WA Focus Orchard trial results 2014

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Supporting your success
To ensure optimum growth in young orchards:

- **Nutrition** delivered at the right time and in the right amount
- **Irrigation** delivered at the right time and in the right amount
Water and nutrition are linked

- Nutrient availability is affected by water movement through soil

- Optimum nutrient delivery is highly dependant on good irrigation scheduling
Aims of the demonstration

To monitor:

• young tree growth
• movement of nitrate fertilisers in the root zone
• irrigation scheduling practices
Trial Site – Newton Orchards Manjimup, Starkies rd, blocks 23 & 24

Variety/ rootstock: Kanzi® and Fuji /MM106
Year planted: 2010 and 2011
Planting distances: 4 by 1.2 m
Planting density: 2083 trees/ha
Area: 3.3 ha
Row orientation: North-South
Training system: Central axis
Trellis: Yes
Harvest 2014: 88 bins
## Soil and irrigation

<table>
<thead>
<tr>
<th>Soil type</th>
<th>Dark sandy loam (Gravel 20%)</th>
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</thead>
<tbody>
<tr>
<td>Depth of root zone</td>
<td>30 cm</td>
</tr>
<tr>
<td>RAW 20 kPa (Root zone 30 cm)</td>
<td>10.8mm or 11 L/m² of soil wetted area</td>
</tr>
<tr>
<td>Irrigation system:</td>
<td>Drip Netafim Uniram™ AS20012 1.6l/hr every 0.6 m</td>
</tr>
<tr>
<td>Output L/tree/hour</td>
<td>3.2 L/tree/hour</td>
</tr>
<tr>
<td>Wetted area per tree:</td>
<td>For each tree: 1.2 * 0.6 = 0.72 m²</td>
</tr>
<tr>
<td>RAW per tree</td>
<td>0.72 m² X 11 = 8 L</td>
</tr>
<tr>
<td>Hours of irrigation required</td>
<td>8 L ÷ 3.2 = 2.5 hrs</td>
</tr>
</tbody>
</table>
Soil moisture monitoring equipment

- Tensiometers at 3 depths
- FullStop® wet front detectors at two depths
- Soil Solution Extractor Tubes (SSET)
Change in root-zone available water
Cumulative water use

- **Cumulative water use (recommended)**
- **Cumulative water use farm**
Daily plant water use

- Actual applied daily per plant
- Daily Deep Percolation per plant
- Daily Plant Requirement

[Graph showing daily plant water use over 12 months with specified line colors and labels.]
Block 23 – movement of water in the soil

- **Blue events** – water did not move past 30cm
- **Red events** – water moved past 30cm
- **Green events** – water moved past root zone
Block 24 – movement of water in the soil

- Blue events – water did not move past 30cm
- Red events – water moved past 30cm
- Green events – water moved past root zone
Monitoring of nitrates

• Soil solution samples were collected at 3 fertigation events

• Nitrates were detected in the solution from the FullStop at 50cm → some leaching below the root zone.

• Lack of a clear pattern of nitrate migration in the soil profile
Tree growth

September 2012

December 2012

March 2013

March 2014
Tree Row Volume

- **Block 24**
- **Block 23**
- **Target**

Season

Tree Row Volume (m³/ha)
Conclusions

- Assessing the movement of nitrate fertilisers is difficult
- Current irrigation practice at the site is not meeting requirements of the trees
- Good management of water is critical to maintaining growth
- Optimum nutrient delivery is highly dependant on good irrigation scheduling
Acknowledgements

Thanks to Paul Good, Newton Orchards, and orchard manager Ben Wilson.
Thank you
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