POTATOES 2006/2007

3.1 INTRODUCTION

The purpose of this trial was test how AquaBoostAG30™ would maintain the moisture in the root zone and as such maximise the tuber set which would then show improved final yield at harvest. Maintaining soil moisture levels in the root zone is an important aspect for potatoes growers. Soils which dry out in the early stages of potato plant development may result in a significant decline of tuber set which has a direct impact on final yield (van Loon, 1981).

This trial was conducted by Tandou Agronomic Services, and independent consulting group. The purpose of the trial was to minimise soil moisture variance in the root zone.

3.2 TRIAL INFORMATION

Location: Northern Mallee region of South Australia
Date: The trial was conducted from the October 2006 to January 2007
Size: Treated area – 16 Ha, Control area – 16 Ha
Irrigation Regime: Centre Pivot
Soil: Light sandy soils
Crop: Nadine Potatoes
Application: AquaBoostAG30™ was added via fertigation to 50% of the pivot run. There were 2 applications. The first was pre-emergent on 14/10/06 and the AquaBoostAG30™ was applied at a rate 5L/Ha for the treated area. The second was a tuber set on 31/10/06 and the AquaBoostAG30™ was applied at a rate 5L/Ha for the treated area.

3.3 RESULTS AND DISCUSSION

3.3.1 SOIL MOISTURE MONITORING

Enviroscan soil water measurement probes were installed in the planted area of the row bank and root zone to take accurate data recording.

The data from these probes may be viewed in attachment 2, graph 3 (Treated Block) and graph 4 (Control Block). The most critical feature of the soil moisture monitoring results is the significant difference between the 20cm (depth) sensors in the monitored areas (the root zone). The treated area shows that the soil water content levels were always held above 7mm and was above 10mm level for the

majority of the trial. This compares to the control where the soil water content levels at 20cm only once gave a reading above 4.5mm.

Table 1 below show the data of the soil moisture content for the treated and the control from the probes at depths of 30cm, 40cm and 70cm.

TABLE 1: SOIL MOISTURE CONTENT

Control		
Depth	Soil Moisture Content	
	ca. mm	% Moisutre of total
30cm	3.7	27%
40cm	3.0	22%
70cm	6.8	50%
Total	**13.5**	

Treated		
Depth	Soil Moisture Content	
	ca. mm	% Moisutre of total
30cm	5.5	59%
40cm	2.0	22%
70cm	1.8	19%
Total	**9.3**	

Source: Phillips (2007)

For the control block, c.a. 27% of the moisture is retained in the top 30cm of the soil whereas ca. 50% of the moisture is at a depth of 70cm. This shows that the water percolates past the root zone into deeper soil.

For the treated block, c.a. 59% of the moisture is retained in the top 30cm of the soil whereas ca. 19% of the moisture is at a depth of 70cm. This shows that less water has moved below the usable root zone area.

The 70cm depth water probe sensors data for the treated area has a near constant 2mm soil moisture levels. This indicates the water is being maintained in the root zone and not percolating down through the soil past the potato roots. For the untreated area, the soil moisture contents levels are much higher at c.a. 6.5-7.5mm (3 to 4 times more water is needed).

The irrigation regime was kept identical for both the control and treated blocks.

3.3.2 YIELD

Yield was measured by harvesting potatoes from one square metre plots. The selections were made on a scientific base for both the control and treated blocks at various spans around the centre pivot. The results may be viewed below in Table 2.

TABLE 2: POTATO YIELD (KG/M)

Nadine South			
Span	**Treated**	**Control**	**Span**
6	5.7	1.2	6
6	5.1	1.6	6
6	6.3	2.2	6
5	5.7	1.7	5
5	5.3	2.6	4
5	5.9	3.2	4
4	6.7	1.7	3
2	5.3	2.0	3
2	5.7	1.9	3
mean	**5.7**	**2.0**	
Std dev.	**0.51**	**0.59**	

Source: Phillips (2007)

The treated block produced significantly greater potato yields with a reduced standard deviation of the sample set. Treated yields averages 5.7Kg versus the 2.0Kg of the control block. The yield increase was more than 250% for the treated block with all other conditions kept the same.

Table 3 shows the total number of potatoes harvested from the control and treated plots. The left column is the premium (larger) potatoes and the right column is the regular potatoes.

TABLE 3: TUBER NUMBERS PER HARVESTED PLOT

Tuber numbers premium and chats				
	Treated		**Control**	
	25	12	0	19
	19	10	3	15
	22	16	3	18
	16	24	1	17
	20	10	10	7
	21	18	13	12
	21	11	6	10
	20	18	7	10
	20	24	6	9
Mean	**20**	**16**	**5**	**13**

Source: Phillips (2007)

Higher yields are reflected in increased tuber set and size. While the total number of tubers per metre was greater in the treated area (36 tubers in the treated plot and 18 in the control plot) the number of larger tubers (premium) is also larger (20 in the treated plot and 5 in the control plot).

3.4 CONCLUSION

The treated AquaBoostAG30™ area clearly shows higher water levels in the usable root zone at 20cm and 30cm. It is noted that water levels remain constant for longer time intervals.

The control area water probe readings show that the majority of water is found at soil depth 70cm – this water is below the usable depth for potatoes.

The result of maintaining the water in the root zone was a large increase in the total yield as well as increasing the production of premium quality tubers.