



IRRIGATION RESEARCH & EXTENSION COMMITTEE

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FOR IRRIGATION CROPPERS

Benefits of open hydroponics in horticulture

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Summary

Open hydroponics is the use of hydroponics technology in the open field.

This involves the concept of open stomata control and maintaining the crop at field capacity during all daylight hours.

Martinez open hydroponics technology (MOHT) was developed by Professor Martinez in Spain. His system is a combination of drip irrigation, a balanced nutritional solution, tree management and controlled saturation to maximise fruit size and yield, avoid alternate bearing and optimise the use of water and nutrients.

The MOHT Principle is the application of a balanced, premixed nutritional solution for a specific phenological phase, directly and when required to the root system during daylight hours, maximising nutrient absorption and control over the tree.

Systems must be designed to keep up with maximum physiological activity in the hottest part of the day to keep up with evapotranspiration and thus keep the stomata fully open and photosynthesising throughout the day.

Different nutritional solutions are applied depending on the phenological phases of the crop. Trees are pushed or held back depending on which phase they are in to maximise fruit set. The nutritional solutions are balanced allowing maximum uptake of nutrients. Constant EC and pH is maintained in the irrigation water to aid in the uptake of nutrients.

The nutritional solution is prescribed depending on water analysis, crop type, cultivar, rootstock, leaf analysis and the previous year's crop tonnage. Each farm will have a different nutritional solution to suit their individual needs.

The concept of MOHT is to develop small dense root zones where a thick pillow of feeder roots are available directly below the dripper, and are ready to uptake small amounts of water and nutrients in daylight hours to keep up with the tree requirements. This is generally 2 or 4 drippers per tree depending on tree density.

Crop moisture monitoring is carried out by the use of:

- Soil moisture monitoring equipment
- Weather forecasts
- ETO calculator
- Help lines
- Field moisture checks

Benefits of Martinez Open Hydroponics

- Increased fruit size and more uniform
- Increased yields and better pack outs
- Reduced alternate bearing
- Improved shelf life, travels better
- Less sunburn
- Less albedo breakdown and splitting
- Reduced pruning requirements
- More efficient use of nutrients and water. Less than 120 litres of water per kg of oranges produced.

- No guess work, reduced risks
- No pollution to ground water
- Marginal soils can be used
- Poor water quality can be used
- Reduced need for foliar application.

Disadvantages of MOHT

It demands a good level of farm management, with attention to detail when scheduling irrigation, injection rates, pulsing, monitoring growth, interpreting field measurements, etc.

Due to creating a shallow root system, trees become very dependant on daily irrigation. Back up generator or diesel pumps are required.

Daily irrigation creates an ideal environment for root rot complex. Monitoring and preventative treatments are required.

In General MOHT has resulted in our business being more profitable.

Have less impact on the environment with no irrigation runoff and less deep percolation of water and nutrients through the soil profile.

Increase navel production by 40 %

Maintained production each year.