

Traditional Knowledge of NE people on conservation of wild orchids

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The paper describes the information of the traditional knowledge of the people of Northeastern region to conserve the valuable wild orchid germplasm. Northeastern region of our country is the traditional home of near about 876 orchid species in 151 genera of which many species are economically important for their ornamental and medicinal values. The people of this region have a tradition of conservation of wild orchids in nature based on various religious beliefs and herbal healthcare.

Keywords: Orchids, Traditional knowledge, Northeastern region

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Traditional knowledge has been used for centuries by indigenous and local communities in their culture and health care. It is an important factor for sustainability of natural genetic resource management. Orchids, the most highly evolved family among monocotyledons with near about 1,000 genera and 25,000-35,000 species exhibit an incredible range of diversity in size, shape and colour of their flowers¹⁻³. India is considered as a rich orchid heritage and recognized as a significant producer of wild orchids in the world. It is estimated that near about 1,600 species of orchids are found in India which constitutes almost 10% of the world orchid flora with Himalayas as their main home. Among India, the Northeastern region (located between 87°32'E to 97°52'E latitude and 21° 34' N to 29°50'N latitude), comprised of the 8 states, i.e. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura is considered as the most important biodiversity hot spot of the Indian subcontinent. High humidity and low temperature accompanied by good rainfall makes entire Northeastern region of the country a hot spot of orchids also. This region has about 876 orchid species in 151 genera which constitutes nearly 70% of total orchid flora of our country (Table 1)⁴. A large numbers of ornamental, rare, endangered and threatened orchid species are available in this region. Some promising ornamental orchids of the region are- *Paphiopedilum fairieanum*, *Paphiopedilum insigne*,

Paphiopedilum villosum, *Paphiopedilum spicerianum*, *Paphiopedilum hirsutissimum*, *Paphiopedilum venustum*, *Anoectochilus sikkimensis*, *Vanda coerulea*, *Vanda teres*, *Renanthera imschootiana*, *Rhynchostylis retusa*, *Pleione maculata*, *Pleione praecox*, *Pleione humilis*, *Cymbidium eburneum*, *Dendrobium hookerianum*, *Dendrobium densiflorum*, *Dendrobium devonianum*, *Dendrobium thrysiflorum* and *Thunia marshalliana*⁵. Many of these species utilized for the production of modern commercial hybrids which play a significant role in the International floriculture trade as cut flowers. Among the Northeastern states, Arunachal Pradesh and Sikkim have the largest number of orchid species and recognized as the paradise of orchids.

The rich orchid diversity in this region has provided an initial advantage to its inhabitants for observing and scrutinizing the orchid flora for developing their own traditional knowledge for importance of valuable orchid diversity and their conservation (Figs 1-9). The important characters of traditional knowledge systems are-effective conservation of biodiversity through cooperation and collective action of the people, intergenerational transmission of knowledge, skills and strategies concern for the well being of the future generations, reliance on the local resources, restraint in resource exploitation, respect and gratitude for their nature mother, management, conservation and sustainable use of biodiversity and ultimately transfer of useful species among the households, villages and larger

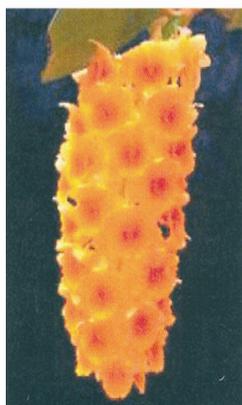
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Table 1—Area and distribution of orchids in Northeastern states (Source-State Forest Department NE states)

States	Total geographical area (Km ²)	Forest area	Forest cover (%)	Orchid genera	Orchid species
Arunachal Pradesh	83743	51540	61.5	126	550
Assam	78438	30708	39.2	81	193
Manipur	22327	15154	67.9	69	251
Meghalaya	22429	15935	75.6	98	352
Mizoram	21087	8629	52.0	75	244
Nagaland	16579	9494	42.3	63	241
Sikkim	7096	6292	60.0	137	525
Tripura	10491	2656	37.3	33	48

Fig.1 *P. hirsutissimum*Fig.2 *D. fimbriatum*Fig.3 *D. nobile*

Fig.4 Natural habitat

Fig.5 *R. retusa*Fig.6 *D. densiflorum*Fig.7 *A. odorata*Fig.8 *C. nitida*Fig.9 *V. coerulea*

area. The people of Northeastern region maintain this traditional knowledge system with great care and attention.

In India, of the total 427 tribal communities reported, more than 130 major tribal communities live in the Northeastern region⁶. The major tribal communities of the Northeastern region have been categorized into sub-tribes and if these sub-tribes are taken into consideration the total number of tribal groups reach up to 300. In general, the tribes of Northeastern India have been categorized into two broad ethnic communities, such as the *Khasi* and the *Jaintia* tribes of Meghalaya, who belong to *Monkhemar* culture of *Austoic* dialect, and the rest of

the tribal groups are basically Mongoloid, who belongs to Tibeto-Burman subfamily of Tibeto-Chinese group. Tribal communities are mainly the forest dwellers who have accumulated a rich knowledge on the uses of various forests and forest products over the centuries. Their dependence on nature had developed knowledge which ultimately is reflected in their traditional culture, religion, belief, folklore⁷⁻⁹. Major forest types are identified in this region- tropical, temperate, alpine, tropical semi evergreen and degraded. Greatest diversity of orchids has been observed in the tropical and sub-tropical climates where the positive factor for growth, i.e. high humidity and thick vegetations prevails.

In the Northeastern region, Arunachal Pradesh is the largest state and 79% of the total population of this state is constituted by tribals (Mongoloid and Tibeto-Burmese in origin). The state inhabited by 28 major tribes and 110 sub-tribes. The major tribal dialects are—*Hill Miri, Monpa, Nishi, Sherdukpen, Mishmi, Apatani, Wancho, Dafla* and *Khamti*. Arunachal Pradesh occupies the 12th position in mega biodiversity region of the world and has the highest number of orchid species known from any single state of India. The prominent species of this region are—*Cymbidium ensifolium, Coelogyne corymbosa, Dendrobium aphyllum, Dendrobium fimbriatum var occulatum, Dendrobium densiflorum, Calanthe masuca, Phaius flavus, Paphiopedilum fairrieanum, Paphiopedilum venustum, Paphiopedilum spicerianum, Rhynchostylis retusa, Renanthera imschootiana, Vanda coerulea*, etc. The orchid species *Rhynchostylis retusa* is found in abundance in the foothill regions of Arunachal Pradesh and declared as the state flower of Arunachal Pradesh¹⁰. Assam, the second largest and most populated state of the Northeastern region though occupies the seventh position in terms of orchid diversity in this region but orchids are closely associated with the socio-cultural lives of the local people. The people of the state are—Assamese and tribals like the *Garos, Nagas, Kukis, Khasis* and *Bodos*, who have a very good knowledge in importance of orchids. Some promising orchids of this state are—*Arundina graminifolia, Eulophia mannii, Goodyera procera, Calanthe angusta, Rhynchostylis retusa, Aerides multiflora, Aerides odorata, Acampe papillosa, Cymbidium aloifolium, Dendrobium aphyllum, Dendrobium acinaciforme*, etc. As per report near about 24 orchid species are endemic in this region.

Manipur literally means the land of the gems. This state is also rich in orchid diversity and occupies the fourth position in orchid diversity. Out of 251 wild orchid species found in this state, four species—*Ascocentrum ampullaceum, Paphiopedilum spicerianum, Vanda amesiana* and *Vanda stangeana* are endemic to this state. Meghalaya is another richest state of India in terms of orchids. A large variation in the altitude, topographical features, soil characteristics and climatic factors has favoured the growth and luxuriance of the orchid flora in this region. The state is endowed with nearly 352 orchid species. In Cherrapunji, the two forests—*Mawamai* and *Mawmluh* contain the highest number of orchid species in the

whole region. These are sacred forests areas of the primary forests that are protected by the local people. Some of the exotic and ecstatic orchids of Meghalaya are *Paphiopedilum insigne, Paphiopedilum venustum, Aerides multiflorum, Rhynchostylis retusa, Coelogyne corymbosa, Phaius tankervilleae, Dendrobium devonianum, Cymbidium elegans* and *Vanda coerulea*. The state of Meghalaya is inhabited by three distinct tribes—*Khasis, Garos* and *Jaintias* each occupying the respective hill district in the state. These tribal of the state are well acquainted about the medicinal properties of orchids growing in their surroundings. The knowledge gained through their experience and on from generation to generation as a guarded secret. Mizoram is a small state of this region but rich in orchid diversity. The *Mizos* are divided into several tribes— the *Lushais, Pawis, Paithes, Raltes, Pang, Himars, Kukis, Lakhers* and others. Many economically important orchids species are present in this state which helps the people of the state to gather knowledge on orchids.

Nagaland is another small state of this region. There are many distinct tribes and sub-tribes among the *Nagas*, each with its distinctive language and cultural features. Prominent among these are the *Kukis, Angamis, Aos, Konyaks, Lothas, Semas* and *Wanchus*. Near about 241 species of 63 genera are found in this state. The widely distributed species are *Goodyera viridiflora, Liparis caespitosa, Luisia trichorrhiza, Malaxis latifolia, Oberonia pyrolifera, Peristylus goodyeroides* and *Spiranthes sinensis*. Sikkim, India's second smallest state occupies the second position in terms of orchid diversity. The *Lepchas, Bhutias* and the *Sherpas* are the major ethnic groups of the state. *Dendrobium nobile* is one of the most commonly grown orchid species, which is important both for ornamental and medicinal value and declared as state flower of Sikkim¹¹. In Tripura, near about 48 species of orchids are available of which *Dendrobium* has the highest species diversity (14 species). Endangered orchids like Blue Vanda (*Vanda caerulea*) and Red Vanda (*Renanthera imschootiana*) are found in the state¹².

Traditional culture

Orchids are associated with the traditional culture of the local people of Northeastern region from past. There is tradition to use orchids by different tribes in their culture; especially the *Tai* people (*Ahom, Khamti, Phake, Aition, Turing, Khamyeni*) and *Deoris* of Assam and Arunachal Pradesh had carried the

tradition of using orchids in their culture from South-east Asian soil and even from southern china. Even at present, people of Assam and Arunachal Pradesh use *Rhynchostylis retusa*, *Papilionanthe teres*, *Vanda roxburghii*, *Aerides odoratum* and many *Dendrobium* orchid species in their cultural festivals and religion.

Rhynchostylis retusa (bihu orchid) the species of the genus *Rhynchostylis* has its wide distribution in the whole of the Northeastern region. This orchid is closely linked with the people of Assam and known as *Kopou Phul* in Assamese language. The flowering spike (inflorescence) is used by the girls to adorn their hair during the spring festival- *Rongali Bihu*. Among the youths, this orchid is regarded as symbol of love. This orchid also acts as a symbol of fertility and merriment. The inflorescence is also used in the marriage ceremony of the local people. Considering the importance of this orchid it is usually seen under cultivation in almost all Assamese families. The people of Assam conserved this plant with great care^{13,14}. The flowers of some other orchids- *Vanda roxburghii* and *Coelogyne nitida* are also used to adorn hair of girls of Assam and Arunachal Pradesh in local festival. The flowers of *Papilionanthe teres* is used as offering to Lord Buddha and spirits by the *Khamtis* and other *Tai* ethnics of Assam and Arunachal Pradesh.

In Arunachal Pradesh, especially in Kameng district orchids like *Dendrobium hookerianum*, *Dendrobium nobile*, *Dendrobium gibsonii* are considered as the symbol of purity and sanctity by the local people. *Monpas* consider the flowers of *Cymbidium grandiflorum* important for holy worship^{15,16}. The young *Naga* women of Manipur wore the orange flower of *Dendrobium densiflorum* behind their ears^{17,18}. Similarly, the beautiful flowers of *Vanda coerulea* wore by the women of Manipur in hair during the autumn *puja* festival. Yellow flower stalk of *Liparis* species has been used in Manipur by all the tribes as a binding for an ornament for armlets or legs or to decorate the weapons.

Traditional food

Wild orchid species are also used as food by the local people of Northeastern region^{7,19}. The local tribes of this region use leaves of *Cymbidium* species as food. The new shoots are ground and made into a sauce for cereals. The pseudobulbs of these orchids are eaten like potatoes with curry or boiled and eaten with salt. Pseudobulb, roots and rhizome of many wild orchid species, viz. *Cephalanthera ensifolia*,

Habenaria acuminata, *Habenaria susannae*, *Orchis latifolia*, *Microstylis wallachii*, *Pholidata articulate* and *Satyrium species* are used as foods which play an important role in the nutrition and socio-economics of the people of this region. A wholesome and nutritious health drink also prepared from the dried roots of various orchids by the local communities. Orchids also form a useful food for domestic animals in this region. Sheep, goats and cattle are driven by the local people to the pastures where terrestrial orchids are located. Stems of *Dendrobium* orchids are added to the grains as roughage and fed to cows with a belief that the *Dendrobiums* enhance the milk yield. Similarly pseudobulb of *Cymbidium* orchids is fed to the cattle to improve their health.

Traditional medicine

Traditional knowledge has been used for centuries by indigenous and local communities and plays a vital role in the area of medical treatment. Today, the local people of Northeastern region use many orchids for a variety of folk medicines and cures as orchids are rich in alkaloids, flavonoids, glycosides, carbohydrates and other phytochemical contents which have great importance in medicinal fields^{7,19,20}. Over the years, they have developed a great deal of knowledge on the use of plants and plant products in curing various ailments which suggests a wealth of traditional knowledge of the local people on orchid diversity and herbal healthcare. The indigenous remedies have originated directly or indirectly from the folklore's rituals, magic and superstitions. Among the tribes of this region *Khamti* of Arunachal Pradesh is considered as one of the most knowledgeable tribe in the field of herbal medicine. The orchids also find a frequent mention about their curative and aphrodisiac properties and as symbols of sanctity. Some orchid species used as medicine by the people of northeastern region are as follows^{18,22-24}.

Dendrobium fimbriatum has been used for liver upsets and nervous debility.

Papilionanthe teres (*Vanda teres*) leaf paste is applied on forehead to keep it cool during high fever. A piece of stem is tied in loin of the body to protect from cold and cough.

Eria muscicola Lindl. whole plant is used to cure diseases of chest, heart, lungs, eyes, ears and nervous system.

Eulophia camprestris Wall. rhizome is used in folk medicine as a tonic. It is effective in curing stomach

problems, cough, paralysis and also used as aphrodisiac.

Satyrium nepalense - pseudobulb is used as tonic and to cure dysentery and malaria.

Liparis odorata Lindl. leaf juice is used in burns, cancerous ulcers and gangrene.

Orchis latifolia tubers and roots are used as nerve tonic and aphrodisiac.

The beautiful *Vanda coerulea* is reported to be used extensively for eye diseases. The juice of leaves of this species is also used in diarrhea, dysentery and external skin diseases.

Vanda cristata Lind. leaves are used as tonic and expectorant.

Vanda roxburghii (*Vanda tessellata*) leaf paste is applied on forehead during high fever. The leaf juice is dropped in the ear for the treatment of otitis and other inflammatory conditions. Roots are bitter in taste and said to be useful in rheumatic and similar kind of pain. It is also used in diseases of nervous system and syphilis. The powdered roots are considered as an antidote for poisoning. The herb is also used in sciatica.

Vanda spathulata rushed leaves and stem are used in skin diseases and diarrhoea. Powdered flowers are used against asthma, tuberculosis and madness.

Pseudobulbs of *Phaius tankervilleae* are used for bone fractures and dysentery.

In the Khasi hills, juice of *Cymbidium giganteum* leaves is said to be utilized for clotting of blood in wound. *Cymbidium aloifolium* seeds are also used for healing wounds.

In Arunachal Pradesh, powdery seeds of *Dendrobium nobile* are applied to the freshly cut wounds for quick healing. Similarly, the leaves and stem of *Cleisostoma williamsonii* are used for healing fractured bones by the *Minpa* tribals.

Dendrobium moschatum leaf juice is used in Meghalaya as drops for earache¹⁹.

Traditional knowledge in conservation of orchids in natural habitat

Community based wild orchid conservation in Northeastern region has a long history as orchids are closely associated with the socioeconomic culture of the local people. The people of this region conserve orchids in their natural habitats in sacred groves. Sacred groves are the forest patches rich in biodiversity and play an important role in their conservation by the local communities in a sustainable manner with their socio-cultural and

Table 2–Sacred groves of Northeastern region to conserve orchids

State	Local term	No of documented sacred grove
Arunachal Pradesh	<i>Gumpa Forests</i> (Sacred groves attached to Buddhist monasteries)	65
Assam	<i>Than, Madaico</i>	40
Manipur	<i>Gamkhap, Mauhak</i> (sacred bamboo reserves)	365
Meghalaya	<i>Law Lyngdhoh</i>	83
Sikkim	<i>Gumpa Forests</i>	56

religious practice. A range of traditions and cultural values of the local people helps in protecting the groves with the beliefs in nature worship inherited from their ancestors, generation after generations. Sacred forests represent a long tradition of environmental conservation by the tribal of this region (Table 2).

The tribal communities of Meghalaya–*Khasis*, *Garos* and *Jaintias* have a tradition of conservation of orchids based on various religious beliefs. In Meghalaya, the indigenous people preserved the forests–*Mawamai* and *Mawmluh* as sacred forests where maximum diversity of orchids observed. The people living near these forests have vast knowledge about conservation and utilization of orchid's wealth. They completely prohibit any human interference in these sacred groves. In Arunachal also the local people protect their sacred groves to conserve orchids. In Manipur, dedicating a patch of forest land to deities is a common practice of the *Meitei* community, which assumes great significance in the conservation of natural diversity. According to their belief the sacred groves are the property of gods and not to allow any one to damage the groves which help to conserve orchids in their natural habitat.²⁵ *Mizos* called the sacred grove *Ngawpui*. Each village has its own sacred grove, the size varies from village to village. Trees are not allowed to be cut in the sacred grove. Sacred groves are the undisturbed natural vegetation scattered in small pockets all over Mizoram providing food and sustenance to people and animals alike. The sacred trees are said to be deeply rooted in the ancient religious, cultural and economic life of the *Mizo* people. In Sikkim, sacred groves have been reported from all the four districts. All sacred groves in this state are attached to the monasteries dedicated to the deities and managed by the *Lamas* and village

communities. The people of this region not only conserve the orchid species in the forest area but due to their cultural, religious belief and medicinal uses many orchids species present in this region are also cultivated by the local people in their home and courtyards with special care and attention.

Conclusion

Conservation of wild orchids is now a matter of universal concern. There is urgent need to protect the valuable orchid species in their natural habitat as orchids are very sensitive to ecological disturbances. Conservation measures have to be strengthened based on traditional knowledge and value systems with which the local communities could identify the revival of the sacred grove concept to protect the forests which help to conserve the orchid diversity present in this area as nature's gift. Understanding of traditional knowledge on conservation of orchids of the local people of Northeastern region will be helpful for sustainable orchid resource management of this region.

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