

## Effect of supplementary irrigation at high ambient temperatures on sunburn, plant physiology, soil and canopy environment of 'Granny Smith' apple

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### ABSTRACT:

Pulsing irrigation is a supplementary irrigation strategy whereby South African apple growers aim to reduce tree stress during a heat wave by applying additional water to the orchard floor using microsprinklers. The aim of this research was to examine the effects of pulsing irrigation, when used as a sunburn control measure, on soil water status, canopy microclimate, plant physiology and fruit quality of 'Granny Smith' apple (*Malus ×domestica*). Treatments consisted of a control irrigation according to the scheduling of the farm using microsprinklers and three treatments that received normal irrigation plus pulsing irrigation at 25, 37 and 75 L h<sup>-1</sup> when ambient air temperatures were =30°C with a cycle of 5 min on and 20 min off. Soil volumetric water content was continuously measured. Leaf gas exchange and plant water status was measured at 90, 114 and 158 days after full bloom. At commercial harvest, a sample of 100 fruit tree<sup>-1</sup> was collected for assessment of sunburn and fruit colour intensity. Fruit size, fruit firmness and internal quality were measured. Pulsing irrigation increased soil volumetric water content, reduced canopy maximum temperature, increased canopy relative humidity, improved plant water status and had no effect on leaf gas exchange. Sunburn incidence was reduced and there was an improvement in fruit color. Internally, there were no changes in TSS and TA whilst starch breakdown was increased by the highest pulsing irrigation treatment.