

## Traditional knowledge and biodiversity conservation in the sacred groves of Meghalaya

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The people of Meghalaya believe that the sacred groves (forests) are the abode of deities. It bestows the welfare of people, their cattle & land, and keeps the evil spirits away. Those who do not obey the traditional norms of these groves may have to face the wrath of the deity. A religious belief is one of the major factors for conservation of plant resources in such groves. Local people believe that the Sylvan deities would be offended if trees are cut and twigs, flowers, fruits, etc. are plucked. These groves are considered as one of the most species-rich areas for plants, birds and mammals. The mythological stories and indigenous knowledge associated with the groves have been the principal factor in preserving the sacred groves in the immaculate condition.

**Key words:** Indigenous knowledge, Meghalaya, Plant diversity, Sacred groves, *Khasi* tribe, *Garo* tribe, *Jaintia* tribe  
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Sacred groves represent long tradition of environmental conservation based on indigenous knowledge by the tribal communities of Meghalaya. These forests are segments of landscape containing vegetation, other forms of life and geographical features, delimited and protected by human society under the belief that to keep them in a relatively undisturbed state, is an expressive of an important relationship of human with the divine or with nature<sup>1</sup>. These virgin forests are biodiversity rich communities, which provide refuge for a large number of endemic, endangered and rare taxa. The concept of sacred grove conservation in the state of Meghalaya is strongly believed to be an indigenous knowledge, conceived, developed and perpetuated by the indigenous people of the state—*Khasis*, *Garos* and *Jaintias*<sup>2</sup>. Over the years, such forests have been attributed with several values namely, natural museums of giant trees, treasure house of threatened species, dispensary of medicinal plants, regulator of water sheds, recreation centre for urbanites, veritable garden for botanists, gene bank of economic species, paradise for nature lovers and laboratory for environmentalists<sup>3-5</sup>.

The state Meghalaya, covering an area of 22,429 sq km comprising of the Khasi, Garo and Jaintia hills,

lying between 25.47'–26.10'N latitude and 89.45'–92.47' E longitude in Northeastern Himalayan region is one of the species rich and mega biodiversity centers. It is bordered on the Northwest, North & east by Assam and South & South West by Bangladesh. The state is a conglomeration of undulating hills with an East West orientation. It represents a picturesque landscape of plateaus, lakes and waterfalls. Meghalaya represents a remnant of ancient plateau of pre-Cambrian Indian peninsular shield mass but later separated from it. The sacred groves of Meghalaya largely fall under the temperate type and are the relic type evolved through millions of years. The tribals of Meghalaya are *Khasis*, *Garos* and *Jaintias*. The *Khasis* were immigrants somewhere from the Cambodian region and from the banks of the Mekong river<sup>6</sup>. Their language is an Austro-Asiatic type of the Far East. The *Garos* are the Tibeto-Burman stock that drifted into eastern India and Burma across Tibet. Their language retains similarity with Tibetan<sup>7</sup>. *Khasis*, *Garos* and *Jaintia* communities are matrilineal consisting of different exogamous clans. Woman holds the property in this state. There are numerous sacred forests along the hill ranges of Garo and Khasi hills districts<sup>8</sup>. Bamboo reserves dedicated to deities are also reported from the Garo hills. The Garo people traditionally perform the ancestral worship in forest patches on the ancient monoliths.

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The individual areas of the groves vary from 1–550 hectares. Of 79 sacred forests reported in Meghalaya, 32 are located in East Khasi hills, 13 in West Khasi hills, 3 in Ri Bhoi, 15 in Jaintia hills and 8 each in East and West Garo hills<sup>9</sup>.

### Results and discussion

The people of Meghalaya believe that the sacred groves (forests) are the abode of deities, *Ryngkew*, *Basa*, etc (Fig. 1). It bestows welfare to the people, their cattle & land and keeps the evil spirit away. Sacred groves are tracts of virgin forests, which people protect to avoid the perceived wrath of the resident God. In such forests, all forms of vegetation belong to the deity. The local indigenous people believe that the Sylvan deities would be offended if trees are cut, and twigs, flowers and fruits are plucked. Various cultural programmes, religious rites and rituals are also performed in these forests<sup>10, 11</sup>. These rites and rituals vary from place to place and also from one sacred grove to another. A religious ritual, *Ka leh-niam pirda* is performed by a group of 7-9 male in a spot inside the grove in the month of April. Presence of tall monoliths in and around a forest, symbolizes existence of sacred grove (Fig. 2). The monoliths at Mawsmal on the East of Mawlong syiem sacred grove and at Nartiang, which are supposed to be tallest in the state, were erected in memory of the departed souls of the most prominent persons of that time.

Sacred forests have undergone heavy environmental transformation because of various reasons such as change in the land use pattern, unregulated tree felling, shifting cultivation and other developmental activities. In spite of religious beliefs, many sacred forests have decreased in size, some are on the way to extinction and only a few continue to be preserved<sup>12</sup>. It is sacrilege to touch even leaves of trees in these forests. However, only Mawphlong Mawsmal and Cherrapunji sacred forests of East Khasi hills district of Meghalaya are well preserved today. Sacred forests represent a long tradition of environmental conservation based on ecological principles practiced by the indigenous people of the Khasi, Garo and Jaintia<sup>15</sup>. Tribal communities living near sacred forests possess a wealth of knowledge about conservation and utilization of genetic wealth. In many of these indigenous communities, the structure of traditional knowledge is being endangered with the onslaught of modernization<sup>16</sup>.

The traditional knowledge evolved over generations on conservation and sustainable

management of sacred forests is as much a resource as biodiversity. Tribals have long been stewards in sustainable utilization and conservation of biodiversity. This traditional and indigenous knowledge and ecological prudence underlying genetic conservation may be lost for ever unless they are recognised and documented<sup>17</sup>.

### Biodiversity

The eastern Himalaya is known as a Mega Biodiversity Centre and a hot spot area for its rich biodiversity<sup>18,19</sup>. Varieties and kinds of orchids, medicinal, ornamental plants (Figs. 3-4), bamboo, canes, timber and resin yielding plants, wild relative of cultivated plant species, etc. are found in these forests. 1886 plant species have been reported from the sacred forests of Meghalaya<sup>20</sup>. Family Orchidaceae dominates the list with respect to number of species followed by Poaceae and Leguminosae (Figs. 5-6). The sacred forests are considered as a sanctuary of ancient angiosperms, and *the Cradle of flowering plant* where angiosperms have diversified<sup>21</sup>. There are a number of phylogenetically primitive plant families such as Magnoliaceae, Digneriaceae, Himantandraceae, Eupomataceae, Winteraceae, Trochodendraceae, Tetracentraceae and Lardizabalaceae largely present in the sacred forests. Many of the endangered species of the state are presently confined to these pockets only. Of 111 rare plants reported from Garo Hills of Meghalaya, 51 species were endemic; while of 31 rare species noticed from the sacred forests of Jaintia hills, 20 were endemic<sup>22,23</sup>. *Fissistigma verrucosum*, represented by five individuals in the forests, was collected after a gap of 70 years. Nine old trees of *Fraxinus floribunda*, a rare species, were found in Khloo Paiu Ram Pyrthai forest in Jaintia Hills<sup>24</sup>. The dominant substrate is a low-nutrient soil, but the high rainfall and local climatic variation as a result of complex landform have promoted high biological diversity and centers of endemism. The endemic pitcher plant *Nepenthes khasiana*, confined to some isolated pockets of Khasi Hills, shows a very limited range of distributions of many plant species.

In Meghalaya, plants used in the primary health-care (Table1) are mostly drawn from the sacred groves<sup>25,31</sup>. Traditional method of medicinal practice has a strong relevance to the socio-economic feature of the tribal communities of Meghalaya. Medicinal plant conservation and sustainable use of indigenous knowledge must be emphasized, and the regulatory

Table 1—Some ethnomedicinal plants found in the sacred groves of Meghalaya

Botanical Name	Family	Useful parts	Uses
<i>Acanthus leucostachyus</i> Wall.	Acanthaceae	Leaves	Fever, toothache
<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Leaves	Cuts and wounds
<i>Ageratum conyzoides</i> Linn.	Asteraceae	Leaves	Snakebite
<i>Anacolosia crassipes</i> Kurz.	Olacaceae	Leaves	Skin disease
<i>Aporosa octandra</i> A.R.Vickerg	Euphorbiaceae	Bark	Colic fever
<i>Aristolochia cathcartii</i> Hook.f.	Aristolochiaceae	Rhizome	Stomach pain
<i>Artemisia nilagirica</i> Pamp.	Asteraceae	Leaves	Asthma
<i>Artemisia vulgaris</i> Linn.	Asteraceae	Leaves	Headache
<i>Asparagus racemosus</i> Willd.	Liliaceae	Tubers	Fever
<i>Begonia</i> sp.	Begoniaceae	Whole plant	Stranguary
<i>Centella asiatica</i> (Linn.) Urban	Apiaceae	Leaves	Brain tonic
<i>Costus speciosus</i> (Koeing)Sm.	Zingiberaceae	Roots	Fever
<i>Curcuma aromatica</i> Salisb.	Zingiberaceae	Tubers	Gastric troubles
<i>Dicliptera roxburghiana</i> Nees.	Acanthaceae	Roots	General tonic
<i>Disporum calcaratum</i> D.Don.	Liliaceae	Tubers	Eye troubles
<i>Ecbolium linneanum</i> Kurz.	Acanthaceae	Roots	Jaundice
<i>Eclipta alba</i> (Linn.) Hassk.	Asteraceae	Leaves	Hair tonic
<i>Elephantopus scaber</i> Linn.	Asteraceae	Whole plant	Abortion
<i>Emilia sonchifolia</i> DC.	Asteraceae	Leaves	Eye troubles
<i>Eupatorium cannabinum</i> Linn.	Asteraceae	Leaves	Fever
<i>Eupatorium odoratum</i> Linn.	Asteraceae	Leaves	Anticoagulant
<i>Garcinia sopsopia</i> Mabb.	Clusiaceae	Leaves	Antidote for poison
<i>Hedyotis scandens</i> Roxb.	Rubiaceae	Leaves	Cough and cold
<i>Impatiens racemosa</i> DC.	Balsaminaceae	Leaf & root	Rheumatism
<i>Jasminium lanceolarium</i> Roxb.	Oleaceae	Leaves	Skin diseases
<i>Lasia spinosa</i> Thw.	Araceae	Rhizome	Antidote for poison
<i>Oenanthe stolonifera</i> Wall.	Apiaceae	Leaves	Stomach pain
<i>Oldenlandia diffusa</i> Roxb.	Rubiaceae	Leaves	Eye troubles
<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Leaves	Snakebite
<i>Plumbago zeylanica</i> Linn.	Plumbaginaceae	Root	General debility
<i>Pogostemon parviflorus</i> Benth.	Lamiaceae	Leaves	Headache
<i>Polygonum chinense</i> Linn.	Polygonaceae	Roots	Urinary disorders
<i>Pothos kunstleri</i> Hookk. f.	Araceae	Leaves	Antidote for poison
<i>Rhaphidophora hookeri</i> Scott	Araceae	Leaves	Antidote for poison
<i>Rubia cordifolia</i> Linn.sensu Kook f.	Rubiaceae	Root & stem	Eye & ear problems
<i>Rubus khasianus</i> Cardot	Rosaceae	Roots	Cuts and wounds
<i>Smilax prolifera</i> Roxb.	Liliaceae	Leaves	Labour pain
<i>Solanum khasianum</i> C.B. Clark emend.	Solanaceae	Fruits	Toothache
<i>Strobilanthes scaber</i> Nees.	Acanthaceae	Leaves	Skin diseases
<i>Terminalia chebula</i> Retz.	Combretaceae	Fruits	Stomach problems
<i>Viola diffusa</i> Ging.	Violaceae	Leaves	Headache

developments need to protect the obtainable resources of ethnomedicinal and traditional knowledge system pertaining to their use. The taboos, religious beliefs and folklore have protected the medicinal plants and precluded only a systematic collection of raw material from the groves.

More than 110 mammal species are known from the sacred groves, but none are endemic to this eco-region (Fig. 7). Some of the conservation importance species are listed (Table 2). The tiger, clouded leopard, Asian elephant, Assamese macaque, bear macaque, capped leaf monkey, wild dog, sloth bear and smooth coated

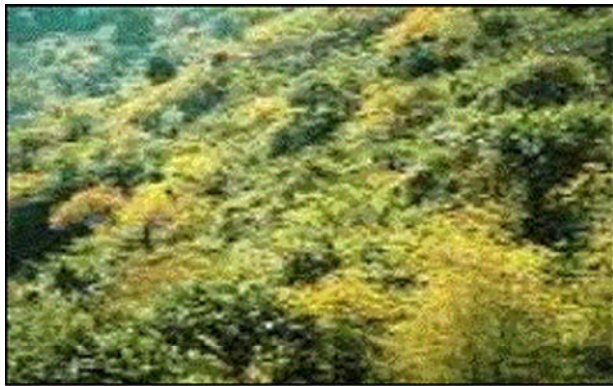


Fig.1 Sacred forest



Fig.2 Monoliths



Fig.3 Orchids



Fig.4 Orchids



Fig.5 *Rhododendron arboreum*



Fig.6 *Melastoma malabathricum*



Fig.7 Wild Buffalo



Fig.8 Great Indian Hornbill.

otter are threatened species<sup>26</sup>. Diversity of Avi-Fauna is high with more than 450 species including five near endemic species. They are Manipur Bush-quail (*Perdica manipurensis*), Marsh babbler (*Pellorneum palustre*), Brown-capped laughing thrush (*Garrulax austeni*), Tawny-breasted wren-babbler (*Spelaornis longicaudatus*) and Wedge-billed wren-babbler (*Sphenocichla humei*). The sacred groves also harbours globally threatened rufous-necked hornbill (*Aceros nepalensis*) and some other species like white-winged duck (*Cairina scutulata*), ferruginous pochard (*Aythya nyroca*), Pallas's fish eagle (*Haliaeetus leucoryphus*), marsh babbler (*Pellorneum palustre*), tawny-breasted wren-babbler (*Spelaornis longicaudatus*), Manipur bush-quail (*Perdica manipurensis*), bristled grass bird (*Chaetornis striatus*), Bluth's kingfisher (*Alcedo hercules*), greater spotter eagle (*Aquila clanga*), black-breasted parrot bill (*Paradoxornis flavirostris*), dark-romped swift (*Apus acuticaudata*) and beautiful nuthatch (*Sitta formosa*). Several of the hornbill species such as wreathed hornbill, brown hornbill and great Indian hornbill depend on the sacred groves because they need tall and mature trees for nesting as well as protection for the young ones (Fig. 8)<sup>27</sup>.

Sacred forests play a crucial role in soil and water conservation. Most of the sacred groves are located on the catchments areas of important rivers and streams. About 60 of them, with an area of about 6,500 ha are located at the source of perennial streams. Lum Shyllong sacred grove is the source of 10 perennial streams. The famous Mawsmat falls and the Mawsmat cave is situated in the Mawlongsyiem sacred grove<sup>28</sup>. The Mawsmat sacred grove in the Cherrapunji ecosystem receives very high rainfall. The dense canopy cover of the groves, a source of vital ecosystem services provides an ideal microclimate for the survival of certain species as evidenced by the luxuriant growth of orchids. Nutrient release in the soil of this grove is very high; this could be linked with rapid litter decomposition. The land surrounding the sacred groves in this area, which is devoid of necessary root mat and litter decomposition, can no longer sustain vegetation<sup>29</sup>.

### Conclusion

The religious beliefs and myths attributed with the deities preserve a large number of isolated pockets (forest patches). The *in-situ* conservation practice of our tribal communities is our traditional ecological heritage, which conserves the population of varied

Table 2—Conservation importance of mammal species found in the sacred groves of Meghalaya

Zoological Name	Common Name
<i>Cuon alpinus</i> Pallas	Wild dog
<i>Elephas maximus</i> Linn.	Asian elephant
<i>Hylobates hoolock</i> (Harlen)	Hoolock gibbon
<i>Lutra perspicillata</i> Geoffroy	Smooth-coated otter
<i>Macaca arctoides</i>	Bear macaque
<i>Macaca assamensis</i> M' Clelland	Assamese macaque
<i>Manis crassicaudata</i> Gray	Chinese pangolin
<i>Melursus ursinus</i> Shaw	Sloth bear
<i>Panthera tigris</i> (Linn.)	Tiger
<i>Pardofelis nebulosa</i>	Clouded leopard
<i>Semnopithecus pileatus</i>	Capped leaf monkey
<i>Ursus malayanus</i>	Malayan sun bear
<i>Viverra zibetha</i>	Indian pangolin

species in its habitat, which is the best method of conservation<sup>30</sup>. Conserving and promoting the heritage are of vital importance to protect many endemic, endangered and relict biological species as well as to keep the habitat protected for future generations. There is a need to launch a sacred grove conservation programme under protected area network programme through tribal traditional institutions, since more than 90% of the total forests in the state is under the control of the indigenous tribes.

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