

Water for Profit

BENCHMARK – IRRIGATING AVOCADOS IN FAR NORTH QUEENSLAND



WATERFORPROFIT

Benchmarking can be an effective way to identify opportunities for improved management. While benchmarking can be conducted on any area of your farming operations, this sheet provides a basis for your irrigation performance.

Crop specifics

Avocados are grown throughout Queensland and consist of numerous varieties, the major two being Hass and Shepard. They are typically irrigated via under tree micro-sprinklers providing partial coverage or total orchard floor watering. Water quality is crucial and to minimise potential production losses the electrical conductivity of the irrigation water should be less than 0.6 dS/m.

Avocado trees require careful water management. Under-watering can result in significantly reduced yields, poorly timed flowering, increased fruit drop, poor fruit quality, rapid ripening and stem-end diseases. Conversely over-watering can induce phytophthora, reduce tree vigour, increase nutrient imbalances and if water logged for more than 48 hours, tree death.

As phytophthora root rot is the major limitation to production, avocado trees are generally grown on well drained soils, typically mounded. Problems relating to water logging and root rot may lead to some growers under-watering.

Maintaining optimum conditions for fruit development is a fine balance that is best achieved through a soil moisture monitoring system. The majority of avocado feeder roots are found in the top 40 cm of soil with 80 percent of the water extracted from the top 20 cm. High crop water demand occurs through spring and early summer with trees requiring significantly more water during flowering.

Critical points are flowering and fruit set, early fruit growth, and when fruit approaches maturity. Water stress at critical stages may result in a small crop load, effect fruit size, quality and yield as well as increase fruit drop during natural events.

Crop benchmarks

For mature trees, the total crop water requirement is approximately 11 - 12 ML/ha. Rainfall distribution varies markedly between the upper Tablelands and lower Tablelands (South & North respectively). Effective rainfall over the period 2000-2003 ranged from 3.5 - 8 ML/ha for the upper Tablelands and from 3.1 - 5.6 ML/ha for the lower Tablelands.

The irrigation requirements varied accordingly from approximately 3 to 7.5 ML/ha, allowing for inefficiencies and drainage losses. Higher or lower irrigation usage may be necessary depending on seasonal rainfall. Best practice yields are in the range of 15 - 25 t/ha.

The numbers below are total water usage (ie irrigation plus effective rainfall) for plantings under various climates, rainfall, varieties, age, planting densities and soil types.

Best practice guidelines

Practices that have been shown to improve irrigation performance growing are detailed below.

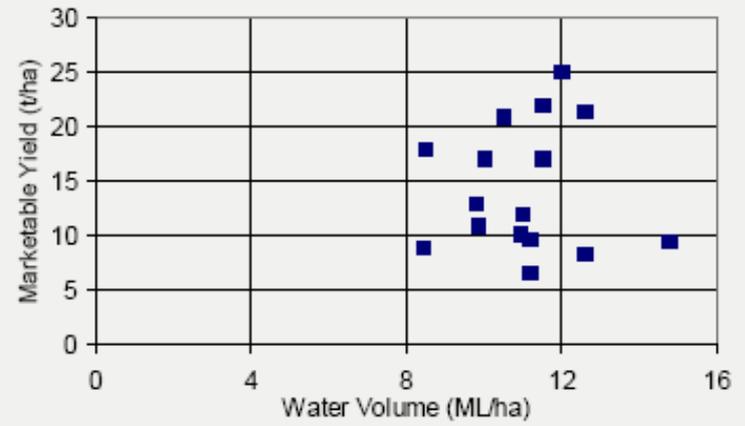
- The active root system is the top 40 cm so irrigation events should be targeted to within this depth.
- Critical tensiometers values for avocados are 20 - 30 kPa during peak use with possibly higher values during winter.





- A layer of deep mulch under the tree is important to protect the very shallow root system and reduce evaporation.
- Adjust water applied with tree age in terms of volume and wetted radius.
- Ensure irrigation system has the capacity to meet seasonal and peak water requirements. Regular maintenance and performance evaluations should be conducted.
- A monitoring program should be used to schedule the timing of irrigations and the volume of water to be applied.
- Uniformity of application systems is critical, especially if utilising fertigation.
- Efficient crop water use and high yield potential can only be achieved if other agronomic factors such as nutrition, disease and pest management are also optimised.

Yields of avocados compared to total water applied



Crop physiology information in this sheet has been obtained from the QDPI Agrilink series and is gratefully acknowledged.

For more details contact the Growcom members access line on 07 3620 3844.

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.

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