عنوان مقاله:

A Review of Recent Advances in Water Vapor Deficit Sensor Technology for Improving Plant Water Usage Efficiency

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خلاصه مقاله:

Accurate assessment and monitoring of plant water stress are essential for optimizing irrigation strategies, improving water use efficiency. This article explores the multifaceted issue of water stress, encompassing both agricultural and environmental contexts. It emphasizes the pivotal role of precise water stress detection in effectively managing water resources and fostering sustainable agricultural practices. The primary focus is on the progression of sensors designed specifically to detect water stress, with particular attention given to two approaches: Vapor Pressure Deficit (VPD) and Crop Water Stress Index (CWSI). The article thoroughly investigates the underlying principles, operational mechanisms, advantages, and limitations of these sensor technologies. It vividly showcases their wide-ranging applications across agriculture, horticulture, and environmental monitoring, elucidating their significance in each domain. Moreover, it delves into the integration of VPD and CWSI sensors and introduces emerging technologies like thermal imaging and chlorophyll fluorescence sensors, expanding the horizon of water stress detection methodologies. Addressing the challenges linked to calibration and data interpretation, the article proposes potential pathways for future research endeavors. In essence, the overarching goal of this article is to propel the development of advanced sensor technologies, ultimately facilitating precise water stress detection. It aims to bolster sustainable water resource management practices while fortifying resilient agricultural methods in the face of evolving environmental challenges. VPD and CWSI-based approaches offer precise water stress insights in agriculture, aiding irrigation management.

کلمات کلیدی:

Water stress detection, Sensor technologies, Vapor Pressure Deficit, Crop Water Stress Index, Sustainable Agriculture