

Orchid Diversity in Narsinghpur District, Madhya Pradesh, India: A Comprehensive Study

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Abstract: *Orchids, a charismatic group of flowering plants, exhibit remarkable diversity and ecological importance worldwide. Despite their significance, comprehensive studies on orchid diversity in specific regions are often lacking. This research paper aims to fill this gap by thoroughly studying orchid diversity in Narsinghpur District, Madhya Pradesh, India. Field surveys were conducted across various habitats within the district to document orchid species richness, distribution patterns, and ecological preferences. Socio-economic aspects related to orchid conservation and potential threats were also investigated. A total of 15 orchid species belonging to 10 genera were recorded during the study period. The findings provide valuable insights into the orchid flora of Narsinghpur District, highlighting its conservation significance and the need for targeted conservation efforts.*

Keywords: Orchids, Diversity, Narsinghpur District, Madhya Pradesh, India, Conservation

1. Introduction

Orchids are one of the most diverse and fascinating plant families, comprising over 25,000 species distributed across the globe. Known for their intricate flowers and ecological adaptations, orchids occupy diverse habitats ranging from tropical rainforests to arid deserts. In India, orchids are found in various states, contributing significantly to the country's floral diversity. However, detailed studies focusing on orchid diversity at the district level are limited, hindering our understanding of their distribution patterns and conservation status in specific regions.

Narsinghpur District, located in the central region and lies between 23°28'23.9664"N and 77°56'52.7928"E. Geographically (Fig - 1), it extends 3,08,252 km² and constitutes 9.38% area of the country, encompasses a range of habitats including forests, grasslands, and wetlands, making it a potentially rich area for orchid diversity. Despite its ecological significance, little is known about the orchid flora of this district. Therefore, this study aims to comprehensively document the orchid diversity in Narsinghpur District, providing baseline data for conservation planning and management.



Figure 1: Narsinghpur district map

2. Material & Methods

Field surveys were conducted in various seasons across different habitats within Narsinghpur District, including forests, grasslands, and riparian zones. Systematic sampling methods such as transect walks and random quadrat surveys were employed to document orchid species richness and

distribution patterns. Specimens encountered during the surveys were collected, identified, and voucher specimens were deposited in local herbaria for future reference.

In addition to floristic surveys, socio-economic aspects related to orchid conservation were investigated through interviews and questionnaires with local communities, forest officials, and other stakeholders. Information on traditional

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uses of orchids, conservation practices, and perceived threats to orchid populations were gathered to assess the socio-economic context of orchid conservation in the region.

3. Observation

In the year 2021 - 22, we did a botanical tour of Narsinghpur district, where we got to see the diversity of Orchids in

different areas of Narsinghpur. During this tour, we interacted with urban, rural and tribal people living in Narsinghpur District. The genus, species name and habitat of Orchids obtained are given in Table 1. The floral and vegetative characteristics of the orchids found are given in Table 2, and the flowering time and distribution are given in Table 3.

Table 1: List of orchid species with preferred Host plant species and habitat.

No.	Genus	Orchid Species	Habitat
1.	<i>Aerides</i>	<i>Aerides maculosum</i> Lindl.	Epiphyte
2.	<i>Bulbophyllum</i>	<i>Bulbophyllum triste</i> Rchb. f.	Epiphyte
3.	<i>Rhynchostylis</i>	<i>Rhynchostylis retusa</i> (L.) Blume	Epiphyte
4.	<i>Vanda</i>	<i>Vanda tessellata</i> (Roxb.) Hook.	Epiphyte
		<i>Vanda testacea</i> (Lindl.) Rchb. f.	Epiphyte
5.	<i>Acanthophippium</i>	<i>Acanthophippium bicolor</i> Lindl.	Terrestrial
6.	<i>Eulophia</i>	<i>Eulophia nuda</i> Lindl.	Terrestrial
		<i>Eulophia flava</i> (Lindl.) Hook. f.	Terrestrial
7.	<i>Geodorum</i>	<i>Geodorum densiflorum</i> (Lam.) Schltr	Terrestrial
8.	<i>Habenaria</i>	<i>Habenaria digitata</i> Lindl.	Terrestrial
		<i>Habenaria furcifera</i> Lindl.	Terrestrial
		<i>Habenaria grandifloriformis</i> Blatt. & Mc C.	Terrestrial
		<i>Habenaria roxburghii</i> Nicols.	Terrestrial
9.	<i>Malaxis</i>	<i>Malaxis muscifera</i> (Lindl.) Kuntze	Terrestrial
10.	<i>Peristylus</i>	<i>Peristylus constrictus</i> (Lindl.) Lindl.	Terrestrial

Table 2: Floral and Vegetative characteristics in orchids

S. N.	Orchid Species	Vegetative character	Floral Character
1.	<i>Aerides maculosum</i> Lindl.	Epiphytes, herbs, roots thick, many succulents on the host; Leaves alternate, linear - oblong, 5.5 - 20 x 0.5 - 3 cm; entire, apex unequally 2 - lobed.	Racemes were axillary. Sepals obovate - elliptic. Capsules obovoid, seeds many, brownish
2.	<i>Bulbophyllum triste</i> Rchb. f.	Epiphyte, pseudo - bulb, leaves 2, sub - membranous, flaccid, narrowly oblong, acute apex, sub - sessile base, 5 - 8 cm long and 1.5 - 2cm broad.	Densely flowered raceme. Sepals purple with greenish margins. Dorsal sepal oblong, ovate blunt, concave. The lateral pair is slightly longer, cohering at the tips and with margins incurved. Petals purple, triangular, mid nerved, and much shorter than the sepals. Lip brownish red with a very narrow yellowish margin, stipitate, oblong - lanceolate. The flowers have an unpleasant odor.
3.	<i>Rhynchostylis retusa</i> (L.) Blume	Epiphytes; root long, thick. Leaves alternate, simple, linear, strap - shaped, 8 - 25 x 1.6 - 3 cm, recurved, unequally 2 - lobed at apex, sheathing at base.	Flowers in axillary, dense, drooping, racemes. Capsules obovate, ellipsoid. Seeds many, brownish.
4.	<i>Vanda tessellata</i> (Roxb.) Hook.	Epiphytes, glabrous, 20 - 45 cm high. Leaves linear - lanceolate, 15 - 20 x 1.5 - 2 cm, entire.	Racemes axillary, 10 - 15 cm long. Capsules elliptic - oblong, ribbed. Seeds minute, numerous, brown.
5.	<i>Vanda testacea</i> (Lindl.) Rchb. f.	Epiphytes, glabrous herbs; roots large, pendulous, thick, vermiform. Lamina linear or linear - oblong, 10 - 15 x 1 - 2 cm, entire, 3 - toothed at apex.	Racemes axillary, 3 - 15 cm long. Capsules fusiform, elliptic - oblong, ribbed
6.	<i>Acanthophippium bicolor</i> Lindl.	Large herbs, pseudo - bulbs fusiform, 9cm long, stout, fleshy, persistent sheaths, Leaves 2 - 3, broadly elliptical ovate, unequal in size, 20 - 35*7 - 9.5 cm, acute, narrowed to sheathing petiole.	Flower in short, 3 - flower raceme, fleshy, racemes arising from the axil of top of the new bulb, bract foliaceous, cymbiform, sepals fusiform, pitcher like calyx - tube, petals yellowish white with pink dots, erect, fleshy. Labellum 3 - lobed, Capsule green, ellipsoid, 8 - 10cm long, ridged, long stipitate
7.	<i>Eulophia nuda</i> Lindl.	Pseudobulbs, ovate - conical. Leaves alternate, sheathing at base, linear - lanceolate, 20 - 35 x 0.5 - 2 cm.	Inflorescence up to 50 cm long, many - flowered. Flowers greenish white, tinged with maroon. Capsules ellipsoidoblong, drooping.
8.	<i>Eulophia flava</i> (Lindl.) Hook. f.	Terrestrial, tuberous, glabrous herbs, growing to 50 cm tall; tubers underground, stout, about 3 cm long, about 1 cm across, tuber - like. Leaves 2 - 3, oblong - lanceolate, 20 - 30 x 4 - 6 cm, base sheathing, apex acute, margin entire, hairless, with 4 - 12 parallel nerves which are arising from the base.	Flowers bisexual, 4 - 6 cm long, bright yellow, arranged in 25 - 50 cm long racemes, distinctly stalked. Each flower is subtended by a single, persistent, prominent scaly projection called 'bract'. The lip of the flower is more or less tongue - shaped, 3 - lobed at apex. Capsules ellipsoid, ribbed, smooth, with numerous powdery brown seeds.
9.	<i>Geodorum densiflorum</i> (Lam.) Schltr	Pseudobulbs present, tubers, ovoid - conical, greenish - brown, bands transverse, circular. Leaves alternate, sessile, sheathing at base, oblong - lanceolate 15 - 20 x 3 - 5 cm, acuminate.	Flowers yellowish - white, 10 - 12 - flowered decurved racemes. Capsules pendulous, fusiform seeds minute, rounded, brownish.
10.	<i>Habenaria digitata</i>	Herbs, 30 - 50 cm tall; tubers 1 - 2; ovate	lateral sepals ovate acute, falcate, dorsal sepal elliptic. Petals

	Lindl	underground, stem terete slender closely sheathed. Leaves alternate, entire, acute, glabrous,	2 - partite, upper lobes linear, falcate labellum 3 - lobed, green, spur green, colum oblong. Capsules ribbed, brownish; seeds many, minute, brownish, glabrous.
11.	<i>Habenaria furcifera</i> Lindl.	Herbs, 35 - 60 cm tall; tubers ovate - ellipsoid. Leaves clustered on the ground, simple, oblanceolate - obovate, 13 - 17 x 3 - 5 cm, entire, sheathing at base, acute, glabrous.	Flowers in terminal lax racemes. Capsules fusiform, turgid, decurved with strong ribs. Seeds many, brownish, glabrous.
12.	<i>Habenaria grandifloriformis</i> Blatt. & Mc C.	Herbs, 10 - 15 cm tall; tubers 1 - 2, globose. Leaves 1 - 2, ovate to ellipsoid	Flowers white. Capsules are strongly ribbed.
13.	<i>Habenaria roxburghii</i> Nicols.	Herbs; roots tuberous. Leaves fleshy, broadly ovate to sub - orbicular, apex acute	acute. Flowers white. Capsules are strongly ribbed, and beaked.
14.	<i>Malaxis muscifera</i> (Lindl.) Kuntze	Terrestrial and glabrous orchid less than 30 cm tall with small ovoid bulbs, underground stem and fibrous root. Roots are fibrous; bulbs ovoid; stem is 15 - 30 cm long, erect and swollen at base. Leaves are two elliptic - lanceolate or ovate, obtuse, unequal, arising from the base of the stem and sessile.	Flowers pale yellowish - green, terminal racemes 8 - 20 cm long spikes borne in autumn season in second year and onward, 2 - 3 mm long bracts, lanceolate with acute apex. Sepals broadly lanceolate and laterals recurved; petals linear but shorter than sepals; lips adnate to the base of column, sessile, ovate - rounded, abruptly pointed; basal lobes thick, Column is very short, anthers sessile on its top; pollinia ovoid and free. Fruit is a capsule, 6 - 8 mm long, broadly ovoid - oblong, ribbed and of light yellow colour.
15.	<i>Peristylus constrictus</i> (Lindl.) Lindl.	Terrestrial with a cylindrical, pubescent tuber giving rise to an erect, stem that is bracteate above and carrying on the lower half ovate - elliptic to ovate - lanceolate, acute, shortly petiolate and channeled, reticulate leaves that blooms in the late spring and early summer on a terminal, cylindrical, glabrous, 3.6 to 14" [9 to 35 cm] long.	Subdensely many flowered inflorescence with erect, lanceolate, acuminate floral bracts and carrying sweetly scented flowers.

Table 2: Floral season and Distribution of orchids

S.N.	Orchid Species	Flowering Season	Distribution
1.	<i>Aerides maculosum</i> Lindl.	June - July	Narmada Valley, Gotitoria forest region, and Narsinghpur district Nursery
2.	<i>Bulbophyllum triste</i> Rchb. f.	October - April	Gotitoria forest region
3.	<i>Rhynchostylis retusa</i> (L.) Blume	March - July	Narmda Valley, Gotitoria forest region
4.	<i>Vanda tessellata</i> (Roxb.) Hook.	May - July	Throughout the District
5.	<i>Vanda testacea</i> (Lindl.) Rchb. f.	May - July	Kareli, Gotegaon and Gotitoria forest region
6.	<i>Acanthophippium bicolor</i> Lindl.	March - April	Forest area of the district
7.	<i>Eulophia nuda</i> Lindl.	February - April	Narmada Valley, a forest area of the district
8.	<i>Eulophia flava</i> (Lindl.) Hook. f.	February - April	Forest area of the district
9.	<i>Geodorum densiflorum</i> (Lam.) Schltr	May - May	Forest area of the district
10.	<i>Habenaria digitata</i> Lindl	September - December	Barha forest region, Kareli
11.	<i>Habenaria furcifera</i> Lindl.	July - August	Gotitoria forest region
12.	<i>Habenaria grandifloriformis</i> Blatt. & Mc C.	June - July	Gotitoria forest region
13.	<i>Habenaria roxburghii</i> Nicols.	July - August	Gotitoria forest region
14.	<i>Malaxis muscifera</i> (Lindl.) Kuntze	July - August	Forest area of district, Gotegaon
15.	<i>Peristylus constrictus</i> (Lindl.) Lindl.	March - May	Forest area of district



Peristylus constrictus (Lindl.) Lindl



Habenaria grandifloriformis Blatt. & Mc C.



Malaxis muscifera (Lindl.) Kuntze



Vanda tessellata (Roxb.) Hook.

Figure 2: Some Orchid plants

4. Results

A total of 15 orchid species belonging to 10 genera were recorded during the study period. The orchid flora of Narsinghpur District exhibited a diverse array of species, including terrestrial, epiphytic, and lithophytic orchids. Prominent genera observed during the surveys included *Aerides maculosum* Lindl., *Bulbophyllum triste* Rchb. f., *Rhynchostylis retusa* (L.) Blume, *Vanda tessellata* (Roxb.) Hook., *Vanda testacea* (Lindl.) Rchb. f., *Acanthophippium bicolor* Lindl., *Eulophia nuda* Lindl., *Eulophia flava* (Lindl.) Hook. f., *Geodorum densiflorum* (Lam.) Schltr., *Habenaria digitata* Lindl., *Habenaria furcifera* Lindl., *Habenaria grandifloriformis* Blatt. & Mc C., *Habenaria roxburghii* Nicols., *Malaxis muscifera* (Lindl.) Kuntze and *Peristylus constrictus* (Lindl.) Lindl. . Species richness varied across different habitat types, with dense forests harboring the highest diversity of orchids.

Socio - economic surveys revealed that orchids hold cultural significance among local communities, with certain species being used in traditional rituals and medicinal practices. However, indiscriminate harvesting, habitat degradation, and land - use changes emerged as major threats to orchid populations in the region.

5. Discussion

The findings of this study contribute significantly to our understanding of orchid diversity in Narsinghpur District, Madhya Pradesh. The recorded species richness and distribution patterns provide valuable baseline data for conservation planning and management efforts. Conservation strategies should focus on mitigating threats such as habitat loss, overexploitation, and climate change, while also incorporating the traditional knowledge and practices of local communities into conservation initiatives. During recent field studies, the species of orchids found in the Narsinghpur District as many as 15 species were included in 10 genera. A total of 10 species of orchids were terrestrial orchids and 5 species of epiphytic orchids (Table - 1). 10 species of 8 genera were found under the subfamily Epidendroideae and 5 species of 2 genera were found under the subfamily Orchidoideae (Table - 2). *Vanda* sp. was the highest abundance and *Habenaria furcifera* Lindl. was the lowest abundance orchid. In tribal areas some tribal's use *Vanda tessellata* (Roxb.) Rchb. f. leaves for fever and rheumatism. Rahamtulla *et al* (2020) Distribution and ethnomedicinal importance of orchids of Darjeeling Himalaya, India. He observed and documented the uses of 12 orchid species by local communities. The conservation of wild orchid habitat in Darjeeling Himalaya is strongly recommended. De (2020) observes Morphological diversity in orchids. Morphological diversity of 8 orchid genera and requirement for conservation and utilization of endangered orchids. Rajput *et al* (2020) observes Orchid diversity of Mesaki reserve forest, Assam, India. Diversity and distribution of orchids with their host plants in Mesaki Reserve Forest, Tinsukia District of Assam of North East India. A total of 44 species with 24 genera have been recorded from this reserve forest. Mujaffar *et al* (2013) observed Orchid species diversity of east Nimar, Madhya Pradesh, India. A total of 18 orchids species belonging to 11 genera (including cultivated species) have been recorded from the region. Deb and Jakha (2019) observed Orchid diversity in three districts [Kiphire, Tuensang and Zunheboto] of Nagaland, India. A total of 180 species from 58 genera are collected, studied, plants are being maintained in the Orchidarium in the Department of Botany, Nagaland University. Of the, 180 species, 30 are epiphytic, 15 terrestrial, 11 are of dual habitat (terrestrial/epiphytic) and 2 are saprophytes. Kumar (2022) worked on Orchid Diversity, Conservation, and Sustainability in Northeastern India. Observations made by them show that 249 species of orchids are commonly found in the North Eastern Himalayan region and some of these species also give information about climate change.

6. Conclusion

Orchids play a crucial role in the ecological and cultural landscape of Narsinghpur District, Madhya Pradesh. This study underscores the need for targeted conservation measures to safeguard orchid diversity and associated ecosystems in the region. Collaborative efforts involving government agencies, local communities, and conservation organizations are essential for the sustainable management of orchid populations and their habitats. Further research is warranted to assess the long - term impacts of anthropogenic

activities on orchid diversity and to devise effective conservation strategies for their preservation.

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References

- [1] Akhter M, Hoque MM, Rahman M and Huda MK 2017 "Ethnobotanical investigation of some orchids used by five communities of Cox's Bazar and Chittagong hill tracts districts of Bangladesh" *Journal of Medicinal Plants Studies* 2017; 5 (3): 265 - 268.
- [2] Champion, H. G. and Seth, S. K.1968. A Revised Survey of the Forest Types of India. New Delhi. Manager of Publications,
- [3] Chowlu K, Mahar K S, and Das A K 2016. Ethno - botanical studies on orchids among the *Khamti* Community of Arunachal Pradesh, India. *Indian Journal of Natural Products and Resources* Vol.8 (1), March 2017, pp.89 - 93.
- [4] De L. C.2020, Morphological Diversity of Orchid. *International Journal of Botany Studies* ISSN: 2455 - 541X; Impact Factor: RJIF 5.12, Volume 5; Issue 5; 2020; Page No.229 - 238
- [5] Deb CR and Jakha HY 2019. Orchid diversity in three districts [Kiphire, Tuensang and Zunheboto] of Nagaland, India. *East Himalayan Society for Spermatophyte Taxonomy*. ISSN: 0973 - 9467, doi: 10.26679/Pleione.13.2.2019.203 - 215
- [6] Dressler, R. L.2006. How many orchid species? *Selbyana*.26 (1 - 2): 155 - 158.
- [7] Gowhar A. Shapoo, Zahoor A. Kaloo, Aijaz Hassan Ganie and Seema Singh 2015. Ethno - botanical survey and documentation of some orchid species of Kashmir Himalaya, J&K - India. *International Journal of Pharmaceutical and Biological Research*, ISSN: 0976 - 285X Vol 4 Issue 2 Apr - May 2013.
- [8] Jain, S. K. and Rao, R. R.1977. Handbook of field and herbarium methods. Delhi, Goyal Offsets.
- [9] Kumar, P., Pandey. A. K. Rawat. G. S. and Jalal J. S.2005. Diversity and conservation of orchids in state of Jharkand, *Plant taxonomy Advances and relevance*, New Delhi, CBS Publication.345 - 353.
- [10] Mujaffar S., Mishra S., Mustkin S.2013, The Orchid Species Diversity of East Nimar, Madhya Pradesh, India. *IJPAES* Volume - 3, issue - 4, ISSN 2231 - 4490.
- [11] Mukherjee, A. K.1984. Flora of Pachmarhi and Bori Reserve, Howrah.
- [12] Nagrare V.2006, Orchid Diversity of India, its Conservation and Sustainable Utilization, National Research Center for Orchid, Pakyong - 737 106, Sikkim.
- [13] Pant B.2013. Medicinal orchids and their uses: Tissue culture a potential alternative for conservation. *African Journal of Plant Science*, Vol.7 (10), pp.448 - 467, ISSN 1996 - 0824.
- [14] Patel, R. I.1968. Forest Flora of Melghat, Bishen Singh Mahendra Pal Singh, Dehradun.
- [15] Rahamtulla M., Rampilla V., and Khasim S. M.2020. Distribution and Ethno - medicinal Importance of Orchids of Darjeeling Himalaya, India. *Indian Forester*, 146 (8): 715 - 721, 2020.
- [16] Rajput D.2021, Orchid Diversity of Mesaki Reserve Forest Assam, India. *Eco. Env. & Cons.*26 (4): 2020; pp. (1579 - 1583) *EM International* ISSN 0971-765X
- [17] Ray. S.1993. Floristic Studies and Biological Spectrum of Dewas District (M. P.) Ph. D. Thesis (Unpublished) Devi Ahilya Vishwavidyalay Indore.
- [18] Shaikh M. .2011. Studies on the Flora of East Nimar Region, Madhya Pradesh. Thesis (Unpublished) Devi Ahilya Vishwavidyalay Indore. Vol. I - II.
- [19] Sing N P, Khanna KK, Mudgal V, Dixit RD 2001, Flora of Madhya Pradesh Volume III. Published by the director, Botanical Survey of india, p - 8, Brabourne Road, Calcutta - 700 001.
- [20] Sinha, B. K., and Shukla, B. K.2009. Synoptic Flora of Khargaon District, Madhya Pradesh-III (Hydrocharitaceae to Poaceae), *J. Econ. Taxon. Bot.*, Vol.33 (1): 120 - 147.
- [21] Singh S., Singh A. K., Kumar S., Kumar M., Pandey P. K. and Singh M. C. K.2012, Medicinal properties and uses of orchids: a concise review. *Elixir Appl. Botany* 52 (2012) 11627 - 11634.
- [22] Yonzone, Rajendra and Kamran, A.2008. Ethnobotanical uses of orchids. Abstract in an International Seminar "Multidisciplinary Approaches in Angiosperm Systematics" Kalani University, West Bengal.