Indian Journal of Traditional Knowledge
Vol. 11 (3), July 2012, pp. 520-527

Medicinal plants of North Cachar Hills district of Assam used by the *Dimasa* tribe

Jayashree Rout*[1], Albert L Sajem[1] and Minaram Nath[2]

[1] Department of Ecology and Environmental Science, Assam University, Silchar 788011, Assam; [2] Department of Botany, Cotton College, Guwahati 1, Assam

Emails: routjaya@rediffmail.com; albertsajem@gmail.com; minaram_nath@yahoo.com

Received 13.07.2009, revised 13.11.2009

A total of 47 plants species have been reported herein to be used in the treatment of diseases like urinary disorder, diarrhoea, malaria, etc. Among the plant types, herbs species were the most frequently used. Ferns and cycad also find usage in their traditional healing system. Notable among the plants documented is the use of a threatened species like *Gloriosa superba* as antihelmintics, *Cycas revoluta* for urinary problems, *Elaeagnus caudata* for miscarriage, etc. A complete account of species, parts used, mode of preparation and dosage for curing diseases like diarrhoea, malaria, jaundice, diabetes, high blood pressure, snakebite, etc. have been investigated in detail.

Keywords: *Dimasa* tribe, Traditional healer, North Cachar Hills, Assam

IPC Int. Cl.[8]: A01D 13/25, A01D 23/07, A01D 23/09, A01D 7/13, A01D 7/14, A01D 20/46

From time immemorial people have accumulated knowledge about plants, and their uses, especially as food and medicine. This knowledge gathered gets transmitted orally and even textually through generations. Many modern medicines have its origin in traditional medical knowledge. There has been an increasing interest in the scientific study of man-plant interaction in the natural environment which is clearly visible among various indigenous people[1]. Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population[2]. This is particularly true in developing countries where herbal medicine has a long uninterrupted history of use[3]. Digitalis, ephedrine, morphine, quinine, reserpine, guggulipid are some common drugs derived from plants that are very popularly used. The starting point in the development of all these drugs is some reference in the use of that plant as an indigenous use in the traditional system of medicine or in folk medicine[4]. Ethnobotanical researches based on such references are providing fundamental information in the search for new drugs, foods, pesticides, natural products, gene resources and chemicals[5]. Currently, researchers in plant science are focusing mainly on ethnobotanical and ethnomedicinal investigation to fulfill the increasing demand of herbal product.

Presently, there is a worldwide demand for assessing the plant resources that are of medicinal and economical values. The World Health Organization estimated that 80% of the populations of developing countries still rely on traditional medicine, mostly plant drugs, for their primary healthcare needs. Demands of medicinal plants are increasing in both developing and developed countries due to growing recognition of the fact that natural products are nontoxic, show no side effects and are easily available at affordable prices. The medicinal plant sector has traditionally occupied an important position in the socio-cultural, spiritual and medicinal area of rural and tribal families[6]. India, a land of physical, cultural, social and linguistic diversity, is also endowed with ecosystems of tremendous biodiversity, genetic as well as of species[7]. It is a land of immense biological treasure in which two out of 18 hotspots of the world are located. It is also one of the 12 mega biodiversity countries in the world[8]. India is sitting on a goldmine of well recorded and traditionally well practiced knowledge of herbal medicine. The medicinal plants of the area have stood the test of time for their safety, efficacy, cultural acceptability and lesser side effects[9]. India officially recognizes over 3,000 plants for their medicinal value. It is generally estimated that over 6,000 plants in India are in use in traditional, folk and herbal medicine, representing about 75% of the medicinal needs of the third world countries[10].

*Corresponding author

The Northeastern states of India comprises of 8 states with more than 130 major tribal communities out of the total 427 tribal communities found in India[11]. Assam itself constitutes 12.8% of the total tribal population of India (2001 census). The tribal people and ethnic races of the region still practice their own culture, customs, cults, religious rites, folktales, foods, medicinal practices, etc. They are still very much dependent on their traditional knowledge on plants and their products which play a very important role among these cultures and this interrelationship has evolved over generations of experience and practice[12].

More than 1,953 ethnobotanical uses of plants from the Northeast region of India itself are on record, but virtually been documented from North Cachar Hills district of Assam[11,13-17]. The district is remotely located with inadequate communication, transportation and insurgency. Sporadic reports on the use of medicinal plant by two tribes namely *Zeme Naga* and *Jaintia* of the district were made[18,19]. Apart from these, no comprehensive account on the traditional knowledge of medicinal plant uses of other tribes is available. The different tribes of the district possess immense wealth on ethnomedicinal uses of plants which are inherited through generations orally but due to advances in science and technology and gradual development of the rural areas, cultural erosion is underway. The *Dimasa* tribe therefore warrants a detailed and systematic ethnobotanical study for sustainable development particularly in the context of conservation of such unique habitat, protection of traditional knowledge and development of newer and safer drugs. The paper aims to highlight the rich traditional knowledge on the use of medicinal plants by the *Dimasa* tribe of the district of North Cachar Hills.

Methodology

North Cachar Hills district, one of the hill district of Assam covers an area of 4,890 sq km and located between 92°37′-93°17′ E longitude and 23º30′N - 25º47′N latitudes. More than 12 different indigenous tribal groups, *viz. Dimasa*, *Zeme Naga, Jaintia, Biate, Hrangkhol, Kuki, Hmar, Vaiphei, Khelma, Karbi*, etc. live harmoniously together within the district with a few non tribal groups like the *Assamese*, *Bengali*, *Nepali*, etc. The district is covered by lush forest of sub tropical type. Climate is largely controlled by the Southwest monsoon and the Northeast winds. Annual average rainfall is ~ 2,500mm. The average mean maximum temperature and minimum temperature varies from ~26°C and ~12°C, respectively, with an average relative humidity being 78%. The soil (P^H ~5) is very fertile with maximum humus in the foothills. Most of the villages are located on isolated hilltops or deep within the forest. There is only one civil hospital and a few community healthcare centers and medical sub centers in the entire district. The tribal villagers, therefore depend on their traditional system of healing to a great extent. *Jhum* cultivation is the principal mode of raising crops. The villagers also collect wild edible plants which are regularly taken along with rice. Many household grows a variety of domesticated food plants and fruits in their residential compounds and paddy fields and raise livestock.

Surveys were carried out for 3 yrs from February 2006-April 2009 to collect information on the traditional uses of the plants by the *Dimasa* tribe for curing and treating different diseases. Twelve villages (*Diyungbra, Waishling, Thaijuwari, Langting, Ambrudisa, Bagadima, Thanalambra, Mupa, Kalachand, Maibang, Wadrengdisa, Miyungkro*) were surveyed with at least three visits to each village per year. Communication problems, remoteness of the study area, seasonal inconveniences and subdued political unrest within the district often pose difficulties restricting frequent visits to the study area. Standard methodologies were followed during the collection of medico-botanical informations[20]. First hand information were collected from the traditional healers (*Mule Kauya/Hoja*), the *Jhum* cultivators (*Pathain dangya rau*), and the aged and elderly people through semi structured questionnaires. In cases where the respondents were uncomfortable with the questionnaires, discussion and informal interviews were employed and in the process information on different medicinal plants were noted and documented. Interviews with all the respondents were made after obtaining prior informed consent (PIC). A total of 217 respondents which also included the 5 traditional healers were interviewed. Most of the respondents barring a few were met in the field itself where plant collections were made. The number of male respondents was 139 (~64%) and female was 78 (~36%). The ages of the male respondents ranges from 19-73 yrs and female respondents from 16-61 years. Most of them were illiterate, while a few have attended primary schools. All of the traditional

healers were professional practitioners who medicate the local people belonging to different community. Information on the use of plants for different disease treated, local names, parts used, plant type, degree of management (wild or cultivated), method of preparation, mode of application and dosages were recorded (Table 1). Besides these, information on the uses of plants for food, religious rites, ceremonies, etc. were also recorded (Table 1). The plants were collected and processed following the routine method of plant collection and herbarium technique[20]. Field photographs of all the plant species were preserved digitally. The specimens have been identified using standard literature in consultation with the Botanical Survey of India, BSI/APC (ARUN Herbarium), Itanagar and BSI, Eastern circle, Shillong[21-23]. All voucher specimens have been deposited at the Department of Ecology and Environmental Science, Assam University, Silchar, Assam.

Table 1—Medicinal plants used by the *Dimasa* Tribes of North Cachar Hills district of Assam

Plant species	Parts used	Diseases	Uses
Aegle marmelos (L.) Corr. Rutaceae, *Bel,* Angiosperm, Cultivated	Tree, Fruit	Diarrhoea	One whole ripe fruit is mixed with ~200 ml of water with a little addition of jaggery (*Gur*) and taken at intervals of 2 hrs till cured.
Ageratum conizoides L. Asteraceae, *Samberma,* Angiosperm, Wild	Herb, Leaf	Bleeding	Fresh leave paste is directly applied and small cuts to stop bleeding.
Allium chinensis L. Liliaceae, *Salang,* Angiosperm, Cultivated	Herb, Bulb	Constipation	About 10-15 bulbs are mashed to a paste and eaten raw with a glass of water once a day for 1 week.
Alseodaphne petiolaris Hk.f.Vern. Lauraceae, *Mandin,* Angiosperm, Wild	Tree, Bark	Jaundice	Paste of about 50 gm of dried bark and a type of an insect (undisclosed) is given once daily (fresh preparation each day) for 1 week.
Ananas comosus (L.) Merr. Bromeliaceae, *Layamuri,* Angiosperm, Cultivated	Herb, Fruit	Lung tonic	Ripe fruits eaten daily (is believed to help cleanse the lungs (lung tonic) for smokers and drinkers.
Azadirachta indica A.Juss. Meliaceae, *Nim,* Angiosperm, Cultivated	Tree, Leaf	Skin Disease	To prevent skin diseases, decoction of fresh leaves is used to take bath every day.
Benincasa hispida Cogn. Cucurbitaceae, *Kaukhluhaba,* Angiosperm, Cultivated	Climber, Fruit	Dysentery	About 100 ml of fresh juice is mixed with ~500 ml of water and boiled until the volume becomes half. ~10ml of this solution is then taken 4-6 times a day for at least 5 days.
Brugmansia suaveolens (Willd) Berscht & J.Presl. Solanaceae, *Khimbung,* Angiosperm, Wild	Shrub, Leaf	Bodyache, fatigue	Dried leaves are mixed with tobacco, rolled and smoked (No particular dosage).
Bauhinia scendens L. Caesalpinaceae, *Suthaibiding,* Angiosperm, Wild	Climber, Stem	Snakebite	Juice of fresh stems (~5ml, preferably the young part) is given hourly until signs of relieve is observed.
Begonia roxburghii A.DC. Prodr. Begoniaceae, *Alumithri,* Angiosperm, Wild	Herb, Rhizome	Skin Disease	Juice extracted from about 500 gm of fresh rhizome is then added to a bowl of hot water (~250ml); affected parts are washed daily till it is cured.
Cajanus cajans (L.) Millsp. Papilionaceae, *Khoklem,* Angiosperm, Cultivated	Shrub, Leaf	Diarrhoea	Mixture of young leaves of the plants and young leaves of *Psidium guyava* in equal proportion is taken daily to cure diarrhoea.
Capsicum fructescens L. Solanaceae, *Morsai berma,* Angiosperm, Cultivated	Herb, Fruit	Leech bite	Fruit paste is applied directly to stop bleeding.
Carica papaya L. Caricaceae, *Koiphol,* Angiosperm, Cultivated	Tree, Fruit	Worms	Nearly ripe fruits are eaten in excess everyday till cured; this treatment is only for minor, ages below 12.
Celosia argentia L. Amaranthaceae, *Khemsagajao,* Angiosperm, Cultivated & wild	Herb, Leaf	White skin spot	Fresh leaves paste is applied daily till it is cured.
Chromolaena odorata (L.) King & Robin. Asteraceae, *Sangkhabli,* Angiosperm, Wild	Herb, Leaf	Constipation	About 5ml of the juice mixed with fresh lemon juice at equal proportion is taken at regular intervals (half or one hourly) till it is cured.
Citrus maxima Burm. Rutaceae, *Reba, Angiosperm, Cultivated*	Tree, Fruit	Involuntary Shaking (Tremor)	About 150 ml of fresh ripe fruit juice mixed with ~10ml of honey and a pinch of salt is taken daily, with each fresh preparation till cured.

Contd

Table 1—Medicinal plants used by the *Dimasa* Tribes of North Cachar Hills district of Assam— *Contd*

Plant species	Parts used	Diseases	Uses
Clerodendrum colebrookianum Walp. Verbenaceae, *Mishmao,* Angiosperm, Cultivated & wild	Shrub, Leaf	High Blood Pressure	About 150 ml of decoction of leaves is taken twice daily to check high blood pressure. Leaves are also eaten as vegetable.
Clerodendrum infortunatum Gaertn. Verbenaceae, *Sgaimjaopha,* Angiosperm, Wild	Shrub, Leaf	Bee's sting, Insanity	Leaf paste is applied on affected area. ~5ml of the fresh leaf juice is diluted in ~150 ml of water and taken daily to cure insanity.
Colocasia antiquorum Schott. Araceae, *Thaugunggishim,* Angiosperm, Cultivated & wild	Herb, Stem	Insect bite	Fresh stems paste is applied directly till it is cured. Leaves are also used as packing material and fodder.
Curcuma longa L. Zingiberaceae, *Slikdi,* Angiosperm, Cultivated	Herb, Rhizome	Sprains and cramps	Rhizome paste mixed with a little lime ($CaCO_3$) at a proportion of 100:1, is applied and bandaged for 3 days.
Cycas revoluta Thunb. Cycadaceae, *Thapin, Gymnosperm,* Cultivated & wild	Cycad, Female Cone	Painful urination	One piece of the young female cone is eaten daily till it is cured.
Datura innoxia Mill. Solanaceae, *Khimbung,* Angiosperm, Wild	Herb Leaf	Skin itch	Leaf paste is directly applied everyday till it is cured.
Elaeagnus caudata Schlec-ht. Elaeagnaceae, *Dauling yaskur,* Angiosperm, Cultivated	Climber, Root	Miscarriage	About 5ml of the fresh root extract is diluted in ~100 ml of water and taken once a week during pregnancy to prevent miscarriage.
Elaeocarpus robustus Roxb. Elaeocarpaceae, *Bongkangkrai*, Angiosperm, Cultivated	Tree, Fruit	Constipation	Fruits are eaten in excess with salt to cure constipation. No particular dosage.
Eryngium foetidum L. Apiaceae, *Dhonia bakhori, Angiosperm, Cultivated & wild*	Herb, Leaf	Food allergy	Leaf paste is immediately taken with water. (Allergy symptom includes vomiting, stomachache etc. after eating food or meat). Also used as flavouring agent.
Garcinia lanceaefolia (G.Don) Roxb. Clusiaceae, *Susruthai,* Angiosperm, Cultivated	Tree, Seeds	Diarrhoea	About 5-10 seeds are crushed and eaten raw once.
Gloriosa superba L. Liliaceae, *Khindaula,* Angiosperm, Wild	Herb, Leaf	Worms	Paste of medium sized leaves is taken once a day early in the morning on empty stomach for at least 3 days.
Ipomoea alba (Bona-nox.L.). Convolvulaceae, *Du mangkhlong,* Angiosperm, Wild	Climber, Leaf	Improve appetite	About 250 gm of leaves are mashed to a paste and given to sick cattle everyday to increase appetite.
Jathropha curcas L. Euphorbiaceae, *Radaokhlong,* Angiosperm, Cultivated	Shrub, Latex	Burns and wounds	Latex is applied till disease is cured.
Litsea citrata Bl. Lauraceae, *Thaiazing, Angiosperm, Wild*	Tree, Fruit	Cough	Mixture of about 5 gm of the ripe fruit with equal proportions of garlic and ginger is eaten twice daily to cure cough. Fruits are also prepared as *chutneys*.
Cyclosorus extensa (Bl.) Ching. Polypodiaceae, *Limbirsi,* Pteridophyte, Wild	Fern, Leaf (Fronds)	Herpes, Skin infection	The patient is whisk with a bunch of leaves (fronds) with continuous chanting till the leaves turn dull brown. It is then dried, burned to ash and applied twice daily over the affected part till it is cured.
Milletia pachycarpa Benth. Papilionaceae, *Rujao,* Angiosperm, WIld	Climber, Barks	Skin Itch, Skin infection	Bark paste is applied till disease is cured. Barks are also used as fish poison.
Mirabilis jalapa L. Nyctaginaceae, *Samkabli,* Angiosperm, Cultivated	Herb, Leaves	Skin Itch, Sprains and Joint swelling	Fresh leaf juice is applied on skin itch regularly everyday. A poultice of fresh leaves is applied (3 days) for sprains and joints swellings.
Momordica charantia L. Cucurbitaceae, *Gala,* Angiosperm, Cultivated	Climber, Fruit & Leaf	High blood pressure	Either fruits or leaves or both, boiled are eaten in excess to check high blood pressure. No particular dosage.
Musa paradisiaca L. Musaceae, *Laigonthai,* Angiosperm, Cultivated	Herb, Flowers	Malaria	About a handful of flowers (~7-10 gm) are mashed with other plant parts (undisclosed) and eaten raw daily till the disease is cured.

Contd

Table 1—Medicinal plants used by the *Dimasa* Tribes of North Cachar Hills district of Assam— *Contd*

Plant species	Parts used	Diseases	Uses
Rauvolfia serpentina (L.)Benth. ex Kurtz. Apocynaceae, *Argamgajao,* Angiosperm, Wild	Shrub, Root	Stomach ache	About 5ml of the fresh root juice is taken once.
Rhus semi alata Murr. Anacardiaceae, *Gembao,* Angiosperm, Wild	Tree, Fruit	Stomach ache	Dry fruit powder (~50 gm) soaked in a cup (~100 ml) of warm water with a pinch of salt and allowed to infuse for about 5 minutes is taken till cured.
Rubus ellipticus Sm. Rosaceae, *Sumukham kabeba,* Angiosperm, Wild	Shrub, Leaf	Diarrhoea	About a handful of leaves are chewed, juice swallowed without ingesting the pulp.
Rungia parviflora Nees. Acanthaceae, *Sbai thai,* Angiosperm, Wild	Herb, Leaf	Cuts and wounds	Leaf paste is applied till the ailment is cured.
Sapindus mukorossi Gaertn. Sapindaceae, *Sukathaiphang,* Angiosperm, Wild	Tree, Fruits	Skin itch	Fruit paste is applied till the ailment is cured. Fruits are used as a substitute for soap.
Solanum integrifolium Poiret. Solanaceae, *Kumkathai,* Angiosperm, Cultivated	Herb, Fruit	High Blood Pressure	About 10-15 boiled unripe fruits are eaten daily to check high blood pressure. It is also taken as vegetable.
Syzygium cumini (L.)Skeels. Myrtaceae, *Jaram,* Angiosperm, Cultivated	Tree, Seeds	Diabetes	Equal weight of dried seeds powder with dried unripe fruits of *Momordica charantia* and dried seeds of *Trigonella foenum* is stored. For severe diabetic, ~5gm of the powder mixed in ~150ml of water is taken twice daily before food. For mild diabetic, ~2.5gm, once daily before food in ~150 ml of water. Regular treatment checks diabetes.
Thysanolaena maxima O.Ktze.Rev.Gen.Pl. Poaceae, *Balangshi,* Angiosperm, Cultivated & wild	Herb, Leaf	Flatulence, improve digestion	Soft part of a young leaf and flower buds are eaten raw (No particular dosage) to cure flatulence and improves digestion. Used as brooms.
Trevesia palmata Vis. Araliaceae, *Kumthaodi,* Angiosperm, Cultivated & wild	Tree, Flower	Piles	Young flowering buds are eaten raw once daily in the morning for about 1 week. Young fruits are eaten as vegetable by other tribes.
Zanthoxylum armatum DC. Rutaceae, *Yaulaishak,* Angiosperm, Cultivated & wild	Tree, Leaf	Urinary Problems	About 250 gm leaf decoction prepared in ~ 500 ml of water is taken daily to prevent urinary problems. Also eaten as vegetable.
Zinziber officinalis Rose. Zingiberaceae, *Hazing,* Angiosperm, Cultivated	Herb, Rhizome	Sore throat	Rhizome is roasted and eaten with salt to relieve sore throat (no particular dosage).

Results

The study has revealed a total of 47 species belonging to 35 families and 45 genera (Table 1). Altogether 49 prescriptions were recorded from 47 species. 26 different types of diseases and its method of treatment have been documented. The highest proportion of species used was herb (18 sp) followed by tree species (14 sp), shrub (7 sp), climbers (6 sp) and one each of fern and cycads (Fig. 1). A single species of plants have different parts used. Present study shows that most of the drug preparations were obtained from leaves (20 sp) and reasonable amounts from fruit (12 sp), bulb and rhizome (4 sp), flowers, roots, bark, stem, seed (2 sp) and one each from female cone of cycad and latex (Fig. 2). Among the 47 species 18 sp were wild whereas 21 sp were indicated as cultivated. Few species (8 sp) were indicated as both cultivated and found wild (Table 1). Of the total species, 45 species are angiosperm and one each from Gymnosperm and Pteridophyta. Most of the species were common and easily available. The traditional healers prefer them to the rare ones partly because they are readily available and partly to preserve the rarer ones and for use only in those medicinal preparation, where they are the main ingredient. It has also been found that some rare plants like *Rauvolfia serpentina*, *Gloriosa superba*, *Cycas revoluta*, etc. were planted in the house compounds. Most of the species documented were cited several times by the respondents. *Psidium guyava, Ageratum conizoides, Clerodendrum coolebrookianum, Rauvolfia serpentina*, etc. were some of the species with high frequency of mention. Some species of plants are related to superstitious beliefs, such as *Clerodendrun infortunatum*, which is believed to cure insanity supposedly caused by black magic (Table 1). It was also observed that traditional healing among the *Dimasa* tribe often involves magic chants and animal sacrifices as in the case of *Cyclosorus extensa* in which the patient is whisked

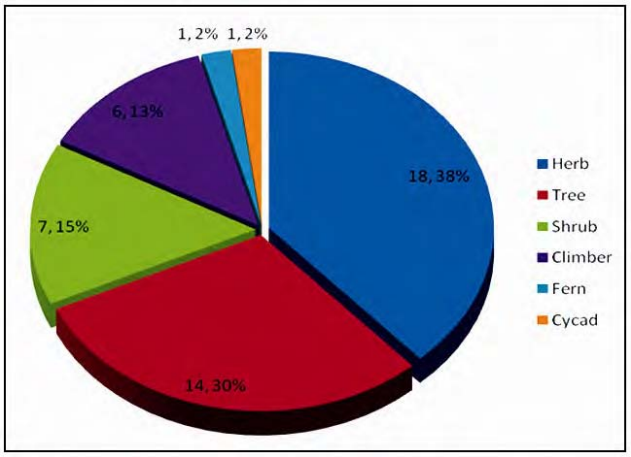

Fig.1—Proportional representation of all the species documented (Number of species and percentage contribution) based on the part used

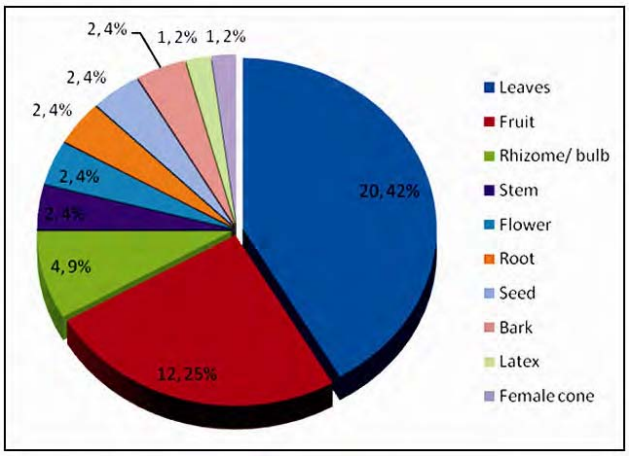

Fig. 2—Proportional representation of all the species documented (Number of species and percentage contribution) based on the plant types

with a bunch of the leaves while the traditional healer performs chanting until the leaves turn brown and dull (Table 1). These leaves are then used for preparing the medicines. Some species of plants such as *Mangifera indica* are used for the treatment of cattle and other animal diseases.

Discussion

Different diseases that have been documented are categorized into 26 types. The highest number of plant species were used in the treatment of skin diseases (8 sp) followed by diarrhoea (5 sp). Besides these, treatment for diseases like jaundice, high blood pressure, miscarriage, piles, involuntary shaking, diabetes, malaria, worms, food allergy, etc. have been documented (Table 1). Besides medicinal uses, many species in day to day use have also been documented. Species like *Trevesia palmata, Solanum violaceum, Eryngium foetidum,* etc. are used as food. *Thysanolaena maxima* is used as broom, leaves of *Musa paradisica* as packing material, *Milletia pachycarpa* is used in catching fishes from the streams, *Colocasia esculenta* is used as fodder for livestock, etc.

Most of the plants used by the *Dimasas* of the district bear a similar resemblance to that of the other tribes from other parts of India. However, traditional healers of the *Dimasa* tribe employ simple yet different combination and methods of preparation of medicine. The most common method is mashing and squeezing out the juices. This is administered directly with or without water after each fresh preparation, as in *Chromolaena odorata* and *Elaegnus caudata.* In some cases the plant material is mashed and then boiled with known amount of water to make a decoction, as in *Benincasa hispida*, whereas in some cases (*Rhus semi alata*), the plant materials are soaked either in hot or cold water for sometimes and taken. Juices squeezed in fresh forms are also applied as lotion. Dried plant material is also burnt and allowed to inhale as in *Bauhinia scendens* while some (*Brugmansia suaveolens*) are rolled and smoked. Plants are usually collected from their natural habitat during the peak season and air dried or sun dried and stored for future use. These are mostly underground parts of plants such as *Begonia roxburghii*, *Allium chinensis*, etc.

The study has revealed that the *Dimasa* tribes have vast knowledge and understanding about nature and make sustainable use of natural product. This traditional knowledge is a guarded secret and inherited by children, which is quite similar to those of the *Jaintias* and the *Zeme Nagas* of the district[18,19]. The reluctance of the traditional healers to reveal their secrets has three fold reasons, one is that it is their source of income, secondly, it is their belief that this healing practice involves spirituality and can be inherited only by the descendents of the traditional healer after performing ceremonies and rituals and with consultation of the 'spirit', and thirdly, it is their belief that revealing the properties and secrets of preparation renders the medicine ineffective. The traditional healers also use animal products in combination with plants for treating different diseases. The *Dimasa* women also possess a lot of expertise in recognizing wild edible plants and

medicinal plants for minor ailments like skin itches, cuts and wounds, flatulence, etc.

Few species recorded here have also been documented from the *Jaintia* and *Zeme Naga* tribe but the use and method of preparations are different[18,19]. For instance *Chromolaena odorata, Clerodendrum coolebrookianum, Rhus semialata* and *Benincasa hispida* has also been recorded from *Jaintia* and the *Zeme Naga* tribes of the district with similar uses but the method of treatment and preparation of the medicine are unique to the *Dimasa* tribe. Species like *Elaegnus caudata* for the treatment of miscarriage, *Trevesia palmata* for piles are unique to the *Dimasa* tribe. *Musa paradisica* is used in the treatment of diarrhoea, dysentery, and blood in the urine by the aborigines of the Andaman and Nicobar Islands but this species was reported by the traditional healers of the *Dimasa* tribe to treat malaria[24]. *Chromolaena odorata* was reported to possess antiseptic activity and this validates the reported use of the species by the *Dimasa* tribe to treat cuts and wounds[25]. *Clerodendron infortunatum* was reported for the treatment of skin diseases and scabies and as a hair tonic but its use in the treatment of madness (due to black magic) is hitherto unreported[26]. Use of *Rauvolfia serpentina* by the *Satar* tribe of Nepal for stomach aches corroborates the report on the use of the species by the *Dimasa* tribe for the same disease[27]. The use of *Syzyzium cumini* for the treatment of diabetes has been reported from different parts of the country, and studies using isolated compound from the seed has also shown significant reduction in blood glucose level in induced diabetic rats, whereas the study has revealed that the of the species for the said disease is an age old practice[28]. It is worth mentioning that the method, particularly of *Syzygium cumini* for the treatment of diabetes is now quite popular amongst different tribes within the district. *Solanum integrifolium* is a plant much popular as an ornamental plant in Asian countries and as vegetable in Northeast India. Its use in controlling high blood pressure is unique to the tribe and reported for the first time from the region. The study also shows that several threatened species like *Gloriosa superba, Rauvolfia serpentina* and *Cycas revoluta* were also used as medicine; nevertheless, it was observed that most of the respondents are aware of its rarity and has been trying to conserve it by planting it in their home gardens for ready availability. The study further reveals that with gradual progress and modernization in rural areas, there have been many changes in the traditional lifestyle, culture and customs of the different tribes of the region. Migration through marriage, settlement of more than one tribe in an area, etc. caused cultural exchanges thereby substantially influencing the traditional healthcare system.

Conclusion

The study provides a comprehensive account of the vast wealth of traditional knowledge and healthcare system of *Dimasa* tribe inhabiting the North Cachar hills district of Assam. Plants such as *Alseodaphne petiolaris, Bauhinia scendens, Eryngium foetidum and Cyclosorus extensa* warrant further investigation in relation to jaundice, snakebite, food allergy and herpes, respectively. *Solanum integrifolium* an ornamental plant in Asian countries and used as vegetable in Northeast India has been reported to control high blood pressure is unique finding of the present study. On careful scientific scrutiny and pharmacological screening these traditional knowledge can be harnessed to develop newer and safer drugs for effective cure of many ailments. Their knowledge on wild edible resources and use of forest products if properly exploited can provide rural households with additional income opportunities. The sustainable usage pattern of natural products by the *Dimasa* tribe can serve as a model example in spreading the message of conservation among the greater mass.

Acknowledgement

Thanks are due to Botanical Survey of India, Shillong and Itanagar for identification of the specimens. The authors thank Dr PK Hajra, former Director, Botanical Survey of India for his assistance in the identification of the species collected. Thanks are also due to the five traditional healers, *viz,* Hamjanon Khersa (age 73, Thaijuwari village), Nirad Langthasa (age 68, Maibang village), Thaishringdau Kemprai (age 67, Thanalambra village), Ringsmaidau Hasnu (age 63, Diyungbra village) and Debanon Kemprai (age 71, Langting village) and all the informants of the *Dimasa* tribe, who contributed to this study with their valuable inputs.

References

1 Srivastava K, Ethnobotanical studies of some important ferns, *Ethnobot Leaflets*, (2007), http://www.siu.edu/~ebl/

2 Akerele O, Medicinal plants and primary healthcare: An agenda for action, *Fitoterapia,* 59 (1988) 355-363.

3 Koduru S, Grierson DS & Afolayan AJ, Ethnobotanical information of medicinal plants used for the treatment of cancer in the Eastern Cape Province, South Africa, *Curr Sci,* 92 (7) (2007) 906-908.

4 Valiathan MS, Healing plants, *Curr Sci*, 75 (11) (1998) 1122-1126.

5 Prusti AB & Behera KK, Ethno-medico botanical study of Sundargarh district, Orissa, India, *Ethnobo Leaflets,* (2007) http://www.siu.edu/~ebl/

6 World Health Organization, WHO Traditional medical strategy, Geneva, 2002-2005.

7 Priya K & Rao S, Exploration of tribal knowledge of *Entada pursaetha* DC: An endangered gigantic medicinal legume in Eastern Ghats, *Ethnobot Leaflets*, (2008), http://www.siu. edu/~ebl/

8 Dubey NK, Kumar R & Tripathi P, Global promotion of herbal medicine, India's opportunity, *Curr Sci,* 86 (1) (2004) 37-41.

9 Kamboj VP, Herbal medicine, *Curr Sci,* 78 (1) (2000) 35-39.

10 Rajshekharan PE, Herbal medicine, *World of Science*, *Employment News,* 21-27 (2002) 3.

11 Kala CP, Ethnomedicinal botany of the *Apatani* in the Eastern Himalayan region of India, *J Ethnobiol Ethnomed,* 1:11 (2005).

12 Lalramnghinglova H & Jha LK, Ethnobotany: A review, In: *Ethnobotany and Medicinal plants of Indian Sub-continent*, edited by Maheswari JK, (Scientific Publishers, Jodhpur), 2000, 1-27.

13 Dam DP & Hajra PK, Observations on ethnobotany of *Monpas* of Kameng district, Arunachal Pradesh, In: *Contribution to Indian Ethnobotany*, Vol I, 2nd edn, edited by Jain SK, (Scientific Publishers, Jodhpur), 1997, 153-160.

14 Vasudeva MK & Shampru R, Some plants in the life of *Garos* of Meghalaya, In: *Contribution to Indian Ethnobotany* 2, Vol I, edited by Jain SK, (Scientific Publishers, Jodhpur), 1997, 179-186.

15 Borthakur SK, Plants in the folklore and folk life of the *Karbis (Mikirs)* of Assam, In: *Contribution to Indian Ethnobotany* 2, Vol I, 2nd edn, edited by Jain SK, (Scientific Publishers, Jodhpur), 1997, 169-178.

16 Rawat MS & Choudhury S, *Ethno-medico-botany of Arunachal Pradesh (Nishi and Apatani tribes)*, (Bishen Singh Mahendra Pal Singh), Dehradun, 1998.

17 Laloo RC, Kharlukhi L, Jeeva S & Mishra BP, Status of medicinal plants in the disturbed and undisturbed sacred forest of Meghalaya, Northeast India: population structure and regeneration efficacy of some important species, *Curr sci,* 90 (2) (2006) 225-231.

18 Tamuli P & Saikia R, Ethno-medico-botany of the *Zeme* tribe of North Cachar Hills district of Assam, *Indian J Traditional Knowledge,* 3(4), (2004) 430-436.

19 Sajem AL & Gosai K, Traditional use of medicinal plants by the *Jaintia* tribes in North Cachar Hills district of Assam, Northeast India, *J Ethnobiol Ethnomed*, 2 (33) (2006).

20 Jain SK & Rao RR, *A Handbook of Field and Herbarium Methods*, (Today and Tomorrow's Printers and Publishers), New Delhi, 1977.

21 Hooker JD, *The Flora of British India*, Vol 1-7, (L Reeve & Co, London), 1872-1897.

22 Kanjilal UN, Kanjilal PC & Das A, *Flora of Assam*, Vol I – II, (Avon Book Company, Delhi), 1982.

23 Kanjilal UN, Kanjilal PC, De RN & Das A, *Flora of Assam*, Vol III – IV, (Avon Book Company, Delhi), 1982.

24 Dagar HS & Dagar JC, Plant folk medicines for gynaecological urino-genital and other related problems among aborigines of Andaman and Nicobar Islands, In: *Ethnobotany and Medicinal plants of Indian Sub-continent* , edited by Maheswari JK, (Scientific Publishers, Jodhpur), 2000, 561-567.

25 Choudhuri D & Neogi B, Ethnobotany of *Khasi Chakma* tribes of Northeast India, In: *Ethnobotany and Medicinal plants of Indian Sub-continent*, edited by Maheswari JK, (Scientific Publishers, Jodhpur), 2000, 583-589.

26 Bhattacharya G, Ethnobotanical wealth of the *Druk-Yul* (Bhutan), *Ethnobotany and Medicinal plants of Indian Sub-continent*, edited by Maheswari JK, (Scientific Publishers, Jodhpur), 2000, 94-98.

27 Sivakoti M & Sivakoti S, Ethnomedicinal uses of plants among the *Satar* tribe of Nepal, In: *Ethnobotany and Medicinal plants of Indian Sub-continent*, edited by Maheswari JK, (Scientific Publishers, Jodhpur), 2000, 99-108.

28 Kumar A, Ilavarasan, R, Jayachandran T, Deecaraman M, Aravindan P, Padmanabhan N, & Krishan MRV, Anti-diabetic activity of *Syzygium cumini* and its isolated compound against streptozotocin-induced diabetic rats, *J Med Plant Res,* 2 (9) (2008) 246-249.