

ETHNO-MEDICO-BOTANICAL STUDY IN LAWACHARA NATIONAL PARK, BANGLADESH

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Abstract

Use of medicinal plants for primary health care by the local people in and around the Lawachara National Park, Bangladesh was recorded. A total of 56 plant species under 30 families with 70 formularies (treatment mode) have been documented. Among the medicinal species, *Citrus limon* (L.) Burm. f., *C. maxima* (Burm.) Merr., *Cucurbita pepo* L., *Lepisanthes rubiginosa* (Roxb.) Leenh., *Euphorbia pulcherrima* Willd. ex Klotz., *Mimosa diplotricha* C. Wright ex Sauv. have been reported as new medicinal species from Bangladesh. Out of these plant species, 39.29% belonged to herbs, 19.64% shrubs, 3.71% trees and 5.36% climbers. In majority cases, leaves of the medicinal plants were found leading in terms of their use followed by fruit, bark, stem, seed, whole plant, latex, rhizome and inflorescence.

Introduction

Lawachara National Park under Maulvi Bazar district is a part of West Bhanugach reserve forest, which was declared reserve in early 19th century as per the Forest Act 1878, the Assam Forest Manual 1898 and the Forest Act 1927. It lies between 24°30'-24°32' N and 91°37'-91°39' E. A part of the reserve forest was declared as a National Park in 1996 having a total area of 1250 ha (Green 1990, Canonizado and Rahman 1998, Riadh 2007, Ahsan 2007). Lawachara forest is a combination of planted exotic species and mixed forest with a deciduous canopy and an evergreen understory (Ahsan 2000). The forest originally supported an indigenous vegetation cover of mixed tropical evergreen type (Alam 1998). Socio-economic and ecological values of the park is high because a number of ethnic (mainly Khasia, approximately 400 people) and other people reside within and around the park on which they depend for their livelihood to some extent. Once, they relied on natural plants and plant products of the park for the primary healthcare other than modern medicine. Currently, traditional knowledge of primary healthcare system of ethnic communities is under great threat because of a number of factors including deforestation, habitat degradation, biodiversity loss and modern civilization. For the sake of conservation of local ethnic knowledge on medicinal plants, ethno-medico-botanical study in Lawachara National Park was essential.

In Bangladesh so far a number of ethno-medico-botanical research has been carried out (Uddin *et al.* 2001, 2004, 2006, 2008, Khan *et al.* 2002, Uddin and Roy 2007). But none of them was devoted to ethno-medico-botany of Lawachara National Park. The aim of the present study was to record medicinal knowledge of plants used by the local and ethnic communities living in and around the Lawachara National Park.

Materials and Methods

The study was carried on the local people living in and around the Lawachara National Park from July, 2009 to June, 2010. A total of 100 people (50 from Khasia community and 50 other than Khasia) having an age range 12 - 92 years were interviewed using semistructured interview

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method (Alexiades 1996, Martin 1995). Professionally they were peasant, day labor, betel leaf cultivators, house wives, medicine men, forest minor product collectors, small shop keepers, etc. Among them 35 were female and rest 65 were male. Triangulation method have been followed for data validation in the field (Dean and Whyte 1959). Plant specimens with flowers and fruits were collected and processed using standard herbarium techniques (Hyland 1972, Alexiades 1996). The specimens were identified consulting Uddin and Hassan (2004), Siddiqui *et al.* (2007) and Ahmed *et al.* (2008-2009, 2008a). Specimens available at Dhaka University Salar Khan Herbarium (DUSH) and Bangladesh National Herbarium were also consulted for the identification of the collected plants which were deposited later on in the DUSH.

Results and Discussion

In the present ethno-medico-botanical survey, a total of 56 species under 30 families were recorded. The species were related with 70 formularies (treatment mode) and for the treatment of 32 ailments. For each species botanical name, local name, family, ailments to be treated, mode of treatment, and part(s) used are provided in Table 1. After consulting Yusuf *et al.* (2009) and Ghani (1998), *Citrus limon* (L.) Burm. f., *C. maxima* (Burm.) Merr., *Cucurbita pepo* L., *Lepisanthes rubiginosa* (Roxb.) Leenh., *Euphorbia pulcherrima* Willd. ex Klotz., *Mimosa diplotricha* C. Wright ex Sauv. have been recorded as new medicinal plants for the first time in Bangladesh.

Distribution of medicinal plant species in the families shows variation (Fig. 1). Rutaceae is represented by six species and each of Lamiaceae and Euphorbiaceae is represented by four species. A single species in each was recorded by 19 families while two species in each was recorded by four families. Zingiberaceae, Solanaceae, Combretaceae, Caesalpiniaceae and Asteraceae were represented by two species in each. The survey indicated that the common medicinal plant families in the study area are Rutaceae, Lamiaceae, Euphorbiaceae, Solanaceae, Zingiberaceae, Combretaceae, Asteraceae, Caesalpiniaceae, Lauraceae, Mimosaceae, Meliaceae, and Cucurbitaceae. This findings of common medicinal plant families in the study is in agreement with Yusuf *et al.* (2009) and Ghani (1998).

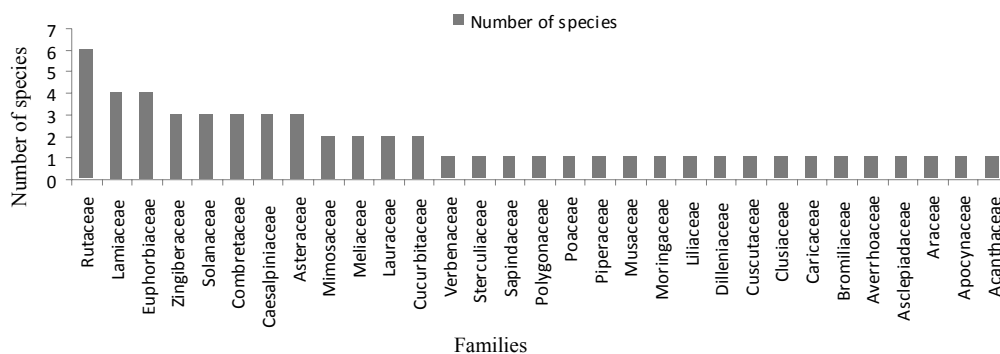


Fig. 1. Distribution of species among different families.

Analysis of the data based on habits showed that leading medicinal plant species 39.29% belonged to herbs, 19.64% shrubs, 35.71% trees and 5.36% climbers (Table 1). Giday (2001) reported that herb is the leading medicinal species in his article on Zay people of Ethiopia whereas Teklehamyanot and Giday (2007) reported same result among the people of Zegie Peninsula, Northwestern Ethiopia. The present report on leading medicinal species as herb, is similar to the above findings.

Table 1. List of plants and their diversity in use for medicinal purposes by the people living in and around Lawachara National Park.

Name of species/plants	Local name	Habit	Name of family	Part (s) used	Ailments	Treatment process
<i>Adhatoda zeylanica</i> Medikus	Bashok	Shrub	Acanthaceae	L	Cough, flue	Taken leaves juice
<i>Aegle marmelos</i> (L.) Corr.	Haigakok	Tree	Rutaceae	F	Dysentery, stomachache	Taken green fruits, also taken ripe fruits
<i>Alium cepa</i> L.	Piaj	Herb	Liliaceae	L	Cold	Applied juice on head
<i>Alstonia scholaris</i> (L.) R. Br.	Chatim	Tree	Apocynaceae	LA, L	Joint pain, cold, fever	Applied latex, also taken leaves juice
<i>Ammomum aromaticum</i> Roxb.	Taragota	Herb	Zingiberaceae	SD	Fever	Taken seed juice
<i>Ananas sativus</i> (Lindl.) Merr.	Anaros	Herb	Bromeliaceae	F	Jaundice, anthelmintics	Taken fruits
<i>Averrhoa carambola</i> L.	Kamranga	Tree	Oxalidaceae	L, F	Blood pressure	Applied both leaves and fruits juice
<i>Azadirachta indica</i> A. Juss.	Neem	Tree	Meliaceae	L, F	Pox, skin diseases, stomachache, anthelmintics, tooth brush, toothache, good health	Leaves boiled with water and apply physically, both leaves and fruits juice taken and tablet made by leaves paste
<i>Cajanus cajan</i> (L.) Millsp.	Orhor	Shrub	Caesalpiniaceae	L	Jaundice	Leaves juice taken
<i>Calotropis procera</i> (Ait.) R. Br.	Akanda	Shrub	Asclepiadaceae	L	Abscess	Applied leaves juice
<i>Capsicum frutescens</i> L.	Morich	Herb	Solanaceae	F	Cut injury	Paste of dry capsicum plus hot mustard oil applied
<i>Carica papaya</i> L.	Kaiphal	Tree	Caricaceae	LA	Ring worm	Applied latex of green fruits
<i>Centella asiatica</i> (L.) Urban	Peruk	Herb	Clusiaceae	WP	Dysentery, stomachache	Taken whole plant by cooking, also taken juice from whole plant
<i>Cinnamomum tamala</i> Nees & Aberm.	Daruchini	Tree	Lauraceae	B	Headache	Chewing bark
<i>Citrus aurantifolia</i> (Chrim. & Panzer) Swingle	Lebu	Shrub	Rutaceae	F	Fever	Applied fruit juice on head
<i>C. limon</i> (L.) Burm. f.	Guralebu	Tree	Rutaceae	F	Jaundice	Taken fruits juice
<i>C. maxima</i> (Burm.) Merr.	Jambura	Tree	Rutaceae	F	Headache	Fruit juice taken
<i>Clerodendrum viscosum</i> Vent.	Bhait	Shrub	Verbenaceae	L	Stomachache, toothache	Taken leaves juice with sugar, also taken juice of young leaves

(Contd.)

(Contd.)

<i>Coccinia cordifolia</i> Cogn.	Kaoaluli	Climber	Cucurbitaceae	L	Cold, cough	Taken leaves juice
<i>Colocasia esculenta</i> (L.) Schott	Kachu	Herb	Araceae	S	Insects bite, cut injury	Applied stem juice
<i>Cucurbita pepo</i> L.	Lao	Climber	Cucurbitaceae	S	Tooth infection	Stem decoction for gargling
<i>Curcuma domestica</i> Valet.	Halud	Herb	Zingiberaceae	R	Rheumatic pain, cut injury	Paste of raw turmeric applied
<i>Cuscuta reflexa</i> Roxb.	Sunnalata	Herb	Cuscutaceae	S	Anthelmintics	Taken juice of stem
<i>Cynodon dactylon</i> (L.) Pers.	Durba	Herb	Poaceae	WP	Cut injury	Applied juice of whole plants
<i>Datura metel</i> L.	Dutura	Shrub	Solanaceae	L	Toothache, abscess	Applied leaves juice with ghee
<i>Dillenia indica</i> L.	Chalta	Tree	Dilleniaceae	F	Hair tonic	Applied juice of fruits
<i>Eupatorium odoratum</i> L.	Pisaish	Herb	Asteraceae	L	Cut injury	Leaves juice applied
<i>Euphorbia hirta</i> L.	Dudia	Herb	Euphorbiaceae	L	Bronchitis, cough	Taken leaves juice
<i>E. pulcherrima</i> Willd. ex Klotz	Lalpata	Shrub	Euphorbiaceae	L	Cut injury	Taken leaves juice
<i>Glycosmis arborea</i> (Roxb.) A. DC.	Bonjamir	Shrub	Rutaceae	L	Flue, cough, fever	Taken leaves juice
<i>Hyptis suaveolens</i> (L.) Poit.	Tokma	Herb	Lamiaceae	SD	Appetizer	Taken seed mixed with juice of bark of <i>Sterculia foetida</i>
<i>Lepisanthes rubiginosa</i> (Roxb.) Leenh.	Chagalnadi	Tree	Sapindaceae	L	Fever	Taken leaves juice
<i>Leucas lavandulaefolia</i> Smith	Dhandakolosh	Herb	Lamiaceae	L	Lactation	Taken as fried leaves
<i>Litsea glutinosa</i> (Lour.) Robinson	Chengpislá	Tree	Lauraceae	L, B	Dysentery, mental peace, menstruation, headache	Both leaves and bark juice taken, also applied juice of bark
<i>Melia azedarach</i> L.	Goraneem	Tree	Meliaceae	L	Fever, anthelmintics	Leaves juice taken
<i>Mikania cordata</i> (Burm.) Robinson	Refugeelata	Climber	Asteraceae	L	Cut injury	Applied leaves juice
<i>Mimosa diplotricha</i> C. Wright ex Sauv.	Sadalaizzabati	Herb	Mimosaceae	L	Skin diseases	Leaf decoction applied physically
<i>M. pudica</i> L.	Ukhainthabi	Herb	Mimosaceae	L	Cut injury, toothache	Applied leaves juice, decoction for gargling
<i>Moringa oleifera</i> Lamk.	Shajna	Tree	Moringaceae	S, B	Cold, bodyache	Taken stem juice mixed sugar, also taken fired bark with turmeric

(Contd.)

(Contd.)

<i>Musa paradisiaca</i> L.	Kala	Herb	Musaceae	L, F	Cut injury, diarrhoea and dysentery	Applied leaves base, also taken paste of green fruits
<i>Ocimum americanum</i> L.	Rozetpata	Herb	Lamiaceae	L	Bronchitis	Leaves juice taken
<i>O. sanctum</i> L.	Tulsi	Herb	Lamiaceae	L	Flue, cough, ring warm	Taken leaves juice, also applied leaves paste with salt
<i>Persicaria hydropiper</i> (L.) Spach	Kukragach	Herb	Polygonaceae	L	Insects bite	Applied leaves juice
<i>Phyllanthus emblica</i> L.	Aolagota	Tree	Euphorbiaceae	F	Appetizer	Taken fruits
<i>Piper betel</i> L.	Pan	Herb	Piperaceae	L	Cut injury, pain waiver,	Leaves juice applied
<i>Psidium guajava</i> L.	Peara	Tree	Rutaceae	L	Dysentery	Taken both young leaves juice added with sugar
<i>Ricinus communis</i> L.	Uripata	Shrub	Euphorbiaceae	L	Ring worm, abscess	Applied leaves juice with salt
<i>Senna alata</i> (L.) Roxb.	Dadmordan	Shrub	Caesalpiniaceae	L	Ring worm	Applied leaves juice
<i>Solanum melongena</i> L.	Begun	Shrub	Solanaceae	F	Pain waiver	Paste of fruit applied
<i>Spilanthes calva</i> DC.	Nakful	Herb	Asteraceae	I	Tooth pain	Chewing inflorescence
<i>Sterculia foetida</i> L.	Udal	Tree	Steculiaceae	B	Stomachache	Taken juice of bark mixed with sugar
<i>Tamarindus indica</i> L.	Tentul	Tree	Caesalpiniaceae	F	Abscess	Applied as paste with tamarind, betel leaves
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Arjun	Tree	Combretaceae	F, B	Stomachache, cough	Juice of fruits added with sugar, also taken juice of bark with honey
<i>T. bellirica</i> (Gaertn.) Roxb.	Bohera	Tree	Combretaceae	F	Constipation	Taken juice of fruits
<i>T. chebula</i> Retz.	Horitaki	Tree	Combretaceae	F	Appetizer, constipation, urinary disorder	Chewing fruits, also taken juice of fruits added with sugar
<i>Zingiber officinale</i> Rosc.	Ada	Herb	Zingiberaceae	R	Flue and bronchitis	Taken zinger with betel leaf and also taken as syrup

L = Leaf, LA = Latex, S = Stem, SD = Seed, F = Fruit, WP = Whole plant, B = Bark, R = Rhizome.

Use of plant parts as medicine shows variation. Leaves are the leading part used in a majority of medicinal plants followed by fruits, bark, stem, seeds, whole plant, latex, rhizome and inflorescence (Fig. 2). Harvesting leaves for medicinal use has also been reported from Southern Ethiopia (Yirga 2010). Herbal preparation that involves roots, rhizomes, bulbs, barks, stems or whole plants affects mother plants (Dawit and Ahadu 1993). In the present study area this threat was minimal as leaves were the leading plant parts used for medicinal purposes. It was observed

that the collection of bark as medicinal part from the wild were not sustainable. According to local people, this type of activity is carried out by the collectors related to illegal trade of medicinal plants. *Litsea glutinosa* and *Sterculia foetida* are vulnerable to this kind of activity in the study area.

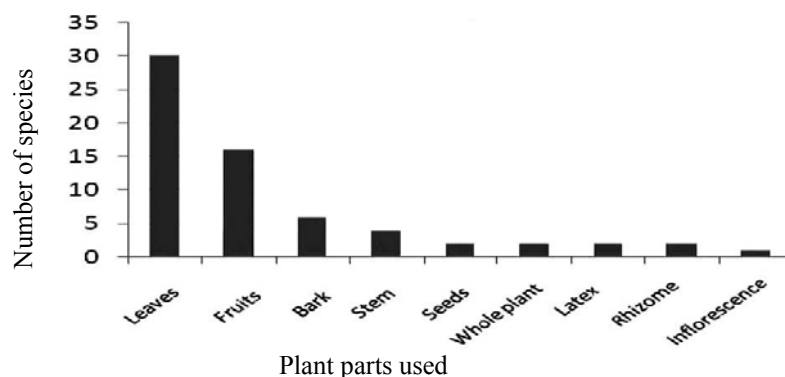


Fig. 2. Number of plant parts used for medicinal purpose.

The survey has also recorded 32 categories of uses of 56 medicinal plants (Fig. 3). This is the indication of rich knowledge of medicinal uses of plants by the local people in the area. Among them, ten species were used to cure cut injury, six species for each of toothache, stomachache, cough, and fever and five species for dysentery. Twelve categories of ailments were treated by two to four species and other fourteen categories of ailments were treated by only one species. Use of species in different ailments showed also variations. Neem (*Azadirachta indica*) has been used for the treatment of 7 ailments and *Litsea glutinosa* for 4 ailments and each of *Glycosmis arborea*, *Musa paradisiaca*, *Ocimum sanctum* and *Terminalia chebula* for 3 ailments. For treating at least two ailments 22 species were used. The remaining 28 species of the total were used for the treatment of a single ailment (Table 1). Among the medicinal use of plants, the survey reported a good number of new uses those were not mentioned in the previous literatures (Yusuf *et al.* 2009, Ghani 1998).

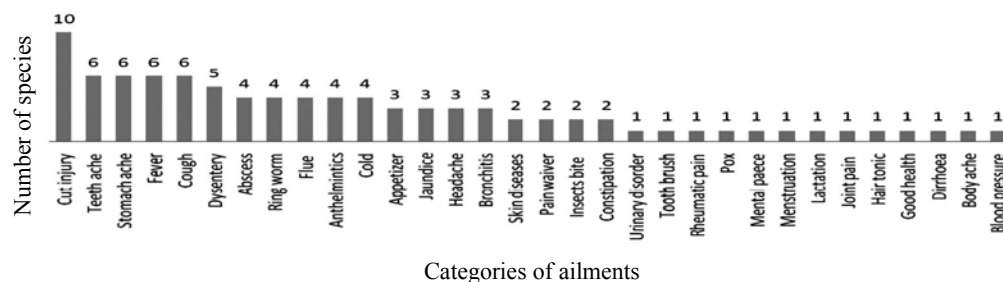


Fig. 3. Number of medicinal plants used in different categories of ailments.

The present findings are probably the first record of ethno-medicinal knowledge for Lawachara National Park using standard research protocols. The present study may be a preliminary contribution to the ethno-botany of this area using standard research methods,

focusing on medicinal plants and their local uses for the health care. One ethnic group Khasia has been living within Magurchara and Lawachara Punji (slam) of the park area. In most cases they use medicinal plants for their primary health care. This health care knowledge transmitted orally from one generation to generation. No written documents were found in the area during the study period. The study also suggested that the present information on medicinal use of plants by the local people may be used for the park management plan and in ethno-pharmacological research in future for the discovery of new sources of drugs.

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