

Resilient Orchids: Understanding the Heat Tolerance of *Vanda tessellata* in Changing Climate in the Western Ghats, Wayanad

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Abstract— This study examines the heat resistance and adaptive strategies of *Vanda tessellata*, a resilient wild orchid species thriving in the semi-arid conditions of Wayanad, Western Ghats. Over five years (2019–2024), comprehensive field observations, physiological assessments, and environmental monitoring were conducted to evaluate its ability to withstand extreme temperatures and minimal water availability.

Our findings highlight that *Vanda tessellata* exhibits multiple survival mechanisms, including Crassulacean Acid Metabolism (CAM) photosynthesis, which allows it to minimize water loss by absorbing CO₂ at night. The orchid also develops thickened