

EnviroSCAN®

The Original and Still the Best in Stone Fruit

Introduction

A nectarine grower from Lismore, New South Wales participated in an irrigation comparison study carried out on two adjacent blocks on his property, each containing approximately 180 trees. One of the key aims of the study was to compare yield and water use on the two blocks. Another objective was to gather information on crop water use and extraction patterns of low-chill stonefruit grown on red Krasnozem soils.

The rich red Krasnozem soil on the grower's property is freely draining. Placement and retention of nutrients in the rootzone is important as it saves money and can help to increase returns. Freely draining soil makes it difficult to keep nutrients in the higher levels of the soil, making effective irrigation scheduling even more crucial.

Trial Set Up

On Block 1, the grower maintained his current irrigation scheduling practices using tensiometers, 'gut feeling' and industry standards. On Block 2, irrigation was scheduled according to the data supplied by an EnviroSCAN®.

Sentek's flagship product, EnviroSCAN® has become the most widely used continuously logging, irrigation management tool in Australia. The EnviroSCAN® is a complete and stand alone soil moisture monitoring solution. The data obtained by the EnviroSCAN® sensors is collected by a central logger and then downloaded by the grower by a variety of telemetry methods. The EnviroSCAN® software program converts this information into graphical form to give growers a better understanding of moisture levels in the soil profile.

The EnviroSCAN® system installed on the property consisted of a 1.5m probe with sensors located at 10cm, 20cm, 40cm, 70cm, 100cm and 150cm. The probe was located within 50% of the distribution of the sprinkler's radial coverage and the trees were planted on a 4 x 2.5 metre spacing.

All other areas of crop management such as fertiliser application, fruit thinning and pest control remained the same on both blocks and the irrigation system used on each block was also kept constant.

Results

The trial illustrated the positive effect soil moisture monitoring with EnviroSCAN® can have on crop and farm management. With the irrigation schedule data from EnviroSCAN® the grower achieved a:

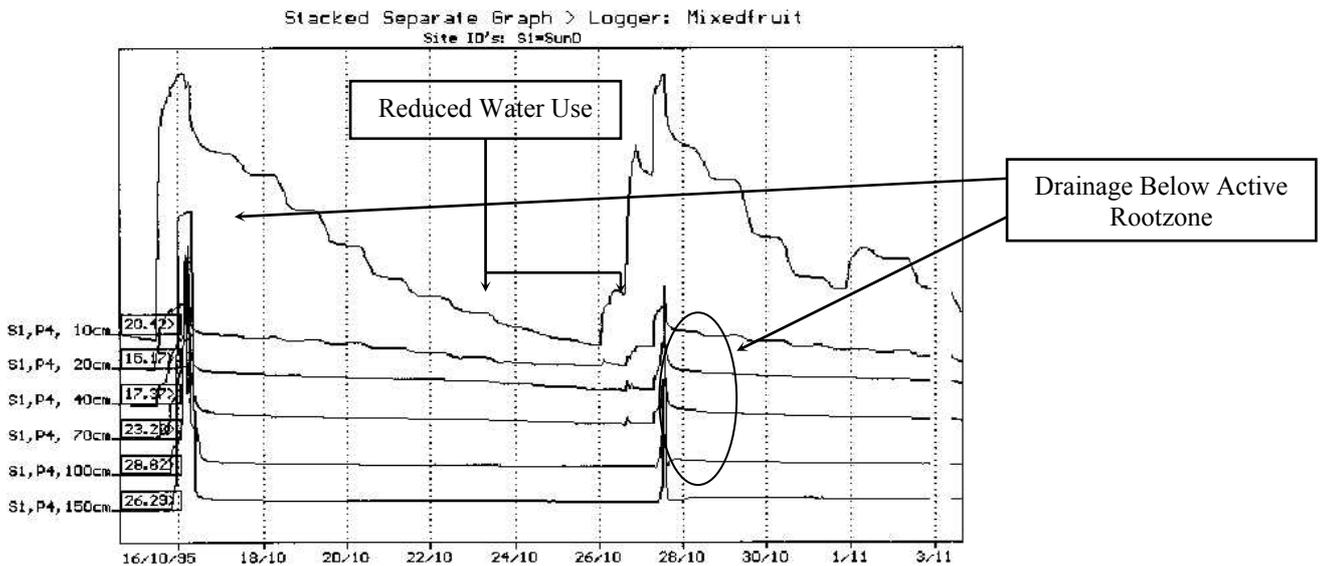
- ✓ 38% increase in gross return per hectare
- ✓ 22% saving in water applied over a three month period
- ✓ 76% increase in dollar return per ML of water applied
- ✓ Increase in average fruit size

How EnviroSCAN® helped to increase fruit size and yield

Increasing fruit size and yield is a desirable outcome for stone fruit growers as increases in both help provide greater returns on each crop. One of the main factors in fruit size and yield is maintaining adequate moisture levels in the active rootzone where the plants absorb most of their water requirements.

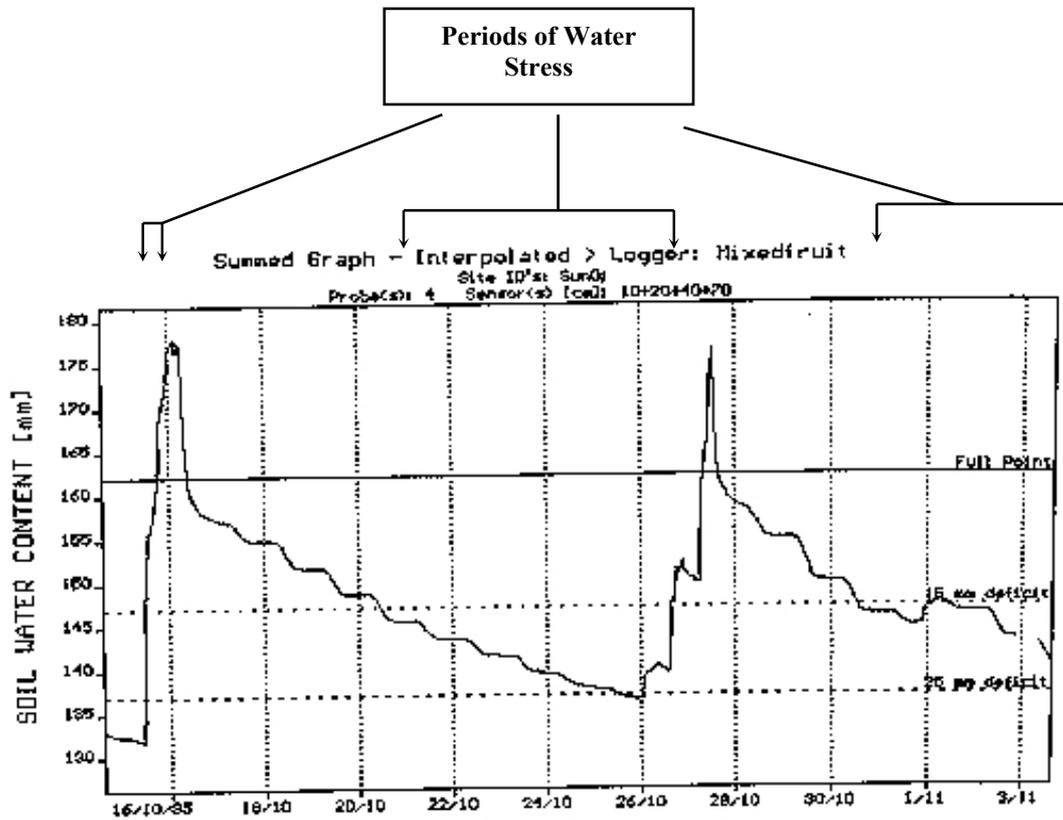
Graphs based on the EnviroSCAN® data showed that the majority of crop water use occurred in the top 20cm of soil. Drainage through the soil and the length of time between irrigation events led to a lack of water in this zone. As a result, the trees became stressed and crop water use declined. This can be seen in the graph below:

Graph 1. Drainage below active root zone

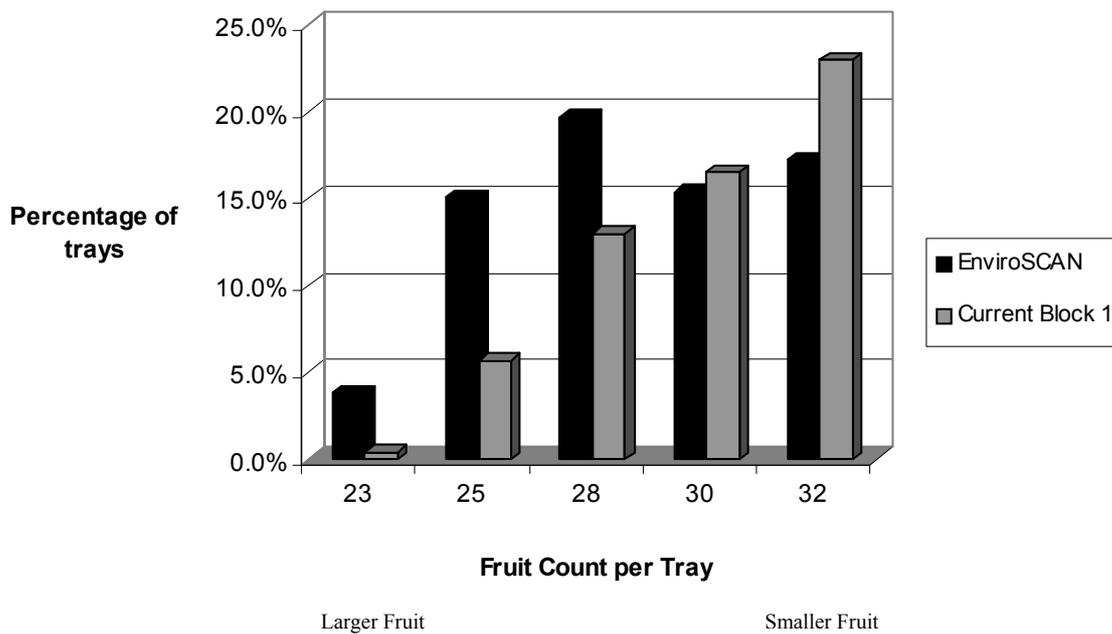


The EnviroSCAN® also showed that there were several periods of water stress during the critical fruit growth period. Adequate water levels are especially important at this time, as this critical growth period occurs at the same time as the dry period in October to December.

Graph 2. Periods of Water Stress



Graph 3. Fruit Size Distribution



One of the key indicators of a successful nectarine crop is the size of the fruit, reflected in the average fruit count per tray. Larger fruit means that a grower can reduce the number of fruit needed to fill each tray, allowing for more trays to be filled and sold, thus increasing their return.

Inadequate water at all levels in the soil profile led to smaller fruit on the block irrigated by the grower's previous methods. With the irrigation schedule based on data from the EnviroSCAN®, **fruit size was greatly increased.**

As an example, the average fruit count per tray for the block irrigated according to EnviroSCAN® data was 30 pieces. On the block irrigated by the grower's current methods, the average count was 32 pieces. Also, a higher number of fruit per tray counts of 23 and 28 pieces were recorded from the EnviroSCAN® irrigated block.

Furthermore, the increase in yield and fruit size lifted the grower's gross return per hectare from \$16,925 to \$23,410 - **an increase of \$6,485/Ha or 38%**.

How EnviroSCAN® increased water use efficiency

The increasing scarcity of water for irrigation is making it more important for many growers to become more aware of their water usage. Not only is there increased pressure to reduce the amount of water being used, there is also an increasing market demand for quality and yield to be maintained and improved.

Using his previous irrigation schedule the grower applied 4.24 ML/Ha on his crop, with an irrigation schedule based on EnviroSCAN® data, he used only 3.3 ML/Ha. **The result was a 0.94ML/hectare saving in the amount of water applied in a three-month period.**

By irrigating more often but with less water the grower was able to maintain moisture levels in the top 20cm of soil and minimise water drainage below this zone, which led to the decrease in overall water use. Previously, irrigation was conducted once a week, whereas with EnviroSCAN® it became once every three days, with 15-18mm of water applied. The water the grower applied was used more effectively, which was reflected in the increase in fruit size.

Water use efficiency can be measured according to the gross return per ML of water applied. Table 1 illustrates that the growers gross return per ML of water applied increased by over one third using an irrigation schedule based on EnviroSCAN® data.

Table 1. Comparison between current practice and EnviroSCAN®

	EnviroSCAN®	Current Practice	Increase/ Saving	% +/- Change
Gross return per hectare	\$23,410	\$16,925	\$6,485	+38%
Water applied in 3 month period	3.30 ML/Ha	4.24 ML/Ha	0.94 ML/Ha	-22%
Dollar return per ML	\$7,094	\$3,990	\$3,104	+76%

Summary

Soil moisture monitoring with EnviroSCAN® showed that the grower's current irrigation practices were inefficient. It highlighted that due to drainage below the active root zone, the trees experienced water stress during critical growing periods.

The use of EnviroSCAN® to schedule irrigation had many advantages for the grower including:

- ✓ Reduced fruit count per tray due to larger fruit;
- ✓ Increased gross return/hectare by \$6 485, or 38%;
- ✓ Reduced water use by 0.94ML/Ha over a three month period, and;
- ✓ Increased dollar return/ML of water by \$3 104 or 76%.

By using EnviroSCAN®, the grower was able to more closely match the plants' water needs with the irrigation he provided. As a result, water stress was eliminated during critical growth stages and fertiliser remained in the active root zone to provide more nutrition to the plants resulting in increased fruit size and yield.

This direct comparison study proved what an important role the EnviroSCAN® system can play in total farm management.

The trial showed the grower that soil moisture monitoring ensures that plant needs are met, with little wastage through drainage below the root zone. Furthermore it proved to the grower just how much of a difference effective irrigation scheduling can make in terms of water use efficiency and yield improvements.

For more information on EnviroSCAN® and Sentek Sensor Technologies new product range please visit www.sentek.com.au, contact Sentek's Marketing Coordinator Adrian Manera at amanera@sentek.com.au or freecall 1-800-244-763.

Acknowledgements

This case study has been adapted from the research undertaken and presented at the IA Conference in May 2000 by Peter Broomhall, Graeme Robertson and Graeme Cole.