

REPORT ON SPECIMENS OF *DENDROBIUM* SW. (ORCHIDACEAE) PRESERVED IN NATIONAL, REGIONAL, AND STATE HERBARIA

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Abstract

Species of *Dendrobium* are revised to 50 from 37 based on the specimens deposited in herbaria namely National- Central National Herbarium (CAL) Howrah; Regional- herbarium of the Eastern Regional Centre of the Botanical Survey of India (ASSAM), Shillong; and State- Orchid Herbarium of the Tropical Forest (OHT), Tipi, West Kameng (Arunachal Pradesh), and Arunachal Pradesh Regional Centre of the Botanical Survey of India (ARUN). The number of specimens is 359 in CAL representing 21 species representing, 251 in ASSAM, and 240 specimens representing 41 species in OHT. The present communication reports examination of specimens for each *Dendrobium* species reported from Arunachal Pradesh.

Introduction

THE GENUS *Dendrobium* Sw. is one of the most highly evolved and diversified group represented by 1600 species worldwide with its major distribution areas ranging from SouthEast Asia to New Guinea and Australia (POWO, 2025). The dendrobiums are distributed in almost all zones. Tropical ones need warm and humid climate in summer, whereas the sub-tropical and temperate ones need cool atmosphere with humid or partially dry conditions. Contribution of Dr S N Hegde, Dr A N Rao, A S Rao, P K Hajra, G Panigrahi, N C Deori *etc.* in deposition of herbarium specimen from state in various herbaria are base to the present study.

Material and Methods

Present study was conducted at Central National Herbarium (CAL) Howrah; regional herbarium of the Eastern Regional Centre of the Botanical Survey of India (ASSAM) Shillong; and state- Orchid Herbarium of the Tropical Forest (OHT), Tipi, West Kameng (Arunachal Pradesh) and Arunachal Pradesh Regional Centre of the Botanical Survey of India (ARUN). In CNH (CAL). The specimens were very old and required magnifying glass to study the specimens both in flower and vegetative condition. Forty one species on 240 herbaria sheets were observed at Orchid Herbarium Tipi (OHT). Most of specimens have been preserved as a paratype and *Dendrobium sessanicum* as a holotype.

During collection, local people helped in guiding the way in dense forest and briefing about the utility of *Dendrobium* species. Help of binocular, altimeter, geographical map, stationary material, literature, camera, compass *etc* was taken during identification

of the specimens. Since these plants are epiphytic, either long pruning stick was used or by climbing on the tree for collections of the specimens with its roots. In some cases the plants were collected fallen on the ground. The plants were collected in polythene bags and after reaching the camp, these were kept open in air. Sometimes, certain species like *Dendrobium wardianum* *etc.* grows on steep rock, in such cases instruments were used for uprooting these with utmost care so as to avoid damage to any part of the plant. The collection of the species was done during flowering season. The flowers were preserved in preservative solution (65% alcohol, 25% distilled water, 5% glycerol, and 5% formalin) for taxonomical studies.

Results and Discussion

The genus *Dendrobium* was established by Olof Swartz in 1799. This large genus is divided into sections as below. The report after examination of *Dendrobium* species of Arunachal Pradesh is as follows:

Section: Callista

1. *Dendrobium jenkinsii* Wall. ex Lindl.

West Kameng district: Rowta, Tipp, Hegde (1889, 3668, OHT); Tipi, Apang 360661 (OHT).

2. *Dendrobium lindleyi* Steud.

West Kameng district: Rowta, Hegde 3668 (OHT).

3. *Dendrobium sulcatum* Lindl.

West Kameng district: Tipi, Paglanallah, Rao 26459, 28710 (OHT); Sessa, Bhalukpong, Namorah, Hegde 2024, 3691, 34256 (OHT); Tipi, Apang 37577 (OHT).

4. *Dendrobium densiflorum* Lindl.

West Kameng district: Sessa, Tippi, Saleri road, Namorah, Hegde 2153-S, 2965, 3731, 3967 (OHT); Howcamp, Muna, Rao 21460, 8797 (OHT); Tippi, Apang 37575 (OHT). Upper Siang district: Jengging, Rao 30906 (OHT).

5. *Dendrobium chrysotoxum* Lindl.

West Kameng district: Sessa, Hegde 1726 (OHT); Tippi, Apang 37584 (OHT); Tirap district: Tissa, Hegde 13515 (OHT); Khonsa, Rao 30632 (OHT).

6. *Dendrobium farmeri* Paxton

West Kameng district: Saleri, Tippi, Saleri road, Koilajuli, Bhalukpong, Hegde 963, 967, 3731, 11511, 19187 (OHT); Tippi, Apang 37580 (OHT).

7. *Dendrobium palpebrae* Lindl.

West Kameng district: Rahung-Mondala, Rao & Deori 2810 (nil.).

Section- *Dendrobium* (Eugenanthe)*Sub-Section-I*8. *Dendrobium moschatum* (Banks) Sw.

West Kameng district: Tippi, Hegde 6085 (OHT); Dezling, Apang 35340 (OHT); Upper Siang district: Jengging, Rao 30899 (OHT); Papum Pare district: Itanagar, Rao 22831(OHT).

9. *Dendrobium pulchellum* Roxb. ex Lindl.

West Kameng district: Bomdila (NEFA), Srinivasan (nil.)

10. *Dendrobium gibsonii* Paxton

West Kameng district: Rahung, Hegde 724 (OHT); Sessa, Hegde 3101 (OHT); Durga Mandhir, Apang 34230 (OHT).

11. *Dendrobium fimbriatum* Hook.

West Kameng district: Tippi, Sessa, Nafra, Rahung, Saleri road, Rowta, Dirang, Hegde 876-1, 2910-S, 2988, 3654, 3732, 3755, 15834 (OHT); Tippi, Apang 37586 (OHT); Tirap district: Nisa, Rao 30640 (OHT); Upper Siang district: Jengging, Apang 30908 (OHT).

*Sub-Section- II*12. *Dendrobium moniliforme* (L.) Sw.

West Kameng district: Chakoo camp, Rao 26039 (OHT).

13. *Dendrobium nobile* Lindl.

West Kameng district: Sessa, Dezling, Rama camp, Koilajuli, Hegde 1371, 1722, 8070, 12472 (OHT); Dirang,

Hawaii, Tippi, Rao 9270, 21408, 30975 (OHT); Upper Siang district: Kumku, Hegde 30903 (OHT); Gosang, Rao 30898 (OHT).

14. *Dendrobium transparens* Wall. ex Lindl.

Changlang district: Madhaban, Rao 28046 (OHT); West Kameng district: Tippi, Apang 37582 (OHT).

15. *Dendrobium lituiflorum* Lindl.

West Kameng district: Dezling, Tippi, Namorah, Rowta, Hegde 1732, 1735, 2670, 3658 (OHT); Tippi, Apang 37585 (OHT); Tirap district: Deomali, Hegde 3408 (OHT). Lohit district: Wakro, Rao 28194 (OHT).

16. *Dendrobium falconeri* Hook.

West Kameng district: Sessa, Rahung, Muna, Dirang, North Dirang, New Dirang, Tippi, Hegde 2109, 5590, 8798, 15823, 15824, 15825, 30905 (OHT); Khellong-Sisni, Tippi road, Rao 30547, 30904 (OHT); North Dirang, Apang 15827 (OHT); Upper Siang district: Jengging, Rao 30907 (OHT).

17. *Dendrobium devonianum* Paxton

West Kameng district: Khellong, Pagla nallah, Khellong-Sisni, Rao 21519, 28580, 30531 (OHT); Lohit district: Kamlang, Rao 28213 (OHT).

18. *Dendrobium wardianum* R.Warner

West Kameng district: Sessa, Hegde 3067 (OHT); Sessa, Apang 361008 (OHT).

19. *Dendrobium pendulum* Roxb.

West Kameng district: Sessa, Hegde 696 (nil.).

20. *Dendrobium crepidatum* Lindl. & Paxton

Lohit district: Glow village, J. Joseph 48577 (ASSAM), 48577 (CAL).

21. *Dendrobium primulinum* Lindl.

West Kameng district: Dibru, Hegde 7681 (OHT); Tirap district: Khonsa, Hegde 3495 (OHT).

22. *Dendrobium aphyllum* (Roxb.) C.E.C.Fisch.

Upper Siang district: Kumku, Apang 30902 (OHT); West Kameng district: Rowta, Tippi, Dibru, Hegde 3660, 7534, 7683 (OHT); Tippi, Dezling, Apang 7174, 35234 (OHT).

23. *Dendrobium macrostachyum* Lindl.

West Kameng district: Dirang, Hegde 20038 (OHT).

24. *Dendrobium chrysanthum* Wall. ex Lindl.

West Kameng district: Sessa, Hegde 9767 (OHT); Sessa, Apang 37579 (OHT); Upper Siang district: Dona

hills (Jengging), Hegde 26031 (OHT); East Kameng district: Khupi, Hegde 4680 (OHT).

25. *Dendrobium hookerianum* Lindl.

West Kameng district: Sessa, 'O'point, Eaglenest, Nechipu, Hegde 1263, 3061, 3146, 3157 (OHT); Supbasti, 'O'Point, Rao 29381, 30901 (OHT); East Kameng district: Khupi, Hegde 4683 (OHT).

26. *Dendrobium khasianum* Deori

West Kameng district: Tipi.

27. *Dendrobium x vexabile* Rchb.f.

Upper Siang district: Tuting, Apang 34710 (OHT); Tuting, Haridasan 33298-B (OHT).

28. *Dendrobium polyanthum* Wall. ex Lindl.

West Kameng district: Rahung-Bomdila, Rao and Deori (Nil.); Siang district (NEFA): Siang district, Rao & Joseph 17834 (ASSAM/CAL); Subansiri district: Subansiri district, Panigrahi and Naik 19528 (ASSAM/CAL).

29. *Dendrobium heterocarpum* Wall. ex Lindl.

West Kameng district: Sessa, Hegde 1090, ASSAM Herbarium, CAL.

Section- Breviflores

30. *Dendrobium bicameratum* Lindl.

West Kameng district: Tippi, Khellong, Sessa, Hegde 2505, 3176, 30896 (OHT); Sessa, Apang 37760 (OHT).

31. *Dendrobium aduncum* Lindl.

East Kameng district: Seijosa, Rao 30182 (OHT); West Kameng district: Pagla nallah, Rao 28580 (OHT); Tippi, Apang 37576 (OHT); Dezling, Tippi, Namorah, Hegde 1750, 1750, 2778 (OHT).

32. *Dendrobium stuposum* Lindl.

Papum Pare district: Itanagar, Hegde 18765 (OHT).

33. *Dendrobium praecinetum* Rchb. f.

West Kameng district: Sessa, Foothills, Hegde 4249, 24153-13 (OHT); Foothills, Rao 24153-3 (OHT).

Section- Formosae

34. *Dendrobium longicornu* Lindl.

West Kameng district: Nechipu, Panchabati, Sessa, Hegde 3892, 3948, 6223-S (OHT); Sessa, Kimi, Sisni, Rao 9770, 29575, 30611 (OHT); Singchung, Apang 35749 (OHT).

35. *Dendrobium formosum* Roxb. ex Lindl.

West Kameng district: Sessa, Hegde 958 (OHT).

36. *Dendrobium arunachalense* C.Deori, S.K.Sarma, S.Phukan & A.A.Mao.

Dibang Valley district, Deori, Sarma, Phukan & Mao 1001163 A (CAL) and 1001164 B-E (ASSAM).

Section- Stachyobium

37. *Dendrobium eriaeflorum* Griff.

West Kameng district: Kimi, Sessa, Rao 29573, 30909 (OHT); Sessa, Apang 37761 (OHT); Upper Siang district: Tuting, Apang 34712 (OHT).

38. *Dendrobium denudans* D.Don

East Kameng district: Chayang Tajo, Hegde 7293 (OHT).

39. *Dendrobium monticola* P.F.Hunt & Summerh.

West Kameng district: Nechipu-Jamiri, Haridasan 26496 (OHT).

40. *Dendrobium numaldeorii* C.Deori, Hynn. & Phukan

Lower Dibang Valley district: Mehao wildlife sanctuary, Deori, Hynniewta & Phukan (nil.).

41. *Dendrobium nareshbaduri* Naithani

West Kameng district: Jamiri, Apang and Rao 37716 (OHT).

42. *Dendrobium sessanicum* Apang

West Kameng district: Sessa, Apang 37577 (OHT).

Section- Pedilonum

43. *Dendrobium cumulatum* Lindl.

West Kameng district: Tippi, Hegde 624 (OHT); Tippi, Apang 37583 (OHT).

Section- Angustifolia

44. *Dendrobium salaccense* (Blume) Lindl.

Lower Dibang Valley district: Simari, Mehao wild life sanctuary, Apang and Rao 40593, 360712 (OHT); East Kameng district: Seijusa, Hegde 940 (OHT); Lohit district: Tezu, Rao 1446 (OHT); West Kameng district: Tippi, Hegde 1377 (OHT).

Section- Aporum

45. *Dendrobium acinaciforme* Roxb.

Tirap district: Deomali, Hegde 13557 (OHT); Deomali, Namsang, Rao 13564, 30658 (OHT); West Kameng

district: Tippi, Rao 26136 (OHT); Tippi, Hegde 1011 (OHT); Tippi, Apang 37578 (OHT).

46. ***Dendrobium terminale*** C.S.P.Parish & Rchb.f.

West Kameng district: Tippi, Namorah, Koilajuli, Hegde 1082, 4154, 12523 (OHT); Tippi, Rao 28897 (OHT).

47. ***Dendrobium anceps*** Sw.

West Kameng district: Namorah, Koilajuli, Tippi, Hegde 4154, 13005, 2719-1 (OHT).

48. ***Dendrobium mannii*** Ridl.

West Kameng district: Tippi, Rao 25310-4 (OHT); Tippi, Hegde 2084 (OHT); Tippi, Apang 360664 (OHT).

Section- Strongyle

49. ***Dendrobium kentrophyllum*** Hook.f.

Changlang district: Motijheel, Rao 28286 (OHT); Tirap district: Deomali, Rao 13587 (OHT); Deomali, Hegde 13577 (OHT).

50. ***Dendrobium parciflorum*** Rchb.f. ex Lindl.

Changlang district: Namdhapa, Rao 28286 (OHT).

Localities Studied

1. *Sessa Orchid Sanctuary*

Dendrobium aduncum Lindl., *D. bicameratum* Lindl., *D. gibsoni* Paxton, *D. lindleyi* Steud, *D. primulinum* Lindl., *D. sulcatum* Lindl., *D. wardianum* R. Warner, *D. heterocarpum* Wall. ex Lindl., *D. sessanicum* O. Apang nov., *D. densiflorum* Lindl., *D. farmeri* Paxton, *D. stuposum* Lindl., *D. hookerianum* Lindl.

2. *Bomdila Road*

Dendrobium chrysotoxum Lindl., *D. moniliforme* (L.) Sw., *D. cumulatum* Lindl., *D. devonianum* Paxton, *D. denudans* D.Don, *D. eriaeflorum* Griff., *Dendrobium falconeri* Hook.f.

3. *Ramda*

Dendrobium gibsoni Paxton

4. *Foothills of Khellong*

Dendrobium jenkinsii Wall. ex Lindl.

5. *Tuting*

Dendrobium macrostachyum Lindl., *D. numaldeorii* C. Deori, Hynn. & Phukan, *D. nareshbadurii* Naithani, *D. x vexabile* Rchb.f.

6. *Mehao wild life Sanctuary*

Dendrobium salaccense (Blume) Lindl., *D. praecinetum* Rchb.f.

The species of *Dendrobium* Sw. have been revised to 50 from 37 (Hegde, 1984). There are three species which are new addition to the orchid flora in the state. *Dendrobium eriaeflorum* Griff. is closely allied to *D. denudans* D.Don but differ by racemes which are shorter and fewer flowered, the sepals and petals shorter and broader, and the lip robust in comparison. The dwarf state of *Dendrobium eriaeflorum* Griff. resembles to *Dendrobium alpestre* Royle. Both have the same colour. *Dendrobium draconis* Reichb.f. was similar to *Dendrobium longicornu*, but stems were much stouter, clavate after leafing; leaves much broader and midlobe of lip was larger. *Dendrobium kentrophyllum* Hook.f. was nearly similar to *Dendrobium parciflorum* Reichb.f. ex Lindl., but was distinguished by stout stems, leaves as recurved or straight stout acute, flowers solitary terminal, dorsal sepal ovate-oblong, lateral obtuse, petals oblanceolate, mentum more than twice as long as the dorsal sepal stout incurved narrowed to the obtuse base; lip spatulate with a long claw. *Dendrobium primulinum* Lindl. is nearing to *Dendrobium aphyllum* C.E.C.Fisch., but stems shorter and stouter, sepals and petals narrower and subequal. *Dendrobium gibsonii* Paxton is similar to *Dendrobium fimbriatum* Hook., but stems shorter and more slender, flowers smaller, petals not erose; lip with broader margins rather villous than fimbriate. *Dendrobium palpebrae* Lindl. was nearly similar to *Dendrobium densiflorum* Lindl., but bracts not distinguishable. *Dendrobium jenkinsii* Wall. ex Lindl. mentioned as a variety of *Dendrobium lindleyi* Steud. *Dendrobium lindleyi* Steud. has distribution extending from Manipur eastwards to Burma and south China, while *Dendrobium jenkinsii* Steud. is found only in the Sikkim Himalayas at 250-1000 m. *Dendrobium pauciflorum* King & Pantl. is a rare species and endemic to the tropical and subtropical valley of the Teesta at 600-1200 m.

Conclusion

Dendrobium Sw. (Orchidaceae) is known for its diversity in the state. With the revision of the genus *Dendrobium* in Arunachal Pradesh, all the species available have been recorded. There are 50 species, out of which 48 have been recorded in herbarium and 2 species were recorded from the available literature. In the present study, it was found that there is a tremendous variation within the *Dendrobium* genus. The studies have been conducted through the survey of all the districts, collections, consultation of literature and herbaria. *Dendrobium sessanicum* O. Apang nov. species has been discovered as a new species from Sessa orchid sanctuary. The present studies at herbaria provided the comparative description of the *Dendrobium* species in

the state. There is an urgent need to conserve these floriculturally and medicinally important *Dendrobium* species. Though attempts have been made to create nine wildlife sanctuaries, two biosphere reserves, and national parks and one orchid sanctuary (Sessa orchid sanctuary) in the country, there is a need to mass propagate these species using *in vitro* techniques. Propagation of orchids using tissue culture technique of commercially important and rare, endangered, and threatened (RET) orchids has been reported earlier by some workers (Anuprabha *et al.*, 2017; Arora *et al.*, 2014,2016; Bhowmik and Rahman, 2023; Dhillon and Pathak, 2023; Dhiman *et al.*, 2007; Gangaprasad *et al.*, 2024; Hossain *et al.*, 2009, 2012; Piri *et al.*, 2013; Jaryal *et al.*, 2025ab; Kaur *et al.*, 2006,2017; Kirti *et al.*, 2023; Kumari and Pathak, 2021; Mutum, *et al.*, 2022; Pathak *et al.*, 2017, 2022, 2023; Sembi *et al.*, 2011; Sunita *et al.*, 2021; Thakur and Pathak, 2020, 2021; Tripura *et al.*, 2022; Vasundhra *et al.*, 2019, 2021; Verma *et al.*, 2013).

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