

Ethnomedicinal plants of Manas National Park, Assam, Northeast India

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In the study, 57 medicinal plant species belonging to 45 genera and 36 families have been recorded. Out of these, the most important species found were *Aesculus punduana*, *Boerhavia diffusa*, *Dillenia pentagyna*, *Holarrhena antidysenterica*, *Justicia adhatoda*, *Oroxylum indicum*, *Rauvolfia densiflora*, *Rauvolfia serpentina*, *Terminalia arjuna*, *Terminalia belerica* and *Terminalia chebula*. The natural distribution of these medicinal plant species in 3 different ranges of Manas National Park were marked with the help of GPS. The study revealed that the documented medicinal plants have potential curative properties with immense market value. Moreover, the plants can be grown commercially by the villagers of the fringes area of Manas National Park through improved agro-technique for the betterment of livelihood.

Keywords: Ethnomedicine, Manas National Park, Medicinal plants, Assam

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Traditionally, various tribes have been using medicinal plants from time immemorial for the treatment of various types of diseases. Traditional system of medicine plays a very prominent role in healthcare system of the rural people covering all types of ailments. *Rigveda* and *Atharvavedas* have details to cure different diseases. *Charaka Samhita* and *Shusruta Samhita* are regarded two most important documents of this system of medicine. Manas is the only landscape in the world where pristine *Terai* grasslands are seen merging with the *Bhabar* Grasslands interspersed with diverse habitats ascending to semi-evergreen forests and then to the Bhutan Himalayas.

Almost half of the Manas National Park is covered by the *Terai* and *Bhabar* grasslands. There are more than 550 species of the angiosperms in the park. Most commonly seen trees are *Bombax ceiba* L., *Dillenia pentagyna* Roxb., *Dalbergia sissoo* Roxb., *Gmelina arborea* Roxb. ex Sm., etc. The park is also very rich in animal diversity and is home to different rare and endangered species such as Clouded leopards, Marbled cat, Binturongs, Pygmy Hog, Land turtle and Manipur Bush Quail. The Manas Park has also rich tiger population and accordingly it was declared as one of the first among 9 tiger reserves of India. Diverse

utilization of medicinal plants has been reported by many researchers from Northeast India¹⁻⁴. It has also been reported that *Boro* tribes of Assam used various medicinal plants for family planning and birth control⁵. Some other uses of medicinal plants by *Boro* tribes also been reported from Assam⁶. Detail information on floral diversity and its management plan in Manas Biosphere Reserve has been reported^{7, 8}. However, no work has been carried out so far on the enumeration and status of medicinal plants in Manas National Park. Therefore, the study was carried out to enumerate the status of medicinal plants in Manas National Park. Manas National Park is located between 26°45'–26°50'N latitude and 90°30'–91°15'E longitudes covering an area of 500 km². Climate of the Manas National Park is subtropical in nature. The elevation ranges between 40–170 m moll with an average of 85 m. Annual rainfall ranges between 3,000–4,000 mm and temperature ranges between 6–37 °C with the highest in the month of July and August. There are three seasons, viz. summer (March–May), monsoon (June–September), winter (December–February). The main ethnic community of the fringe villages of the Park is *Bodo*, *Assamese*, *Nepalese* and *Adivasi*.

Methodology

Field trips were conducted during 2005–2007 in Manas National Park covering 3 ranges, viz.

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Bhuyapara, Bansbari and Panbari (Fig. 1). Detailed work plan was prepared with the help of topomaps available in the Forest Department. Extensive exploration trips were made to record the populations of different medicinal plants in Manas National Park and the locations were marked with the help of Global Positioning System (GPS). Voucher specimens were collected, identified properly consulting a flora¹⁰⁻¹⁴.

Results and discussion

Fifty seven medicinal plant species belonging to 45 genera and 36 families are being used for treating different ailments (Figs. 2-4). Besides these medicinal properties, the plants have other uses also like edible fruit, vegetables, timber, fiber and fodder (Table 1). The family Apocynaceae and Verbenaceae contributed highest 4 species each followed by Combretaceae and Rubiaceae contributing 3 species each. *Boerhavia diffusa* is used in the treatment of jaundice, *Centella asiatica* in the treatment of stomach disorder and also as vegetable. *Cinnamomum*

obtusifolia and *Cinnamomum zeylanica* are widely used as medicine and as spice. *Clerodendrum indicum*, *Clerodendrum serratum* and *Clerodendrum viscosum* are used in the treatment of stomach disorder whereas *Dillenia pentagyna* and *Oroxylum indicum* are traditionally used as an anticancer drug. *Holarrhena antidysenterica* is used against dysentery, *Justicia adhatoda* is used in the treatment of stomach disorder. Roots of *Rauvolfia serpentina* and *Rauvolfia densiflora* are used to cure high blood pressure. With the help of GPS ground truthing, following 3 statuses of medicinal plants in Manas National Park were recorded: Frequently observed species in almost all areas (common), less frequently observed species (scattered), and very less frequently observed species in some particular areas (rare).

In the study, 31 plant species such as *Aesculus punduana* Wall. ex Hern, *Boerhavia diffusa* L., *Bombax ceiba* L., *Butea monosperma* (Lam.) Taubert, *Calotropis acia* Buch.-Ham., *Cannabis sativa* L., *Casearia vareca* Roxb., *Centella asiatica* (L.) Urban, *Cleome viscosa* Linn, *Clerodendrum indicum* (L.) Kuntze, *Clerodendrum serratum* (L.) Moon, *Clerodendrum viscosum* Vent., *Cynodon dactylon* (L.) Pers., *Dillenia indica* L., *Dillenia pentagyna* Roxb., *Embllica officinalis* Gaertner, *Glycosmis arborea* (Roxb.) DC., *Gmelina arborea* Roxb. ex Sm., *Hedyotis scandens* Roxb., *Homonoia riparia* Lour., *Ipomoea aquatica* Forssk., *Justicia adhatoda* L., *Murraya koenigii* (L.) Sprengel, *Nymphaea nouchali* Burm. f., *Nymphaea pubescens* Hook. f. & Thomson, *Oxalis corniculata* L., *Sida cordifolia* Linn., *Syzygium cumini* (L.) Skeels, *Terminalia arjuna* (Roxb.), *Terminalia belerica* (Gaertner) Roxb., *Terminalia chebula* (Gaertner) Retz., *Trichosanthes tricuspidata* Lour. are common. Eighteen species, viz. *Alstonia scholaris* (L.) Brown., *Azadirachta indica* Adr. Juss., *Cassia fistula* L., *Cinnamomum obtusifolia* (Roxb.) ex

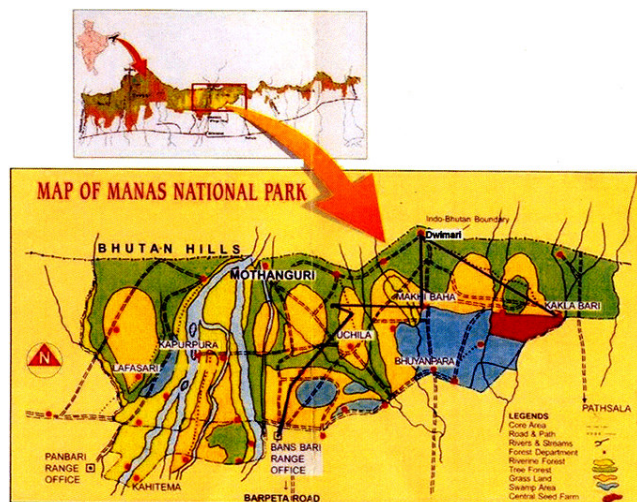


Fig. 1 — Location map of the study area

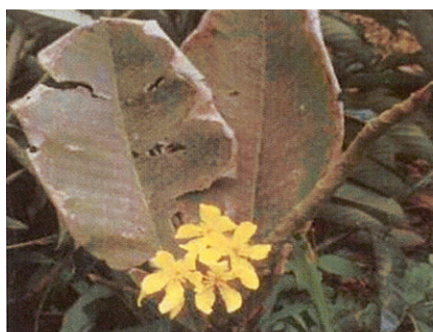


Fig. 2 *Dillenia pentagyna*



Fig. 3 *Oroxylum indicum*



Fig. 4 *Aesculus punduana*

Table 1 — Uses of medicinal plants of Manas National Park

Plant name	Medicine	Fruits	Vegetables	Timber	Fiber	Fodder
<i>Aesculus punduana</i> Wall. ex Hiern	+					
<i>Alstonia scholaris</i> (L.) Brown.	+					
<i>Averrhoa carambola</i> L.	+	+				
<i>Azadirachta indica</i> Adr. Juss.	+					
<i>Boerhavia diffusa</i> L.	+					
<i>Bombax ceiba</i> L.	+				+	
<i>Butea monosperma</i> (Lam.) Taubert	+					
<i>Calotropis acia</i> Buch.-Ham.	+					
<i>Cannabis sativa</i> L.	+					
<i>Casearia vareca</i> Roxb.	+					
<i>Cassia fistula</i> L.	+			+		
<i>Centella asiatica</i> (L.) Urban	+		+			
<i>Cinnamomum obtusifolia</i> (Roxb.) ex Ness.	+					
<i>Cinnamomum zeylanica</i> L.	+					
<i>Clematis gouriana</i> Roxb. ex DC.	+		+			
<i>Cleome viscosa</i> Linn.	+					
<i>Clerodendrum indicum</i> (L.) Kuntze	+					
<i>Clerodendrum serratum</i> (L.) Moon	+					
<i>Clerodendrum viscosum</i> Vent.	+					
<i>Costus speciosus</i> (J. Koenig) Sm.	+					
<i>Crateva religiosa</i> Froster f.	+			+		+
<i>Cynodon dactylon</i> (L.) Pers.	+					
<i>Dillenia indica</i> L.	+	+	+	+		
<i>Dillenia pentagyna</i> Roxb.	+			+		
<i>Embllica officinalis</i> Gaertner.	+	+				
<i>Flacourtia jangomas</i> (Lour.) Raeusch.	+	+				
<i>Glycosmis arborea</i> (Roxb.) DC.	+					
<i>Gmelina arborea</i> Roxb. ex Sm.	+			+		
<i>Hedyotis corymbosa</i> (L.) Lam.	+					
<i>Hedyotis costata</i> (Roxb.) Kurz	+					
<i>Hedyotis scandens</i> Roxb.	+					
<i>Holarrhena antidysenterica</i> (Roxb. ex Fleming) Wallich ex A. DC.	+					
<i>Homonoia riparia</i> Lour.	+					
<i>Ipomoea aquatica</i> Forssk.	+		+			
<i>Justicia adhatoda</i> L.	+					
<i>Kydia calycina</i> Roxb.	+					
<i>Lasia spinosa</i> (L.) Thwaites	+	+	+			
<i>Murraya koenigii</i> (L.) Sprengel	+					
<i>Nymphaea nouchali</i> Burm. f.	+					
<i>Nymphaea pubescens</i> Hook. f. & Thomson	+					
<i>Ocimum sanctum</i> Linn.	+					
<i>Oroxylum indicum</i> (L.) Vent.	+			+		
<i>Oxalis corniculata</i> L.	+		+			
<i>Piper longum</i> L.	+					
<i>Piper mullesua</i> Buch.-Ham. ex D. Don.	+					
<i>Rauwolfia densiflora</i> (Wall.) Benth. ex Hook. f.	+					
<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz	+					
<i>Sida cordifolia</i> Linn.	+					
<i>Smilex ocreata</i> A. DC.	+					
<i>Smilex perfoliata</i> Lour.	+					
<i>Streblus asper</i> Lour.	+					
<i>Stephania japonica</i> (Thunb.) Miers	+					
<i>Syzygium cumini</i> (L.) Skeels	+	+				
<i>Terminalia arjuna</i> (Roxb.)	+			+		
<i>Terminalia belerica</i> (Gaertner) Roxb.	+					
<i>Terminalia chebula</i> (Gaertner) Retz.	+			+		
<i>Trichosanthes tricuspidata</i> Lour.	+					

Ness., *Cinnamomum zeylanica* L., *Clematis gouriana* Roxb. ex DC., *Costus speciosus* (J. Koenig) Sm., *Hedyotis corymbosa* (L.) Lam., *Hedyotis costata* (Roxb.) Kurz, *Lasia spinosa* (L.) Thwaites, *Ocimum sanctum* Linn., *Oroxylum indicum* (L.) Vent., *Piper longum* L., *Piper mullesua* Buch.-Ham. ex D. Don., *Rauvolfia serpentina* (L.) Benth. ex Kurz, *Smilax ocreata* A. DC., *Smilax perfoliata* Lour., *Streblus asper* Lour. are scattered. *Averrhoa carambola* L., *Crateva religiosa* Froster f., *Flacourtia jangomas* (Lour.) Raeusch., *Holarrhena antidysenterica* (Roxb. ex Fleming) Wallich ex A. DC., *Kydia calycina* Roxb., *Rauvolfia densiflora* (Wall.) Benth. ex Hook. f., *Stephania japonica* (Thunb.) Miers, *Terminalia belerica* (Gaertner) Roxb. are rare.

Some species e.g. *Averrhoa carambola* L., *Crateva religiosa* Froster f., *Flacourtia jangomas* (Lour.) Raeusch., *Holarrhena antidysenterica* (Roxb. ex Fleming) Wallich ex A. DC., *Kydia calycina* Roxb., *Rauvolfia densiflora* (Wall.) Benth. ex Hook. f., *Stephania japonica* (Thunb.) Miers, *Terminalia belerica* (Gaertner) Roxb. are facing threats in Panbari range due to anthropogenic pressure mainly due to illegal falling. The people of fringe villages of Manas National Park collect these medicinal plants. Large scale collection of medicinal plants is banned in Bhuyapara and Bansbari range of eastern and middle part of the Manas National Park. In the western Panbari range, collection of certain medicinal plant species is still which may bring them under a threat category. Measures should be taken to prevent anthropogenic pressure for future germplasm conservation as well as the conservation of Manas National Park. The topography as well as edepic conditions of the fringe villages of Manas National Park are almost same as that of core zone of the park. Therefore, most of the important medicinal plants with high market value can also be grown in the fringe villages areas through improved agro-technique. This may improve the socio-economic condition of the park dwellers for betterment of the livelihood of fringe villagers. This may also reduce the pressure on natural medicinal plant resources.

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References

- 1 Kumar Y, Scarlet F & Rao RR, Further contribution to the ethnobotany of Meghalaya, Plants used by the people of Jaintia Hills district, *J Econ Tax Bot*, 99 (11) (1987) 65-70.
- 2 Rao RR, Ethnobotanical studies on some *advasi* tribes of Nagaland in North East India, In: *Contribution to Indian Ethnobotany*, edited by SK Jain, (Scientific Publisher, Jodhpur India), 1990, 215-230.
- 3 Kohli YP, Some prominent medicinal plants of Arunachal Pradesh, *Arunachal Forest News*, 11(1) (1992) 35-38.
- 4 Khumbongmayum AD, Khan ML & Tripathi RS, An ethnobotanical study of medicinal plants in the sacred groves of Manipur, Northeast India, *Indian J Traditional Knowledge*, 4 (1) (2005) 21-32.
- 5 Tiwari KC, Mazumder R & Battacharjee S, Folklore medicines from Assam & Arunachal Pradesh (District Tirap), *Quart J Crud Drug Res*, 17 (2) (1979) 61-67.
- 6 Baruah P & Sharma GC, Studies on the medicinal uses of plants by the *Boro* tribals of Assam (India) II, *J Econ Tax Bot*, 5 (3) (1984) 599-604.
- 7 Rabha A, *Management plan of Manas National Park, 2002-2007*, (2001) 1-84.
- 8 Baruah CK, Sharma GC, Bezbaruah P & Phukan U, Biodiversity status in Manas Biosphere Reserve, *A report submitted to Ministry of Environment and Forests, Government of India*, 2003, 1-40.
- 9 Hooker JD, *Flora of British India*, Vol 1-7, (Lovell, Reeve & Co, London), 1872-1887.
- 10 Kanjilal UN, Kanjilal PC, Das A & Purkayastha C, *Flora of Assam*, Vol-I, (Bishan Singh Mahendra Pal Singh, Dehra Dun), 1934.
- 11 Kanjilal UN, Kanjilal PC & Das A, *Flora of Assam*, Vol II, (Bishan Singh Mahendra Pal Singh, Dehra Dun), 1936.
- 12 Kanjilal UN, Kanjilal PC, Das A, & De RN, *Flora of Assam*, Vol III, (Bishan Singh Mahendra Pal Singh, Dehra Dun), 1938.
- 13 Kanjilal UN, Kanjilal PC, De RN & Das A, *Flora of Assam*, Vol IV, (Bishan Singh Mahendra Pal Singh, Dehra Dun), 1938.
- 14 Bor NL, *Flora of Assam* (Gramineae), Vol V, (Government of Assam), 1940.