



# Apple

## Water Use Study Karragullen, Western Australia



CARING FOR OUR COUNTRY

This project is supported by Perth Region NRM, through funding from the Australian Government's Caring for our Country.

**Irrigation System:** Microsprinklers (Winfield Challenger maroon 1.3mm nozzle)

**Application Rate:** 3.2mm/hour

The soil under the Pink Lady apples has been textured as light clay with a color change at 30cm depth with mottled iron particles which indicates historical waterlogging.

Gbug soil moisture monitoring equipment was installed in the Pink Lady Block on the 19th Sept 2007 with four gypsum block sensors at 15cm, 30cm, 45cm and 60cm. Evaporation in October/November 07 was averaging 7-8.5mm, the trees are actively growing and have healthy leaf growth.

During October and early November 2007, rainfall was low (22.8mm) and soil moisture reached -86kPa at 15cm. 5.3mm of irrigation was applied which saturated the soil to 15cm but soil tension did not increase at 30cm. Daily irrigations of 2mm (40mins) started on the 22nd November which

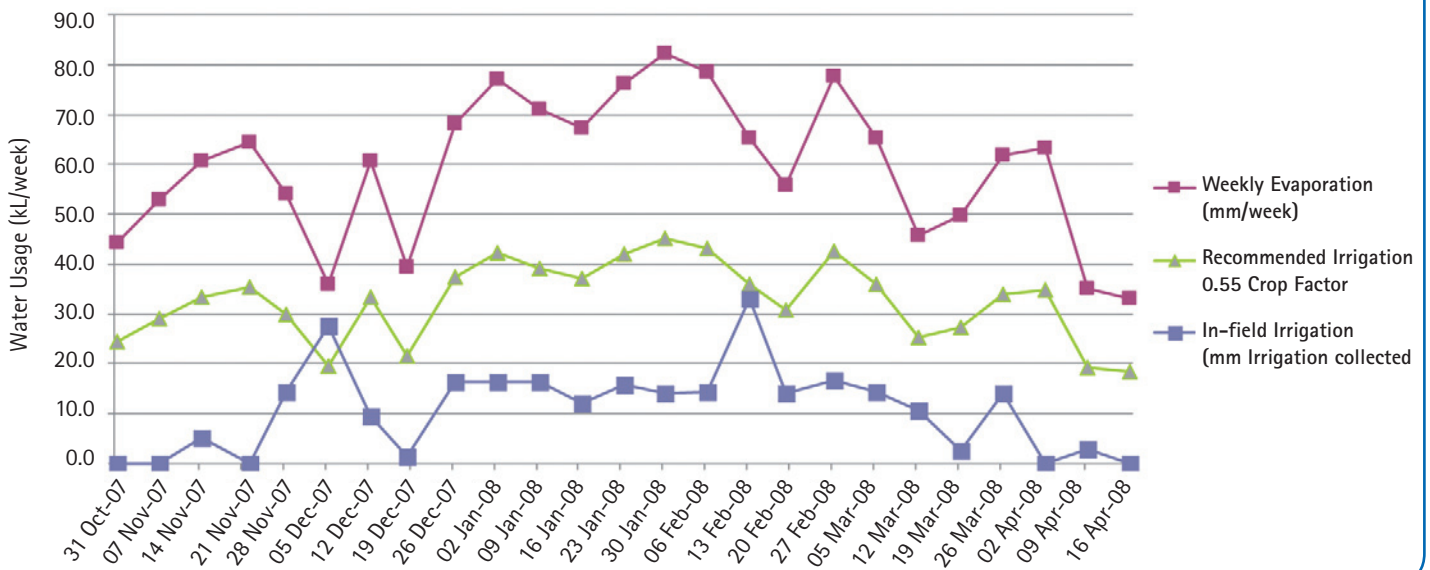
increased soil tension at 30cm from -87kPa to -28kPa but there was no increase at 45cm.

During December 07, 153mm of water was applied to the Pink Lady crop, 54mm of rain and 99mm of irrigation. Evaporation for the same period was 204mm. Soil Water tension at all depths increased to saturation of between -5kPa to -13kPa. Research has shown that Pink Lady apples can produce good quality fruit from a deficit Irrigation schedule, so having the soil at saturation may be affecting the crops growth.

Note: This situation where all depths are at field capacity for a number of days indicates water logging in the rootzone will need to be avoided next season due to the clay soil type.

Daily irrigations of 1 hour (approx 3.2mm) were scheduled during January 2008. Soil surface (15cm) tension remained between -5 to -15kPa but 30cm, 45cm and 60cm depths continued to dry out.

### 2007-2008 Evaporation, Crop Factors and Irrigation – Pink Lady Apples



### Sprinklers

The existing sprinkler system (Wingfield Challenger) has a distribution uniformity (DU) of 60% which is considered low compared to the industry standard of 75% for head to head micro Irrigation systems. A DU of 60% can be attributed to the square sprinkler pattern along the laterals, distance between sprinklers (5m) does not match the throw radius of that sprinkler (3.7m) @ 150kPa, branches may be interfering with water distribution under the trees.



### Water Use

The Karragullen area is not prescribed as a proclaimed water source area so water can be drawn from underground aquifer without a licence. Hypothetically, if the area was a proclaimed groundwater resource and required a licence to abstract groundwater, approx 10,000kL/ha/annum would be allocated to grow apples. Approx 1.107ha of the property is under production, 11,070kL/year would be allocated to grow the apples.

For 2007-2008, irrigation applied to the Pink Lady block was approx 2721kL/ha with a majority of irrigation used between 28th November to 26th March. A crop factor of 0.2-0.3 (not 0.55) appears to be adequate for the crop and to reduce the occurrence of waterlogging in high clay soil types.



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