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Ciência, tecnologia e inovação no Brasil: desafios e transformações

Could both deficit irrigation and polyethylene plastic cover be used as strategies to save water and improve grapevines (*Vitis labrusca*) cultivation in Tropical conditions?

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We considered the interactive effects of deficit irrigation [Regulated Deficit Irrigation (RDI) and Partial Rootzone Drying (PRD)] and polyethylene plastic cover use on a variety of key physiological traits in 'Niagara Rosada' grapevine (*Vitis labrusca*) grown under Tropical conditions. The following questions were addressed: (i) What are the effects of deficit irrigation on leaf respiration rates and leaf carbon balance? (ii) Is it possible to save water without affecting yield and fruit quality? (iii) Is polyethylene plastic covering a good strategy to cultivate grapevine in Tropical conditions? Three water management techniques were applied [full-irrigated (FI): 100% of the crop evapotranspiration (ET_c) was supplied to both sides of the root system; RDI: 50% of the ET_c was supplied to both sides of the root system; and PRD: 50% of ET_c was alternately supplied to only one side of the root system, whereas the other side of the rootzone remained without water] in each of two sides, so that one was covered with polyethylene plastic structure whereas the other side remained uncovered. Light response curves were performed every two weeks for 45 days on both seasons, with the Li-Cor 6400 portable photosynthesis system (Li-Cor Inc., Lincoln, NE, USA). The LCB was estimated as $A_{net} / (R_{dark} + R_{light})$, where A_{net} is the net photosynthetic rate and R_{light} and R_{dark} are respiration rates in the light and in the dark, respectively. The intrinsic (A_{net}/g_s) and the water use efficiency (A_{net}/E) were calculated, where g_s is the stomata conductance and E is the transpiration rate. Yield and fruit quality [pH, total soluble solids and total titratable acidity] were measured on both seasons. We found that: (i) Leaf respiration rates are not affected by either RDI or PRD. Thereby, considering our experimental conditions, deficit irrigation does not damage the leaf carbon balance in 'Niagara Rosada'; (ii) Up to 154.3 L of water can be saved per plant when either RDI or PRD is used, with no negative effects on both yield and fruit quality. However, RDI should be preferable for practical reasons; (iii) the use of polyethylene plastic cover can be a great strategy for 'Niagara Rosada' grapevine in Tropical conditions, since it improves A_{net}/g_s and A_{net}/E .

Palavras-chave: Net photosynthetic rate; Water availability; Leaf respiration.

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