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DIVERSITY, HOST SPECIFICITY AND DUS-BASED QUALITATIVE MORPHOLOGICAL CHARACTERIZATION OF ORCHIDS IN CHHATTISGARH PLAINS

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ABSTRACT

Orchids constitute one of the largest and most diverse groups of flowering plants, exhibiting remarkable variation in vegetative and floral characteristics. The present investigation was undertaken to characterize orchid species using Distinctness, Uniformity and Stability (DUS) descriptors and to assess the diversity of qualitative morphological traits; To document the growth habit, habitat preference, host specificity of orchid species occurring in the Chhattisgarh plain zone. The experiment was carried out in Randomized Block Design. A total of 20 orchid species representing 11 genera were studied under wild and cultivated conditions. Among these, 18 species were epiphytic and 2 species were terrestrial. Based on growth habit, 11 species exhibited a monopodial growth pattern, whereas 9 species were sympodial. The study recorded 7 wild species and 13 cultivated species, indicating the rich orchid diversity and increasing importance of orchid cultivation in the region. Observations were recorded on qualitative, pseudo-qualitative and quantitative floral traits, including leaf shape, leaf apex, flower colour, colour pattern, sepal and petal morphology, lip characteristics, column traits, fragrance, and lip surface texture. Field observations revealed that epiphytic orchids showed prominent host specificity, with mango (*Mangifera indica*) and mahua (*Madhuca longifolia*) serving as the predominant host trees, owing to their suitable bark texture, canopy architecture, and favorable microclimatic conditions. The terrestrial orchid species were mainly associated with sandy loam soils, which provided adequate drainage, aeration, and moisture retention essential for growth and seasonal development. The study highlights the usefulness of DUS characterization as a reliable tool for germplasm documentation, varietal identification, and conservation of orchid genetic resources. The generated morphological database provides valuable baseline information for breeding programmes, taxonomic studies, protection of plant varieties, and sustainable utilization of orchid biodiversity.

Keywords **:** Orchid diversity, DUS characterization, qualitative traits, morphological variability, germplasm characterization, wild orchids, cultivated orchids, Chhattisgarh Plains, floriculture, biodiversity conservation.

Introduction

Orchids (family Orchidaceae) constitute one of the largest and most diverse families of flowering plants, comprising more than 28,000 species distributed across diverse ecological habitats worldwide. Owing to their extraordinary diversity in floral morphology, colour, shape, fragrance, and growth habit, orchids are highly valued as ornamental crops and possess significant ecological, horticultural,

medicinal, and commercial importance. India is recognized as one of the important centres of orchid diversity, harboring a rich assemblage of orchid species distributed across various phytogeographical regions. Although the northeastern and Himalayan regions are well known for orchid diversity, several species are also found in the forests and plains of central India, including the Chhattisgarh Plains (De, 2020).

The Chhattisgarh Plains represent a unique agro-climatic zone characterized by diverse vegetation and suitable environmental conditions that support the growth of several terrestrial and epiphytic orchid species. However, systematic documentation and characterization of orchid germplasm in this region remain limited. Comprehensive characterization of orchid species is essential for their identification, conservation, genetic improvement, and sustainable utilization.

Morphological characterization based on Distinctness, Uniformity, and Stability (DUS) descriptors is a widely accepted approach for the identification and differentiation of plant genetic resources. DUS characterization provides a standardized framework for recording qualitative and quantitative traits that enable accurate assessment of variability among species and varieties. Qualitative traits are particularly useful because they are generally stable across environments and can serve as reliable diagnostic characters for species identification and classification (Malley, 2009).

In orchids, qualitative morphological traits such as leaf shape, leaf apex, flower colour, colour pattern, sepal and petal shape, lip characteristics, column traits, fragrance, and floral texture exhibit considerable variation and can effectively distinguish species. The evaluation of these traits not only facilitates germplasm characterization but also contributes to the development of databases useful for breeding programmes, variety protection, and conservation planning (Kottaimuthu, 2020).

Therefore, the present study was undertaken to characterize orchid species occurring in the Chhattisgarh Plains using DUS descriptors with special emphasis on qualitative morphological traits. The objectives were to assess morphological diversity, identify distinct diagnostic characters, and generate baseline information for the conservation, documentation, and future improvement of orchid genetic resources in the region.

Materials and Methods

The present investigation entitled “Diversity and DUS Morphological Characterization of Qualitative Traits in Wild and Cultivated Orchids of Chhattisgarh Plains” was conducted during 2024–2025 and 2025-26 at different districts of Chhattisgarh Plains, India. A total of 20 orchid species, comprising both wild and cultivated orchids representing different genera, were selected for the study. The selected orchid species were observed for vegetative and floral qualitative traits.

Collection and Documentation

Wild orchid species were documented through field surveys and collection from different districts of Chhattisgarh Plains, whereas cultivated orchid species were maintained in orchid collections and nurseries. Information including species name, genus, habitat, origin, and growth habit was recorded for each species. Identification of the wild orchids and the hosts were made mainly with the help of Botanist, plant taxonomists and also by referring to available literature, Biodiversity portal and Orchid society of India websites.

DUS Characterization

Morphological characterization was carried out following the guidelines prescribed by the Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) and the International Union for the Protection of New Varieties of Plants (UPOV) for orchids. Observations were recorded on visually assessed qualitative traits that exhibit stable expression and minimal environmental influence (PPV & FRA, 2007).

Observation Recording

Observations were recorded from five randomly selected healthy plants of each species. Floral observations were taken at full bloom stage, while vegetative observations were recorded during active growth. Character states for each trait were assigned according to standard DUS descriptor scales (Singh and Jalal, 2009).

Result and Discussion

Table : 1 List of Orchid genotype collected for study

S. No.	Genotype code	Orchid species	Genera	Frequency	Habitat	Habit of growth	Ethnobotanical uses	Parts used
1	CG-26-O1	*Vanda tessellata*	Vanda	Abundant	Epiphyte	Monopodial	Anti-inflammatory, ear infections, Antipyretic The roots are used as laxative and tonic for liver, aphrodisiac. Gautam *et al.* (2025)	Roots, Leaves, Flowers
2	CG-26-O2	*Spathoglottis plicata*	Spathoglottis	Frequent	Terrestrial	Sympodial	Anti-inflammatory, antimicrobial, and antipyretic properties.	Entire plant
3	CG-26-O3	*Dendrobium cv. Sonia yellow*	Dendrobium	Abundant	Epiphyte	Sympodial	Traditional medicine for clearing heat, nourishing body fluids, and hydrating the lungs and stomach.	Stems, pseudobulbs, and flowers
4	CG-26-O4	*Dendrobium cv. Sonia white*	Dendrobium	Abundant	Epiphyte	Sympodial	Anti-inflammatory, antioxidant, and immune-modulating properties, promote body fluids, relieve coughs, and support skin and joint health	Stems/Canes, Leaves, Pseudobulbs & Roots, Flowers
5	CG-26-O5	*Cattleya cv. white*	Cattleya	Occassional	Epiphyte	Sympodial	Treat ailments like inflammation, digestive issues (dysentery), rheumatism, skin conditions (burns, eczema), and fevers	Pseudobulbs & Tubers, leaves, flowers
6	CG-26-O6	*Oncidium cv. pink*	Oncidium	Occassional	Epiphyte	Sympodial	Medicine for their wound healing, anti-inflammatory and tissue-repairing.	Whole plant
7	CG-26-O7	*Dendrobium cv. Sonia purple*	Dendrobium	Abundant	Epiphyte	Sympodial	Pharmacological and nutritional, Cosmetic	Flowers and Aerial Parts (Leaves, Stems, and Pseudobulbs)
8	CG-26-O8	*Dendrobium cv. star pink*	Dendrobium	Abundant	Epiphyte	Sympodial	To treat skin disorders, rashes, and pimples	Flowers , leaves, stems, Pseudobulbs & Bulbs
9	CG-26-O9	*Dendrobium cv. caesar red*	Dendrobium	Abundant	Epiphyte	Monopodial	For nourishing body fluids, clearing heat, and supporting skin health	Stems, Pseudobulbs & Bulbs
10	CG-26-O10	*Rhynchostylis retusa*	Rhyncostylis	Occassional	Epiphyte	Monopodial	Rheumatic disease, wounds, asthma, nervous twitching, cramps, kidney stone, menstrual disorders	Root/Whole plant
11	CG-26-O11	*Aerides multiflora*	Aerides	Occassional	Epiphyte	Monopodial	Used as tonic. For treating cuts and wounds. Fruit is used for healing wounds.	Leaves Stem/pseudoblb, flowers/fruits/ seeds
12	CG-26-O12	*Vanda testacea*	Vanda	Frequent	Epiphyte	Monopodial	Antipyretic, The roots are used in rheumatism, acid peptic diseases, sciatica.	Leaf, roots
13	CG-26-O13	*Phalaenopsis cv. white*	Phalaenopsis	Occassional	Epiphyte	Monopodial	Antioxidant and antibacterial properties	Leaves, roots, and stems
14	CG-26-O14	*Acampe praemorsa*	Acampe	Abundant	Epiphyte	Monopodial	Rheumatism, sciatica, neuralgia, asthma, bronchitis, eye diseases, uterine diseases.	Roots, leaves
15	CG-26-O15	*Dendrobium cv. suriya gold*	Dendrobium	Occassional	Epiphyte	Monopodial	Health tonics, to nourish the stomach, manage inflammation, and soothe dryness	Whole plant
16	CG-26-O16	*Dendrobium cv. purple curly*	Dendrobium	Occassional	Epiphyte	Monopodial	To treat itchy skin, eczema, boils, and minor	Flowers, leaves,stems
17	CG-26-O17	*Dendrobium cv. royal land rare*	Dendrobium	Frequent	Epiphyte	Monopodial	Anti-inflammatory & Skin Care.	Whole plant
18	CG-26-O18	*Dendrobium cv. hybrid airy*	Dendrobium	Frequent	Epiphyte	Monopodial	Anti-inflammatory & Skin Care.	Leaves Stem/pseudoblb,

		crimson						
19	CG-26-O19	*Cymbidium aloifolium*	Cymbidium	Occassional	Epiphyte	Sympodial	As anti-emetic, in vertigo, diarrhea, weakness of eyes and treatment paralysis.	Root
20	CG-26-O20	*Nervilia simplex*	Nervilia	Rare	Terrestrial	Sympodial	Used in urinary tract diseases, asthma, vomiting, diarrhoea & mental disease.	Whole plant

Table 2 : List of Orchid genotype collected for study with location.

S.No.	Genotype code	Range/ Sanctuary	Location	Latitude	Longitude	Cultivated /Wild type
1	CG-26-O1	Achanakmar wildlife Sanctuary	Shivtarai	22.341823^0	81.935046^0	Wild
2	CG-26-O2	Raipur	Vidhayak colony	21.234188^0	81.690711^0	Cultivated
3	CG-26-O3	Raipur	Tarra-1	21.355654^0	81.762626^0	Cultivated
4	CG-26-O4	Raipur	Tarra-1	21.355653^0	81.762603^0	Cultivated
5	CG-26-O5	Raipur	Tarra-1	21.354942^0	81.762486^0	Cultivated
6	CG-26-O6	Raipur	Tarra-1	21.355053^0	81.762459^0	Cultivated
7	CG-26-O7	Raipur	Tarra-1	21.355182^0	81.762697^0	Cultivated
8	CG-26-O8	Raipur	Tarra-1	21.354934^0	81.762577^0	Cultivated
9	CG-26-O9	Raipur	Tarra-1	21.355098^0	81.762579^0	Cultivated
10	CG-26-O10	Raigarh Forest Area	Sambalpur- Odisha Road	21.879086^0	83.454696^0	Wild
11	CG-26-O11	Gomarda wildlife Sanctuary	Sarangarh-Bilaigarh	21.472647^0	83.165057^0	Wild
12	CG-26-O12	Gomarda wildlife Sanctuary	Sarangarh-Bilaigarh	21.469345^0	83.167147^0	Wild
13	CG-26-O13	Raipur		21.355138^0	81.762239^0	Cultivated
14	CG-26-O14	Raigarh Forest Area	Regada village	21.952975^0	83.40815^0	Wild
15	CG-26-O15	Raipur	Tarra-1	21.355053^0	81.762455^0	Cultivated
16	CG-26-O16	Raipur	Tarra-1	21.354807^0	81.762483^0	Cultivated
17	CG-26-O17	Raipur	Tarra-1	21.355085^0	81.762325^0	Cultivated
18	CG-26-O18	Raipur	Tarra-1	21.355104^0	81.76233^0	Cultivated
19	CG-26-O19	Achanakmar wildlife Sanctuary	Kota, Bilaspur	22.340062^0	81.935263^0	Wild
20	CG-26-O20	Raigarh Forest Area	Village -Nagoi, Kharsia	22.117735^0	83.072728^0	Wild

Twenty orchid species under present investigation were characterized based on 22 qualitative traits and pseudo-qualitative traits

Qualitative traits

S. No	Orchid species	Flower fragrance	Sepal colour	Sepal colour pattern	Petal colour	Petal colour pattern	Lip colour	Lip colour pattern	Column colour no.	Column colour pattern
1	*Vanda tessellata*	Present	Yellow-Brown	Streak /striped	Yellow-Brown	Streaked /Striped	Purple	Streaked /striped	Double	Streaked /striped
2	*Spathoglottis plicata*	Absent	Pink-purple	Uniform	Pink-purple	Uniform	Yellow with purple margins	uniform	Single	Uniform
3	*Dendrobium cv. Sonia yellow*	Present	Yellow	Uniform	Yellow	Uniform	yellow	Uniform	Double	Uniform
4	*Dendrobium cv. Sonia white*	Present	White	Uniform	White	Uniform	White	Uniform	Single	Uniform
5	*Cattleya cv. white*	Present	Pink-white	Uniform	Pink-white	uniform	Pink	Uniform	Double	Uniform
6	*Oncidium cv. pink*	present	Pink	blotched	Pink	blotched	Pink	Uniform	Double	Spotted
7	*Dendrobium cv. Sonia purple*	Absent	Purple	Uniform	Purple	uniform	purple	Uniform	Double	Uniform present present
8	*Dendrobium cv. star pink*	Present	Pink	Shaded /striped	Pink	Shaded /striped	Pink	Blotched	Single	present Shaded /striped
9	*Dendrobium cv. caesar red*	Present	Red	Uniform	Red	uniform	Red	uniform	Single	Uniform
10	*Rhynchostylis retusa*	Present	Pink-white	Uniform	Pink-white	Uniform	Pink-white	Uniform	Double	Uniform
11	*Aerides multiflora*	Present	Violet-pink-white	Uniform	Violet-pink-white	Uniform	Pink-white	uniform	Double	uniform
12	*Vanda testacea*	Present	Yellow	Uniform	Yellow	Uniform	Yellow	Uniform	Single	uniform
13	*Phalaenopsis cv. white*	Absent	White/pink/purple	Uniform	White/pink/purple	Uniform	Pinkish yellow	Uniform	Double	uniform

14	*Acampe praemorsa*	Present	Greenish-yellow	Spotted /blotched	Greenish-yellow	Spotted /blotched	White to pale yellow	blotched	Double	blotched
15	*Dendrobium cv. suriya gold*	Present	Yellow-red	Shaded /striped	Yellow-red	Shaded /striped	white	Striped /shaded	Double	Striped /shaded
16	*Dendrobium cv. purple curly*	Present	Violet-purple	Shaded /striped	Violet-purple	Shaded /striped	Yellowish white	Striped /shaded	Single	Striped /shaded
17	*Dendrobium cv. royal land rare*	present	White	uniform	White	uniform	pink to purple	Blotched	Single	uniform
18	*Dendrobium cv. hybrid airy crimson*	present	Deep maroon-crimsom red	Shaded /striped	Deep maroon-crimsom red	Shaded /striped	Yellow-pinkish	Striped /shaded	Single	Striped /shaded
19	*Cymbidium aloifolium*	Present	Pale yellow to cream yellow	Streak /striped	Pale yellow to cream yellow	Streak/striped	Pale yellow to cream yellow	Streak /striped	double	Streak /striped
20	*Nervilia simplex*	Absent	White	Uniform	Pink-white	Uniform	White	Uniform	Single	Uniform

Pseudo- qualitative traits

S. NO	Orchid species	Leaf shape	Leaf apex	Dorsal sepal shape	Dorsal sepal apex	Lateral sepal shape	Lateral sepal apex	Petal shape	Petal apex	Lip shape	Lip apex	Lip surface texture	Lip callus	Flowering season
1	*Vanda tessellata*	Strap to linear	retuse	obovate	Obtuse	obovate	Obtuse	obovate	Obtuse	Ovate	bilobed	Pubescent	Present	Summer
2	*Spathoglottis plicata*	Terete	acuminate	Ovate-obovate	acute	Ovate-obovate	Acute	Ovate-obovate	Acute	Orbicular	Obtuse	Glabrous	Present	Winter
3	*Dendrobium cv. Sonia yellow*	Lanceolate	Obtuse	Orbicular	obtuse	obovate	Obtuse	obovate	Obtuse	obovate	Obtuse	Pubescent	Present	Winter
4	*Dendrobium cv. Sonia white*	Lanceolate	obtuse	Orbicular	obtuse	obovate	Obtuse	obovate	Obtuse	obovate	Obtuse	Pubescent	Present	Winter
5	*Cattleya cv. white*	Narrow oblong	Acute	Lanceolate to elliptic	acute	Lanceolate to elliptic	acute	Lanceolate to elliptic	Acute	Oblanceolate	retuse	Pubescent	Absent	Winter
6	*Oncidium cv. pink*	Linear	Obtuse	obovate	obtuse	Obovate	obtuse	Obovate	obtuse	Obovate	bilobed	Glabrous	Present	Winter /spring
7	*Dendrobium cv. Sonia purple*	lanceolate	Obtuse	Orbicular	Obtuse	Obovate	Obtuse	Obovate	obtuse	Obovate	obtuse	Pubescent	Present	Year round
8	*Dendrobium cv. star pink*	lanceolate	Obtuse	Orbicular	Obtuse	obovate	Obtuse	Obovate	Obtuse	Obovate	obtuse	Glabrous	Present	winter
9	*Dendrobium cv. caesar red*	lanceolate	Bilobed	obovate	Obtuse	obovate	Obtuse	Obovate	Obtuse	Obovate	obtuse	Pubescent	Present	Winter
10	*Rhynchostylis retusa*	Semi-terete	Bilobed	Obovate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Ovate	bilobed	Pubescent	Present	Summer /rainy
11	*Aerides multiflora*	Semi-terete	Bilobed	Obovate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Ovate	Bilobed	Glabrous	Present	Summer /rainy
12	*Vanda testacea*	Strap	Retuse	Obovate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Ovate	bilobed	Glabrous	Present	Summer
13	*Phalaenopsis cv. white*	Oblong to elliptic	Obtuse	Oblong	Obtuse	ovate	Obtuse	Obovate	obtuse	Oblanceolate	acute	Glabrous	prominent	winter
14	*Acampe praemorsa*	Strap	retuse	Obovate	obtuse	Obovate	Obtuse	Obovate	obtuse	ovate	bilobed	Pubescent	Present	Summer /rainy
15	*Dendrobium cv. suriya gold*	Lanceolate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Obovate	obtuse	Obovate	obtuse	Glabrous	Present	Summer /rainy
16	*Dendrobium cv. purple curly*	Lanceolate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Obovate	Obtuse	Pubescent	Present	Summer /rainy
17	*Dendrobium cv. royal land rare*	Lanceolate	Obtuse	Orbicular	Obtuse	Obovate	Obtuse	Obovate	obtuse	Obovate	obtuse	Pubescent	Present	Summer /rainy
18	*Dendrobium cv. hybrid airy crimson*	Lanceolate	Obtuse	obovate	obtuse	Obovate	Obtuse	Obovate	obtuse	Obovate	obtuse	Pubescent	Present	Rainy
19	*Cymbidium aloifolium*	Linear oblong	obtuse	oblong	obtuse	oblong	obtuse	oblong	obtuse	Obovate	obtuse	Smooth	Present	Summer
20	*Nervilia simplex*	Linear	Acute	lanceolate	Acute	Ovate	Acute	Ovate	Acute	Ovate to orbicular	acute	Glabrous	Absent	Rainy

Table 3 : Host specificity of epiphytes

S.NO.	Host species	Host species B.N	Bark type	Suitability for epiphytic orchids	Soil
1	Mango	*Mangifera indica*	Rough, longitudinally fissured	Excellent moisture retention and root anchorage	Sandy loamy soil
2	Jackfruit	*Artocarpus heterophyllus*	Rough, corky	Good support and humidity retention	Sandy loamy soil
3	Jamun	*Syzygium cumini*	Rough to flaky	Suitable for orchid root attachment	Loamy soil
4	Tamarind	*Tamarindus indica*	Deeply fissured, rough	Excellent for large epiphytic orchids	Loamy soil
5	Neem	*Azadirachta indica*	Moderately rough	Moderate suitability	Sandy loamy soil
6	Banyan	*Ficus benghalensis*	Rough, spongy	Highly suitable due to aerial roots and humidity	Sandy loamy soil
7	Peepal	*Ficus religiosa*	Rough, cracked	Good for orchid establishment	Sandy loamy soil
8	Saja	*Terminalia elliptica*	Rough, longitudinally fissured	Highly suitable due to aerial roots and humidity	Loamy soil
9	Mahua	*Madhuca longifolia*	Rough, cracked	Highly suitable due to aerial roots and humidity	Sandy loamy soil
10	Sal	*Shorea robusta*	Thick and rough	Supports natural orchid colonization	Laterite Red-yellow soil
11	Teak	*Tectona grandis*	Rough and flaky	Moderate suitability	Laterite Red-yellow soil
12	Silk cotton tree/ semal	*Bombax ceiba*	Rough with spines when young	Suitable for orchid attachment	Alluvial soil
14	Bael	*Aegle marmelos*	Rough, fissured	Highly suitable due to aerial roots and humidity	Sandy loamy soil
15	Tendu	*Diospyros melanoxylon*	Rough, longitudinally fissured	Highly suitable due to aerial roots and humidity	Sandy loamy and Laterite soil
16	Dumur	*Ficus racemosa*	Rough, longitudinally fissured	Highly suitable due to aerial roots and humidity	Clay-loamy and alluvial soil

Epiphytic Orchids Growing association on Host Trees in Chhattisgarh

Host Tree Association

Epiphytic orchids in Chhattisgarh were found growing on a wide range of host trees such as *Mangifera indica, Ficus religiosa, Terminalia elliptica*. Trees with rough bark, greater canopy cover, and higher moisture retention supported greater orchid diversity and abundance. Host trees mainly provide physical support rather than nutrients. ZHANG, Z., (2015)

Nutritional Adaptations

Epiphytic orchids obtain nutrients from decomposed organic matter, dust particles, bird droppings, and rainwater accumulated on bark surfaces. Specialized aerial roots covered with velamen tissue efficiently absorb atmospheric moisture and dissolved minerals. Mycorrhizal fungi play a crucial role in seed germination and nutrient uptake (Khunte *et al.*, 2025).

Relationship with Rainfall

The monsoon season (June–September) was identified as the most favorable period for vegetative growth and root development. High rainfall increases humidity and nutrient availability, promoting vigorous orchid growth. Prolonged dry periods reduce water availability and may induce dormancy in some species.

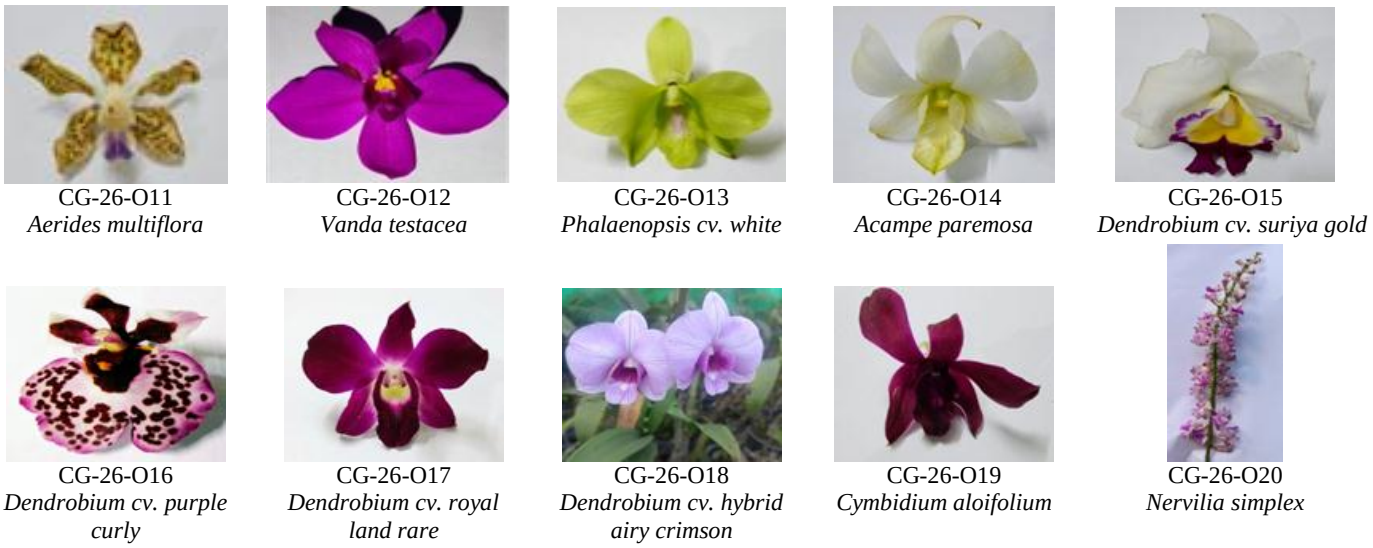
Influence of Climate

Chhattisgarh's tropical monsoon climate provides suitable conditions for epiphytic orchid survival. Optimal growth was observed under moderate temperatures (20–32°C) and relative humidity above 70%. Extreme summer temperatures and low humidity negatively affected plant vigor and flowering.

Conclusion

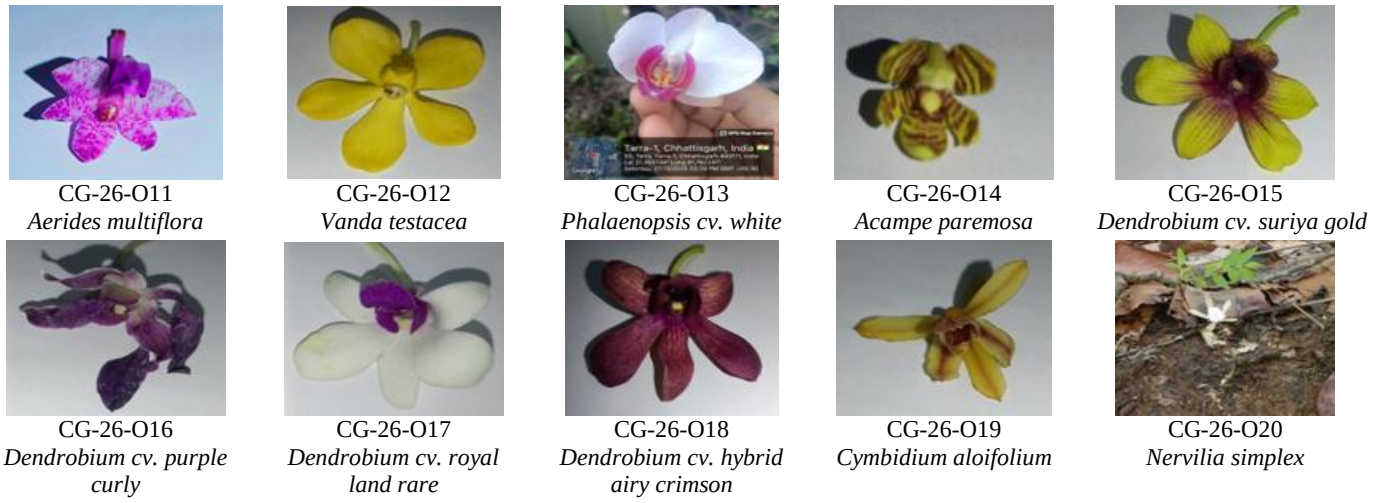
The present study revealed a considerable degree of morphological diversity among the 20 orchid species evaluated. The assessment of qualitative traits using DUS descriptors proved to be an effective and

reliable approach for the identification, characterization, and differentiation of orchid germplasm. Significant variations were observed in floral characteristics, including leaf morphology, inflorescence type, flower colour, flower shape, sepal and petal characteristics, and lip morphology. The epiphytic orchids of Chhattisgarh exhibit remarkable adaptations that enable survival without direct soil contact. Their growth, distribution, and flowering are strongly influenced by host tree characteristics, rainfall, humidity, seasonal changes, and microclimatic conditions. Conservation of host trees and natural forest habitats is therefore essential for maintaining orchid diversity in the Chhattisgarh plains and forest ecosystems. The findings emphasize the importance of systematic documentation of orchid germplasm for biodiversity conservation, breeding programmes, and sustainable utilization.



CG-26-O11 *Aerides multiflora*
CG-26-O12 *Vanda testacea*
CG-26-O13 *Phalaenopsis cv. white*
CG-26-O14 *Acampe paremosa*
CG-26-O15 *Dendrobium cv. suriya gold*
CG-26-O16 *Dendrobium cv. purple curly*
CG-26-O17 *Dendrobium cv. royal land rare*
CG-26-O18 *Dendrobium cv. hybrid airy crimson*
CG-26-O19 *Cymbidium aloifolium*
CG-26-O20 *Nervilia simplex*

Fig. 1 : Collected orchid species for study



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CG-26-O18 *Dendrobium cv. hybrid airy crimson*
CG-26-O19 *Cymbidium aloifolium*
CG-26-O20 *Nervilia simplex*

Fig. 2 : Host tree specificity of epiphyte orchid [Mango, Sal and Mahua]


GPS Map Camera
Kota, Chhattisgarh, India
8wrm+3hp, Kargi Road, Kota, Chhattisgarh
495113, India
Lat 22.340509° Long 81.935058°
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Fig. 3 : Morphological view of *Vanda tessellata*

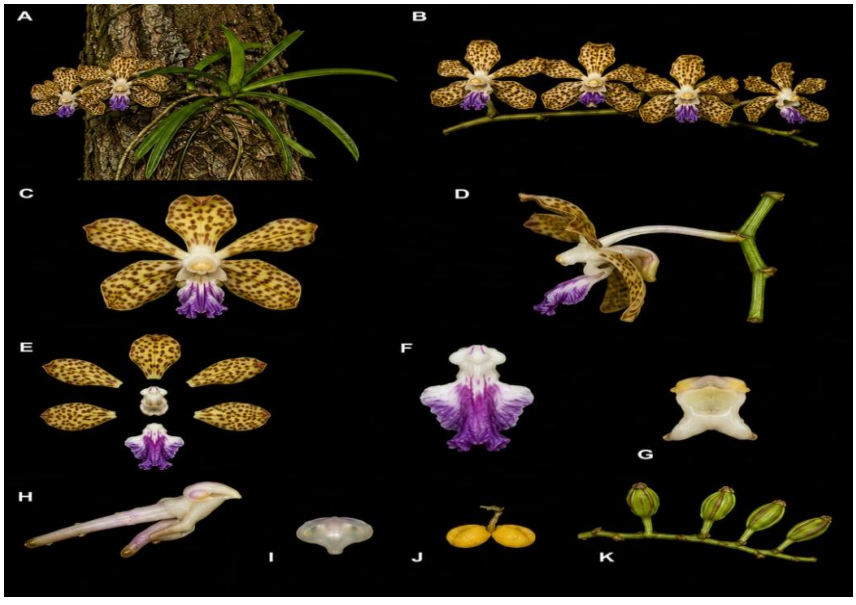

Figure 4. ***Vanda tessellata***
A. Entire plant with host
B. Inflorescence
C. Flower view [3 sepals, 2 petals]
D. Flower side view
E. Labellum
F. Lip
G. Column front view
H. Column lateral view
I. Anther cap
J. Pollinia
K. Capsule

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Competing Interests

Authors have declared that no competing interests exist.

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