

A CONSPECTUS OF ORCHIDS OF MEGHALAYA AND THEIR CONSERVATION

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Abstract

Meghalaya, one of the seven states of North Eastern India is floristically very rich. Orchidaceae is represented by 352 species in 98 genera, here. This paper lists and suggests some conservation measures for these species.

Introduction

MEGHALAYA, ONE of the seven North Eastern states is geologically very ancient and covering an area of about 22429 sq km and lying between 25°00' and 26°10' N latitude and 89°45' and 92°45' E longitude consists of seven districts. It has a forest area of 1735 sq km and is predominantly hilly area. Phyto geographically, it is of great interest as regards the nature of the vegetation as well as floristic composition. The vegetation of Meghalaya can be broadly classified into three parts, the tropical mixed evergreen forests in the Northern and Southern parts, the rolling grasslands and the pine forests. The vegetation of the hills is noteworthy from a cultural point also, as there are pockets of undisturbed forests, dedicated to the sylvan spirits and are known as sacred groves. The vegetation composing these sacred groves are very different from that of surrounding areas. They contain an unusual wealth of species of great botanical, phytogeographical and economic value. These sacred groves play important role in *in situ* conservation. Due to the varied tropical, ecological and climatic condition, the family

Orchidaceae exhibit enormous diversity and is the largest family in Meghalaya. Kataki (1986) reported 324 species and 78 genera. Haridasan (1999) reported 96 genera and 352 species from the state. Chowdhery (2009) also reported 98 genera and 352 species out of estimated 1,331 species in 186 genera in India (Misra, 2007). Studies on the orchids of Meghalaya date back to early nineteenth century. Wallich (1820), Griffith (1848), Hooker (1854) are some of the celebrated botanists who collected plants from Meghalaya which includes orchids also. After the reorganization of Botanical Survey of India and establishment of Eastern Circle, the National Orchidarium was established at Shillong. The scientists are actively engaged in the collection and cultivation of the Orchids since 1959 and have published several research papers including some books. Lady's slipper Orchids in India (Kataki, 1984), Orchids of India (Rao, 1979), and Orchids of Meghalaya (Kataki, 1986) are some of the important publications. In what follows a list of orchids in Meghalaya is provided. Some of the species are illustrated (Fig. 1a-l). Threats to the orchid diversity and measures for its conservation are also discussed.

List of Orchids in Meghalaya

Acampe ochracea (Lindl.) Hochr.
A. papillosa (Lindl.) Lindl.
A. rigida (Buch.-Ham.) Hunt
Acanthephippium sylhetense Lindl.
Aerides multiflora Roxb.
A. odorata Lour.
A. roseum Lodd. ex Lindl. & Paxt.
Agrostophyllum brevipes King & Pantl.
A. callosum Rchb. f.
A. khasianum Griff.
Anoectochilus brevilabris Lindl.
A. crispus Lindl.
A. grandiflorus Lindl.
A. lanceolatus Lindl.
A. roxburghii (Wall.) Lindl.

Anthogonium gracile Lindl.
Aphyllorchis montana Rchb. f.
A. vaginata Hook.f.
Arachnis labrosa (Lindl. & Paxt.) Rchb.f.
Arundina graminifolia (D. Don) Hochr.
Biermannia bimaculata (King & Pantl.) King & Pantl.
Brachycorythis galendra (Rchb.f.) var. *major* Summerh.
B. helferi (Rchb.f.) Summerh.
Bulbophyllum affine Lindl.
B. bisetum Lindl.
B. blepharistes Rchb.f.
B. careyanum (Hook.f.) Spreng.
B. caudatum Lindl.
B. cauliflorum Hook.f.
B. cylindraceum Lindl.

List of orchids in Meghalaya (Contd.)

Bulbophyllum cylindraceum Lindl. var. *khasianum* Griff.
B. elatum (Hook.f.) J.J. Sm.
B. griffithii Rchb.f.
B. guttulatum Wall. ex Lindl.
B. gymnopus Hook.f.
B. helenae (Kuntze) J.J. Sm.
B. hirtum (J.E. Sm.) Lindl.
B. hymenanthum Hook.f.
B. leopardinum Lindl.
B. leptanthum Hook.f.
B. odoratissimum Lindl.
B. penicillium Par. & Rchb.f.
B. repens Griff.
B. reptans (Lindl.) Lindl.
B. scabratum Rchb.f.
B. secundum Hook.f.
B. spathulatum (Rofle) Seidn.
B. striatum Rchb.f.
B. triste Rchb.f.
B. umbellatum Lindl.
B. viridiflorum (Hook.f.) Schltr.
B. wallichii Rchb.f.
Calanthe alismaefolia Lindl.
C. angusta Lindl.
C. biloba Lindl.
C. clavata Lindl.
C. densiflora Lindl.
C. mannii Hook.f.
C. masuca (D. Don) Lindl.
C. puberula Lindl.
C. tricarinata Lindl.
Cephalanthera longifolia (L.) Fritsch.
Cephalantheropsis gracilis (Lindl.) Hu.
Ceratostylis himalaica Hook.f.
C. teres Rchb.f.
Cheirostylis griffithii Lindl.
C. pusilla Lindl.
Chiloschista lunifera (Rchb.f.) J.J. Sm.
Chrysoglossum assamicum Hook.f.
Cleisocentrum trichromum (Rchb.f.) Bruhl
Cleisostoma appendiculata (Wall. ex Lindl.) Garay
C. asperum (Rchb.f.) Garay
C. filiforme (Lindl.) Garay
Clelostoma racemiferum (Lindl.) Garay
C. sagittiforme Garay
C. subulatum Blume
Coelogyne barbata Griff.
C. corymbosa Lindl.
C. cristata Lindl.
C. fimbriata Lindl.
C. flaccida Lindl.
C. flavida Wall. ex Lindl.
C. fuscescens Lindl.
C. longipes Lindl.

Coelogyne micrantha Lindl.
C. nitida (Wall. ex Don) Lindl.
C. occulata Hook.f.
C. ovalis Lindl.
C. prolifera Lindl.
C. punctulata Lindl.
C. punctulata var. *brevifolia* (Lindl.) Das & Jain
C. raizadae Jain & Das
C. schultesii Jain & Das
C. stricta (D. Don) Schltr.
C. suaveolens (Lindl.) Hook.f.
C. viscosa Rchb.f.
Corybas purpureus Jos. & Yog.
Corymborkis veratrifolia (Reinw.) Blume.
Cryptochilus sanguine Wall.
Cryptostylis arachnites (Blume) Hasak.
Cymbidium aloifolium (L.) Sw.
C. cochleare Lindl.
C. cyperifolium Lindl.
C. devonianum Paxt.
C. eburneum Lindl.
C. elegans Lindl.
C. ensifolium Sw.
C. iridioides D. Don
C. lancifolium Hook.
C. longifolium D. Don
C. macrorhizon Lindl.
C. mastersii Griff. ex Lindl.
Dendrobium acinaciforme Roxb.
D. anceps Sw.
D. aphyllum (Roxb.) C.E.C. Fischer
D. bicameratum Lindl.
D. candidum Wall. ex Lindl.
D. cathcartii Hook.f.
D. chrysanthum Lindl.
D. crepidatum Lindl.
D. cretaceum Lindl.
D. cumulatum Lindl.
D. denneanum Kerr.
D. densiflorum Lindl.
D. devonianum Paxt.
D. eriaeflorum Griff.
D. fimbriatum Hook.
D. fimbriatum var. *oculatum* Hook.
D. formosum Roxb.
D. gibsonii Lindl.
D. heterocarpum Lindl.
D. hookerianum Lindl.
D. jenkinsii Wall. ex Lindl.
D. lindleyi Steud.
D. longicornu Lindl.
D. moschatum Sw.
D. nobile Lindl.
D. ochreatum Lindl.



Fig. 1a-f. Orchids of Meghalaya: a, *Bulbophyllum affine*; b, *B. guttulatum*; c, *Coelogyne cristata*; d, *C. fimbriata*; e, *C. punctulata*; f, *Cymbidium ridioides*.

List of orchids in Meghalaya (Contd.)

- Dendrobium prophyrochilum* Lindl.
D. primulinum Lindl.
D. ramosum Lindl.
D. ruckeri Lindl.
D. stuposum Lindl.
D. sulcatum Lindl.
D. terminale Par. & Rchb.f.
D. transparens Lindl.
D. williamsonii Day & Rchb.
Didymoplexis pallens Griff.
Diplomeris pulchella D. Don
Diploprora championii (Lindl.) Hook.f.
Doritis pulcherrima Lindl.
Epigeneium amplum (Lindl.) Summerh.
E. fuscescens (Griff.) Summerh.
E. roseum (D. Don) Lindl.
Eria acerbata Lindl.
E. amica Rchb.f.
E. apertiflora Summerh.
E. bambusifolia Lindl.
E. biflora Griff.
E. bipunctata Lindl.
E. bractescens Lindl.
E. carinata Gibson ex Lindl.
E. clavicaulis Wall. ex Lindl.
E. coronaria (Lindl.) Rchb.f.
E. crassicaulis Hook.f.
E. excavata Lindl.
E. ferruginea Lindl.
E. glandulifera Deori & Phukan
E. javanica (Sw.) Blume
E. laniceps Rchb.f.
E. muscicola (Lindl.) Lindl.
E. paniculata Lindl.
E. pannea Lindl.
E. pubescens (Hook.) Steud.
E. pudica Ridley
E. pumila Lindl.
E. pusilla (Griff.) Lindl.
E. spicata (D. Don) Hand.
E. stricta Lindl.
E. tomentosa (Koen.) Hook.f.
Eriodes barbata (Lindl.) Rolfe
Erythroides blumei (Lindl.) Schltr.
Esmeralda cathcartii (Lindl.) Rchb.f.
E. clarkei Rchb.f.
Eulophia bicallosa (D. Don) Hunt & Summerh.
E. bracteosa Lindl.
E. graminea Lindl.
E. nuda Lindl.
E. sanguine Hook.f.
E. santapau Panigr. & Katak
Flickingeria fugax (Rchb.f.) Seidenf.
Galeola javanica (Blume) Benth.
Gauleola lindleyana (Hook.f. & Thoms.) Rchb.f.
Gastrochilus acutifolius (Lindl.) Kuntze
G. calceolaris (Buch.-Ham. Ex Sm.) D. Don
G. crassilabris (King & Pantl.) Garay
G. distichus (Lindl.) Kuntze
G. intermedius (Griff. ex Lindl.) Kuntze
Gastrodia exilis Hook.f.
Geodorum appendiculatum Griff.
G. densiflorum (Lam.) Schltr.
Goodyera foliosa (Lindl.) Benth. ex Clarke
G. hispida Lindl.
G. procera (Ker-Gawl.) Hook.
G. recurva Lindl.
G. robusta Hook.f.
G. schlechtendaliana Rchb.f.
G. viriflora (Blume) Blume
Habenaria acutifera Wall. ex Lindl.
H. arietina Hook.f.
H. concinna Hook.f.
H. cubitalis (L.) R. Br.
H. dentata (Sw.) Schltr.
H. ensifolia Lindl.
H. intermedia D. Don
H. khasiana Hook.f.
H. malleifera Hook.f.
H. mandersii Collett & Hemsl.
H. pectinata (J.E. Sm.) D. Don
H. reniformis (D. Don) Lindl.
H. stenopetala Lindl.
H. trifurcata Hook.f.
Hermidium lanceum (Thun. ex Sw.) Vuijk
Herpysma longicaulis Lindl.
Hetaeria rubens (Lindl.) Benth. ex Hook.f.
Kingidium taenialis (Lindl.) Hunt.
Liparis acuminata Hook.f.
L. assamica King & Pantl.
L. bootanensis Griff.
L. caespitosa (Lam.) Lindl.
L. cordifolia Hook.f.
L. delicatula Hook.f.
L. elliptica Wight
L. lancifolia Hook.f.
L. longipes Lindl.
L. luteola Lindl.
L. macrocarpa Hook.f.
L. nervosa (Thunb.) Lindl.
L. nervosa var. *khasiana* (Hook.f.) Sarkar
L. paradoxa (Lindl.) Rchb.f.
L. plantaginea Lindl.
L. pulchella Hook.f.
L. resupinata Ridley
L. rupestris Griff.
L. torta Hook.f.
L. vestita Rchb.f.



Fig.1g-l. Orchids of Meghalaya (contd.): g, *Cymbidium longifolium*; h, *Dendrobium densiflorum*; i, *D. hookerianum*; j, *D. nobile* and *D. formosum*; k, *Paphiopedilum hirsutissimum*; l, *P. insigne*.

List of orchids in Meghalaya (Contd.)

- Liparis viridiflora* Lindl.
Listera mucronata Panigrahi & Wood
Luisia brachystachys (Lindl.) Blume
L. filiformis Hook.f.
L. inconspicua (Wall. Ex Hook.f.) King & Pantl.
L. micrantha Hook.f.
L. psyche Rchb.f.
L. trichorhiza (Hook.) Blume
L. volucris Lindl.
L. zeylanica Lindl.
Malaxis acuminata D. Don
M. biaurata (Lindl.) Kuntze
M. calophylla (Rchb.f.) Kuntze
M. josephiana (Rchb.f.) Kuntze
M. khasiana (Hook.f.) Kuntze
M. latifolia J.E. Sm.
Micropera mannii (Hook.f.) Tang & Wang
M. obtuse (Lindl.) Tang & Wang
M. rostrata (Roxb.) Balak.
Neogyna gradneriana (Lindl.) Rchb.f.
Neottianthe secundiflora (Hk.f.) Schltr.
Nephelaphyllum cordifolium (Lindl.) Blume
Nervilia aragoana Gaud.
N. hookeriana (King & Pantl.) Schltr.
N. khasiana (King & Pantl.) Schltr.
N. macroglossa (Hook.f.) Schltr.
Oberonia acaulis Griff.
O. anthropophora Wall. ex Lindl.
O. bicornis Lindl.
O. caulescens Lindl.
O. clarkei Hook.f.
O. demissa Lindl.
O. ensiformis (J.E. Sm.) Lindl.
O. falcata King & Pantl.
O. iridifolia (Roxb.) Lindl.
O. jenkinsiana Griff. ex Lindl.
O. mannii Hook.f.
O. myriantha Lindl.
O. obcordata Lindl.
O. orbicularis Hook.f.
O. pachyrachis Rchb.f. ex Hook.f.
O. pyrulifera Lindl.
O. recurva Lindl.
O. rufilabris Lindl.
Ornithochilus difformis (Wall. ex Lindl.) Schltr.
Otochilus albus Lindl.
O. fuscus Lindl.
O. porrectus Lindl.
Pachystoma senile (Lindl.) Rchb.f.
Panisea demissa (D. Don) Pfitzer
Pantlingia serrata Deori
Paphiopedilum hirsutissimum (Lindl. ex Hook.) Stein
P. insigne (Wall. ex Lindl.) Pfitzer
P. venustum (Wall. ex Sims.) Pfitzer
Papilionanthe teres (Roxb.) Schltr.
P. uniflora (Lindl.) Garay
P. vandarum (Rchb.f.) Garay
Pecteilis susannae (J.E. Sm.) Raffin
Pelatantheria insectifera (Rchb.f.) Ridley
Pennilabium proboscidium A.S. Rao & Joseph
Peristylus aristatus Lindl.
P. constrictus (Lindl.) Lindl.
P. goodyeroides (D. Don) Lindl.
P. gracillima (Rchb.f.) Mukerjee
P. gracilis Bl.
P. hamiltonianus Lindl.
P. lacertiferus (Lindl.) J.J. Sm.
P. mannii (Rchb.f.) Mukherjee
P. stenotachya (Lindl.) Krzl.
Phaius flavus (Blume) Lindl.
P. longipes (Hook.f.) Holtt.
P. mishmensis (Lindl.) Rchb.f.
P. tankervilleae (Aiton) Blume
Phalaenopsis mannii Rchb.f.
Pholidota articulata Lindl.
P. calceata Rchb.f.
P. convallariae Hook.f.
P. convallariae Hook.f. var. *breviscapa* Deori & Joseph
P. griffithii Hook.f.
P. imbricata (Roxb.) Lindl.
P. imbricata var. *sessilis* Hook.f.
P. obovata Hook.f.
P. protracta Hook.f.
P. recurva Lindl.
P. rubra Lindl.
Phreatia elegans Lindl.
Platanthera concinna (Hook.f.) Krzl.
Pleione humilis (J.E. Sm.) D. Don
P. lagenaria Lindl.
P. maculata (Lindl.) Lindl.
P. praecox (J.E. Sm.) D. Don
Podochilus khasianus Hook.f.
Pomatocalpa ramosum (Lindl.) Summerh.
Porpax gigantea Deori
Rhynchostylis retusa Blume
Saccolabiopsis pusilla (Lindl.) Seidnf. & Garay
Satyrium nepalense D. Don
Schoenorchis gemmata (Lindl.) J.J. Sm.
Smitinandia micrantha (Lindl.) Holttum
Spathoglottis pubescens Lindl.
S. pubescens Lindl. var. *parviflora* Hook.f.
Spiranthes sinense (Pers.) Ames.
Stereochilus bicuspidatus (Hook.f.) King & Pantl.
S. hirtus Lindl.
Sunipia bicolor Lindl.
S. candida (Lindl.) Hunt.
S. racemosa (J.E. Sm.) Tang & Wang
Taeniophyllum khasianum Joseph & Yoganar.

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List of orchids in Meghalaya (Contd.)

Tainia khasiana King & Pantl.
T. latifolia (Lindl.) Rchb.f.
T. minor Hook.f.
T. viridifusca Benth.
Thelasis biflora Hook.f.
T. khasiana Hook.f.
T. longifolia Hook.f.
T. pygmaea (Griff.) Blume
Thrixspermum arachnites (Blume) Rchb.f.
Thunia alba (Lindl.) Rchb.f.
Trachoma coarctatum (King & Pantl.) Garay
Trias oblonga Lindl.
T. pusilla Joseph & Deka
Trichotosia dasyphylla (Par. & Rchb.f.) Kranzl.
T. pulvinata (Lindl.) Kranzl.
Tropidia angulosa (Lindl.) Blume
Tylostylis discolor (Lindl.) Hook.f.

Uncifera acuminata Lindl.
U. obtusifolia Lindl.
Vanda alpina (Lindl.) Lindl.
V. amesiana Rchb.f.
V. bicolor Griff.
V. coerulea Griff. ex Lindl.
V. cristata Lindl.
V. pumila Hook.f.
V. stangeana Rchb.f.
V. testacea (Lindl.) Rchb.f.
Vandopsis undulata (Lindl.) J.J. Sm.
Zeuxine abbreviata Hook.f.
Z. affinis (Lindl.) Benth ex Hook.f.
Z. goodyeroides Lindl.
Z. longilabris (Lindl.) Trimen
Z. strateumatica (L.) Schltr.

Threats to Orchid Diversity

The orchids are of ornamental value and have attracted a large number of botanists and horticulturists from very early times. There has been an indiscriminate and ruthless collection of these plants from the wild, in order to meet the big demand from the European markets. Besides, the destruction of their habitats through forest clearings has led to depletion of the natural orchid populations. The impact of developmental activities such as road building, creation of new townships, hydro-electric projects are some of the well known factors other than natural calamities such as landslides etc. The following are some of the rare ornamental orchids reported from Meghalaya. *Acanthephippium sylhetense* Lindl., *Anoectochilus roxburghii* (Wall.) Lindl., *Corybas purpureus* Joseph & Yoganor; *Diplomeris pulchella* D. Don.; *Malaxis josephiana* (Rchb.f.) Kuntze, *Paphiopedilum hirsutissimum* (Lindl. ex Hook.) Stein., *Paphiopedilum venustum* (Wall.) Pfitz.; *Phaius mishmensis* (Lindl.) Rchb.f.; *Pleione maculata* Lindl.

Conservation Measures

Recognizing the above mentioned facts, various initiatives have been taken to conserve the orchid diversity of Meghalaya. These include *in situ* and *ex situ* conservation, research and development, and legal measures. The *in situ* conservation mainly deals with the conservation of orchids in its natural habitat. In Meghalaya, there are 2 National Parks and 3 Wildlife Sanctuaries. Many Orchids have been reported from these protected areas. Besides these the sacred groves which are conserved through, traditional faiths are the treasure house of plants. They contain an unusual wealth of orchid species and play an important role in *in situ*

conservation of plants e.g. *Law Lyngdoh* sacred grove at Mawphlang near Shillong. The most effective mechanism for conservation of orchids is *in situ* conservation. However, the maintenance of individuals in National Orchidarium and Conservatory of botanical gardens as a part of *ex situ* conservation is also necessary. In the Botanical Survey of India, the National Orchidarium was established and research work is done so as to conserve the orchids as a part of *ex situ* conservation.

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