

Optimizing the Growth Performances of Selected Ornamental Plants Using an IoT-based Greenhouse Environment.

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The quality and productivity of floriculture plants highly depend on the surrounding environmental conditions. Greenhouses can provide suitable microclimatic conditions for floriculture plants. “Internet of Things (IoT)” is a next-generation automated system that is used in greenhouse agriculture. Monitoring, data collection, and output generation are done through this system. This experiment was carried out to study how the use of IoT-based greenhouses affects the performance of floriculture plants. *Codiaeum variegatum* “Croton”, *Torenia fournieri* “Torenia blue river”, and *Euphorbia hypericifolia* “Diamond frost” plants were used in this experiment. IoT-based fully intensive greenhouse, a Glasshouse with the timer-based system, and a naturally ventilated greenhouse were used as treatments. Plants were arranged according to a Completely Randomized Design in the greenhouses. Plant dry weight, leaf area, plant height, and root length were measured as growth measurements, and chlorophyll content, leaf color, and chlorophyll fluorescence were also measured as quality and physiological measurements. There were significant differences among treatments for some measurements. In all three species, especially, the leaf area and root growth were found to be better in IoT-based greenhouses. Chlorophyll fluorescence data were collected at 9 am, 12 noon, and 3 pm on bright sunny days. Fluorescence transient (OJIP) curves that were generated according to those data also show a significant difference among treatments. The IoT-based greenhouse environment keeps photosynthesis of croton leaves at a higher level than the other two greenhouses. The plants in the glasshouse displayed photo-inhibition at noon. *Torenia* plants showed a more sensitive relationship with IoT treatment because *Torenia* keeps photosynthetic performance relatively constant throughout the day in the IoT-based Greenhouse. With these results, it can be concluded that, there is a positive impact of IoT system-based applications on the performance of tested floriculture plant species.

Keywords: Greenhouse cultivation, Floriculture, Internet of things, IoT, Protected culture

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