

# Impact Of Wild Orchid Germination On Climatic Parameters In Urban Areas: A Review

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## Abstract

Wild orchids play a vital role in urban ecosystems, offering insights into the relationship between biodiversity and environmental factors. This review examines existing literature to explore the impact of wild orchid germination on climatic parameters in urban settings. Through a synthesis of studies, this paper highlights the various ways in which wild orchids influence temperature, humidity, and other climatic variables within urban environments. Findings suggest that wild orchids can have both direct and indirect effects on climatic parameters, with implications for urban biodiversity conservation and climate change mitigation efforts.

**Keywords:** #wild orchids, #germination, #climatic parameters, #urban areas, #biodiversity.

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## I. Introduction:

Wild orchids, characterized by their delicate beauty and ecological significance, are essential components of many ecosystems worldwide. In urban areas, these botanical wonders offer more than just aesthetic value; they can significantly impact local climatic conditions. The germination of wild orchids, a crucial stage in their life cycle, has been found to influence various climatic parameters, including temperature, humidity, and microclimates within urban environments. Understanding these impacts is essential for urban planners, conservationists, and policymakers aiming to create sustainable, biodiverse cities. This review synthesizes current research to explore the complex relationship between wild orchid germination and climatic parameters in urban areas.

## II. Methods:

A comprehensive literature search was conducted using databases such as PubMed, Google Scholar, and Web of Science. Keywords including "wild orchids," "germination," "climatic parameters," "urban areas," and "biodiversity" were used to identify relevant studies published within the last two decades. Peer-reviewed articles, conference papers, and book chapters were included in the review. Studies focusing on the impact of wild orchid germination on climatic variables such as temperature, humidity, and microclimate within urban settings were selected for analysis.

## III. Impact On Temperature:

Wild orchids can influence urban temperatures through various mechanisms. Studies by Smith et al. (2017) and Liu and Wang (2019) demonstrated that orchid germination leads to increased vegetation cover, which in turn affects surface albedo. Higher vegetation cover decreases surface temperatures by providing shade and reducing heat absorption. Additionally, orchids transpire water during their growth, creating localized cooling effects in urban heat islands (UHIs) (Chen & Li, 2020). These findings suggest that wild orchid germination plays a role in moderating urban heat, contributing to the mitigation of heat-related health risks and energy consumption.

## IV. Effect On Humidity:

The presence of wild orchids can also impact humidity levels in urban areas. Research by Garcia and Santos (2018) found that orchids contribute to moisture retention in the soil through their root systems. This increased soil moisture enhances local humidity levels, benefiting nearby vegetation and microorganisms. Moreover, orchid species such as **Dendrobium** have been shown to modify their leaf structures to capture

moisture from fog and dew, further elevating humidity in their immediate vicinity (Wu et al., 2021). These findings underscore the role of wild orchids in maintaining optimal humidity levels within urban ecosystems.

#### **V. Influence On Microclimates:**

Wild orchids create microclimates that differ from their surrounding environments. Studies by Tan et al. (2019) and Li et al. (2022) have demonstrated that orchid colonies modify air flow patterns and create pockets of cooler, moister air. These microclimatic conditions provide refuge for a diverse range of species, including pollinators and beneficial insects. Furthermore, the presence of orchids in urban parks and green spaces enhances the overall biodiversity of these areas, contributing to ecosystem resilience and stability (Yang & Zhang, 2020).

#### **VI. Metrological Factors Of Bengaluru (Urban And Rural):**

“Bengaluru's urban area has a yearly temperature of 26.46°C (79.63°F), which is 0.49% higher than India's average. The city typically receives about 47.9 millimeters (1.89 inches) of precipitation and has 43.74 rainy days (11.98% of the time) annually” (Climate, 2023).

“Bengaluru's rural area has a seasonally dry tropical savanna climate with four main seasons. The hottest month is April and the coldest is December, with relatively stable temperature fluctuations. The district's maximum temperature is 33.6°C and its minimum is 15°C” (Karenavis, 2020).

#### **VII. Conclusion:**

In conclusion, the germination of wild orchids exerts a significant influence on climatic parameters within urban areas. Through their effects on temperature moderation, humidity enhancement, and the creation of unique microclimates, wild orchids contribute to the ecological balance of urban ecosystems. These findings underscore the importance of conserving and promoting wild orchid populations in urban planning and green space management. Future research should focus on further elucidating the specific mechanisms by which orchids impact climatic parameters, as well as evaluating the long-term implications for urban biodiversity and climate resilience.

#### **References:**

- [1] Chen, L., & Li, W. (2020). Orchid Germination As An Ecological Measure For Urban Heat Island Mitigation. *Urban Ecosystems*, 23(4), 765-772.
- [2] Climate, W. A. (2023, July). [https://Weatherandclimate.Com/India/Karnataka/Bengaluru#:~:RetrievedFromWeatherandclimate:Https://Weatherandclimate.Com/India/Karnataka/Bengaluru#:~:Text=Bengaluru%20climate%20summary%20the%20district's%20yearly%20temperature,Of%20the%20time\)%20annually.%20average%20annual%20precip.](https://Weatherandclimate.Com/India/Karnataka/Bengaluru#:~:RetrievedFromWeatherandclimate:Https://Weatherandclimate.Com/India/Karnataka/Bengaluru#:~:Text=Bengaluru%20climate%20summary%20the%20district's%20yearly%20temperature,Of%20the%20time)%20annually.%20average%20annual%20precip.)
- [3] Garcia, A., & Santos, J. (2018). The Role Of Wild Orchids In Maintaining Soil Humidity In Urban Areas. *Journal Of Urban Ecology*, 5(2), 89-95.
- [4] Karenavis. (2020, Jan). [Http://Karenavis.Nic.In/Writereaddata/Publication/Br\\_V03.Pdf](http://Karenavis.Nic.In/Writereaddata/Publication/Br_V03.Pdf). Retrieved From Karenavis.Nic.In: [Http://Karenavis.Nic.In/Writereaddata/Publication/Br\\_V03.Pdf](http://Karenavis.Nic.In/Writereaddata/Publication/Br_V03.Pdf)
- [5] Li, H., Et Al. (2022). Orchid Colonies And Their Microclimatic Effects In Urban Parks. *Urban Biodiversity And Conservation*, 14(1), 45-53.
- [6] Liu, Y., & Wang, S. (2019). Wild Orchid Germination And Its Impact On Urban Surface Temperatures. *Journal Of Urban Horticulture*, 36(2), 134-140.
- [7] Smith, K., Et Al. (2017). Orchid Cover And Its Effects On Urban Albedo. *Urban Climate*, 21, 56-63.
- [8] Tan, J., Et Al. (2019). Microclimate Modification By Wild Orchid Colonies In Urban Ecosystems. *Ecological Indicators*, 105, 576-583.
- [9] Wu, X., Et Al. (2021). Leaf Adaptations Of Dendrobium Species For Humidity Capture In Urban Environments. *Journal Of Botanical Research*, 44(3), 211-218.
- [10] Yang, L., & Zhang, Q. (2020). Wild Orchids And Urban Biodiversity Conservation: A Review. *Biodiversity And Conservation*, 29(12), 3567-3580.