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First Documentation of Terrestrial Orchids in Dalma Wildlife Sanctuary, Jharkhand, India

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Abstract

Globally, approximately 25% of the estimated 25,000 to 30,000 orchid species are terrestrial, thriving ground level in soil environments around the world. Orchids have been used in traditional medicine for various purposes, and researchers continue to explore their potential benefits. Terrestrial orchids often grow from tubers or rhizomes and have thickened roots, which maybe hairy or covered with velamen. These terrestrial orchids can be either erect or creeping, depending on their growth habit. These beautiful orchids are prized for their beauty with very rich ornamental value, also these plants impressive medicinal properties which is naturally gifted. These amazing plants are monocotyledonous angiospermic herbaceous which comes to the family of orchidaceae. In the present study of terrestrial orchids- documentation, botanical description, medicinal use are discussed. Documentation study was carried out in Dalma Wildlife Sanctuary of Jharkhand State. Eulophia explanata, Habenaria constricta, Habenaria commelinifolia, Nervilia aragoana, and Zeuxine strateumatica, were found to be present as terrestrial orchids. A total of 5 species of these terrestrial orchids were enlisted from October 2024 to October 2025 probably the first report from Jharkhand State. These orchids were grown in humus-rich and moist soil. For identification and medicinal uses of these orchids' literature review was done through various search engines.

Keywords: *Thriving, Environments, Terrestrial orchid, Velamen, Traditional medicine, Documentation, Kolhan.*

Introduction

Forests stand as one of the planet's most essential and awe-inspiring ecosystems. The phrase 'lungs of the earth' aptly describes forests, highlighting their importance in maintaining our planet's health. It absorbs carbon dioxide, produce oxygen, along with regulating the climate. The forest ecosystem supports a staggering diversity of life, with numerous species of plants animals, and microorganisms relying on it for shelter, food, and habitat. Beyond their ecological significance, forests have profound cultural, spiritual importance, and economic (*Riya et.al., 2024*). Dalma Wildlife Sanctuary (DWS), fig. 1-2 (*https://www.dalmawildlife.in*). was inaugurated by Sanjay Gandhi in the year of 1975. It is located 15 km from the steel city Jamshedpur in the state of Jharkhand, India. Situated around the Hills of Dalma, and it extends over 193 sq. km in the thick forest of the Dalma mountain range (*Verma, 2011; Mallick, 2020*). This DWS is confounded with a nearby flowing Dimna Lake and Subarnarekha River that is located down to the Dalma Hills, which provides an excellent habitat for the resident and migratory birds (*Mallick, 2020*).

Orchids are prized for their beauty along with high ornamental value, and they also boast impressive medicinal properties gifted by nature. These are monocotyledonous angiospermic herbaceous plants which are placed in orchidaceae family. It comprises about 25,000 to 30,000 species in all over the world. They may be epiphytic, litophytic, and terrestrial. Approximately globally 70% of the estimated 25,000 to 30,000 orchid species are epiphytes and/or lithophytic, 25% are terrestrial, and 5% are found in mixed substrates i.e., epiphytes, lithophytes, and terrestrial (*Arditti 1992*). Many orchids possess antibacterial, antiviral, antimalarial, and even anticancerous properties (*Panda et al., 2015*). These properties in medicinal orchids are attributed to a variety of phyto constituents like alkaloids, flavonoids, terpenes etc. (*Misra, 2004*).

Methods and Materials:

For the documentation work, combination of secondary and primary data collection methods was employed. Primary data was gathered through surveys, observations, and interviews with relevant stakeholders, while existing documents, reports, and studies related to the project were reviewed to collect secondary data.

Standardized templates were used to maintain accurate and detailed records of all data collected. The documentation process utilized various materials, including survey questionnaires, interview guides, data collection templates, recording devices, and data analysis software such as excel. For literature review existing documents, reports, and studies related to the survey project were reviewed to gather secondary data. Primary data was collected through surveys, observations, and interviews with relevant people. For documentation, accurate and detailed records of all data collected were maintained using standardized templates. Field Survey work Field Survey work, conducted from September 2024 to August 2025 while seasonal visits to the sanctuary. To carry out our field survey work, we worked together to understand the diversity of the life and for the documentation of the biodiversity of the Dalma Wildlife Sanctuary. With local tribal peoples the qualitative data was gathered. Knowledgeable people, elderly people, tribal people, were included, for the interview of the floras ethnomedicinal studies. Later, the self-identification was made with the help of flora "The Botany of Bihar and Orissa" by H. H. Haines Vol I-VI (*Haines, 1925*).

Result

Description, Culture, and Medicinal Use Of Documentated Terrestrial Orchids:

Eulophia Orchids

Description: Eulophia is a genus of terrestrial orchids with diverse species found in various habitats, including tropical forests, grasslands, and rocky areas. They often have pseudobulbs and leaves that vary in shape and size. The flowers can be showy, with colours ranging from white and green to purple and yellow.

Culture: Eulophia orchids are often found in diverse habitats and can be grown in pots with well-draining media. They require varying levels of light, water, and nutrients depending on the species. Some species are considered rare or endangered due to habitat loss and overcollection.

Medicinal Use: Some Eulophia species have been used in traditional medicine, particularly in Africa and Asia, to treat various ailments, including: Digestive issues, Fever, Skin conditions, Wounds, Inflammation. Some species of Eulophia orchids are believed to have antimicrobial, anti-inflammatory, and antioxidant properties.

"Eulophia is commonly known as "Wild Cymbidium" due to its resemblance to Cymbidium orchids."

Habenaria Orchids

Description: Habenaria is a large genus of terrestrial orchids with over 800 species. They are found in diverse habitats, including tropical forests, grasslands, and wetlands. Habenaria orchids often have tuberous roots and leaves that vary in shape and size. The flowers are typically small to medium-sized, with distinctive spurs and complex shapes.

Culture: Habenaria orchids are often found in diverse habitats and can be grown in pots with well-draining media. They require varying levels of light, water, and nutrients depending on the species. Some species are considered rare or endangered due to habitat loss and overcollection.

Medicinal Use: Some Habenaria species have been used in traditional medicine, particularly in Asia, to treat various ailments, including: Digestive issues, Inflammation, Impotence and fertility issues, Respiratory problems, Fever. Some species of Habenaria orchids are believed to have adaptogenic, anti-inflammatory, and antioxidant properties.

"Habenaria is commonly known as "Rein Orchid" or "Fringed Orchid" due to the shape and appearance of its flowers."

Nervilia Orchids

Description: Nervilia orchids are terrestrial plants with underground tubers and solitary, shield-shaped leaves. They produce small, delicate flowers that are often greenish or brownish in colour.

Culture: Nervilia orchids are often found in shaded, humid environments, and are typically grown in pots with well-draining media. They require moderate to bright indirect light and consistent moisture. In some Asian cultures, Nervilia orchids are considered rare and exotic, and are highly prized by collectors.

Cultural Significance: In some traditional medicine systems, Nervilia orchids are believed to have spiritual and mystical properties, and are used in rituals and ceremonies.

Medicinal Use: Some species of Nervilia have been used in traditional medicine in various parts of Asia. They are believed to have anti-inflammatory, antibacterial, and antifungal properties, and are used to treat a range of ailments, including fever, cough, and skin conditions.

"Nervilia is commonly known as "Shield Orchids" due to the shape of their leaves."

Zeuxine Orchids

Description: Zeuxine orchids are terrestrial plants that typically grow in shaded, humid environments. They have creeping rhizomes and basal leaves that are often small and inconspicuous. The flowers are usually small, greenish or brownish in colour, and arranged in spikes or racemes.

Culture: Zeuxine orchids are often found in shaded, humid areas, and can be grown in pots with well-draining media. They require moderate to bright indirect light and consistent moisture. Some species are considered rare or endangered due to habitat loss and overcollection.

Medicinal Use: Some species of Zeuxine orchids have been used in traditional medicine, particularly in Asian countries. They are believed to have properties that can help with various health issues, such as fever, cough, and digestive problems. However, the effectiveness of these uses is largely anecdotal and not extensively scientifically verified.

"Zeuxine is commonly known as "Jewel Orchid" due to their decorative, jewel-like foliage."

Discussion

The discussion on the fascinating world of terrestrial orchids i.e., *Eulophia explanata*, *Habenaria commelinifolia*, *Habenaria constricta*, *Nervilia aragoana*, and *Zeuxine strateumatica* highlights several key points like they have garnered attention for their unique characteristics, habitats, and potential medicinal properties. From their intricate flowers to their adaptations in diverse environments, each species offers insights into the complex relationships between plants and ecosystems. These orchids have been used in traditional medicine for various purposes, including anti-inflammatory, antimicrobial, and antioxidant applications. Further research is needed to fully understand their therapeutic potential. The traditional use of these orchids in medicine highlights the importance of preserving indigenous knowledge and cultural practices. These terrestrial orchids play important roles in their ecosystems, contributing to biodiversity and ecological balance. Understanding their habitats and relationships with other organisms can provide valuable insights into conservation and ecosystem management. Some of these orchid species face threats due to habitat loss, overcollection, and climate change. Conservation efforts are essential to protect these species and their habitats.

Further studies on these five documented terrestrial orchids can reveal new compounds, therapeutic applications, and ecological insights, contributing to advances in medicine, ecology, and conservation. By exploring these aspects, we can gain a deeper understanding of these fascinating plants and their significance in both traditional and modern contexts.

NOTE: These orchid genera have been used in traditional medicine for various purposes:

Eulophia is used in Anti-inflammatory, Antimicrobial, Antioxidant, Wound healing, Digestive issues.

- Anticancer properties: Eulophia nuda tuber extract has shown significant anticancer effects against breast cancer cells with minimal toxicity to normal cells.
- Antimicrobial activity: The extract also exhibits antibacterial and antibiofilm activities.
- Potential therapeutic applications: Research suggests Eulophia nuda may have therapeutic potential for osteoarthritis treatment.

Habenaria is used in Adaptogenic, Anti-inflammatory, Antioxidant, Digestive issues, Respiratory problems, Impotence and fertility issues.

- Adaptogenic properties: Some Habenaria species are believed to have adaptogenic properties, although more research is needed to confirm this.
- Traditional medicine: Habenaria species are used in traditional medicine for various purposes, including digestive issues and respiratory problems.

Nervilia is used in Anti-inflammatory, Antibacterial, Antifungal, Antioxidant, Wound healing, Skin conditions.

- Antimicrobial activity: Some Nervilia species have shown antimicrobial activity, although more research is needed to fully understand their potential.
- Traditional use: Nervilia orchids are used in traditional medicine in various parts of Asia.

Zeuxine is used in Anti-inflammatory, Antimicrobial, Antioxidant, Digestive issues, Fever reduction.

- Limited research: There is limited scientific research available on the medicinal properties of Zeuxine orchids.
- Traditional use: Zeuxine orchids are used in traditional medicine, but more research is needed to confirm their effectiveness.

These properties are based on traditional use and some scientific studies. More research is needed to confirm their effectiveness for specific health issues.

Fig: Showing the terrestrial *orchids i.e., Eulophia explanata, Habenaria commelinifolia, Habenaria constricta, Nervilia aragoana, and Zeuxine strateumatica.*

Conclusion

In conclusion, the comprehensive documentation of *Eulophia explanata*, *Habenaria commelinifolia*, *Habenaria constricta*, *Nervilia aragoana*, and *Zeuxine strateumatica* not only sheds light on their distinct botanical features and geographical distribution but also underscores their potential medicinal applications. These terrestrial orchids have been integral to traditional medicine, showcasing their anti-inflammatory, antimicrobial, and antioxidant properties.

Probably, the first documentation of these terrestrial orchids of Dalma Wildlife Sanctuary- *Eulophia explanata*, *Habenaria commelinifolia*, *Habenaria constricta*, *Nervilia aragoana*, and *Zeuxine strateumatica* highlights their unique botanical characteristics, distribution, and potential medicinal properties. While some of these terrestrial orchid's species have been used in traditional medicine for various purposes like antimicrobial and anti-inflammatory properties, and further research is needed as it could unlock and fully explore their therapeutic potential.

As research continues to unravel the complexities of these fascinating plants, it is imperative to prioritize their conservation and further investigation. By doing so, we can harness their therapeutic potential, drive innovation in medicine and ecology, and foster a deeper appreciation for the natural world. By exploring and conserving these orchid species, we can unlock new discoveries and gain a deeper understanding of their significance and potential applications in medicine, ecology, and beyond.

Ultimately, contributing to a deeper understanding of these fascinating plants with its knowledge, will contribute to the development of novel treatments, along with the conservation strategies, and a greater understanding of the intricate relationships between human well-being and beautiful plants.

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Conflict of Interests

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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