



Avowest  
Avocados

# Irrigation Field Day: Avowest - Carabooda



CARING  
FOR  
OUR  
COUNTRY

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

# Waterwise on the Farm

- **Waterwise on the Farm is a joint irrigation and training initiative, delivered by Perth Region NRM.**
- **The project aims to raise awareness of sustainable irrigation management practices and to identify opportunities for improving on farm water use efficiency.**
- **Irrigation Efficiency – Principles to Practice training courses**
- **Sustainable Irrigation Demonstration Sites**
- **Landholder support – eg Irrigation Audit Service**
- **Funded by the Federal Government’s Caring for Our Country – Sustainable Practices Grant (old NLP)**

# Main Discussion Points Today



Irrigation Scheduling



Micro sprinklers – application rates and  
uniformity



Nitrogen in groundwater - what is being applied?



Avocado Industry Update – Alec McCarthy



Drip Irrigation Trial – Alan Blight

# Irrigation Scheduling 2009-2010

- Regular irrigations commenced in late Sept 2009 with some supplementary irrigation in August and early Sept to sustain crop during harvest.
- Flowering (Oct): Irrigations were scheduled to replace 100-120% of evaporative losses. Moisture stress was avoided during flowering. 1 to 3 irrigations per day. Critical time, rootzone salinity may increase during Oct.
- Leaf flush (Nov): Evaporation ranged from 3.8mm to 9.9mm per day. 1.0 crop factor was used. No rain!
- Rootflush (Dec): 1.0 crop factor used during Dec. 1 night irrigation of 4mm with 1-2 day irrigations of 30mins. No rain!
- Root flush/Leaf flush start (Jan): 276mm evaporation, 288mm irrigation applied. 1.1 crop factor. Pruning

# Irrigation Scheduling 2009-2010

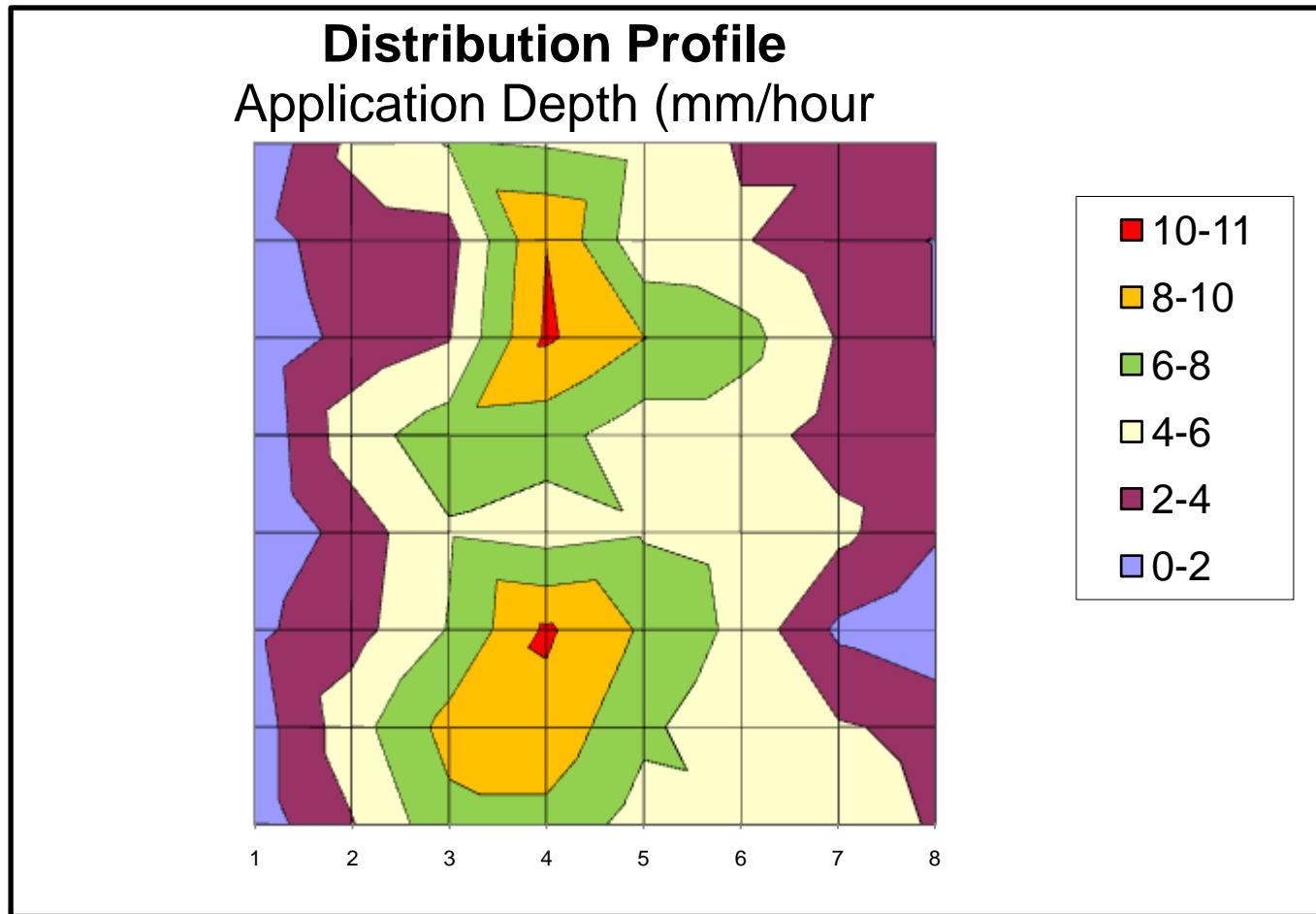
- Leaf flush/Pruning (Feb): Mild Temperature at an average of 28<sup>0</sup>C (day). Evaporation avg 7mm/day. 1.0 to 1.3 crop factor.
- Leaf Flush (March): 194mm evaporation, 66mm rain in 1 day (33.1mm in deep lysimeter = 50% effective rainfall), 1.1 crop factor.
- Root Flush (April): Avg soil temp 25<sup>0</sup>C (Wanneroo Weather station), approx 29 hours of irrigation applied, irrigations scheduled for 23 days out of 30 in April. 4-6mm of irrigation/day. 1.0 to 1.2 crop factor.
- Root Flush (May): 105mm water applied to crop – 60mm via irrigation, 45mm via rainfall. 1.0 crop factor. Critical time, rootzone salinity may increase during May
- Dormancy (June): 9 days of irrigation totalling approx 36mm.

# Irrigation Scheduling 2009-2010

Irrigation Water Use = 17,151kL/ha from application rate of 4mm/hour, 17,770kL/ha from 95L/hour sprinkler flow.

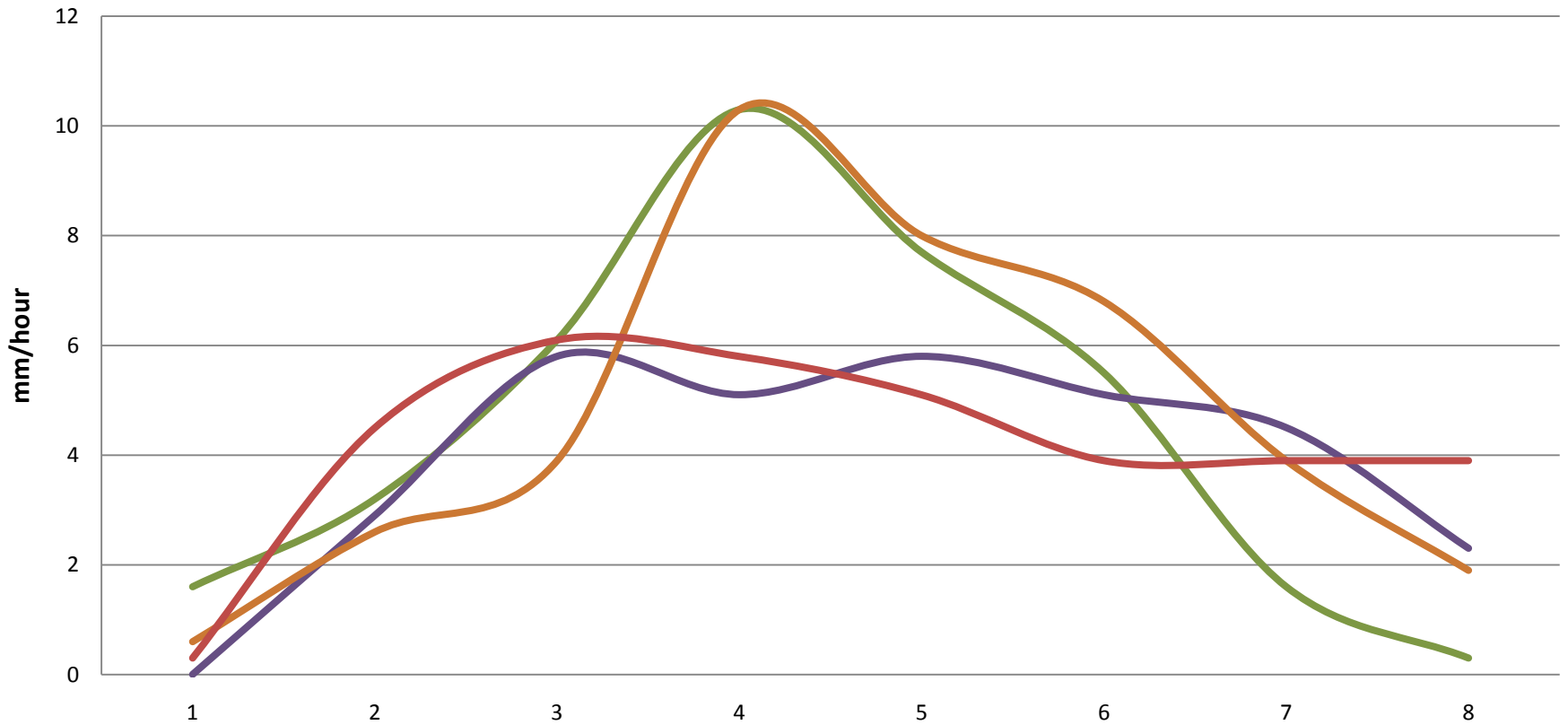
Evaporation	Rainfall	Effective Rainfall 50%	Effective Rainfall 80%	Irrigation	Irrigation + Effective Rainfall %
1866 mm	650 mm	325 mm		1770 mm	2007.4 mm
1866 mm	650 mm		520 mm	1530.4 mm	2050 mm

# Sprinkler Application Rates and Uniformity

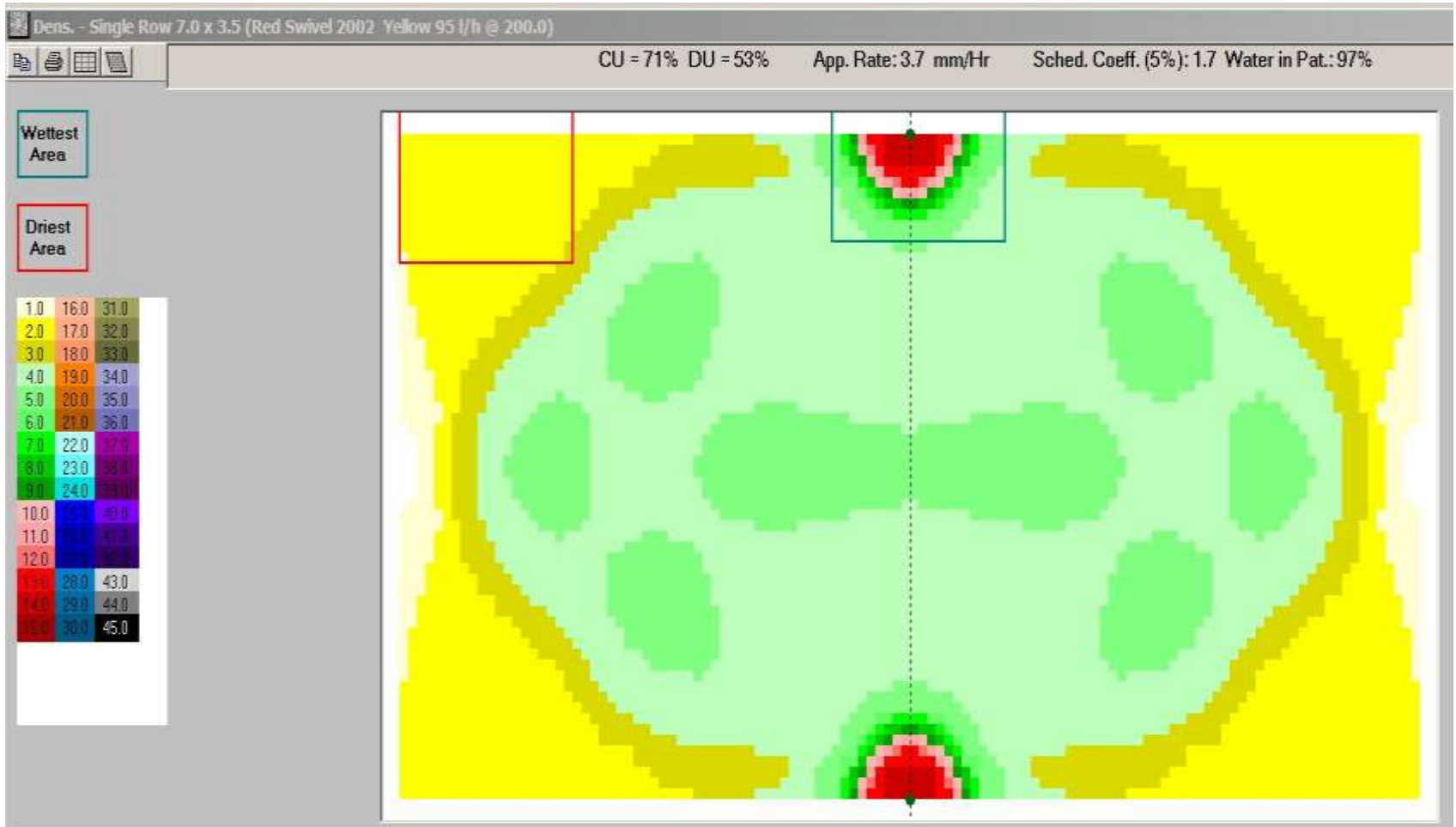


# Sprinkler Application Rates and Uniformity

## Wetting Pattern Cross-Section



# Sprinkler Application Rates and Uniformity



# Nitrogen in the Groundwater

- Irrigation with nitrogen-rich groundwater can add a considerable proportion of a crop's nitrogen requirement. Calculate the amount of nitrogen applied in the irrigation water and adjust their fertiliser programs accordingly.
- Nitrogen in the groundwater can be so high that the crop suffers nitrogen toxicity.
- Nitrogen levels in the groundwater are likely to be higher in areas where horticulture has been practised for a long time and where the groundwater source is shallow. It is important to regularly check the nitrogen concentration in bores and to readjust fertiliser programs if nitrogen concentrations change.

# Calculate kg/ha of N

70mg/L of Nitrate in Avowest groundwater sample -

17,700kL/ha = 17,770,000 Litres

70mg/L = 0.00007kg

17,770,000 x 0.00007kg = 1243.9kg of Nitrate per hectare

1243.9kg ÷ 204 trees/ha = **6.09kg/tree/year**

1243.9kg ÷ 408 trees/ha = **3.04kg/tree/year**

# Calculate kg/ha of K

13mg/L of Potassium in Avowest groundwater sample -

17,700kL/ha = 17,770,000 Litres

13mg/L = 0.000013kg

17,770,000 x 0.000013kg = 231 kg of Potassium per hectare

231kg ÷ 204 trees/ha = **1.13kg/tree/year**

231kg ÷ 408 trees/ha = **0.56kg/tree/year**

# Avocado Industry Update

## Alec McCarthy

Department of  
**Agriculture and Food**



# Drip Irrigation Project - Avowest

Due to possibility of reduced Water Allocation with the onset of the Gngangara Sustainability Strategy, Avowest has invested in a small scale drip trial to investigate its feasibility on sandy soils.

System Details: Netafim CNL 1.0L/hr 0.3m dripper spacing. 3 tree rows in total (2 rows with 3 driplines and 1 row with 4 driplines). Small centrifugal pump with irrigation controller and valve.

Drippers/tree: 35 (35L/hour/tree)

# Drip Irrigation Project - Avowest

## Drip Schedule:

12 x 30mins = 210L/tree/day (85.680kL/ha)

12 x 25mins = 175L/tree/day (71.4kL/ha)

12 x 22mins = 154L/tree/day (62.8kL/ha)

12 x 20 mins = 140L/tree/day (57.120kL/ha)

12 x 15 mins = 105L/tree/day (42.8kL/ha)

12 x 10 mins = 70L/tree/day (28.560kL/ha)

12 x 5 mins = 35L/tree/day (14.280kL/ha)

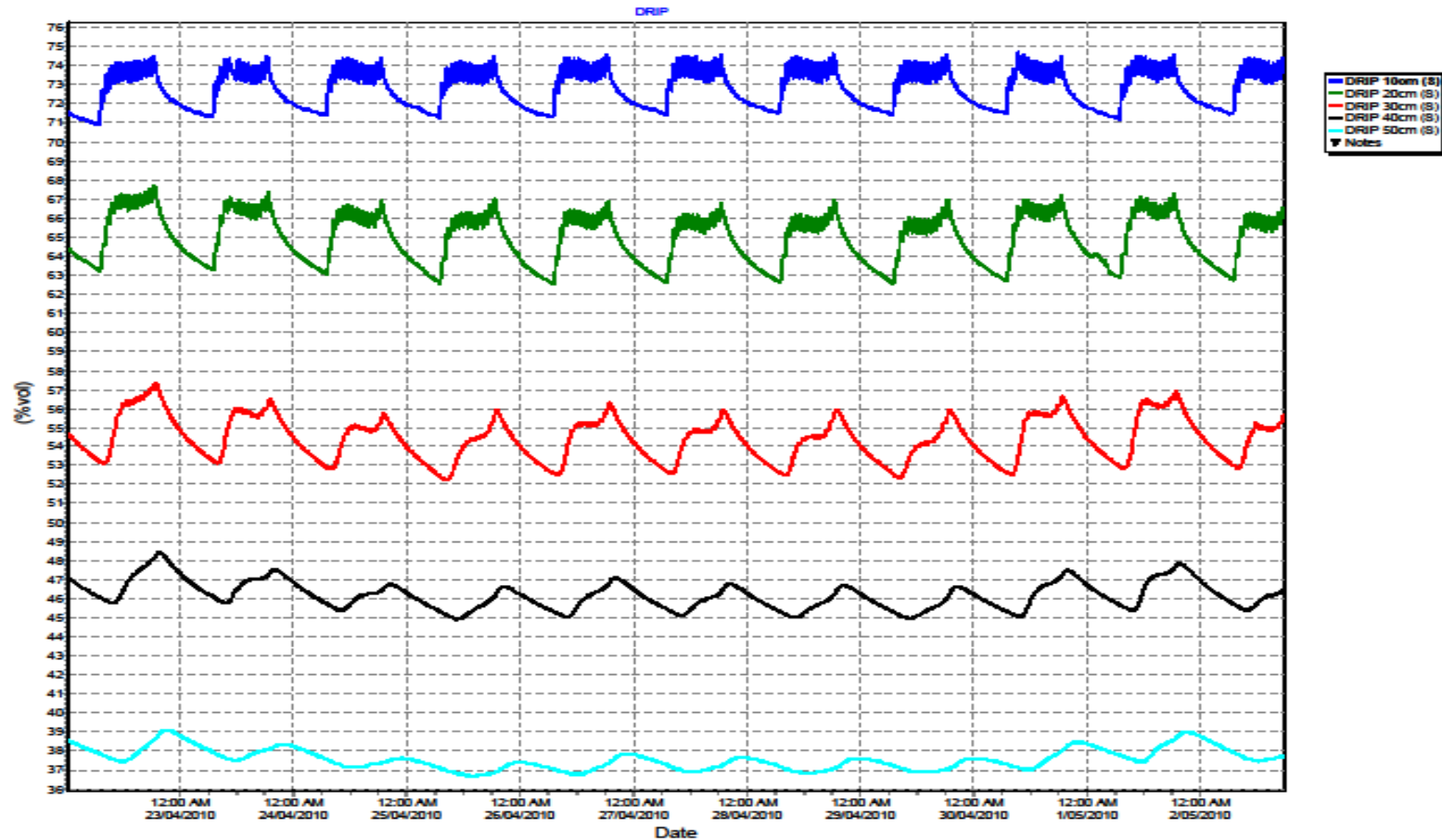


# Drip Irrigation Project - Avowest

	July	August	September	October	November	December	January	February	March	April	May	June
evap (mm/month)	75	88	111	171	204	265	273	201	194	123	93	69
crop factor	1	1	1	1.2	1	1	1.1	1.2	1.2	1	1	1
CWR (mm/month)	75	88	111	205.2	204	265	300.3	241.2	232.8	123	93	69
CWR L/tree/month	787.5	924	1165.5	2154.6	2142	2782.5	3153.15	2532.6	2444.4	1291.5	976.5	724.5
Avowest Runtime/Day (hours)	0	0	2	3	5	6	4.5	4	4	3	2	1
L/tree/month			2100	3255	5250	6510	4882.5	3920	4340	3150	2170	1050
kL/ha (3.5mx7m spacing)			856.8	1328.04	2142	2656.08	1992.06	1599.36	1770.72	1285.2	885.36	428.4

408 trees/ha, 35L/hour/tree dripper output, 10.5m<sup>2</sup> canopy area (3m x 3.5m).  
 Approx Irrigation Usage: 14,994kL/ha

# Drip Irrigation Project – Avowest 12 x 10mins/day (April-May 2010)



# Drip Irrigation Project – Avowest

## Leaf Analysis Results

Element	Low	Sufficient	High	Drip area	Area 1
<b>Total N</b>	< 2.0	2.0-2.4	> 2.5	2.73	3.01
<b>P</b>	< 0.05	0.08-0.25	> 0.3	0.22	0.2
<b>K</b>	< 0.35	0.75-2.0	> 3.0	1.55	1.09
<b>Ca</b>	< 0.5	1.0-3.0	> 4.0	1.73	1.63
<b>Mg</b>	< 0.15	0.25-0.8	>1.0	0.43	0.42
<b>B</b>	< 10-20	50-90	>90-250	35	29
<b>Fe</b>	< 20-40	50-200	> 200	52	80
<b>Mn</b>	< 10-15	30-500	> 1000	52	85
<b>Cl</b>			>0.25	0.49	0.79
<b>Na</b>			>0.25	0.01	0.03
<b>Zn</b>	< 10-20	30-150	> 300	31	47

# Drip Irrigation Project – Avowest Photos



# Drip Irrigation Project – Avowest Photos



# Drip Irrigation Project – Avowest Photos



Thankyou for your time today!



I hope you leave with something useful?