

Assessing the Effect of Different Irrigation Practices on Kiwifruit Quality Traits

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Abstract

Kiwifruit (*Actinidia deliciosa* cv. 'Hayward') is a high-value fruit crop with increasing global demand due to its nutritional benefits. Given the high-water demand of this crop, the adoption of sustainable irrigation strategies is very important, particularly in regions suffering from water scarcity. Regulated deficit irrigation (RDI) at specific growth stages can be used to optimize water use efficiency without affecting yield. In this study, *Actinidia deliciosa* cv. 'Hayward' vines, cultivated in a commercial kiwifruit orchard located in Greece, subjected to three irrigation treatments applied from the end of the rapid fruit growth stage until harvest: (a) Control CTR (full irrigation: 100% of ETc), DI85 (deficit irrigation: 85% of ETc), and DI₇₀ (deficit irrigation: 70% of ETc). The aim was to evaluate the effects of different RDI treatments on key fruit quality characteristics i.e fruit weight (*fw*), fruit firmness (*fn*), Total soluble solid (*TSS*), Titratable acidity (*Ta*) and fruit ripening index (*FRI*). Soil water moisture content and microclimatic parameters were continuously monitored on hourly basis, while Leaf Water Potential (*LWP*) and stomatal conductance (*gs*) as key plant water status indicators were also measured. Results of hydrodynamic parameters indicated that RDI85 vines were exposed to mild stress conditions. Fruit weight in RDI₈₅ treatment remained close to those of the corresponding control treatment while *TSS* and *FRI index* values were higher and *Ta* values were lower compared to fully irrigated plants respectively. In contrast, under the RDI₇₀ treatment, *fw* values were reduced by approximately 15% relative to the control, whereas fruit firmness exhibited not statistically significant differences compared to the other irrigation treatments. RDI₇₀ treatment also led to a reduction in yield due to the decrease in fruit weight while fruit ripening was enhanced. Moreover, *TSS* values were higher, and *Ta* values were lower compared to the control, resulting in an increased ripening index. These findings suggest that the RDI85 treatment imposed after the rapid fruit growth stage could be considered as a sustainable irrigation strategy which promotes key fruit quality attributes while reduces irrigation amount.

Keywords

Actinidia deliciosa, Regulated Deficit Irrigation, kiwifruit, water stress, fruit quality.

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