



Unlocking Deeper Plant Health Insights with TreeTag Sensor Data

At ePlant, we empower growers, researchers, and land managers with cutting-edge **real-time data** to enhance plant health and productivity. Our **TreeTag sensor system** provides a comprehensive view of tree growth and environmental conditions through an integrated suite of **temperature and humidity sensors, a lean detector, and a high-precision dendrometer** that tracks daily growth at the micron level.

By continuously monitoring environmental and physiological factors, TreeTag enables **data-driven insights** that optimize irrigation, assess fertilization effectiveness, detect environmental stressors, and even predict fruit yield and quality.

Here's how TreeTag transforms plant health management:

1. Optimizing Irrigation & Hydration Strategies

Key Sensors: Dendrometer, Temperature, Humidity

- **Monitor Water Availability & Growth** – A slowdown in daily growth, particularly in **hot and dry conditions**, signals insufficient hydration, guiding irrigation timing and volume.
- **Track Evapotranspiration** – TreeTag integrates humidity and temperature data to estimate **moisture loss**, enabling **precise irrigation schedules**.
- **Prevent Overwatering** – If growth remains stagnant despite adequate soil moisture, it could indicate **waterlogging or poor drainage**.
- **Identify Drought Stress Early** – Low humidity, high temperatures, and slowed growth provide **proactive warnings**, preventing long-term damage.

2. Evaluating Fertilization Effectiveness & Runoff Risks

Key Sensors: Dendrometer, Temperature, Humidity

- **Measure Nutrient Uptake Efficiency** – Growth acceleration post-fertilization signals effective absorption, while stagnation suggests nutrient loss or inefficiency.
- **Detect Nutrient Leaching** – If **heavy rainfall or over-irrigation** follows fertilization without growth improvement, nutrients may have washed away before absorption.
- **Optimize Fertilization Strategies** – Compare **slow-release vs. liquid fertilizers** under varying conditions to maximize effectiveness.

3. Understanding Soil & Environmental Variability

Key Sensors: Dendrometer, Temperature, Humidity

- **Analyze Soil Performance** – Comparing tree growth in **sandy vs. clay-rich soils** reveals moisture retention capacity and soil productivity.
- **Assess Microclimate Effects** – Variations in temperature and humidity pinpoint **how climate influences plant hydration and growth**.
- **Enhance Irrigation in Complex Terrain** – Evaluate **sloped vs. flat environments** to optimize water absorption and distribution.

4. Comparing Different Varieties of the Same Species

Key Sensors: Dendrometer, Temperature, Humidity

- **Identify Drought-Resistant Cultivars** – Some varieties maintain **steady growth** even in water-limited conditions.
- **Compare Productivity Potential** – Correlating growth data with **yield trends** helps determine **the most fruitful varieties** for a given climate.

5. Detecting Environmental Stress & Stability Risks

Key Sensors: Lean Detector, Temperature, Humidity, Dendrometer

- **Monitor Wind Stress & Structural Stability** – Sudden **lean detector shifts** indicate trees at risk of uprooting or breakage.
- **Identify Heat & Sunlight Stress** – Growth stagnation during **high temperatures** suggests excessive sunlight exposure, prompting **shading solutions**.
- **Prevent Mold & Disease** – High humidity **without significant temperature fluctuations** creates conditions for fungal infections, enabling **early detection and prevention**.

6. Predicting Fruit Size, Yield & Harvest Timing

Key Sensors: Dendrometer, Temperature, Humidity

- **Track Fruit Development Stages** – Steady increases in tree diameter correlate with **fruit growth**, while stagnation may indicate **water or nutrient deficiencies**.
- **Link Climate & Fruit Quality** – Temperature and humidity trends before harvest can **impact fruit sweetness, size, and firmness**.
- **Optimize Harvest Timing** – If **temperature spikes slow growth**, early harvesting may prevent fruit shrinkage due to stress.

7. Expanding Insights Beyond Growth Tracking

- **Carbon Sequestration Monitoring** – Integrating dendrometer data with **remote sensing** enables **real-time carbon capture tracking**, supporting sustainability and carbon credit initiatives.
- **Early Disease Detection** – A sudden halt in growth, combined with stable or declining humidity, can indicate **disease onset before visible symptoms appear**.
- **Urban Forestry & Street Tree Management** – TreeTag helps **monitor city trees** for potential stressors such as **pollution, extreme temperatures, and root constraints**.

TreeTag provides **unparalleled real-time insights** into plant health, enabling **smarter irrigation, fertilization, and environmental management**. By correlating dendrometer growth data with **temperature, humidity, and lean measurements**, **farmers, researchers, and land managers** can make **data-driven decisions** to enhance plant productivity, sustainability, and overall ecosystem resilience.