

## 2010-2011 Irrigation Scheduling – Table Grape Update for Growers



### *It was another dry season.....*

With only 406mm of rainfall this year (July 2010 – May 2011) and only 96mm falling between late Sept 2010 and April 2011, this growing season was one of the driest years on record again.

Combine a dry year with a relatively low percentage of rainfall that is effective (canopy interception is very high) and hits the vineyard floor, the water use equation stacked against you to keep within a set water resource allocation of 5000kL/ha.

The irrigation season started on the 20<sup>th</sup> Sept 2010. First irrigation in 2009 was 12<sup>th</sup> October. Soil moisture levels at Sept 2010 were 12% less than Sept 2009. The irrigation season started about 1 month early due to reduced soil moisture levels.

Irrigation schedule changes: 2-3 shifts per week to reduce possibility of fungal diseases. Slightly increase irrigation amount applied to the vines in February and March and must ensure wetting fronts reach 30cm as vines start to draw available moisture from 30cm. An extra 10% was added to the crop factors.

Production Results: 22kg/vine, equal to 24,934kg/ha (1140 vines/ha). Water Use Efficiency = 3.95kg/kL

	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>March</b>	<b>April</b>	<b>Total</b>
<b>Epan (mm)</b>	61	189	260	292	299	285	275	123	<b>1784</b>
<b>Rain (mm)</b>	0	25.2	7.6	16	43.2	0.4	0	4	<b>96</b>
<b>Crop Factor</b>	<b>0.11</b>	<b>0.16</b>	<b>0.27</b>	<b>0.33</b>	0.38	0.44	0.44	<b>0.33</b>	
<b>CWR (mm)</b>	6	30	70	96	113	125	121	40	<b>601</b>
<b>kL/ha</b>	60	300	700	960	1130	1250	1210	400	<b>6010</b>
<b>Actual water applied (mm)</b>	20	20	70	100	110	134	151	26	<b>631 or 6310kL/ha</b>
<b>Actual Crop Factor</b>	<b>0.32</b>	0.10	0.26	0.34	0.36	0.47	<b>0.54</b>	0.21	

Evaporation is a major driver of vine water use. Comparing last season to the present season, Epan evaporation was highly variable from month to month. This is a very timely reason to monitor these figures as it relates directly to vine water use and how much irrigation to apply.

	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>March</b>	<b>April</b>	<b>Total</b>
<b>2009-2010 Epan (mm)</b>		116	218.8	309.6	344.6	257.2	236.6	133.4	<b>1596.2</b>
<b>2010-2011 Epan (mm)</b>	61	189	260	292	299	285	275	123	<b>1784</b>

### **Soil Texture and Water Holding Capacity (readily available water)**

A quick refresher on how soil texture can influence water holding capacity of different soil types. There are many different soil types in the Swan Valley from grey sands in Henley Brook and parts of West Swan to gravelly clay soils near Baskerville. Each soil type has the ability to hold different amounts of water and if gravel is present then water holding capacity may be significantly reduced.

For example, in the Crimson Seedless block at Peter Nuich’s the soil texture is Light Clay. Light clay has the ability to hold approximately 45mm of water per meter of soil. With a rootzone of 0.5m, the RAW is only 22.5mm. It is up to each individual grower with the guidance of local knowledge and soil moisture monitoring equipment to determine how much irrigation to apply and how dry you want the soil to get between irrigations. Irrigations should commence after 30% of the RAW has been depleted. For the example above, irrigations should commence once the RAW reaches 15-16mm.

At -40kPa tension (refill point for table grape crops under production), the approximate readily available water and total available water for different soil textures are:

Soil Texture	Readily Available Water (mm/m)	Total Available Water (mm/m)
Sand	35	60
Sandy Loam	60	115
Loam	70	150
Clay Loam	55	150
Light Clay	45	150
Medium to Heavy Clay	45	140

Note – total available water includes all water held in the profile including hygroscopic, capillary and gravitational water. Hygroscopic and gravitational may not be available to the plant.

Example

Soil Texture: 20cm of Clay loam (55mm/m) over 30cm of Light Clay (45mm/m)

0.2m x 55mm/m = 11mm

0.3m x 45mm/m = 13.5mm

Rootzone RAW = 24.5mm of readily available water (in the rootzone)

#### **Scenario for Drip Irrigation – Crimson Seedless Table Grape**

4L/hour dripline @ 0.7m spacing

2.0m vine spacing, 3.5m row spacing

1428 vines/ha

	Sept	Oct	Nov	Dec	Jan	Feb	March	April	Total
Evap (mm)	61	189	260	292	299	285	275	123	1784
Rain (mm)	0	25.2	7.6	16	43.2	0.4	0	4	96
Crop Factor	<b>0.1</b>	<b>0.15</b>	<b>0.25</b>	<b>0.3</b>	<b>0.35</b>	<b>0.4</b>	<b>0.4</b>	<b>0.3</b>	
CWR – drip(L/vine)	43	198	455	613	732	798	770	37	3646
kL/ha	61	282	649	875	1045	1139	1099	52	5206
runtime/day (hours)	1	1.5	3.7		5.9				

Note: The recommended CWR (L/vine) may change due to soil type, visual signs of moisture stress, time of year, soil moisture levels and rainfall.

As you can see, if you delivered water to the vines via drip and micro sprinkler irrigation systems, both were over the 5000kL/ha budget amount with drip being 5206kL/ha and micro sprinklers 6010kL/ha (theoretical amounts).

Kind regards,

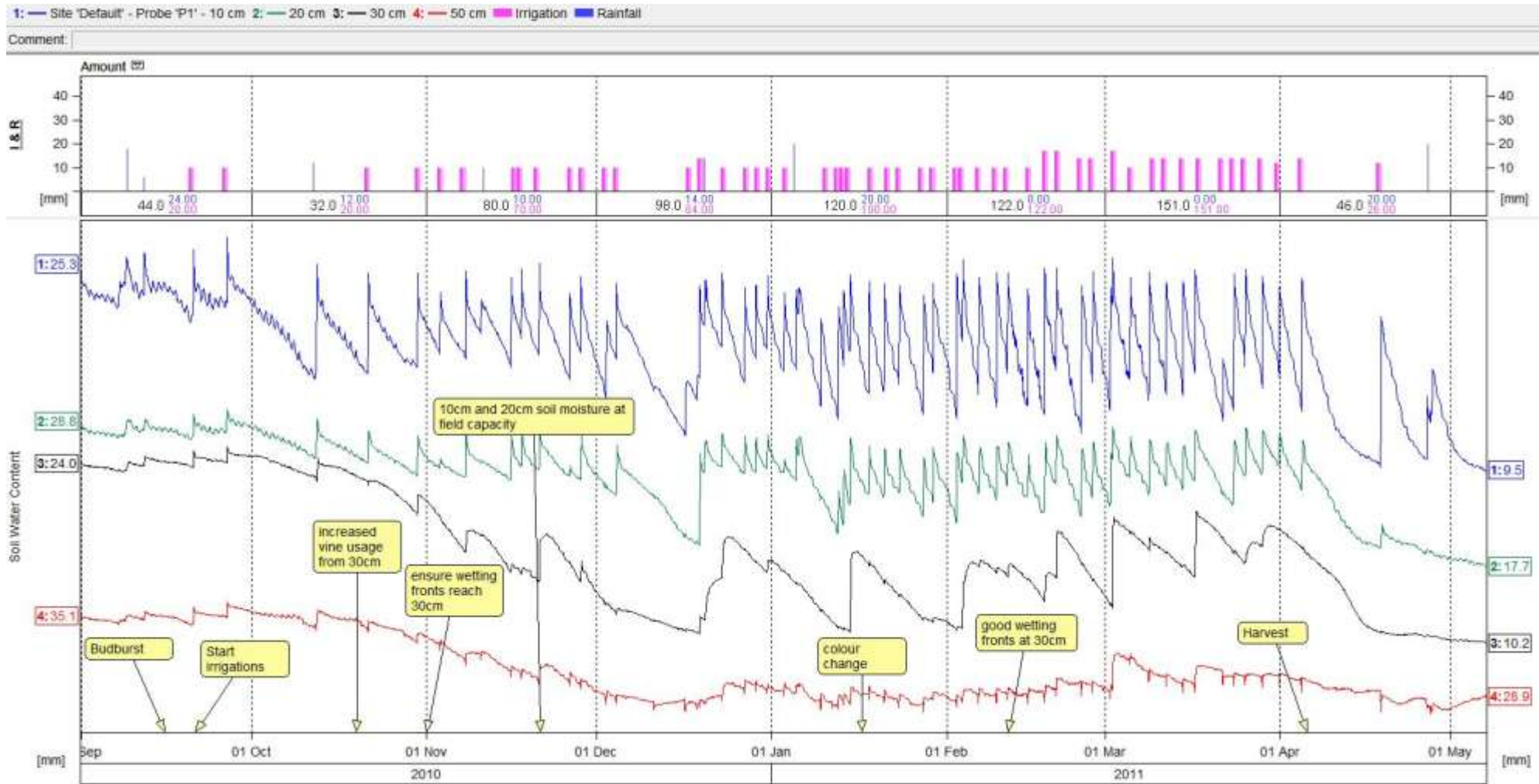
David Gibb – Waterwise on the Farm

Ph: 9374 3306 or 0466 744 952



CARING FOR OUR COUNTRY

This project is supported by Perth Region NRM through funding from the Australian Governments Caring for our Country.



#### Soil moisture graph:

- Good available moisture at 10 and 20cm. Similar to winter “full” levels.
- 30cm soil moisture ranged from 25mm in October to 11mm in December.
- Soil moisture at 50cm does not vary as much as the surface and only has range of 8mm from full to dry.
- To increase soil moisture at 30cm, two irrigations of similar length are needed, 1 day apart (eg – mid Jan, early Feb).
- There are no right or wrong soil moisture limits/thresholds. Use your experience, vine growth stage, weather conditions and soil moisture monitors to justify your choice.