

STATUS AND DISTRIBUTION OF MEDICINAL PLANTS IN THE NORTH-EASTERN REGION OF BANGLADESH

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Abstract

An exploratory study was conducted to find out the status, distribution pattern and uses of medicinal plants in the small hill plains situated in northeastern part of Bangladesh. Sylhet city was selected for the survey. A total of 38 species belonging to 32 families, having 55 different curative uses were recorded from 30 random sample plots of 10m × 10m quadrat size chosen from three different topographical sites. Trees were found dominant (45%) followed by shrubs (42%), herbs (10%) and climbers (3%). Plain lands were found most favorable for medicinal plants which harbor approximately 42% of species followed by hill slope and base of the hill. Study also revealed that, the area is very suitable for the growth of medicinal plants; proper initiatives therefore, should be taken to familiarize the cultivation of market potential medicinal plants among local farmers in their fallow lands and uncultivable hill terrains.

Key words: Medicinal plants, curative uses, topography, SUST, Bangladesh.

Introduction

Medicinal plants have been used by humans from the pre-historic times. Interest in the exploitation of medicinal and aromatic plants as pharmaceuticals, herbal remedies, flavorings, perfumes and cosmetics, and other natural products has greatly increased in the recent years (Rao and Arora, 2004). Most developing countries are endowed with vast resources of medicinal and aromatic plants, which have been used over millennia for human welfare in the promotion of health and as drugs and fragrance materials (De Silva, 1997). More than 80% of the world's population depends on traditional medicinal plants for their healthcare and 20% of the drugs in modern allopathic medicine are derived from plant resources (FAO, 1995). Out of the 350 000 plants identified so far, about 35 000 are used worldwide for medicinal purposes and less than about 0.5% of these have been chemically investigated (Comer and

Debus, 1996). Traditional collection in wild and commercial cultivation of medicinal plants can contribute in the national economy of a country both by meeting the domestic demand and exporting to other countries. The global market value of pharmaceuticals derived from genetic resources is estimated at US\$ 75 000-150 000 million annually (WRI, 2000). In India alone, less than 10% of the medicinal plants traded in the country are cultivated, about 90% are collected from the wild (Natesh, 2000).

Bangladesh is rich in floral diversity, most of which possesses medicinal properties. Eighty five percent of the population of Bangladesh lives in rural areas and there are a total of 45 indigenous communities (Anon., 2002), a considerable number of who are residing in and around forested areas. As such peoples depend mainly on herbal medicines, they are knowledgeable about medicinal plants locally available;

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but much of this knowledge is being lost due to change of habitats and culture (Banik, 2001). Of about 5000 plant species found in Bangladesh, 1000 are said to have medicinal qualities and 250 are regularly used in medicines (Kadir, 1990).

Sylhet, situated in the northeastern region of Bangladesh, supports a considerable portion of the country's forestlands with diversified landscapes including plain lands, hills, reed lands and fresh water swampy depressions. Sylhet Forest Division lying between 23°55'–25°12' north latitude and 90°55'–92°30' east longitude, consists of 46,976 ha reserve forests, 4,426 ha acquired forests, 2,160.97 ha un-classed state forests (USF) and 24,109 ha proposed reserve forests (Patwary, 1999). The whole region is rich in floral diversity including herbs, shrubs, trees, climbers, bamboos, canes, reeds, grasses and epiphytes. Several studies have been conducted earlier on the medicinal plant resources growing in hilly region but it was concentrated to the Chittagong Hill Tracts (CHTs) only. No study on medicinal plants was carried out in Sylhet region. The present study is an attempt to explore valuable information on the status of medicinal plants in the northeastern hilly region of Bangladesh, particularly in the campus of SUST.

Methodology

We purposively selected campus of Shahjalal University of Science and Technology (SUST) located in Sylhet city for the present study since, the area supports diversified plant species growing both naturally and artificially, which in general sense, treated as medicinal by the local people. Besides, the campus area has diversified landscapes that represent the country's whole north-eastern region (Figure 1). The area stretches over a 320 acres landscape of green hill, undulating valleys, moulds, plain grass land and lush

forests. It is situated some 10 km away from Sylhet town. The average rainfall varies from 2 mm in November to 1172 mm in July. The highest temperature varies from 26.8°C in May to 36.1°C in June and the lowest from 8.8°C in January to 36.1°C in June. The soil is mainly reddish brown loam and slightly to strongly acidic (Patwary, 1999).

The medicinal plant species of the area were reordered from three different topographical areas viz., plain land, base of the hill and hill slope over a period of 5 months from August 2005 to December 2005. For each topographical area, 10 sample plots of 10m × 10m in size were selected randomly making a total of 30 plots that covered almost the whole campus. The sampling was determined by applying the species area curve of Hossain (1998). For the exploration of curative uses of different plant species, physical observation and investigation was made along with two local herbal medical practitioners locally known as *Kabiraj*.

Results

A total of 38 plant species belonging to 32 families including herbs, shrubs, trees and climbers, which are deliberately considered as medicinal plants by the local peoples and herbal medical practitioners and used for the purpose of curing 55 different ailments, were recorded during the study. The local and scientific names, family, habit, useable parts and curative uses of different species are enlisted in Annex 1. Trees were found dominant (45%) followed by shrubs (42%), herbs (10%) and climbers (3%) as shown in the Figure 2. Two species were found from each of the six families viz., Amaranthaceae, Apocynaceae, Compositae, Lythraceae, Moraceae and Rubiaceae and one species was found from each of the rest of the families.

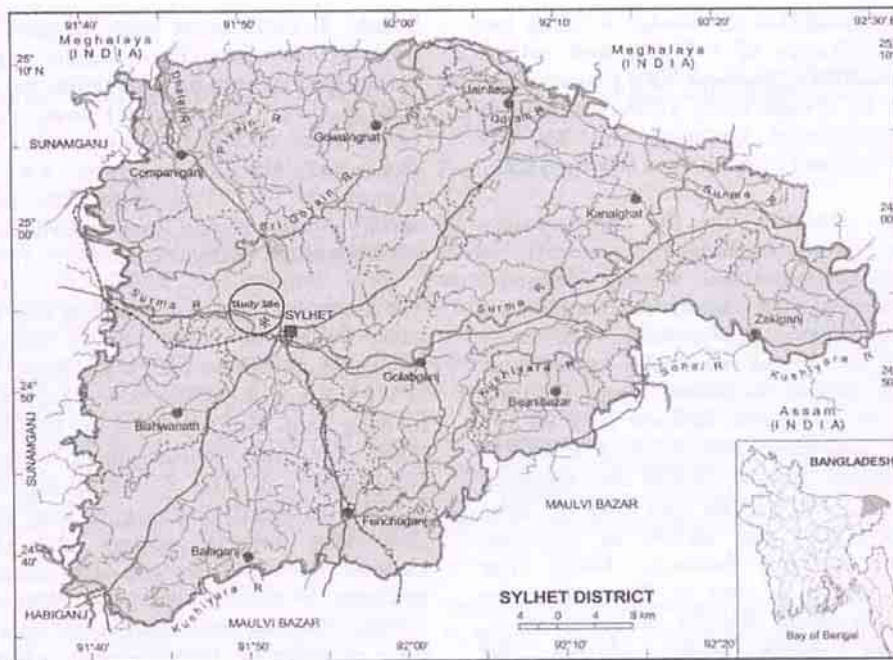


Figure 1. Location map of the study area

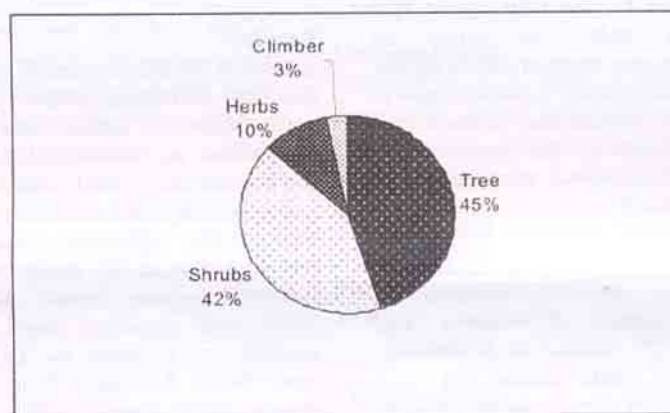


Figure 2. Percentage of medicinal plants in SUST campus

The frequency of occurrence of the species varied according to topography of the study site (Table 1). Plain land was found to harbor most of the species (42%). In case of rugged topography, the hill slope was observed to house 34%, whereas the base of the hills was seen to support 24%

of the species. The medicinal plants in the category of tree constituted the highest amount both in the plain lands (50%) and base of the hills (55.56%), while shrubs got this status (61.54%) in the hill slopes. The only existed climber *Coccinea indica* was found to grow in the base of the hill.

Table 1: Status of different medicinal plants at different topography at SUST campus

Topographical site	Total species (%)	Herbs (%)	Shrubs (%)	Trees (%)	Climber (%)
Plain land	42	12.50	37.50	50.00	0.00
Base of the hill	24	11.11	22.22	55.56	11.11
Hill slope	34	7.70	61.54	30.77	0.00

Discussion

The hilly region of Bangladesh is particularly rich in herbal medicinal resources, which is evident from several studies conducted with special reference to the CHTs (Rashid and Rashid, 2002). Being hilly in topography, Sylhet region also houses a huge number of flora of which a considerable number is medicinal plant. Rahman (1997) recorded 52 species of medicinal plants used by the tribal people of this region. The richness of Bangladesh's forests with medicinal plants is also evident from the traditional herbal healthcare perceptions of almost all the forest dwellers. Alam (1992) reported the use of 76 medicinal plants by the *Marma* tribe, while Miah and Chowdhury (2003) revealed 39 species used by the *Mro* tribe of the CHTs.

Bangladesh Forest Research Institute (BFRI) recognized the occurrence of 220 species of medicinal plants in the country (Ara et al., 1990), while Bangladesh Council for Scientific and Industrial Research (BCSIR) enlisted 546 species (Yusuf et al., 1994). Ghani (1998) explored the chemical constituents and uses of 449 medicinal plants of Bangladesh. Rahman and Hossain (2002) recorded a total of 956 individuals belonging to 55 tree species under 26 families as medicinal plants from Chunati Wildlife Sanctuary of Bangladesh. And 54 species of 34 families (of which 23 species trees, 19 shrubs, 4 herbs and 8 climbers) were recorded from Sitakund Botanical Garden and Eco-Park of the country (Uddin et al., 2005). Not in local level

only, medicinal plants are the concerns of a wide range of populations throughout the world. In China, over 4000 species of medicinal plants have been reported (Ayensu, 1996) and about 2000 species are reported from Malaysia (Latif, 1997). In India, about 2500 species are used for medicinal purposes, and about 90% of those provide raw materials for the herbal pharmaceuticals (Rahasekharan and Ganeshan, 2002). For the Indian Himalayan Region, a total of 1748 species of medicinal plants have been listed (Rao and Arora, 2004).

About 100 plant species are involved in 25% of all drugs prescribed in advanced countries (Comer and Debus, 1996). In Bangladesh, there are 180 medicinal plant based drug industries all over the country. Their annual requirement of raw materials was calculated to be 970 metric tons, of which 66% collected locally, 30% imported from India and 4% imported from Pakistan, Iraq, Iran, China, Singapore and Nepal. It was reported that 70% of raw materials for *Unani* and *Ayurveda* comes from foreign countries and most of them from India due to decline of production and distribution of forest in the country (Rashid et al., 1990).

At present, eleven companies specifically are involved in exporting medicinal plants and crude drugs in Bangladesh. The annual consumption of crude drugs is more than 1000 metric tons per annum (Kadir, 1990). But the local resources can't meet the one-fourth demand of the raw materials of the industries. The main reason for these

problems are inadequate knowledge about the medicinal plants, improper management, over exploitation and distribution of natural forests due to population pressure, conversion of fallow lands into agricultural lands, unscientific use of land and collection, preservation etc. (Rashid, 2001). Plantation of medicinal plants should be included in the plantation programs (Banik, 2001). Various countries like India, Nepal, Sri Lanka, China and Philippines have also been given emphasis on the plantation of medicinal plants (Ara, 2001). Many countries (e.g., India, South Korea, Zaire, Czech Republic, Albania, Argentina, Greece, Poland and Hungary) earn foreign currency by exporting medicinal plants/parts to various developed and developing countries (Iqbal, 1995). Presently the government, semi-government and non-government organizations of Bangladesh are trying to create awareness about the necessity of planting medicinal plants and uses of herbal medicines.

Conclusion

As demand of the medicinal plants is increasing day by day, so emphasis on the commercial cultivation of this resource is urgently needed to mitigate the domestic demand and then facilitate the export. Collecting in the wild will decrease the biological diversity due to unplanned over exploitation. So initiatives have to be taken to ensure sustainable production and utilization. Side by side, more research activities regarding intensive breeding program to upgrade the yield and quality of medicinal plants needs to be undertaken for which germplasm collection and conservation are the most essential. As most natural habitats are on the verge of being destroyed in Bangladesh by tremendous pressure of the increasing population, there is an urgent need to collect and conserve

valuable germplasm of medicinal plants before they become extinct. Local and national level research and educational institutions can play the pioneer and vital role in this regard. Besides, scientific investigations should be conducted on the traditional usages of medicinal plants to record this usage and form an information base for the future. Finally, the study concludes that, as the area shows its suitability as the natural reservoir of medicinal plants, so farmers of the area should be encouraged to plant medicinal species in their fallow lands and uncultivable hilly terrains.

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Appendix 1: The local and scientific names, family, habit, useable parts and curative uses of different species found in the study area

Family	Local Name	Scientific Name	Habit	Parts used	Curative Uses
Acanthaceae	Basak	<i>Adhatoda vasica</i> Nees.	Shrub	Leaves	Cough, asthma, phthisis, malaria and bleeding of piles.
Amaranthaceae	Apang	<i>Achyranthes aspera</i> Linn.	Herb	Whole plant	Stopping bleeding, dysentery, rheumatism, piles, skins disease.
Anacardiaceae	Kata denga/ kata notea Am	<i>Anacardium spinosus</i> Willd. <i>Mangifera indica</i> Linn.	Shrub Tree	Whole plant	Fever, wound, snakebites, diuretic and gonorrhoea.
Apocynaceae	kurchi Chatim	<i>Holarrhena antidysenterica</i> Wall. <i>Alstonia scholaris</i> R. Br.	Shrub Tree	Fruit, seed, bark and latex. Bark, leave and seed.	Diarrhoea, diabetes, asthma, cough, phthisis, piles, dysentery, constipation and diphtheria.
Araceae	Man kachu	<i>Alacacia indica</i> Schott.	Shrub	Root and leaves	Skin disease, asthma, fever, wound, dysentery and worms.
Asclepiadaceae	Akondo	<i>Calotropis calycinum</i>	Shrub	Whole plant	Malaria, dysentery, fever, constipation, weakness and diarrhoea.
Caricaceae	Papeya	<i>Carica papaya</i> Linn.	Shrub	Latex, green & ripen fruit and seed	Constipation, pain, rheumatism, ear disease and mouth disease.
Combretaceae	Arjun	<i>Terminalia arjuna</i> W & A.	Tree	Bark	Constipation, worms, cough, asthma, gout, urinal problem, fever and rheumatism.
Compositae	Assam lata Assam gach	<i>Mikania cordata</i> <i>Crotalaria verucosa</i>	Shrub Shrub	Whole plant Leaves	Eczema, asthma and skin disease.
Cucurbitaceae	Talakucha	<i>Coccinea indica</i> W & A.	Climber	Leaves and roots	Heart disease, fever, ear pain and toxicity.
Euphorbiaceae	Vherenda	<i>Ricinus communis</i> L.	Shrub	Leaves and bark	Bleeding, colds, influenza, fever, cough, diabetes and bronchitis.
Flacourtiaceae	Chalmugra	<i>Hydnocarpus kurzii</i> King.	Tree	Seed oil	Itches, wounds, dyspepsia, gastric, ulcer and hemorrhages
Guttiferae	Nageswar	<i>Mesua ferrea</i> Linn.	Tree	Flower, bark, leaves and bark.	Diabetes, anorexia, epilepsy, fever and gonorrhoea.
Labiatae	Donkolosh/ Shethedron	<i>Leucas aspera</i>	Herb	Whole plant	Flatulence, gout and rheumatism.
Lauraceae	Tezpatha	<i>Cinnamomum tamala</i> Fr. Nees.	Tree	Barks and leaves	Leprosy and skin disease.
Leguminosae	Lajjibati	<i>Mimosa pudica</i> L.	Herb	Whole plant	Piles, snake bite, rheumatism, skin disease and dysentery.
					Chronic, rheumatism, snake bite and skin disease.
					Dyspepsia, gonorrhoea, nerve disease and heart disease.
					Wounds, fistula, dysentery, piles and jaundice.

	Koranch	<i>Pongamia glabra</i> Vent.	Tree	Seed, leaves, fruits and oil seed.	Indigestion of baby, diarrhoea, leprosy, gonorrhoea, piles, rheumatism, diphtheria, fever, eczema and skin disease.
Lythraceae	Mehedi	<i>Lawsonia inermis</i> Linn.	Shrub	Leaf juice, bark, seed oil and flower.	Spleen, skin disease, headache, rheumatism, sexual disease, jaundice and mouth disease.
	Jarul	<i>Lagerstroemia speciosa</i> (Linn.) Pers.	Tree	Leaves and barks	Fever and urinary disease
Magnoliaceae	Champa	<i>Micheia champaca</i> Linn.	Tree	Bark, bark of roots, flower, fruits, leaves and oil	Dyspepsia, vomiting, fever, diabetes, gonorrhoea, headache, pain, eye irritation and rheumatism.
Malvaceae	Jaba phol	<i>Hibiscus rosa-sinensis</i> Linn.	Shrub	Flowers and leaves	Dandruff and cough.
Melastomataceae	Lutki/Tea indicator	<i>Malastoma malabathicum</i> Linn.	Shrub	Leaves flower and bark.	Diarrhoea, dysentery and leucorrhoea.
Meliaceae	Neem	<i>Azadirachta indica</i> A. Juss.	Tree	Leaves and barks	Antiseptic, ulcer, rheumatism, eczema, diabetes, fever, malaria and skin disease.
Moraceae	Kanthal	<i>Artocarpus heterophylla</i> Lam.	Tree	Green and ripen fruit, root and latex	Abscesses skin disease, Diarrhoea and constipation.
	Bot	<i>Ficus bengalensis</i> Linn.	Tree	White latex and bark	Dysentery, diarrhoea, diabetes, rheumatism, gonorrhoea, toxic, teeth pain and sexual stimulant.
Myrtaceae	Jam	<i>Syzygium cumini</i> (Linn.) Skeels.	Tree	Fruit, seed and bark.	Cough, piles, disease of teeth, dysentery, bronchitis and diabetes.
Pandanaceae	Keya	<i>Pandanus tectorius</i> Soland.	Shrub	Stem and seed	Eye irritation and dandruff.
Planae	Supari	<i>Areca catechu</i> Linn.	Tree	Green and ripen fruit, leaves.	Stomach pain, ulcer, teeth disease, diarrhoea, sex stimulant, hook worm and rheumatism.
	Mon kata	<i>Randia dumetorum</i> Lamk.	Shrub	Fruit and bark	Cough, vomiting, dysentery, fever, rheumatism, pain and abscesses.
Rubiaceae	kadam	<i>Anthocephalus chinensis</i> Miq.	Tree	Bark, root and latex	Fever and snake bite.
Rutaceae	Lebu	<i>Citrus medica</i>	Shrub	Fruits	Cough, appetizer, fever and bronchitis.
Sapotaceae	Bokul	<i>Mimusops elengi</i> Linn.	Tree	Leaf, bark and flowers.	Headache, disease of teeth, bleeding and dysentery.
Thymelaeaceae	Bon begun	<i>Solanum indicum</i>	Herb	Roots, leaves and fruits	Carminative, expectorant, vomiting and asthma.
	Agar	<i>Aquilaria agallocha</i> Roxb.	Tree	Resinous substances by fungi.	Rheumatism, vomiting and diarrhoea.
Verbenaceae	Bhat	<i>Clerodendron infortunatum</i> Linn.	Shrub	Root, bark, leave and young plant.	Vomiting, fever, skin disease and worms.