BULL. BOT. SURV. INDIA
Vol. 23, Nos. 3 & 4 : pp. 165-169, 1981

HIMALAYAN ORCHIDS IN PENINSULAR INDIA

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A systematic survey of the Orchidaceae, their collection, cultivation and multiplication as well as critical taxonomic studies—has been initiated and intensified in the three National Orchidaria of the Botanical Survey of India at Yercaud, Calcutta and Shillong. A preliminary survey of their distribution in the Indian subcontinent has shown that the Himalayan ranges, especially, North-East Himalayas as a whole are richer in both terrestrial and epiphytic orchids, as compared to the South Indian ranges. North-East Himalayas foster about 500 species while South India has less than 250 species. It is paradoxical to observe that although South India is geologically an older landmass with its western coast receiving ample rain & sun, has less than half the number of species present in the Himalayan region, which is recent.

A critical preliminary study by the authors has brought to light that out of the 250 species, only 59 species are so far reported from the Himalayan regions. This information can be updated only after a critical comparative study of each species from both the regions.

One of the aims of this paper is to create interest and initiate investigations by other disciplines of botany such as anatomy, cytology, ecology, experimental taxonomy etc., to throw light on the inter and intraspecific variations on the backdrop of phytogeographical distinctiveness and also to predict the micro-evolutionary trends. Besides, pollination biology of such species having distribution in both these regions could also be an interesting objective is pursue, as orchid flowers are fantastically adopted to entomophily. The relationship of insects and floral structure, especially of tropical orchids of India is very little known.

Terrestrial orchids

Aphyllorchis montana Reichb. f. in Linnaea 41 : 57. 1876; Hook. f. Fl. Brit. Ind. 6 : 116. 1890; Fischer in Gamble, Fl. Pres. Madras 1457. 1928. *A. prainii* Hook. f., *l. c.* 6 : 117. 1890.

Calanthe masuca (D. Don) Lindl. Gen. Sp. Orch. 249. 1833; Hook. f. Fl. Brit. Ind. 5 : 850. 1890; Fischer in Gamble, Fl. Pres. Madras 1432. 1928. *Bletia masuca* D. Don, Prodr. Fl. Nep. 30. 1825.

Didymoplexis pallens Griff. in Calcutta Journ. Nat. Hist. 4 : 383. t. 17. 1844; Hook. f. Fl. Brit. Ind. 6 : 122. 1890; Sant. & Kap. Orch. Bombay 162. 1966.

Epipogium roseum (D. Don) Lindl. Journ. Linn. Soc. 1 : 177. 1857; *Limodorum roseum* D. Don, Prodr. Fl. Nep. 30. 1825. *Epipogium nutans* Reichb. f. : Hook. f. Fl. Brit. Ind. 6 : 124. 1890; Fischer in Gamble, Fl. Pres. Madras 1460. 1928 (*'Epipogum'*).

Eulophia dabia (D. Don) Hochr. in Bull. N. Y. Bot. Gard. 6 : 270. 1910; Sant. & Kapad. Orch. Bombay 112. 1966. *Bletia dabia* D. Don Prodr. Fl. Nep. 30. 1825. *Eulophia campestris* Wall. ex Lindl.; Hook. f. Fl. Brit. Ind. 6 : 4. 1890.

Eulophia herbacea Lindl. Gen. Sp. Orch. 182. 1833; Hook. f. Fl. Brit. Ind. 6 : 2. 1890; Fischer in Gamble, Fl. Pres. Madras 1438. 1928.

E. nuda Lindl. Gen. Sp. Orch. 180. 1833; Hook. f. Fl. Brit. Ind. 6 : 5. 1890; Fischer in Gamble, Fl. Pres. Madras 1435. 1928.

Geodorum densiflorum (Lamk.) Schltr. in. Fedd. Repert. Bieh. 4 : 250. 1919; Fischer in Gamble, Fl. Pres. Madras 1437. 1928. *Limodorum densiflorum* Lamk. Encycl. 3 : 516. 1791-92. *Geodorum purpureum* R. Br. : Hook. f. Fl. Brit. Ind. 6 : 16. 1890. *G. dilatatum* R. Br. : Hook. f. *l. c.* 17.

Goodyera procera Hook. Exot. Fl. 1. t. 39. 1823; Hook. f. Fl. Brit. Ind. 6 : 111. 1890; Fischer in Gamble, Fl. Pres. Madras 1456. 1928.

Habenaria commelinifolia Wall. ex Lindl. Gen. Sp. Orch. 325. 1835; Hook. f. Fl. Brit. Ind. 6 : 143. 1890; Fischer in Gamble, Fl. Pres. Madras 1470. 1928.

H. digitata Lindl. Gen. Sp. Orch. 307. 1835; Hook. f. Fl. Brit. Ind. 6 : 134. 1894 (p.p.); Fischer in Gamble, Fl. Pres. Madras 1469. 1928.

H. diphylla Dalz. in Hook. J. Bot. 2 : 262. 1850; Hook. f. Fl. Brit. Ind. 6 : 151. 1890 (Excl. syn. *Liparis diphyllos* Nimmo); Fischer in Gamble, Fl. Pres. Madras 1471. 1928.

H. furcifera Lindl. Gen. Sp. Orch. 319. 1835; Hook. f. Fl. Brit. Ind. 6 : 149. 1890; Sant. & Kap. Orch. Bombay 39. f. 20. 1966.

H. marginata Coleb. in Hook. Exot. Fl. 2 : 17. t. 136. 1824; Hook. f. Fl. Brit. Ind. 6 : 160. 1890; Fischer in Gamble, Fl. Pres. Madras 1471. 1928. *H. fusifera* Hook. f. Fl. Brit. Ind. 6 : 147. 1890. *H. flavescens* Hook. f. Fl. Brit. Ind. 6 : 150. 1890.

H. plantaginea Lindl. Gen. Sp. Orch. 323. 1835; Hook. f. Fl. Brit. Ind. 6 : 141. 1890; Fischer in Gamble, Fl. Pres. Madras 1420. 1928.

H. stenopetala Lindl. Gen. Sp. Orch. 319. 1835; Hook. f. Fl. Brit. Ind. 6 : 134. 1890; Sant. & Kap. Orch. Bombay 9. 1963.

Malaxis latifolia J. E. Sm. in Rees, Cyclop. 3 : 22. 1819. *Microstylis congesta* Reichb. f. : Hook. f. Fl. Brit. Ind. 5 : 689. 1890.

M. wallichii Lindl. Gen. Sp. Orch. 20. 1830. *Microstylis wallichii* Hook. f. Fl. Brit. Ind. 5 : 686. 1890; Fischer in Gamble, Fl. Pres. Madras 1407. 1928.

Nervilia aragoana Gaud. in Bot. Voy. Freycinet 422. t. 35. 1826; Fischer in Gamble, Fl. Pres. Madras 1459. 1928; Hook. f. Fl. Brit. Ind. 6 : 121. 1890. *Pogonia scotti* Reichb. f. : Hook. f. Fl. Brit. Ind. 6 : 120. 1890.

N. prainiana (King & Pantl.) Seidenfaden & Smit. Orch. Thailand 730. 1964; Saldanha, Fl. Hassan 837. 1976. *Pogonia prainiana* King & Pantl. Journ. Asiat. Soc. Bengal 65(2) : 129. 1896.

Pachystoma senile (Lindl.) Reichb. f. Bonplandia 3 : 250. 1858; Hook. f. Fl. Brit. Ind. 5 : 812. 1890; Fischer in Gamble, Fl. Pres. Madras 1426. 1928. *Apaturia senilis* Lindl. Gen. Sp. Orch. 130. 1831.

Pecteilis gigantea (J. E. Sm.) Rafin. Fl. Tell. 2 : 38. 1837. *Orchis gigantea* J. E. Sm. Exot. Bot. 2 : 79. t. 100. 1805. *Platanthera susannae auct. Pl.* : Wight Icon. 3 : 11. t. 920. 1845; Fischer in Gamble, Fl. Pres. Madras 1475. 1928. *Habenaria susannae auct. Pl.* : Hook. f. Fl. Brit. Ind. 6 : 137. 1890.

Pecteilis gigantea (J. E. Sm.) Rafin. is the correct nomenclature for the Indian species *fc. f.* Seidenf., Dansk Bot. Arkiv 31 (3) : 22 &

23. f. 8. 1977] while, *P. susannae* (L.) Rafin. represents the species, so far known "in Eastern Asia from China down to Northern Malaya (including Thailand) and in Indonesia from Java to Amboina" And it is characterised by the lateral petals being much shorter than the sepals instead of little shorter (*c. f.* Seidenf. *loc. cit.*) and the midlobe of the lip being longer than the side lobes instead of being equal (as in *P. gigantea—c. f.* Sant. et Kapad. Orch. Bombay 42. 1966). Besides in *P. susannae* the lacination of the side lobes of the lip is less deep and more regular than in *P. gigantea.*

Peristylus densus (Lindl.) Sant. & Kap. Journ. Bombay Nat. Hist. Soc. 57 : 128. 1960 & Orch. Bombay 46. Pl. 9A, B. 1966. *Coeloglossum densum* Lindl. Gen. Sp. Orch. 302. 1835. *Habenaria stenostachya* Benth. Hook. f. Fl. Brit. Ind. 6 : 156. 1890. *Peristylus stenostachyus* (Lindl.) Kranz. : Fischer in Gamble, Fl. Pres. Madras 1474. 1928.

P. goodyeroides (D. Don) Lindl. Gen. Sp. Orch. 299. 1835; Fischer in Gamble, Fl. Pres. Madras 1475. 1928. *Habenaria goodyeroides* D. Don, Prodr. Fl. Nep. 25. 1825; Hook. f. Fl. Brit. Ind. 6 : 161. 1890 (excl. syn. *P. grandis* Bl.).

P. richardianus Wight, Icon. 5 : 12. t. 1697. 1852; Fischer in Gamble, Fl. Pres. Madras 1475. 1928. *Habenaria bicornuta* Hook. f. Fl. Brit. Ind. 6 : 156. 1890.

Satyrium nepalense D. Don, Prodr. Fl. Nep. 26. 1825; Hook. f. Fl. Brit. Ind. 6 : 168. 1890; Fischer in Gamble, Fl. Pres. Madras 1476. 1928.

Spiranthes sinensis (Pers.) Ames, Orch. 2 : 53. 1908. *Neottia sinensis* Pers. Syn. 2 : 511. 1807. *Spiranthes australis* (R. Br.) Lindl. : Hook. f. Fl. Brit. Ind. 6 : 102. 1890.

Tropidia angulosa Bl. Orch. Arch. Ind. 122. 1858; Hook. f. Fl. Brit. Ind. 6 : 92. 1890; Fischer in Gamble, Fl. Pres. Madras 1452. 1928.

Zeuxine longilabris Benth. ex Hook. f. Fl. Brit. Ind. 6 : 107. 1890; Fischer in Gamble, Fl. Pres. Madras 1456. 1928.

Z. strateumatica (L.) Schltr. in Bot. Jahrb. 45 : 394. 1911; Fischer in Gamble, Fl. Pres. Madras 1456. 1928. *Orchis strateumatica* L. Sp. Pl. 943. 1753. *Zeuxine sulcata* (Roxb.) Lindl. : Hook. f. Fl. Brit. Ind. 6 : 106. 1890.

Epiphytic orchids

Acampe ochracea (Lindl.) Hochr. in Bull. N. Y. Bot. Gard. 6 : 270. 1910; Sant. & Kap. Orch. Bombay 234. 1966. *Saccolabium ochraceum* Lindl. in Bot. Reg. Misc. 2. 1842; Hook. f. Fl. Brit. Ind. 6 : 62. 1890.

Aerides odorata Lour. Fl. Coch. 2 : 525. 1790; Hook. f. Fl. Brit. Ind. 6 : 47. 1890; Fischer in Gamble, Fl. Pres. Madras 1443. 1928. *A. suavissima* Lindl. : Hook. f. Fl. Brit. Ind. 6 : 47. 1890.

Chiloschista luniferus (Reichb. f.) J. J. Sm. Fl. Buitenz. 6 : 553. f. 419. 1905; Sant. & Kap. Orch. Bombay 209. 1966. *Sarcochilus luniferus* Hook. f. in Bot. Mag. t. 7044. 1889 & Fl. Brit. Ind. 6 : 37. 1890.

Cleisostoma discolor Lindl. Bot. Reg. 31. misc. 59. 1845; Hook. f. Fl. Brit. Ind. 6 : 75. 1890; *Sarcanthus macrodon* Reichb. f. : Hook. f. Fl. Brit. Ind. 6 : 70. 1890; *Saccolabium rostellatum* Hook. f. Fl. Brit. Ind. 6 : 59. 1890.

Cymbidium aloifolium (L.) Sw. in Nov. Act. Sc. Upsal. 6 : 73. 1799; Hook. f. Fl. Brit. Ind. 6 : 11. 1890; Fischer in Gamble, Fl. Pres. Madras 1436. 1928. *Epidendrum aloefolium* L. Sp. Pl. 1350. 1753.

Dendrobium crepidatum Lindl. in Paxton, Fl.

Gard. 1 : 63. f. 45. 1850-51 & nov. ed. 1 : 53. f. 40. 1882; Hook. f. Fl. Brit. Ind. 5 : 740. 1890; Sant. & Kap. Orch. Bombay 101. 1966.

Dendrobium herbaceum Lindl. Bot. Reg. misc. 69. 1840; Hook. f. Fl. Brit. Ind. 5 : 710. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928.

D. heterocarpum Wall. ex Lindl. Gen. Sp. Orch. 78. 1830; Hook. f. Fl. Brit. Ind. 5 : 737. 1890; Fischer in Gamble, Fl. Pres. Madras 1416. 1928.

D. peguanum Lindl. in J. Linn. Soc. 3 : 19. 1859. *D. pygmaeum* Lindl. : Hook. f. Fl. Brit. Ind. 5 : 717. 1890; Sant. & Kap. Orch. Bombay 84. 1966.

Diploprora championi (Lindl.) Hook. f. Fl. Brit. Ind. 6 : 26. 1890 & Icon. Pl. t. 2120. 1892; Saldanha Fl. Hassan 824. 1976.

Cottonia championii Lindl. in Hook. Journ. Bot. 7 : 35. 1855.

Ephemerantha macraei (Lindl.) Hunt. & Summerh. in Taxon 10 (4) : 105. 1961. *Dendrobium macraei* Lindl. Gen. Sp. Orch. 75. 1830; Hook. f. Fl. Brit. Ind. 5 : 714. 1890 (p. p.). *Desmotrichum fimbriatum auct. non* Bl. : Fischer in Gamble, Fl. Pres. Madras 1412. 1928.

Gastrochilus dasypogon (J. E. Sm.) O. Ktze. Rev. Gen. Pl. 2 : 661. 1891; Sant. & Kap. Orch. Bombay 226. 1966. *Saccolabium dasypogon* Lindl. : Hook. f. Fl. Brit. Ind. 6 : 66. 1890.

Liparis caespitosa (Thou.) Lindl. Bot. Reg. 11 sub t. 882. 1825. *Malaxis caespitosa* Thou. Orch. Ill. Afr. t. 89. 1822. *Liparis pusilla* Ridl. : Hook. f. Fl. Brit. Ind. 5 : 701. 1890; *L. prainii* Hook. f. Fl. Brit. Ind. 5 : 700. 1890. *L. duthiei* Hook. f. Fl. Brit. Ind. 5 : 701. 1890; Fischer in Gamble, Fl. Pres. Madras 1411. 1928.

L. elliptica Wight Icon. 5 : 17. t. 1735. 1852. *L. viridiflora auct. non* Lindl. *p. p. sensu* Hook. f. Fl. Brit. Ind. 5 : 704. 1890; Fischer in Gamble, Fl. Pres. Madras 1411. 1928.

L. nervosa (Sw.) Lindl. Gen. Sp. Orch. 26. 1830; Fischer in Gamble, Fl. Pres. Madras 1410. 1928. *Malaxis nervosa* Sw. in Vet. Akad. Nya. Handl. Stockh. 21 : 235. 1800. *Liparis paradoxa* (Lindl.) Reichb. f. : Hook. f. Fl. Brit. Ind. 5 : 697. 1890.

L. viridiflora (Bl.) Lindl. Gen. Sp. Orch. 31. 1830. *p. p. Malaxis viridiflora* Bl. Bijdr. 392. 1825. *Liparis longipes* Lindl. : Hook. f. Fl. Brit. Ind. 5 : 703. 1890; Fischer in Gamble, Fl. Pres. Madras 1411. 1928.

Luisia zeylanica Lindl. Fol. Orch. Luisia 3. 1853. *L. teretifolia auct. non* Gaud. : Hook. f. Fl. Brit. Ind. 6 : 22. 1890 (Excl. some syn.); Fischer in Gamble, Fl. Pres. Madras 1948. 1928.

Oberonia bicornis Lindl. Gen. Sp. Orch. 16. 1830 & Fol. Orch. Ober. 4. 1859; Hook. f. Fl. Brit. Ind. 5 : 682. 1888; Sant. & Kap. Orch. Bombay 73. 1966.

O. ensiformis (Sm.) Lindl. Fol. Orch. Ober. 4. 1859; Hook. f. Fl. Brit. Ind. 5 : 679. 1888; Fischer in Gamble, Fl. Pres. Madras 1406. 1928. *Malaxis ensiformis* Sm. in Rees, Cyclop. 221. no. 14. 1812.

O. falconeri Hook. f. Icon. Pl. t. 1780. 1888 & Fl. Brit. Ind. 5 : 678. 1890; Fischer in Gamble, Fl. Pres. Madras 1406. 1928.

O. iridifolia (Roxb.) Lindl. Gen. Sp. Orch. 15. 1830; Hook. f. Fl. Brit. Ind. 5 : 675. 1888; Sant. & Kap. Orch. Bombay 58. Pl. 12. 1966. *O. iridifolia* var. *denticulata* Hook. f. Fl. Brit. Ind. 5 : 676. 1888.

Papilionanthe teres (Roxb.) Schltr. Orchis 9 : 78. 1915. *Dendrobium teres* Roxb. Fl. Ind. 3 : 485. 1832. *Vanda teres* (Roxb.) Lindl. ;

Hook. f. Fl. Brit. Ind. 6 : 49. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1444. 1928.

Phalaenopsis decumbens (Griff.) Holtt. Gard. Bull. Sing. 11 : 286. 1947. *Aerides decumbens* Griff. Notul. Pl. As. 3 : 365. 1851. *Kingiella decumbens* (Griff.) Rolfe : Fischer in Gamble, Fl. Pres. Madras 1439. 1928.

Pholidota pallida Lindl. Bot. Reg. Sub. t. 1777. 1836 ; Summerh. Rep. Third World Orch. Conf. 311. 1960. *P. imbricata* (Roxb.) Lindl. : Hook. f. Fl. Brit. Ind. 5 : 845. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1430. 1928.

Polystachya flavescens (Bl.) J. J. Sm. Fl. Buitz. 6 : 284. f. 218. 1905. *Onychium flavescens* Bl. Bijdr. 325. 1825. *Polystachya wightii* Reichb. f. : Hook. f. Fl. Brit. Ind. 6 : 21. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1437. 1928.

Rhynchostylis retusa (L.) Bl. Bijdr. 286. t. 49. 1825 ; Hook. f. Fl. Brit. Ind. 6 : 32. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1440. 1928. *Epidendrum retusum* L. Sp. Pl. 953. 1753.

Thelasis pygmaea Lindl. in J. Linn. Soc. 3 : 63. 1858 ; Hook. f. Fl. Brit. Ind. 6 : 86. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1450. 1928.

Vanda tessellata (Roxb.) Hook. ex G. Don in Loud. Hort. Brit. 372. 1830 ; Fischer in Gamble, Fl. Pres. Madras 1445. 1928. *Epidendrum tessellatum* Roxb. Pl. Corom. 1 : 34. t. 42. 1795. *Vanda roxburghii* R. Br. : Hook. f. Fl. Brit. Ind. 6 : 52. 1890.

V. testacea (Lindl.) Reichb. f. Gard. Chron. 2 : 166. 1877 ; *Aerides parviflora* Lindl. : Hook. f. Fl. Brit. Ind. 6 : 50. 1890 ; Fischer in Gamble, Fl. Pres. Madras 1444. 1928.