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Investigation into the indigenous knowledge and use of medicinal plants in a Marma community of Pantola, Bandarban, Bangladesh

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Abstract

An investigation was done into the use of medicinal plants by Marma tribe live in Pantola, Bandarban, Bangladesh. A thorough field survey was carried out and information was obtained through plant interviews. A total of 40 plant species in 22 families and 31 genera were reported in the treatment of 21 body complaints. Common life form of the plants was herb. Asteraceae family ranked top representing 17.5% of the documented plant species. Leaves (60%) were the most frequently used parts in preparing herbal remedies. Common mood of preparation and administration of herbal medicines were paste (57.5%) and external use (52.5%) respectively. Cuts and wounds were the mostly treated disease.

Keywords: Medicinal plants, Indigenous knowledge, Marma, Pantola, Bandarban

Introduction

Human beings are indispensably dependent on plants for their survival. Use of plants to treat various ailments has been a prehistoric culture in human civilization. Still now plants are important source of therapeutic drugs. World Health Organization (WHO) estimated that in developing world more than 80% people relies on the traditional medicine and most of them are derived from plants (Senthilkumar, 2013) ^[13]. Moreover, the acceptance and use of plant based medicine is increasing globally (Tugume *et al.*, 2016) ^[15]. The use of medicinal plants is also well known among the indigenous people in remote rural areas who live in harmony with the nature and maintain a close link between man and environment (Senthilkumar, 2013) ^[13].

Local knowledge generated by people living within a particular community is unique and it may contribute to a sustainable development plan of the indigenous population (Biswas *et al.* 2010). The Marma communities of Chittagong Hill Tracts possess such kind of knowledge particularly from their healthcare viewpoint, which is transmitted from generation to generation by oral instructions. The indigenous knowledge may differ within the same community living aloof in almost inaccessible pockets of hilly regions.

Marma, also known as *Maghs*, the second largest tribe scattered over the three hill tracts and majority of them live in impassable hills in Bandarban district. A few pockets of their settlement are also found in the Cox's Bazar district and in Kalapara Upazila of Patuakhali district (Sattar 1971) ^[12]. They use various plants for treatment of different diseases (Alam 1992) ^[3]. In the present investigation we have selected Pantola, a very remote hilly area of Ruma Upazila in Bandarban district, to document the medicinal plants used by the inhabitants with their therapeutic uses.

The Pantola para is located on the bank of Sangu River surrounded by vast hilly forest areas. This village is inhabited by Marma community. There are 190 households and about 480 residents in this village. Agriculture is their main occupation. Among the inhabitants 54.27% was male and 45.73% females. Average literacy rate is 29.1%. The easiest communication route is river *Sangu* but they also use bumpy hilly routes for maintaining contact with near villages. There is no medicine shop in the village. The location of the nearest healthcare center is about two hour's journey by engine boat. The villagers are characteristically dependent on the nature and natural resources for their livelihood. It is pertinent to mention here that there is no designated medicine man in Marma communities although they have their own treatment systems for different ailments (Sattar 1971) ^[12]. Most of the Marma tribes have a primary knowledge of medicinal plants that are used for first aid remedies to treat cough, cold, fever,

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headache, poisonous bite and some other ailments. And some people possessed adequate knowledge about medicinal plants. This kind of knowledge passed down through generations mainly by oral tradition. Due to the advent of improved lifestyle, with some other traditional cultures, their indigenous knowledge of medicinal plants becoming abolish. Nevertheless, some elderly men and women in this community possess some important knowledge about the use of medicinal plants. However, introduction of modern medicines and the scarcity of medicinal plants in nearest jungles and forests, the people are losing interest in this occupation. If this trend is continuing for the next two to three generations, their knowledge about medicinal use of plants will be completely vanished.

Documentation of indigenous knowledge is important in conservation and utilization of biological resources (Tugume *et al.* 2016) [15]. Therefore, it is essential to restore the knowledge of medicinal plants used by the Marma communities residing in Chittagong Hill Tracts and other plain lands in Bangladesh. Indigenous knowledge may vary within the same community due to isolation or distance barrier so, the present study was carried out in a Marma community at Pantola, a remote hilly area of Bandarban

district, to document their indigenous knowledge regarding the use of medicinal plants.

Materials and Methods

The investigation was conducted during December 2014 to March 2015. A thorough survey was done in the village thickets, its surrounding forest areas and adjacent plain lands. Data were collected following plant interview. Plant specimens were collected and bring it to the house of the informants for getting information. Three informants, two male and one female, were participated in the interview process. The informants were 1. Hla Moug Marma (Age 40, male) - identified 25 medicinal plants, 2. O Mra Khing Marma (Age 55, female) - identified 5 plants and 3. Kyawthree Marma (Age 45, male) - identified 10 plants). Taxonomic identification of the collected medicinal plants were done with the help of authentic literatures (Kirtikar and Basu, 1935; Biswas and Ghosh, 1973; Alam, 1992; Alam *et al.*, 1996; Ahmed, 1997; Ghani, 2003; Rahman *et al.* 2003a, b; Yusuf *et al.* 2003; Yusuf *et al.* 2007; Yusuf *et al.* 2009; Biswas *et al.*, 2010; Pasha and Uddin, 2013) [3, 4, 6, 10-11, 16, 17, 18, 8].

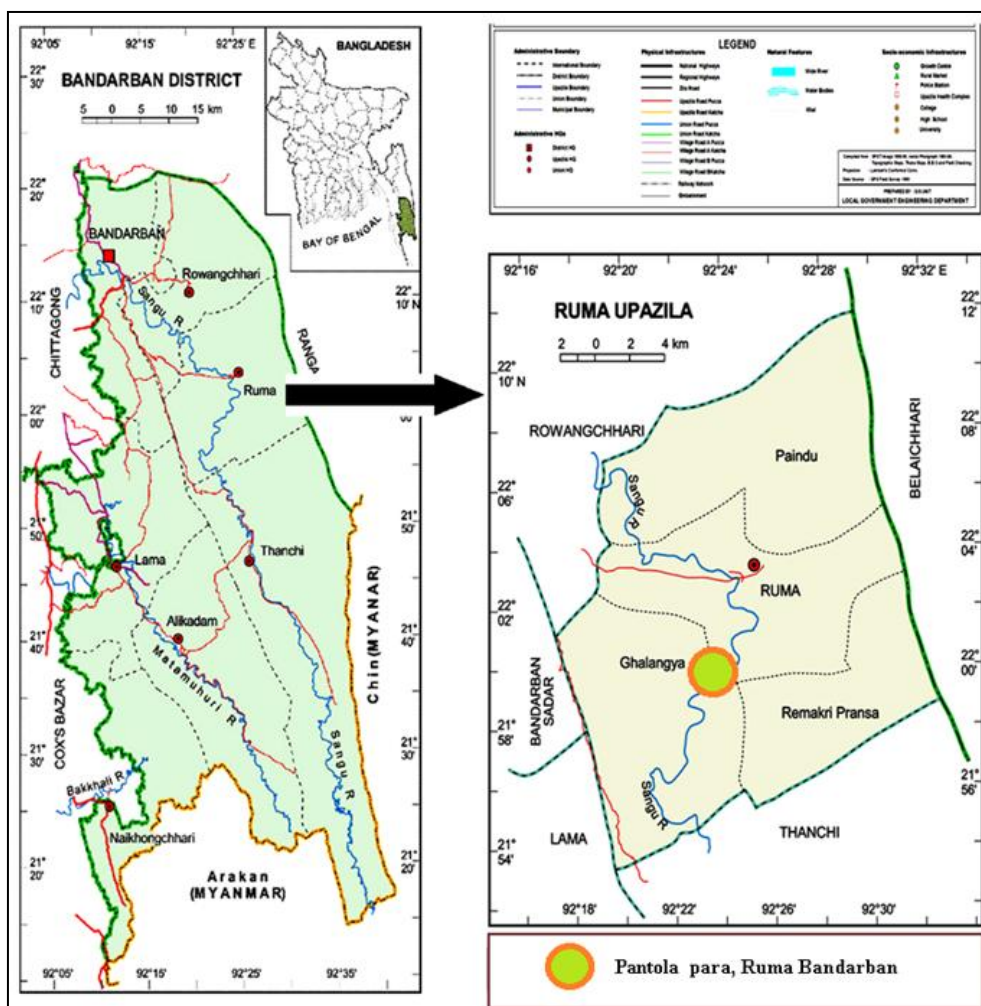


Fig 1: Location of the residence of Marma community at Pantola

All information is summarized in tabular form and arranged according to plant’s scientific name, family, local name, habit, habitat, parts used, mode of use, ailment/s treated (Table 1). Global Positioning System (GPS) of each collected species was recorded (Table 1). In some cases scientific names of plant species were checked for accuracy according to The

Plant List database (www.plantlist.org). Voucher specimens and photographs have been deposited in the Department of Botany, University of Chittagong.

Results and Discussion

The Marma community of Pantola uses various plant species

for the treatment of a number of ailments. We have interviewed 3 informants. Two respondents were male and one was female with an average age of 47 years. Younger people are getting modern education and therefore not interested in learning and practicing ethnomedicinal wisdom that would perpetuate indigenous knowledge hence, there appears to be a risk of knowledge loss. The present study documented 40 plant species under 22 families in 31 genera those are traditionally used for the treatment of 21 different health conditions (Table 1). The plants are listed with scientific name, marma vernacular name, habit, habitat, parts used, mode of use, ailment/s treated. Among the families, Asteraceae represented the highest number (7) of medicinal plant species followed by Lamiaceae (5), Fabaceae (4), and Euphorbiaceae (3). Acanthaceae and Asclepiadaceae shared 2 species individually. Rest of the families comprised one species each. More than half (52.5%) of all medicinal plants was herb followed by shrub (20%), climbers (17.5%), trees (7.5%), and under shrubs (2.5%) respectively (Fig. 2). The most used plant part was leaves (60%) followed by root (27.5%), seed (5%), whole plant (5%) and flower (2.5%) (Fig.3). Total 13 recipes were prepared using 40 different plant species (Fig. 4) Leaves were the commonly used part of medicinal plants and applied in different forms depending on the ailments (Fig. 4). Cut and wound is the common ailment reported in the present investigation and seven plants is used for the treatment of this suffering (Fig. 5) Plant/s used for a particular ailment is graphically shown in Fig.5. Paste was the common preparation (used for 10 diseases) followed by fresh juice (used for 6 diseases), powder (used for 3 diseases) decoction (used for 1 disease), warm leaves paste (used for 1 disease), direct chewing (used for 1 disease) and fresh leaves juice and paste (used for 1 disease) (Fig. 6).

The use of medicinal plants by Marma and other tribal communities of Chittagong hill tracts were previously published in some literatures (Alam, 1992; Alam *et al.*, 1996; Ghani, 2003; Rahman *et al.* 2003a, b; Siddiqui *et al.* 2007; Yusuf *et al.* 2009; Biswas *et al.*, 2010; Faruque and Uddin, 2014) [3, 4, 6, 10-11, 18, 5].

Alam (1992) [3] described 87 medicinal plants used by Marma tribe living in the Chittagong hill tracts. Out of eighty seven plant species only seven were noted to be used by the Marma

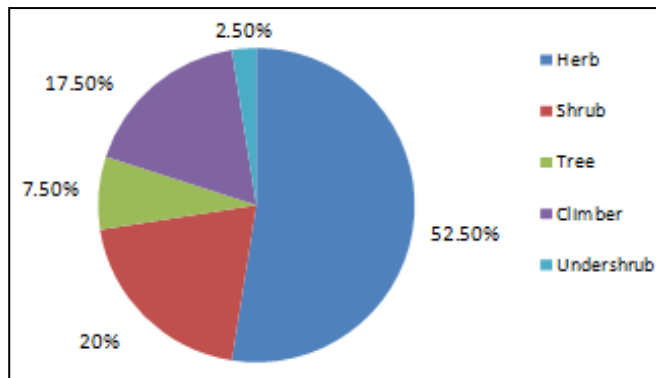


Fig 2: Percentage of documented medicinal plants according to their habit

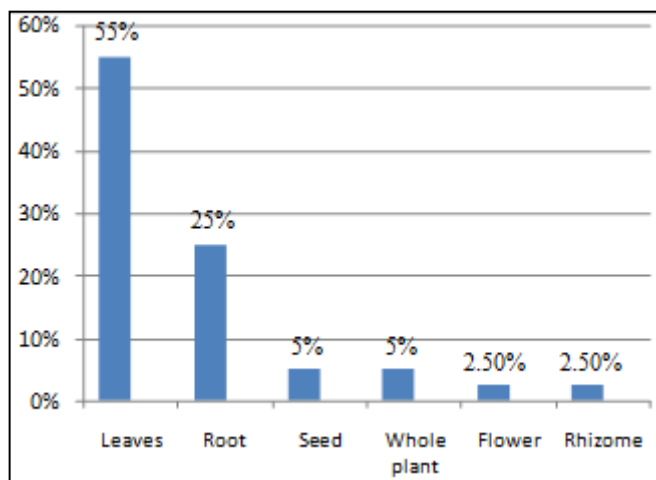


Fig 3: Percentage of plant parts based on use

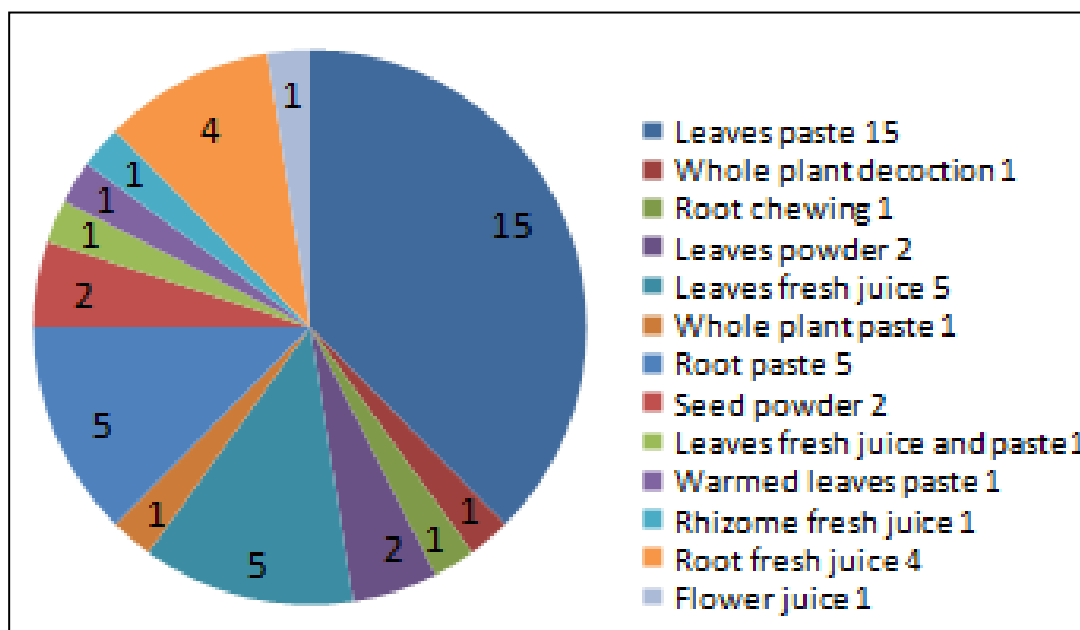


Fig 4: Number of plant/s involved in each mood of use.

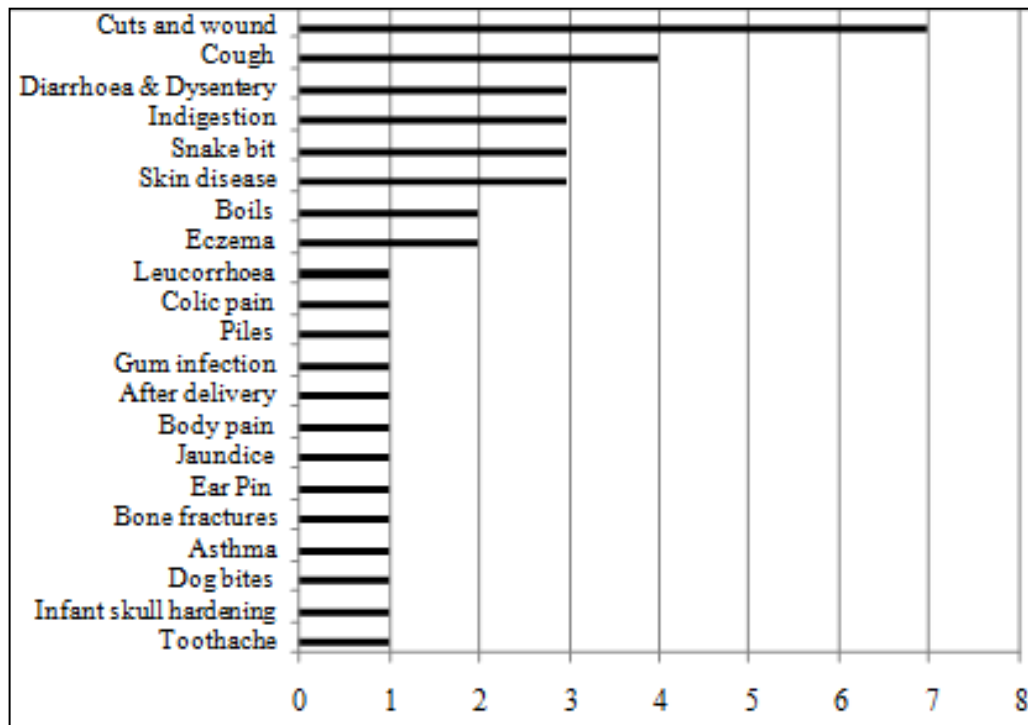


Fig 5: Number of plant species used for the treatment of a particular ailment.

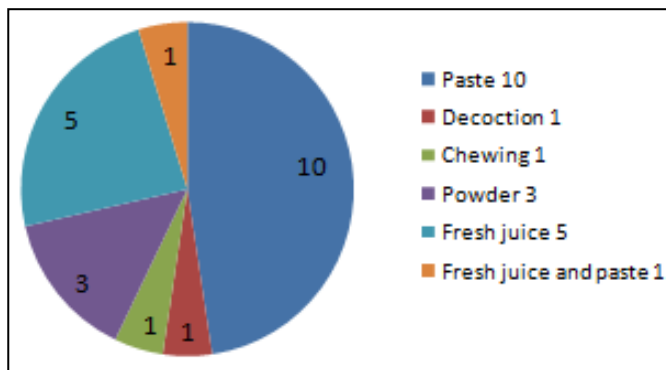


Fig 5: Number of ailments treated with a specific preparation.

people of Pantola. Among them six species differed with respect to vernacular name and uses. Information of *Centella asiatica* matched with the present result in all respect. Vernacular name of *Scoperia dulcis* was same but its uses were different. Rahman *et al.* (2003a, b) ^[10-11] described 62 medicinal plants used by different tribal communities in Chittagong hill tracts. Out of 62 plants five were used by the Marma tribe. But these species were not found to be used by the Marma tribes of Pantola. Faruque and Uddin (2014) ^[5] reports 66 medicinal plant species for the treatment of 40 diseases in the Marma tribe of Bandarban. Among the species vernacular name and uses of 3 plants were found similar with the present research. Three species shared common vernacular name but differed in their way of uses. Eleven species were differed in respect of vernacular name and uses. From these observations it was evident that indigenous knowledge may differ considerably within the same community due to

communication and isolation barriers as well as vegetation types and environmental factors of a particular area. The use of leaves to make herbal medicine preparations followed by other parts of plant is a common practice in tribal communities (Alam, 1992; Alam *et al.*, 1996; Ghani, 2003; Rahman *et al.* 2003a; Rahman *et al.*, 3003b; Thomas *et al.*, 2009; Yusuf *et al.* 2009; Biswas *et al.*, 2010; Faruque and Uddin, 2014) ^[3, 4, 6, 10, 11, 14, 18, 5].

Use of herbaceous plants in traditional medicine is a common occurrence (Alam, 1992; Alam *et al.*, 1996; Rahman *et al.* 2003a, b; Thomas *et al.*, 2009; Biswas *et al.*, 2010; Senthilkumar *et al.* 2013; Tugume *et al.* 2016) ^[3, 4, 10-11, 14, 13, 15]. Leaf is the most common plant part that is frequently used in folk formularies (Senthilkumar *et al.* 2013; Naghibi *et al.*, 2014; Ahmed 2016) ^[13, 7, 1]. The reason for high utilization of leaves could be ascribed to the easy availability and effectiveness compared to other plant parts. Leaves are the main photosynthetic organ in plants and considered to be a key component of the natural pharmacy for synthesis of constituents particularly those that are more pharmacologically active against diseases (Passulacqua *et al.*, 2007) ^[9]. The preference of leaves to other plant parts is thus thought to be due to accumulation of active ingredients like tannins and other alkaloids (Passulacqua *et al.*, 2007) ^[9]. It was noticed that liquid preparation of different plant parts is usually prescribed in traditional medical treatments (Alam, 1992; Alam, 1996; Biswas *et al.* 2010; Senthilkumar *et al.* 2013; Naghibi *et al.*, 2014; Ahmed 2016) ^[3, 4, 13, 7, 1] but paste was found to be the main herbal preparation in the present investigation.

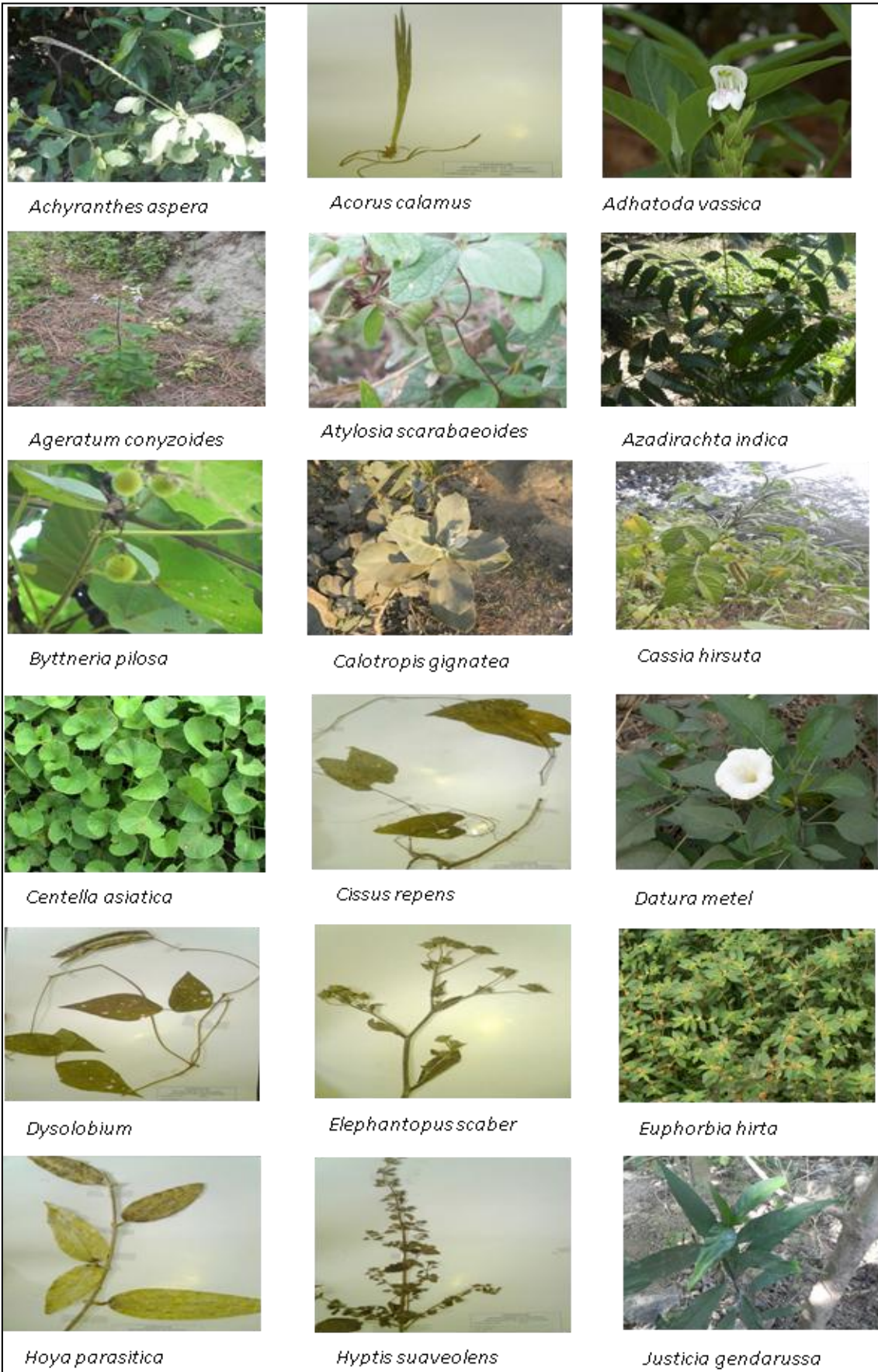
Table 1: Documentation of medicinal plant used by the Marma community of Pantola, Bandarban

S.L No	Scientific Name	Marma vernacular name	Family	Habit	Habitat	Parts used	Mode of use	Used for the Complaint/s	GPS
1	<i>Achyranthes aspera</i> L.	<i>Merokh</i>	Amaranthaceae	Herb	Hilly area	Root	Chew	Gum infection	21° 45' 54.7" N 92° 12' 15.6"E
2	<i>Acorus calamus</i> L.	<i>Long hi</i>	Acoraceae	Herb	Plane land	Leaves	Paste	Infant skull hardening	21° 59' 45.2" N 92° 23' 27.0"E
3	<i>Adhatoda vasica</i> Nees	<i>Mro nack</i>	Acanthaceae	Shrub	Plane land	Leaves	Fresh Juice	Cough	21° 45' 54.7" N 92° 12' 15.6"E
4	<i>Ageratum conyzoides</i> (L.) L.	<i>Chunachu appa</i>	Asteraceae	Herb	Fallow land	Leaves	Paste	Cuts and wound	21° 59' 45.9" N 92° 23' 27.0"E
5	<i>Anisomeles indica</i> (L.) Kuntze	<i>Pui si bo</i>	Lamiaceae	Herb	Fallow land	Leaves	Paste	Eczema	21° 45' 53.6" N 92° 12' 14.3"E
6	<i>Atylosia scarabaeoides</i> (L.) Benth.	<i>Mrokh bho</i>	Fabaceae	Herb	Hilly area	Leaves	Paste	Skin disease	22° 00' 07.0" N 92° 23' 28.6"E
7	<i>Azadirachta indica</i> A. Juss.	<i>Tama</i>	Meliaceae	Tree	Plane land	Leaves	Fresh leaves Juice and past	Skin disease	21° 45' 54.7" N 92° 12' 15.6"E
8	<i>Blumea lacera</i> (Burm.f.)DC.	<i>Fao Ma</i>	Asteraceae	Herb	Foothill	Roots	Extract	Diarrhoea	21° 44' 52.2" N 92° 10' 15.3"E
9	<i>Byttneria pilosa</i> Roxb.	<i>Che line bo</i>	Sterculiaceae	Climber	Hilly area	Leaves	Paste	Cuts and wound	21° 59' 44.6" N 92° 23' 17.9"E
10	<i>Calotropis gigantea</i> (L.) Ait. f.	<i>Jijonma</i>	Asclepiadaceae	Shrub	Hilly area	Leaves	Powder	Indigestion	21° 45' 54.7" N 92° 12' 15.6"E
11	<i>Cassia hirsuta</i> L.	<i>Mrong siban</i>	Fabaceae	Herb	Hilly area	Root	Paste	Snake bit	21° 00' 08.6" N 92° 23' 92.2"E
12	<i>Centella asiatica</i> (L.) Urban	<i>Mrang khua</i>	Apiaceae	Herb	Damp place	Whole plant	Decoction	Dysentery & diarrhoea	22° 00' 08.0" N 92° 23' 15.6"E
13	<i>Cissus repens</i> Lam.	<i>Owa Rong Si</i>	Vitaceae	Climber	Hilly area	Root	Paste	Dog bites	21° 00' 16.5" N 92° 11' 15.6"E
14	<i>Clitoria ternatea</i> L.	<i>Amio</i>	Fabaceae	Climber	Plane land	Flower	Fresh Juice	Cough	21° 45' 53.6" N 92° 12' 14.3"E
15	<i>Datura metel</i> L.	<i>Dhutura</i>	Solanaceae	Shrub	Plane land	Seed	Powder	Asthma	21° 44' 52.2" N 92° 10' 15.3"E
16	<i>Dysolobium pilosum</i> (Willd.) Meréchal	<i>Too pang</i>	Fabaceae	Climber	Hilly area	Seed	Paste	Indigestion problem	21° 59' 41.2" N 92° 23' 22.2"E
17	<i>Elephantopus scaber</i> L.	<i>Pru Suang</i>	Asteraceae	Herb	Hilly area	Whole plant	Paste	Body fractures	21° 20' 11.6" N 92° 18' 12.6"E
18	<i>Eupatorium odoratum</i> L.	<i>Way la row</i>	Asteraceae	Herb	Foothill	Leaves	Paste	Cuts and wound	22° 00' 07.0" N 92° 23' 28.6"E
19	<i>Euphorbia hirta</i> L.	<i>Chinu</i>	Euphorbiaceae	Herb	Plane land	Leaves	Paste	Skin disease	21° 45' 53.6" N 92° 12' 14.3"E
20	<i>Hoya parasitica</i> (Roxb.)Wall. ex Wight	<i>Gha piza</i>	Asclepiadaceae	Climber	Hilly area	Leaves	Fresh Juice	Ear Pin	21° 59' 41.2" N 92° 23' 22.2"E
21	<i>Hyptis suaveolens</i> (L.) Poit.	<i>Tunka</i>	Lamiaceae	Shrub	Hilly area	Leaves	Paste	Body pain	22° 00' 07.7" N 92° 23' 15.6"E
22	<i>Justicia gendarussa</i> Burm.f.	<i>Chi tulong</i>	Acanthaceae	Shrub	Moister areas	Leaves	Paste	Eczema	21° 45' 54.7" N 92° 12' 15.6"E
23	<i>Kalanchoe pinnata</i> (Lam.) Pers.	<i>Raikhapombom</i>	Crassulaceae	Herb	Garden	Leaves	Fresh Juice	Cough	21° 04' 11.8" N 92° 20' 12.1"E
24	<i>Lantana camara</i> L.	<i>Shelkata</i>	Verbenaceae	Shrub	Plane land	Root	Paste	Snake bit	21° 20' 11.6" N 92° 18' 12.6"E
25	<i>Leucas aspera</i> (Roth) Spreng.	<i>Pya soon cho</i>	Lamiaceae	Herb	Damp place	Leaves	Fresh Juice	Jaundice	22° 00' 07.0" N 92° 23' 28.6"E
26	<i>Mikania scandens</i> (L.)Willd.	<i>Ree fuzi agya</i>	Asteraceae	Climber	Plane land	Leaves	Paste	Cuts an wound	21° 19' 11.8" N 92° 06' 12.6"E
27	<i>Mimosa pudica</i> L.	<i>Rhak Pine</i>	Fabaceae	Herb	Damp place	Root	Paste	Boils	22° 00' 07.0" N 92° 23' 28.6"E
28	<i>Moringa olerifera</i> Lam.	<i>Suchna</i>	Moringaceae	Tree	Plane land	Root	Fresh Juice	Leucorrhoea	21° 59' 45.2" N 92° 23' 27.0"E
29	<i>Mussaenda roxburghii</i> Hook.f.	<i>Soong pe la</i>	Rubiaceae	Tree	Hilly area	Root	Fresh Juice	Indigestion problem	21° 45' 54.7" N 92° 12' 15.6"E
30	<i>Ocimum africanum</i> L.	<i>Nhung aro</i>	Lamiaceae	Herb	Hilly area	Leaves	Paste	Wound	22° 00' 18.4" N 92° 23' 11.2"E
31	<i>Ocimum tenuiflorum</i> L.	<i>Nung Gri</i>	Lamiaceae	Herb	Plane land	Leaves	Fresh Juice	Cough	22° 00' 17.5" N, 92° 23' 15.6"E
32	<i>Pedilanthus tithymaloides</i> Poit.	<i>Aroi</i>	Euphorbiaceae	Herb	Garden	Leaves	Paste	Cut and wound	21° 44' 52.2" N 92° 10' 15.3"E
33	<i>Rauwolfia serpentine</i> (L.) Benth. ex Kurz	<i>Boma raja</i>	Apocynaceae	Shrub	Plane land	Root	Extract	Colic pain	22° 00' 07.0" N 92° 23' 28.6"E
34	<i>Ricinus communis</i> L.	<i>Krachuban</i>	Euphorbiaceae	Shrub	Hilly area	Leaves	Warmed leaves paste	Piles.	21° 44' 53.6" N 92° 12' 14.3"E
35	<i>Scoparia dulcis</i> L	<i>Rokoung rulung</i>	Scrophulariaceae	Herb	Plane land	Leaves	Powder	After delivery	22° 00' 08.1" N 92° 23' 15.8"E
36	<i>Sida rhombifolia</i> L.	<i>Wasi pa ne</i>	Malvaceae	Undershrub	Hilly area	Leaves	Paste	Boils	21° 59' 45.2" N 92° 22' 26.0"E
37	<i>Spilanthes acmella</i> (L.) L.	<i>Haa foi</i>	Asteraceae	Herb	Plane land	Leaves	Paste	Gum infection	22° 00' 23.4" N 92° 23' 9.3"E
38	<i>Tinospora cordifolia</i> (wild.) Miers	<i>Cho chelo machi</i>	Menispermaceae	Climber	Hilly area	Root	Paste	Snake bit	21° 59' 44.8" N 92° 23' 35.4"E
39	<i>Vernonia patula</i> (Dryand.) Merrill	<i>Hung Fui</i>	Asteraceae	Herb	Plane land	Leaves	Paste	Cuts and wound	21° 44' 52.2" N 92° 10' 15.3"E
40	<i>Zingiber sp.</i>	<i>Palay</i>	Zingiberaceae	Herb	Hilly area	Rhizome	Fresh Juice	Diarrhoea	21° 44' 52.2" N 92° 10' 15.3"E

Conclusion

The tribal communities of Chittagong Hill Tracts live in close contact with nature. Due to remoteness, their livelihood is completely dependent on natural resources available in their vicinity. For the treatment of different diseases, they use plant based medicines. This knowledge is inherited from generation after generation by oral instructions. We should restore this

type of indigenous knowledge for better use of medicinal plants in future. The diversity of medicinal plant species in the studied area and the related indigenous knowledge are of great value to the local community. The information regarding therapeutic uses of the documented plants provides basic data for further pharmacological studies and conservation of the important plant species.





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