

# ABSTRACT

From the floristic point of view, Darjeeling Himalaya is very wealthy. Because of such floristic wealth, many botanists were attracted and explored the flora of the region. Sir J.D. Hooker (1848-1850) explored many places including Sikkim Himalaya and collected around 3,500 plant species. Later, other botanical explorers further explored this region and introduced the flora of this unknown region to the world.

Present work has been designed to understand the different taxonomic aspects of the Orchid flora of Darjeeling Himalaya of West Bengal, India with following objectives: (i) Survey to document Orchid species diversity in the Darjeeling part of the Eastern Himalaya for assessing the total available taxa (ii) to assess habit and habitat group, phytogeographical distribution and altitudinal effects (iii) to find out endemic species (iv) to find out threatened species; (v) determination of flowering; (vi) to assess the species of exotic and economic value and (vii) to assess new taxa, new distributional record if there is any.

Present work deals with 321 Orchid species under 86 genera which have been recorded from Darjeeling Himalaya of West Bengal, India through periodical visit between June 2007 to April 2015 covering all seasons of the year in the entire region including the forest areas, floral nurseries and farms covering the plains of Siliguri ( $\pm 120$  m), temperate regions of Darjeeling,

Kalimpong and Kurseong hills and sub-alpine regions of Sandakphu and Phalut (3660 m amsl). Of them, 2 species with 2 genera are saprophytic, 100 species with 34 genera are terrestrial and the rest 219 species with 52 genera are epiphytic. *Cymbidium* and *Liparis* are two genera which have both epiphytic and terrestrial habitat. The numbers of epiphytic Orchids are greater than the terrestrial and saprophytic species. The total number of recorded species of each genus are 2 *Acampe* spp., 2 *Aerides* spp., 4 *Agrostophyllum* spp., 2 *Anoectochilus* spp., 36 *Bulbophyllum* spp., 7 *Calanthe* spp., 2 *Ceratostylis* spp., 2 *Cheirostylis* spp., 4 *Cleisostoma* spp., 16 *Coelogyne* spp., 3 *Crepidium* spp., 2 *Cryptochilus* spp., 13 *Cymbidium* spp., 34 *Dendrobium* spp., 2 *Epigeneium* spp., 11 *Eria* spp., 2 *Esmeralda* spp., 2 *Flickingeria* spp., 6 *Gastrochilus* spp., 7 *Goodyera* spp., 5 *Habenaria* spp., 5 *Herminium* spp., 16 *Liparis* spp., 4 *Luisia* spp., 2 *Malaxis* spp., 2 *Neplelaphyllum* spp., 4 *Nervilia* spp., 9 *Oberonia* spp., 4 *Odontochilus* spp., 3 *Otochilus* spp., 2 *Panisea* spp., 5 *Paphiopedilum* spp., 8 *Peristylus* spp., 3 *Phaius* spp., 4 *Phalaenopsis* spp., 6 *Pholidota* spp., 5 *Pinalia* spp., 8 *Platanthera* spp., 4 *Pleione* spp., 2 *Podochilus* spp., 2 *Satyrium* spp., 4 *Sunipia* spp., 3 *Tainia* spp., 2 *Thunia* spp., 2 *Trichotosia* spp., 3 *Vanda* spp. and 4 *Zeuxine* spp. The remaining genera possess single species distribution in the region. The available saprophytic Orchid species in the region are *Didymoplexis pallens* and *Galeola lindleyana*. Three monotypic Orchid genera are found in the regions viz., *Acrochaene punctata*, *Anthogonium gracile* and *Herpysma longicaulis*. Out of these, *Acrochaene punctata*, is epiphytic and the other two are of terrestrial habitat. *Geodorum densiflorum* var. *kalimpongense*, is the var. nov. established in the present survey. Epiphytic Orchid species like *Bulbophyllum* and *Dendrobium*, have the highest number of species diversity and the widest distribution. It is found that *Bulbophyllum* with 36 spp. is the largest and dominant genus in the region.

On Orchids of Darjeeling, many taxonomists did sporadic survey. Such fragmentary survey assists to meager documentation relating to Orchid flora of the region. Therefore, present survey reports 41 numbers of new distributional records from the region. It is also a great landmark of the Orchid flora of Darjeeling Himalaya and it helps the addition number of species richness in the region.

The entire region is storehouse of Orchid species and known as “Epicenter of Orchid Germplasm”. Because of this reason, many botanists worked on the Orchids of the region and documented as per their will and expertise and published massive volumes on the flora of the region. However, to meet the missing links on intra-specific floral morphology and colour variation with photography of the species have been carried out in the present investigation because such facilities were not available in those days. Therefore, following listed Orchids are the new findings which have intra-specific variations in their floral morphology including their variation in colour and they are presented in detailed description along with colour photographs for the first time. Those species includes *Chilochista parishii*, *Crepidium acuminatum*, *Cymbidium lowianum*, *Dendrobium anceps*, *Eria lasiopetala*, *Geodorum densiflorum*, *Phalaenopsis lobbii*, *Pinalia amica*, *Vanda cristata* etc.

After literature survey, 27 genera with 48 Orchid species found in the regions are medicinally important and their medicinal usage are known worldwide. Of these, 31 species are epiphytic and the remaining 17 species are terrestrial. Further, 15 species are ethnobotanically important. Nineteen species are grown only in floral nurseries, research centre and botanical garden of this region. None of these species are available in their natural

habitat in the region. The Orchid species recorded from Darjeeling Himalaya represents the Himalayan origin with major representative taxa of Sino-Himalayan, followed by South-East Asian, Sumatra, Taiwan, Borneo, Afghanistan, Australia, Malay-Archipelago, Japan, Cambodia, Laos, Java, Malaysia, Indonesia, Myanmar, Nepal, Thailand, Vietnam, New Guinea, Philippines, South West Pacific Islands, Sulawesi, Sri Lanka, and of African origin. There are 11 endemic species found in the region and 95 of the 321 species are endemic to various smaller or larger region of India or the Indian subcontinent. Present availability status of Orchid species in the regions are 19 species are cultivated, 30 species are common, 28 species are frequent, 85 species are sparse, 118 species are rare, 35 species are threatened and 6 species are endangered. The major threat to the Orchid flora in the study region is the random felling of old epiphytic host trees, the extension of agricultural lands and occupation of forest land, construction and the extension of motorable roads, cutting of seasonal grasses, application of weedicide, rapid urbanization, developmental schemes, frequent landslide, topsoil erosion, grazing of domestic animals and indiscriminate collections to sell them abroad. Therefore, conservation of natural habitat is emphasized to save the available Orchid germplasm resources in the region.