers. Further, such studies not only benefit the scientific community but also the region and the tribal community as well.

**Acknowledgements**

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References


Some Superstitious Botanical Folklore of Different Tribes of
North Cachar Hills, Assam (Northeast India)

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Abstract

The district of North Cachar Hills of Assam, one of the most biodiverse regions of the world is endowed with different tribes each with their own traditions, customs and method of healing. Northeast India has been a paradise for ethnobotanical research but the district of N.C.Hills, with its vast ethnobotanical wealth is virtually unexplored.

The present study documents for the first time, the superstitious folkloric uses of plants to treat ailments among the different tribes. 16 species of plants has been identified with details on its method of use, disease, parts used, local name and growth forms. The study was conducted through informal interviews after prior informed consent. The study reflects a rich traditional knowledge base of the tribe on ethnomedicine with immense potential for a more detailed study with emphasis on its pharmacological aspects.

Keywords: N.C.Hills, Traditional knowledge, Superstition.

Introduction

The familiarity with the uses of plants in the field of medicine dates back to the beginning of civilization. Over the past decade, herbal medicine has become a topic of global importance in all corners of the world. It continues to receive attention of scientist from chemical, pharmacological and clinical companies in India and abroad. Such ethnobotanical studies have led to the documentation of a large number of conventional and non conventional medicinal plants used by tribals for meeting their multifarious requirements. Many folkloric uses of plants for medicine are now being supported by scientific studies that confirm both their safety and efficacy. The starting point in the development of many modern drugs is some reference in the use of that plant as an indigenous use in the traditional system of medicine or in folk medicine (Valiathan, 1998).

A report (2006-07) by the Ministry of Tribal Affairs states that the Indian subcontinent is inhabited by 84.3 million tribal populations, which is 8.2% of the total national population. They settle in more than 5000 forest dominated villages covering 15% of the total geographical area of Indian landmasses, representing one of the greatest emporia of ethnobotanical wealth (Chowdhury, 2000). The north-eastern part of India comprising of eight states alone harbour more than 130 major tribal communities out of a total 427 tribal communities found in India (Dutta and Dutta, 2005; Ramakrishnan, 1992). Tribal people are the ecosystem people who live in harmony with nature and...
maintain a close link between man and environment. Animism, symbolism, superstitious beliefs etc. plays an important part in a tribal culture. They have deep faith in their traditional method of healing which often involves superstitions.

A perusal of available literatures has shown that much research has been done in the north-eastern part of India alone (Kala, 2005; Hajra and Baishya, 1997; Borthakur, 1997; Dutta and Nath, 2000) but virtually none been documented from North Cachar Hills district of Assam (Sajem and Gosai, 2006; Tamuli and Saikia, 2004; Sajem et al, 2008). The present paper reports on some superstitious botanical folklore prevalent among different tribes of N.C.Hills district.

The Study area: North Cachar Hills district of Assam, India.

North Cachar Hills, a small hill district of Assam, Northeast India, located between 92°37' E - 93°17'E longitudes and 23°30'N - 25°47'N latitudes, lies in one of the world’s 12 mega biodiversity hotspot regions (Fig). It is a living anthropological museum of many ethnic tribes, such as Dimasa, Zeme-Naga, Hmar, Kuki, Biate, Hrangkhok, Khelma, Jaintia, Karbi, Vaiphei etc., each with their own unique cultures and traditional system of healing. The small hill district has a total population of 1, 86,189 and density of population is 38 person per square kilometres which is the lowest in the state of Assam (2001 census). Jhum or shifting cultivation on the hilly slopes is the traditional means of agricultural practice. It is the major mode of livelihood for indigenous communities and is a major component of the larger agro ecosystem that comprises of agriculture, forestry, hunting and fishing (Warner, 1991). The villages are located in isolated hilltops and far flung areas without modern medical facilities. Thus their system of medicine has remained as the most affordable and easily accessible source of treatment for daily ailments.

Fig. Map showing the study
Methodology

The study was conducted between April 2006-March 2007. Surveys were conducted through informal interviews with the traditional healers and the local cultivator. Prior informed consent was obtained before conducting the interview. Data on the uses of plants, local name, parts used, and growth forms, method of preparation and mode of application were recorded. All the plant specimens were collected in its flowering stage. A photo data of all the plant specimens has been maintained. Standard methods of plant collection and herbarium techniques have been followed in the study (Jain and Rao, 1977; Alexiades, 1996). The specimens were identified using relevant floras and standard literature (Kanjilal et al, 1982a; Kanjilal et al, 1982b; Hooker, 1989) and in consultation with the Botanical Survey of India, BSI/APC (ARUN Herbarium,) Itanagar and BSI, Eastern circle, Shillong. Voucher specimens were submitted in the Department of Ecology and Environmental Science, Assam University, Silchar.

Results

The study revealed the usage of 16 plant species used for the treatment of different ailments. The plant species collected are enumerated in alphabetical order, giving information on its botanical name, family, common name, local name, and method of use and dosage.

Enumeration

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Acorus calamus L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Areceae</td>
</tr>
<tr>
<td>English Name</td>
<td>Sweet Flag</td>
</tr>
<tr>
<td>Local Name</td>
<td>Namechek (Zeme)</td>
</tr>
<tr>
<td>Disease</td>
<td>Prevention of food allergy (due to black magic)</td>
</tr>
<tr>
<td>Part used</td>
<td>Rhizome</td>
</tr>
<tr>
<td>Method of use</td>
<td>A small piece of the rhizome is eaten before food. It is believed to render the magic potion added in food materials ineffective. (Zeme).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Allium cepa L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Liliaceae</td>
</tr>
<tr>
<td>English Name</td>
<td>Onion</td>
</tr>
<tr>
<td>Local Name</td>
<td>Piat (Jaintia)</td>
</tr>
<tr>
<td></td>
<td>Samphrang (Dimasa)</td>
</tr>
<tr>
<td>Disease</td>
<td>To cure any eye disease/evil eye</td>
</tr>
<tr>
<td>Part used</td>
<td>Bulb</td>
</tr>
<tr>
<td>Method of use</td>
<td>The bulb is cut into half and hold near the eye (Dimasa). This causes tears to flow which is believed to cleanse the eye of all its impurities and evil eye (Jaintia).</td>
</tr>
</tbody>
</table>
**Botanical Name**: Bauhinia scendens L.
**Family**: Caesalpinaceae
**English Name**: Snake Climber
**Local Name**: 
- Zongleilon (Hmar)
- Suthaibiding (Dimasa)
- Lutichhreh chitein sangragh (Jaintia)
- N’rui pichai ria/N’rui teso ria (Zeme)
**Disease**: Black magic/curse/evil spirits
**Part used**: Stem
**Method of use**: A piece of the stem (~60 cm) is kept inside the house. It is believed to ward off black magic and curses from envious neighbours (Dimasa). It is also believed by the Zemes that it could ward off evil spirits.

---

**Botanical Name**: Citrus aurantium L.
**Family**: Rutaceae
**English Name**: Orange
**Local Name**: Serthlum (Vaiphei)
**Disease**: Infection
**Part used**: Thorn
**Method of use**: The thorn is used to remove other thorns stuck in body parts. It is believed to prevent infection. It is also used to prick a raised body scar which is allowed to bleed for sometime. It flattens the raised scars (Vaiphei).

---

**Botanical Name**: Cyclosorus extensa (Bl.) Ching.
**Family**: Polypodiaceae
**Local Name**: Limbirsi (Dimasa)
**Disease**: Shingles
**Part used**: Leaves
**Method of use**: 10-15 young leaves are collected and the patient is beaten with it, in and around the infection till it bleeds. The traditional healer performs chants during the whole process. The leaves are then burned to ash and then applied over the wounds (Dimasa).

---

**Botanical Name**: Cymbopogon martenii (Roxb.) Wats
**Family**: Poaceae
**English Name**: Ginger Grass or Rosha Grass
**Local Name**: Nithal (Biate)
**Disease**: Headache
**Part used**: Leaves
**Method of use**: Water extract is applied over the head. A piece of the long leaf is also tied around the head (Biate).

---

**Botanical Name**: Dioscorea bulbifera L.
**Family**: Dioscoreaceae
**Local Name**: Jarma ske (Jaintia)
**Disease**: Enuresis
<table>
<thead>
<tr>
<th>Part used</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of use</td>
<td>Leaves are washed, cleaned and placed on the plate on which food is served. This is done for 1 week to cure enuresis (Jaintia)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th><em>Erythrina variegata</em> L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Papilionaceae</td>
</tr>
<tr>
<td>English Name</td>
<td>Coral tree</td>
</tr>
<tr>
<td>Local Name</td>
<td>N’tahabe bang (Zeme)</td>
</tr>
<tr>
<td>Disease</td>
<td>Seizure from extreme pain of stomach and heart (Black magic)</td>
</tr>
<tr>
<td>Part used</td>
<td>Roots</td>
</tr>
<tr>
<td>Method of use</td>
<td>The roots are crushed and ~ 5 ml of the juice is taken. It is also believed by the Zeme Nagas that a person who possess black magic cannot sit on a stool/chair made out of this wood (Zeme).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th><em>Euphorbia antiquorum</em> L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>English Name</td>
<td>Triangular Milkwort</td>
</tr>
<tr>
<td>Local Name</td>
<td>N’rangpali (Zeme)</td>
</tr>
<tr>
<td>Disease</td>
<td>To ward off evil spirits</td>
</tr>
<tr>
<td>Part used</td>
<td>Whole plant</td>
</tr>
<tr>
<td>Method of use</td>
<td>It is used as border plants and planted around the houses. It is believed to ward off evil spirits (Zeme).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th><em>Euphorbia roylaena</em> Boiss.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Local Name</td>
<td>N’rangbang (Zeme)</td>
</tr>
<tr>
<td>Disease</td>
<td>To ward off evil spirits</td>
</tr>
<tr>
<td>Part used</td>
<td>Whole plant</td>
</tr>
<tr>
<td>Method of use</td>
<td>It is used as border plants and planted around the houses. It is believed to ward off evil spirits (Zeme).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th><em>Ficus glomerata</em> Roxb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Local Name</td>
<td>Theithot (Hmar)</td>
</tr>
<tr>
<td>Disease</td>
<td>Eye disease</td>
</tr>
<tr>
<td>Part used</td>
<td>Leaves</td>
</tr>
<tr>
<td>Method of use</td>
<td>Seven clean leaves are taken and made into a cone. It is then filled with water and heated. This water is then applied in the eye for any eye problems. (Hmar)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th><em>Gossypium herbaceum</em> L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Malvaceae</td>
</tr>
<tr>
<td>English Name</td>
<td>Cotton tree</td>
</tr>
<tr>
<td>Local Name</td>
<td>Pat (Vaiphei)</td>
</tr>
<tr>
<td></td>
<td>Kunthlai (Dimasa)</td>
</tr>
<tr>
<td>Disease</td>
<td>Insomnia</td>
</tr>
<tr>
<td>Part used</td>
<td>Seeds</td>
</tr>
</tbody>
</table>
Method of use: Pillows made out of seeds of this plant are believed to cure insomnia. (Vaiphei & Dimasa).

**Botanical Name**: *Musa paradisiaca* L.  
**Family**: Musaceae  
**English Name**: Banana  
**Local Name**: Laigonthai (Dimasa)  
**Disease**: To ward off evil spirits  
**Part used**: Shoot part  
**Method of use**: The shoot part is used in religious rites, festivals, ceremonies etc. They are tied at the entrance of the venue of celebration which is believed to drive off evil spirits so that the programmes can be carried out without any problems.

**Botanical Name**: *Sanseviera zeylanica* Roxb.  
**Family**: Agavaceae  
**English Name**: Ceylon Bowstring Hemp  
**Local Name**: Santu P’sain (Jaintia)  
**Disease**: To ward off evil spirits and other unwanted living beings such as snakes, scorpions etc.  
**Part used**: Whole plant  
**Method of use**: It is planted around the house compounds.

**Botanical Name**: *Scoparia dulcis* L.  
**Family**: Scrophulariaceae  
**English Name**: Sweet Broomweed  
**Local Name**: Gymbat Pdyp (Jaintia)  
**Disease**: Stomach ache, (said to be due to the dislocation of the navel)  
**Part used**: Root  
**Method of use**: Roots are crushed and made in to a paste and applied on the navel. A piece of the root is also tied over the navel with a black thread to correct the location and thus cure the pain (Jaintia)

**Botanical Name**: *Urena lobata* L.  
**Family**: Malvaceae  
**English Name**: Congo jute  
**Local Name**: Saberthied (Jaintia)  
**Disease**: Sprain  
**Part used**: Roots  
**Method of use**: Crushed and applied on the swellings and bandaged. Then pieces of roots are tied around the swellings. It is believed to prevent further swelling and reduce the pain (Jaintia)

**Discussion**

From the enumeration it is clear that different tribes in N.C.Hills district still practice their age old customs and has a strong interrelationship with plants and their
usage in their customs and traditional method of healing. As many as four species, *Musa paradisiaca* L., *Euphorbia antiquorum* L., *E. roylaena* Boiss. and *Bauhinia scendens* L. are identified which, the tribal people believe, ward off evil spirit. Although their method of healing has a superstitious background, some of the species such as *Erythrina variegata* L., *Acorus calamus* L. and *Cymbopogon martini* (Roxb.) Wats can be scrutinised using scientific methods. The study also reveals some unique and unconventional methods of treating common ailments. It is a common belief among the Biate, Vaiphei, Hmar, Hrangkhol and Kuki tribe that licking a little salt or wetting the toes gives relief from burning eyes due to chilli. The Hmars, Vaiphei and Biates believe that applying a little lime (CaCO₃) in the lobes of the ears cures caterpillar stings. It is also common among the Vaiphei tribe to apply a little lime (CaCO₃) around the navel to cure flatulence and the villagers swear upon its effectiveness. Besides plants, it was also observed that some insects and animal parts are also being used for certain diseases such as, the dried gall bladder of a hoolock gibbon is used in the treatment of diabetes, crabs in the treatment of jaundice etc. The superstitious beliefs connected with certain plants explain how much the indigenous people were close to nature. ‘These superstitious beliefs in those plants may not be as imagined by the people but it reveals their deep faith in the mysterious power of divine commands that evil would befall on him or her, or their beloved ones etc. if they violated such beliefs’ (Mao, 2000).

**Conclusion**

The study thus shows that there is a vast wealth of both ethnobotanical and ethnozoological treasures which warrants a more detailed study. But due to the reduction in land holdings and increase pressure on shifting cultivation, youth on the area under study are seeking other avenues of livelihood in nearby towns, and as such, younger generation appears to be less interested in the traditional healthcare system or in the conservation of such resources. It is therefore high time to record wherever possible such indigenous botanical folklore of the various tribes. Systematic investigation of the plants to establish the pharmacological activity is anticipated to lead to development of newer and safer drugs as well as spur conservation of such unique habitat and its resources.

**Acknowledgements**

Thanks are due to Botanical Survey of India, Shillong and Itanagar for identification of the specimens. We thank Dr.P.K.Hajra, former Director, Botanical Survey of India for his assistance in the identification of the species collected. Thanks
are also due to all the informants who contributed to this study with their valuable traditional knowledge. Acknowledgement is due to the Department of Botany, Haflong Government College for logistic support.

References


Traditional Medicinal Knowledge of the Zeme (Naga) tribe of North Cachar Hills District, Assam on the Treatment of Diarrhoea.

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Abstract

North Cachar Hills district of Assam with unique geographical location, climate and land topography harbours about twelve tribes, each having a distinct culture and traditional knowledge. Due to remoteness, inaccessibility and closed culture tradition vast body of ethno-botanical knowledge has remained largely unexplored. The Zeme (Naga) tribe is one of the major tribes of the district with colorful culture and traditions in which traditional system of medicine forms a large part. The study was conducted through discussion and informal interviews with the traditional healer, local people and cultivators and visits to fields. This paper documents 8 species of medicinal plants used in the treatment of diarrhoea. The study shows that there is immense potential for ethno-botanical research which would benefit not only the scientific world but also open up new avenues for augmenting the tribal economy through sustainable approach.

Key words: Traditional knowledge, Zeme (Naga) tribe, medicinal plant.

Introduction

The familiarity with the uses of plants in the field of medicine dates back to the beginning of civilization. The tribal people and ethnic races throughout the world have develop their own cultures, customs, cults, religious rites, taboos, legends and myths, folktales, medicinal plants etc. Numerous wild and cultivated plants play a very important and vital role among these cultures and this interrelationship has evolved over generations of experience and practice (Lalramnghinglova, 2000). Over the past decade, herbal medicine has become a topic of global importance in all corners of the world. It continues to receive attention of scientist from chemical, pharmacological and clinical companies in India and abroad and the studies on folk medicines through ethno-botanical surveys are gaining importance. Such ethno-botanical studies have led to the documentation of a large number of conventional and non-conventional medicinal plants used by tribals for meeting their multifarious requirements. India is one of the 12-mega biodiversity centres having about 10% of the world's biodiversity wealth, which is distributed across 16 agro-climatic zones. Out of 17,000 species of higher plants reported to occur within India, 7500 are known to have medicinal uses. Ayurveda, the oldest medical system in the Indian Subcontinent, has alone reported approximately 2000 medicinal plant species, followed by the Siddha and Unani medical system (Kala and Sajwan, 2007). Written records of the use of plants in medicine in India can be traced back to scriptures of the Hindus, the Rig-Veda, and Ayurveda dating back to the Vedic ages. In India, organized study of ethnobotany is of recent origin but interest in this subject is growing at lightning pace and many works in different field has already been carried out.
North-east India is a region of many culture and traditions, races, an ethnic tapestry of many hues and shades. The folk culture is still vital in this region. Most tribal communities still largely depend on their traditional system of medicine. Because of their scattered and far flung settlements, and problems arising due to transportation and communication, traditional medicine has remained as the most affordable and easily accessible source of treatment (Yinag and Yewhalaw, 2007).

Though some of the tribal medicines have been already incorporated in the organized systems of medicine, much larger number of folk medicines has remained endemic to certain pockets of the area. There are several contributions from the Northeastern region of India (Borthakur, 1997; Dam and Hajra, 1997; Rawat and Choudhury, 1998; Laloo et al., 2006; Sajem and Gosai, 2006; Sajem et al. 2008) from several districts of the states, but very few have been documented from North Cachar Hills district of Assam. Also, little or no documentation of the traditional knowledge of the Zeme (Naga) tribe from North Cachar Hills has been done till date.

According to the World Health Organization (WHO) not less than 20,000 species of plants are used as medicinal plants (Gupta and Chadha, 1995) and 80% of the population in the developing countries depends directly on plants for its medicine (Pareek, 1996). Because of excessive collections and exploitation the medicinal plants are under great pressure. Plant resources are depleting globally at an alarming rate and at this rate many species of economically and medicinally important plants will become extinct if not controlled. Moreover there is a steady decline in human expertise capable of recognizing medicinal plants due to modernization. If the rich traditional knowledge base of the various ethnic tribes are not documented then there may come a time when these valuable information which forms the basis of modern medicine, may be lost forever. The present paper thus aims to highlight in detail the rich traditional practices of the Zeme (Naga) tribe on the ethno-medicinal uses of plants.

Methodology

Study area: Zeme (Naga) group of villages.

The district of North Cachar Hills is one of the two hill district of the state of Assam, located at the south-eastern part of Assam between 92°37'E-93°17'E longitudes and 25°3'N-25°47'N covering an area of 4890 sq. km (Fig.1). It has a total population of 186,189 and density of population is 38 individuals per square kilometer which is the lowest in the state of Assam according to the census of India, 2001. The climatic condition of the district is temperate and largely controlled by the South-West monsoon and the North-East winds. Rainfall is heavy during the month from May to September, but it is not evenly distributed throughout the district. The climate is also not uniform, annual average rainfall varies from 2200 mm to 2700 mm. Fog occurs frequently in the post-monsoon and cold seasons. The average mean maximum temperature and minimum temperature varies from 24°C to 30°C and 10°C to 14°C respectively with an average relative humidity of 73 to 84 percent. The nature of the soil is a mixture of sand, silt and clay. It is fertile with maximum humus clay and sandy types of soil are found in the top hills. Humus is present in large amount in undisturbed conditions. The soil pH varies from 4.6 to 5.5. The district is homeland for more than a dozen hill tribes, such as, Dimasa, Zeme (Naga), Hmar, Kuki, Biate, Hrangkhol, Khelma, Jaintia, Karbi, Vaiphei etc.(2001 census). Jhum or shifting cultivation practiced usually on the slopes is the traditional means of agriculture in the hills based on the indigenous knowledge systems. It is the major form of livelihood for indigenous communities of the North Cachar Hills district of Assam. This bountiful hill district still harbors a valuable heritage of herbal medicines along with its ethnic diversity and these diverse groups of ethnic people living in remote forest areas still depend to a great extent on the indigenous systems of medicine. They have considerable knowledge of use of both conventional and non-conventional plants, plant parts and their products.
**Collection of Data**

To collect information on the medicinal uses of plants several visits to Zeme (Naga) villages within the study area was carried out. Information on ethno medicinal plants have been gathered from the village chief (Matrai), the Traditional healer (Herenkateleupeu) and the local people and *jhum* cultivators (Hetaprapu) through discussion and informal interview. Prior informed consent of the village chiefs and other respondents were obtained before conducting the interview. Traditional healers have been visited to collect first hand information on the medicinal use of plants. Assistance of the relatively senior cultivators with knowledge of medicinal plants was extremely useful during the field study. Some of them accompanied us during field trips for correct identification.

All the plants specimens were collected in its flowering stage. Incomplete specimens (as for e.g. only bark material) are also collected and recorded for future collection and documentation. A photo data of all the plant species is also maintained. Routine methods of plant collection and herbarium technique have been followed in the study (Jain and Rao 1977; Alexiades, 1996). Information about the plants were recorded with regards to their vernacular names, plant parts used, process of preparation of medicine, either individually or in combination with other plant parts, and mode of application. The doses for the treatment of a particular disease, or diseases were also recorded. These specimens were identified using relevant floras and standard literature (Hooker, (1989); Kanjilal et al., (1982). Voucher specimens have been submitted in the Department of Ecology and Environmental Science, Assam University, Silchar.

**Results**

**Enumeration of collected data**

In the following enumeration, the plants are arranged alphabetically, giving information on botanical name, synonynm (if any), family and vernacular name. This is followed by details of parts used, disease type, method of preparation...
and dosages and any other uses if present.

**Baccaurea ramiiflora** Lour. (Plate I-E.)

**Synonym:** Baccaurea sapida Roxb.

**Family:** Euphorbiaceae

**Vernacular Name:** N'kauchi

**Part used:** Seeds

**Method of use:** 4-5 seeds are crushed and taken to cure diarrhoea.

**Bauhinia variegata** Linn. (Plate I-F.)

**Family:** Caesalpinaceae

**Vernacular Name:** Ngapa

**Part used:** Leaves and bark

**Method of use:** A decoction of the leaf and bark is made. A cup of this decoction is taken daily to cure dysentery and diarrhoea.

**Dysoxylum gahara** (Buch-Ham) Merr. (Plate I-A.)

**Synonym:** Dysoxylum procerum Hiern.

**Family:** Meliaceae

**Vernacular Name:** M'bakbua

**Part used:** Leaves

**Method of use:** The leaves are boiled and taken in excess to cure diarrhoea.

**Musa paradisiaca** var. **sylvestris** L. (Plate I-H.)

**Family:** Musaceae

**Local Name:** Hagumzuibang

**Part used:** Stem

**Method of use:** The soft inside part of the stem is crushed and the juice is taken for diarrhoea.

**Mikania micrantha** Kurz. (Plate I-C.)

**Synonym:** Mikania scandens Willd.

**Family:** Asteraceae

**Vernacular Name:** Kabuizamheu

**Part used:** Leaves

**Method of use:** Tablespoon of the leaves extract is also given to pigs, hens and dogs suffering from diarrhoea.

**Psidium guajava** Linn. (Plate I-G.)

**Family:** Myrtaceae

**Vernacular Name:** Bangochi

**Part used:** Leaves

**Method of use:** Young leaves and fruits are eaten for diarrhoea.

**Rhus semi alata** Mur. (Plate I-B.)

**Synonym:** Rhus javanica Linn.

**Family:** Anacardiaceae

**Vernacular Name:** Kameupi

**Part used:** Fruits

**Method of use:** Dry fruits are crushed (2 tablespoon) and immersed in a cup of warm water. This infusion is taken to cure stomachache due to diarrhoea.

**Tamarindus indica** Linn. (Plate I-D.)

**Family:** Caesalpinaceae

**Vernacular Name:** Kameupi

**Part used:** Seeds

**Method of use:** 10-15 seeds are roasted and taken for diarrhoea.

**Discussion**

The North Cachar Hills district region is characterized by diverse physiography ranging from plains, plateaus to hills and valleys of various dimensions. “Jhum” or shifting cultivation is a major component of the larger agro-ecosystem that comprises of agriculture, forestry, hunting and fishing (Warmer, 1991). Most of the villages are not connected by roadways and the tribal people have to walk long distance to reach even the nearest town. So, traditional medicine has remained as the most affordable and easily accessible source of treatment in the primary healthcare system of resource poor communities, and the local therapy is the only means of medical treatment for such communities (Yineger and Yewhalaw, 2007). The tribal villagers have immense faith in their traditional system of medicine which is also largely based on traditional cultures, beliefs and superstition. Because of their deep relationship with nature, they know the importance of preservation and conservation. Their immediate dependence on forest and their product for food, shelter, medicine etc has developed their knowledge and this is reflected in their way of traditional management and sharing of natural resources for optimum utilization of such resources. Different workers have reported more than 195 ethno botanical uses of plants from the North-East region of India alone (Dutta and Dutta, 2005) but virtually been documented from North Cachar Hills District of Assam which is one of the most diverse regions of the country. A preliminary study on the ethno-medicinal-botany of...
A. Dysoxylum gabara (Buch-Ham) Merr
B. Rhus semi alata Murr.
C. Mikania micrantha Kunth.
D. Tamarindus indica Linn.
E. Baccaurea ramniflora Lour.
F. Bauhinia variegata Linn.
G. Psidium guajava Linn.
H. Musa paradisiaca var. sylvestris L.
the Zeme (Naga) tribe of N.C. Hills has been done by Tamuli et al. which recorded 33 species (Tamuli and Saikia, 2004). The present study has added to the above record new usage of 8 species of plants. Other than this, a systematic study on ethno medicinal plants of the Zeme (Naga) tribes in particular is at present unavailable.

The study has revealed that the Zeme (Naga) tribes’ knowledge about the medicinal use of plants is vast, unique and genuine. This knowledge is a guarded secret and is handed down by the traditional healer (Herokhkeleng) to any of the son of his choice, or to a daughter, if absent. It is also a belief among the traditional healer that changing the formulation of a medicine to a patient or others could reduce the effectiveness of the medicine. The present investigation has documented a total of 8 species of medicinal plants used by the Zeme (Naga) tribes of North Cachar Hills. These plants were distributed across 8 families. Different parts of the plants were used by the Zemes as medicine. Tamrhindus indica has been reported for the treatment of snakebite by the Himar tribe of Cachar district (Das, 2008) whereas the Zeme (Naga) tribe of the present study uses it in the treatment of diarrhea. Interestingly, the fruit pulp of the same species is being used as laxatives by the tribals in Vishakarbanam district of Andhra Pradesh (Lenir-Bapuji and Venkat Ratnam, S. (2009)). The use of Ficus spp. by the Himar and Reangs (Das, 2008) validates the reported use of the same species by the tribe of the present study for the same disease. The use of Mikania micrantha in the treatment of fowl animals and pets (Pig, Hen & Dogs) is being reported for the first time from the area. The succulent leaves and seeds of Mimus paradisaea is used by the tribes of Kengjhar and Mayurbhanj district of Orissa and this corroborates with the reported usage of the same species for the same disease.

Conclusion
This study clearly shows that a deep-rooted folk-cultural heritage surrounding medicinal plants still forms an inseparable part in the life of the Zeme (Naga) tribes of North Cachar Hills district of Assam. They have a deep understanding of the ways of nature and the need for the conservation of forest and its products. The study warrants detailed ethno botanical study of the area in order to conserve the valuable ethno-medicinal-botanical knowledge of the tribe. This would not only spread awareness to conserve and preserve the traditional knowledge but also open new avenues to scrutinize these rich natural resources for further studies, development of potential herbal medicines and to the development of the tribe as a whole.

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Traditional Medicinal Knowledge


