

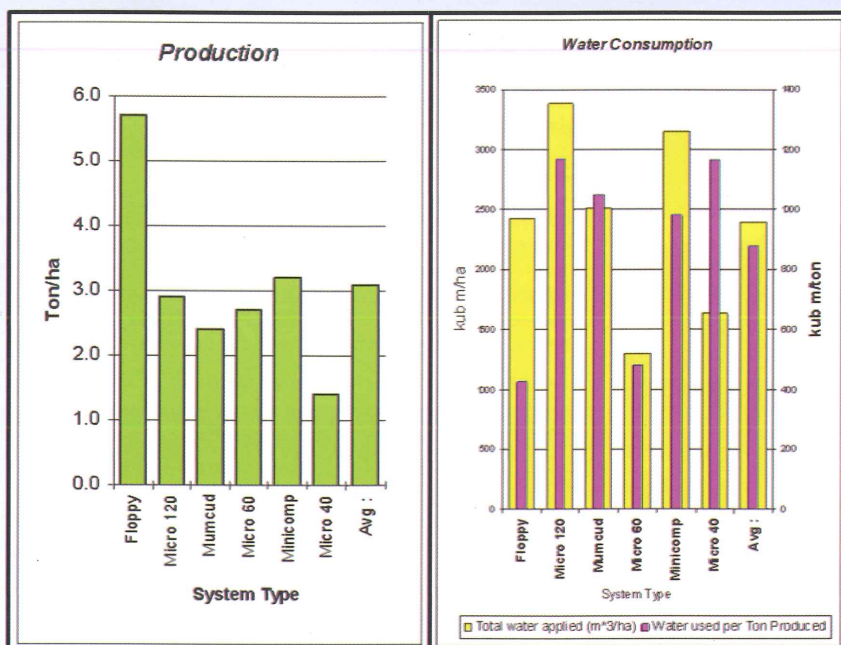
TRANSITION TO TOTAL ROOT AREA IRRIGATION ON MACADAMIA TREES, USING LESS WATER PER TON PRODUCED THAN MICRO'S



In the USA Pacific Northwest there has been a massive rollback from Drip and Micro irrigation on Orchards in favor of total root area irrigation. Even proponents of drip irrigation now support this fact by installing multiple drip lines in order to irrigate a larger root area. The ultimate scenario would be to irrigate the total root area for maximum yields. The Floppy irrigation system – with an extremely high efficiency of 90% - can do this, and do cooling as well which is critical during the flowering stage of trees! Many other obvious benefits come with this system, such as:

- De-risking your investment by cooling on hot days, preventing flower loss;
- It is beneficial for Macadamias to keep temperatures as close as possible to 25 °C for quality nut production. Higher temperatures result in smaller kernel size and thicker shells;
- All fertigation, including foliar feed, can be applied through the system which is flow control equipped;
- All pesticides can be applied through the system – eliminating mechanical spray and labour;
- Washing dust off leaves in long dry winter months ensures optimum photosynthesis;
- The system is robust – large orifices, no blockages by insects and no labourers needed to walk the system every day;
- No deep percolation – Irrigate in the effective root zone;
- No wearing parts and extreme long life of the system;
- Most efficient sprinkler in the world with 90% efficiency. Water out the nozzle directly to water on the ground;
- Ease of installation – simple and quick;
- Maximise yields with lowest water per ton used. See graph – because total roots are well developed and total rainfall is utilised;
- The flow controller allows for accurate irrigation on slopes and steep gradients;
- Improved fertility of many soils, particularly with plant nutrients like Phosphorus and Potassium, that are released from the decomposition of organic matter produced by the cover crop;
- Full coverage irrigation increases the micro-organism activity in the soil and the expanse of the root system. This creates a larger soil reservoir from which nutrients can be sourced, saving on fertilisers;
- Total root area irrigation results in developing a healthy large root system, which betters anchor trees – minimizing uprooted trees during storms.

TOTAL ROOT AREA ON YOUNG AVO TREES



NOTES ON GRAPH:

1. Look at the relationship between the 3 sizes of micro sprinklers. You will clearly see that the larger wetted rooting area results in higher yields. (Left hand side) The 120-l/h micro sprinklers irrigate a larger area than the 60-l/h micro, and the 60 l/h micro irrigates a larger area than the 40 l/h micro.
2. On the right you will see the water use and water use efficiency. The 60 liter per hour micro sprinkler gives the best water use efficiency, but the production is lower than the Floppy System, because it does not irrigate the full area and therefore the roots do not develop over the total area.
 - a. The 120 liter per hour micro sprinkler does have high evaporative losses. (small droplet sizes of the sprinkler)
 - b. The 40 liter per hour has a low water use efficiency due to deep percolation. (too much water on a small area)
3. The Floppy System irrigates the total area. This results in a much larger (almost double) rooting area which in term doubles the yield, but at the same time the evaporate losses are very small due to the uniform medium sized droplets without mist formation, or deep percolation.

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