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Orchids in Manas Biosphere Reserve: survey and their perspective distribution

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Abstract

Manas Biosphere Reserve is very rich in Orchid flora. Systematic survey for orchids was carried out there during 2003-2006. A total of 37 species within 24 genera were recorded. During the present work *Eulophia manii* and *Bulbophylum forestii* are new records for the state flora of Assam.

***Keywords*:** Orchid flora, Manas Biosphere, Distribution.

INTRODUCTION

Among the most beautiful flower of the world orchids are dominating ones. They have vivid and tremendously variable color, texture, shape and size. The orchid has been occupying an important role in horticulture and floriculture for their exquisite beauty, scent, medicinal value and their long lasting quality as cut flowers. Most importantly, orchid always draw the attention of field biologist by its unique habitat and extraordinary regenerating skill (Arora 1983).

The Orchidaceae is one of the largest families of the flowering plants with about 17000 species known to be in the warm humid tropics of the world. Nearly 1300 species are believed to occur in India (Arora & Mukherjee 1983). Majority of Indian orchid (about 700 species) are found in phytogeogrphicaly important N.E. region. Epiphytic orchids grow mainly on the trunks or branches of different trees fixing themselves with strong fascicular and stout spongy roots while the terrestrial one grows on soil (Baruah 1978).

The Indian state of Assam is occupying the long narrow and low-lying Brahmaputra River Valley. Assam receives heavy rainfall during April to October and it varies annually from about 200 cm to 330 cm. Winter temperature along the valley drops below 10° C in the border areas of Bhutan and Arunachal Pradesh. The summers are quite warm and humid. The average temperature is around 35° C. Due to high humidity, the area posses extensive forest covers, evergreen, semi evergreen and deciduous types. And as such, has become an ideal homeland for the growth of many species of orchid.

Manas the first Biosphere Reserve in the state of Assam is a unique representation of tropical humid forest belonging to the Indo- Malayan realm. The entire reserve is spread along the Himalayan foothill to the north of the cultivated areas and village settlements of fertile Brahmaputra valley, in a linear belt about 50 km. Wide at the broadest portion in the west and gradually narrowing in the east. The northern boundary form part of the common international border with Bhutan merging with mixed forest belt of Bhutan foot hills.

The Manas Biosphere Reserve (MBR) covers an area of 2837 km square and spread over the districts Barpeta, Nalbari, Bongaigaon, Kokrajhar, Darrang and Kamrup. The core area of 500 km square being the Manas National Park which is now enlarged by inclusion of Kokilabari, Kahitama and Panbari reserve forests. It is located 26º 30' N to 27º 00' N latitude and 89º57' E to

92º70' E longitude (core area) and altitude varies between 61 to 110 m above m.s.l. (core area). The Manas River, the largest Himalayan tributary of Brahmaputra river form a network as it enters the land part of MBR. This network pattern with shifting river channels creates a variety of ecological niches, ranges from relatively drier sites to swamps, thus contributing a rich biodiversity in this landscape. The vegetation of MBR is basically wet alluvial grassland but there are patches of *Dillenia* swamp forest .The Riparian fringe forest type vegetation generally meets along the bank of the rivers Manas, Mora Manas, Jongrog, Gyoti and Rabang inside the sanctuary. The other semi-evergreen type of forest composed of *Aphanamixis polystachya, Anthocephalus chinensis, Syzygium cumini, S. formosum, Bauhinia purpurea* etc met along the India-Bhutan international border. The unique location of MBR at the confluence of the Indian, Ethiopian and Indo-Chinese realm along with the hot and humid climate make this reserve treasure of immense diversity of orchid flora (Rao 1977). The objective of present study was to bring a systematic account of orchid flora and their uses in Manas Biosphere Reserve. The following identified specimen listed below.

MATERIALS AND METHODS

The present investigation is the outcome of several field trips encompassing all the season have been carried out in MBR. The collected specimens were examined critically in laboratory during the flowering period. Then specimens were processed into dried and mounted herbarium specimens (Jain & Rao 1977). The mounted specimen were identified by matching at the Herbarium of the Department of Botany, G.U. and at ASSAM herbarium at Shillong and using different literature (Baruah,1978; Kaushik 1983). The Herbarium specimens will be deposited in Harbarium, Department of Botany, G.U. In the enumeration a generic name is followed by citation of the member of species in the world and in this area and a species is supported with its habit, habitat and reference to voucher specimen.

ENUMERATION OF ORCHIDS OF MANAS BIOSPHERE RESERVE

ACAMPE Lindley
About 9 specis in British India, 3 species in Assam and 1 in MBR.

Acampe papillosa (Lindley) Lindley
Flowering: November – January; **Exsiccatus**: *Sarma 3410,* Manas, Mothanguri.
Notes: Common Epiphytic orchid on tree trunks.

AERIDES Loureiro
About 20 species in the world, 10 species from India and 2 species in MBR**.**

Aerides multiflorum Roxburgh
Flowering: May – July; **Exsiccatus**: *Sarma 1302,* Manas, Mothanguri.
Notes: common hardy epiphytes in forests and villages on tree trunk. The scarlet pendulous recemes add reddish color to the deep forest.

Aerides odorata Loureiro
Flowering: May – July; **Exsiccatus**: *Sarma 3361,* Manas, Mothanguri.
Notes: common epiphytes in the forest and village, more particularly in the teak forest. The flowers lax white with fragrant.

ARUNDINA Blume
About 8 species in India, Malaysia and China; 1 in Assam and Manas.

Arundina graminifolia (D. Don) Hochreutiner; *Bletia graminifolia* D. Don
Flowering: June – August, occasionally round the year. **Exsiccatus:** *Sarma 4461*, Near Bhutan border.
Notes: Shrubby terrestrial, gradually become rare in plains and confined to upper ranges of hills with river vine forest and in alluvial grassland of Manas sanctuary.

BULBOPHYLLUM Thouars
About 88 specimens in India and Malaysia china. Only 2 species in Manas.

Bulbophylum careyanum Sprengel
Flowering: October – January; **Exsiccatus:** *Sarma 4129*, Mothanguri.
Notes: Very common epiphyte on tree trunks in Sal forest. The flower last for 15 to 25 days.

Bulbophylum forrestii Seidenfaden
Flowering: July; **Exsiccatus**: *Sarma 4123*, Near Mothanguri
Notes: Rare epiphyte; it is a new record for Assam flora and found growing wild in Manas Wildlife Sanctuary.

CALANTHE R. Brown
About 80 species in tropics and sub tropics. About 5 species in Assam.

Calanthe angusta *Lindley*
Flowering: May –July; **Exsiccata**: *Sarma 2441*, and Narayan&Roselind 35, Bhuyapara.
Notes: Terrestrial; rare in grassland; flowers white.

CHILOSCHISTA Lindley
20 available species in India Sikkim, and N. E. province, Bhutan, Nepal, Burma, Thailand and Malaysia.Only 2 species in Assam.

Chiloschista parishii Seidenfaden; *Chiloschista lunifera* (Reichb.f.) J.J. Smith ; *Thrixpermum luniferum sensu* Reichb.f.
Flowering: June – July; **Exsiccatus**: *Sarma 4910* and *Baruah 281*, near Bansbari and Narayanguri.
Notes: Rare epiphytes on the plant like *Dillenia* p*entagyna* .*Reduced stem,* Leaves generally appears after flowering and last for few weeks only.

CLEISOSTOMA Blume
About 35 species in tropics Asia.5 species have been reported from Assam.
Cleisostoma filiforme (Lindley) Garay; *Sarcanthus filiformis* Lindley
Flowering: August – September; **Exsiccatus**: *Sarma 4462*, Bhuyapara.
Notes: Very rare; laves terete

COELOGYNE Lindley
A cosmopolitan genus with about 115 species; out of which 3 species from Assam.

Coelogyne suaveolens (Lindley) Hook.f.
Flowering: June – July; **Exsiccatus**: *Sarma 3221*,Bhuyapara, Koilamoila.
Note: Common in Sal forest.

CYMBIDIUM Swartz
About 50 species, 18 in Indis, 1 in Manas.

Cymbidium aloifolium (L.) Swartz; *Epidendrum aloifolium* L.
Flowering: May – June; **Exsiccatus**: *Sarma 3456,* Bansbari and Mothanguri.
Notes: They are generally epiphytes on *Legerostromia* sp.

DENDROBIUM Swartz
About 168 species in India and about 8 species in MBR

Dendrobium acinaciforme Roxburgh
Flowering: June – July; **Exsiccatus**: *Sarma 3466,* Manas near Mothanguri.
Notes: Rare epiphytes, leaves are comparatively narrower at the base.

Dendrobium anceps swartz
Flowering: November – February; **Exsiccatus**: *Sarma 6391*,Panbari range.
Notes: Quite common epiphyte in semi evergreen deep forest where *Shorea robusta* is a common host.

Dendrobium aphyllum (Roxburgh) C.E.C. Fischer; *Limodorum aphyllum* Roxburgh
Flowering: February – March; **Exsiccatus**: *Sarma 4913,* Mothanguri to Rabang road.
Notes: A very common epiphyte.

Dendrobium densiflorum Lindley
Flowering: June – July; **Exsiccatus**: *Sarma 4399***,** Indo- Bhutan Bordar.
Notes: Epiphytes mostly on Sal forest.

Dendrobium fimbriatum Hook.
Flowering: March – April; **Exsiccatus**: *Sarma 3449*, Mothanguri-Rabhang Road.
Notes: Common epiphyte in Manas forest; leaves usually appear after flowering.

Dendrobium lindleyi Steudel
Flowering: July – August; **Exsiccatus**: *Sarma 5103*, Mothanguri, and IndoBhutan border.
Notes: Epiphytes. Rare.

Dendrobium moschatum (Buchanan–Hamilton) Swartz; *D. calceolaria* Carey ex Hook
Flowering: June – July; **Exsiccatus**: *Sarma 5015*, Indo-Bhutan Border.
Notes: Epiphytes.

Dendrobium lituiflorum Lindley
Flowering: March – April; **Exsiccatus**: *Sarma 4391*, Bhuyapara.
Notes: Rare epiphytes. Recognizable from its allied species *D. aphyllum* mainly by its purple flower and glabrous lower surface of the lip.

EPIPOGIUM S.G. Gmelin ex Borkhausen
Available in west and east Kemeng district of Arunachal Pradesh and only 1 in Manas.

Epipogium sessanum Hegde & A.N. Rao
Flowering: June – July; **Exsiccatus**: *Bezbarua 301*, Mothanguri.
Notes: Epiphytes.

ERIA Lindley
160 species in tropical Asia; about 8 in Assam.

Eria pubescens Lindley
Flowering: May; **Exsiccatus**: *Bezbarua 401*, Indo Bhutan Border, Rabang Daimari Road.
Notes: Epiphytes; less common; inflorescence wooly.

EULOPHIA R. Brown ex Lindley
Terrestrial Orchids. Out of total 70 species, 20 grow in India and 2 in Assam.

Eulophia mannii (Reichb.f.) Hook.f.; *Cyrtopera mannii* Reichb.f.
Flowering: June – August; **Exsiccatus**: *Bezbarua 409*, Bansbari - Kantajhar Road.
Note: It is a new record for the state of Assam.

FLICKINGERIA A.D. Hawkes
Epiphytic Orchids; about 70 species widespread from India to Pacific; one reported from Assam.

Flickingeria macraei (Lindley) G. Seidenfaden: *Dendrobium macraei* Lindley; *Ephemerantha macraei*.(Lindley) Hunt & Summerhays
Flowering: June – August; **Exsiccatus**: *Sarma 4019*, Mothanguri.
Notes: Quite common epiphytes in deciduous and semi evergreen forest.

GASTROCHILUS D. Don
Small epiphytes; about 30 species in Asia and Australia, 15 in India, 5 in Assam.

Gastrochilus dasypogon (Smith) J.E. Kuntze; *Aerides dasypogon* J.E. Smith
Flowering: November – December; **Exsiccatus**: *Bezbarua 449*, Rabang to Doimary Road along the Indo-Bhutan border.
Notes: Rare in evergreen deep forest; often mistaken with its allied *G. calceedaris* and *G. belinus.*

Gastrochilus incospicuus (Hook.f.) J.E. Kuntze; *Saccolabium inconspicuum* Hook.f.; *Luisia inconspicua* Hook.f. ex King & Pantl.
Flowering: June – July; **Exsiccatus**: *Sarma 3112*, Mothanguri.
Notes: Very common; easily recognizable by smaller terete leaves and dense greenish purple flower in short thyme.

GEODORUM G. Jackson
Terrestrial. About 10 species have been reported round the world; one species from Assam.

Geodorum densiflorum (Lamarck) Schlechter; *Limodorum densiflorum* Lamarck
Flowering: April – August; **Exsiccatus**: *Bezbarua 522*, Koilamoila; *Bezbarua512*, Manas, Indo-Bhutan Border.
Notes: Common on hill slopes particularly in lower Assam.

OBERONIA Lindley
About 330 species throughout the world, 34 in India and 2 in Assam.

Oberonia falconeri Hook.f.
Flowering: April – August; **Exsiccatus**: *Sarma 2114*, Panbari range.
Notes: Extremely rare. Generally growing as epiphytes on dried up fallen trees in deep forest in accompanied with the lichen of the bark.

PAPILIONANTHE Schlechter
About 60 species have been reported, 10 from India, 1 from Assam.

Papilionanthe teres (Roxburgh) Schechter; *Vanda teres* Roxburgh
Flowering: May – June; **Exsiccatus**: *Sarma 3312*, Manas.
Notes: Epiphytic; very common on *Careya arborea* and other plants.

PERISTYLUS Blume
About 60 species throughout the world; 6 from India and 1 from Assam.

Peristylus goodyeroides (D. Don) Lindley; *Habenaria goodyeroides* D. Don
Flowering: June – August; **Exsiccatus**: *Bezbarua 313*, Mothanguri.
Notes: Quite common terrestrial in shaded and wet sandy forest.

PHAIUS Loureiro
Five species recorded from India of which only one is growing in Manas.

Phaius tankervillae (Banks ex l'Héritie) Blume
Flowering: February – March; **Exsiccatus**: *Sarma 3345*, Manas, Bhuyapara.
Notes: Robust terrestrial orchid.

PHOLIDOTA Lindley ex Hook.
About 55 species in tropical Asia and Australia; 9 in India; 3 species reported from MBR.

Pholidota articulata Lindley
Flowering: July – August; **Exsiccatus**: *Sarma 3211*, Mathanguri-Usalapith.
Notes: Quite common as lithophytes.

Pholidota imbricata Lindley
Flowering: June – July; **Exsiccatus**: *Sarma 3312*, Panbari range
Note: Common epiphyte with white flowers.

Pholidota pallida Lindley
Flowering: August; **Exsiccatus**: *Bezbarua 224*, Panbari range.
Note:Common in shrubby plant.

RHYNCHOSTYLIS Blume
Epiphytes; about 3 in India, 1 from Assam.

Rhynchostylis retusa Blume
Flowering: April – May; **Exsiccatus**: *Sarma 1191*, Mathanguri-Genda Biel.
Notes: Very common; flowering spike is festive hair ornament for ladies in Bihu festival in Assam.

SMITINANDIA Holttum
Epiphytes; about 3 species in world and 1 species in Assam.

Smitinandia micrantha (Lindley) Holttum; *Saccolabium micranthum* Lindley
Flowering: June – August; **Exsiccatus**: *Sarma 3112*, Bansbari, Narayanguri.
Notes: Extremely rare.

ZEUXINE Lindley
Terrestrial; about 17 species in India 3 species in Assam and2 species have been reported from Manas
Zeuxine longilabris (Lindley) R. Trimen; *Monochilus longilabris* Lindley
Flowering: December – February; **Exsiccatus**: *Sarma 1193,* Bansbari.
Notes: Common among the grasses near water.

Zeuxine strateumatica (Lindley) Schlechter; *Orchis strauteumatica* Lindley
Flowering: February – March; **Exsiccatus**: *Sarma 2214, Barua 925*, Bansbari, Mothanguri Road side.
Notes: Quite common in grassland at shady places.

DISCUSSION

The present study reflects the interesting composition of the Orchid flora in Manas Biosphere Reserve in Assam. During field work we have collected and identified 37 species within 24 genera. Out of these 29 are epiphytic and 8 are terrestrial orchids. But Earlier Jain & Hajra (1975) recognised only 15 orchids species in MBR. The orchids with attractive flowers in this area are worth mentioning for their beauty and long lasting qualities like *Aerides odorata, Arundina graminifolia, Rhynchostylis retusa* and *Papilionanthe teres*. Some orchid species have been used by the local native people as food and medicine. As for example, the flower of *Cymbidium* is used as vegetable. The leaves of *Cymbidium aloifolium* and *Pholidota imbricata* are used for treating cuts and injuries. The juice from the pseudobulbs of *Pholidota imbricata* is also used against naval pain.

A good proportion of the recorded species [e.g.: *Bulbophyllum forrestii, Calanthe angusta, Chiloschista parishii, Cleisostoma filiforme, Dendrobium acinaciforme, Oberonia falconeri, Smitinandia micrantha*, etc.] are very rare and need special care for their conservation and improvement of population structure.

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