

On the ground: Water use efficiency in horticulture

Pineapples are such a well known horticulture crop on the Capricorn Coast that they have their own festival, Pinefest which is organised by the Yeppoon Lions Club and has run for over 30 years. For nearly as long as Pinefest has been running Colin & Gail Stevens have been farming pineapples – 27 years all up!

In a partnership with their son, Nathan and daughter in law Crystal they grow pineapples for three different markets at "Lake Mary Pines", a 116ha farm north of Yeppoon. Their pineapples are sold as fresh fruit, with Golden Circle supplied with bulk fruit for canning, and juice grade fruit for juicing, cordials and softdrinks.

Irrigating pineapples – improving on 'gut feel' and guess work

Do pineapple crops need an inch of water each month? Can they be watered more efficiently via drip irrigation than overhead sprinklers?

The Yeppoon and District Co-op and the Stevens' set up a trial in July 2005 to answer these questions by comparing production (yield) and irrigation efficiency (water use) on 1.5ha of "Lake Mary Pines".

A Plastrow drip irrigation system was installed on one 10 and two 9 row blocks. For comparison a 10 row block was irrigated using an overhead sprinkler system with another block left 'dry' as a control. EnviroSCAN, an automated soil moisture monitoring system consisting of probes and a data logger was installed to record the soil moisture in the sprinkler and drip irrigation blocks.

"Lake Mary Pines" Neighbourhood Catchment Incentive Scheme
Project Map



Pleasing results – nothing 'drippy' about crop yield

With a successful harvest and two years of EnviroSCAN data Nathan Stevens is clearly happy with the results of the trial. "The trial definitely demonstrated water saving while increasing production. The drip irrigation block grew a more consistent sized plant across the board compared to overhead irrigation. Fruit size, as well as being larger, became more uniform towards the premium sizes. We also grew more fruit on the drip irrigated block."



Figure 1. Yield comparison in Tons per acre between dry, drip and overhead irrigation NB The 'dry' block was irrigated halfway through the trial due to lack of rain and the possibility of losing the crop.

Fitzroy River & Coastal Catchments (FRCC) Field Officer Chantelle James agrees with Nathan's comment on both quality and quantity. "What we see is that drip irrigation grows more uniform sized fruit for the fresh fruit market which, as the premium market, improves farmers' returns.

A cost/benefit analysis shows that drip irrigation infrastructure costs twice as much to install than overhead sprinklers. However the increase in yield produces a financial return which covers these costs and produces a profit.

Data supplied by the Stevens family & Tropical Pines packing shed



Harvest time saw size 7, 8 and 9 pines – the best size pines for the fresh fruit market – being consistently picked on the drip irrigated blocks.

Photo: by Gail Stevens

Irrigation with water 'smarts'

Drip irrigation provides a more accurate and efficient way to deliver water without the common weather dependency issues of overhead irrigation. Note the over and under watering shown in Figure 2.

Significant water savings are another major benefit of drip irrigation. The overhead irrigation system used **twice** the amount of water to irrigate the same area for the same amount of time. With refinement the drip irrigation system could recoup a 70% reduction in water use.

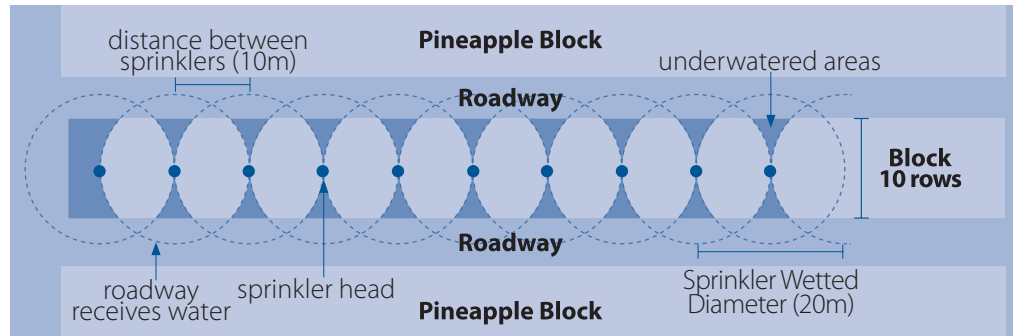
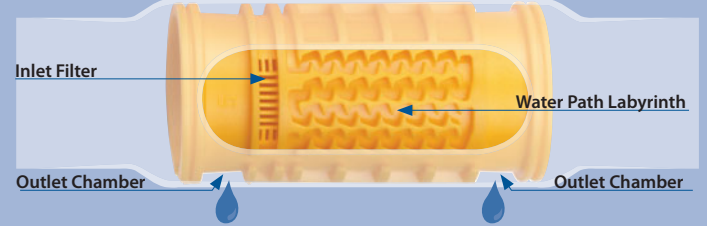


Figure 2. Overhead sprinkler watering pattern

Different drip systems

To achieve the water use efficiencies seen in this trial patented technologies were used. The Plastro Hydrogol dripline is designed with a labyrinth insert at each drip hole to minimise clogging and retain uniform pressure along the line, even on slopes, to ensure even distribution of water to the crop.

Figure 3. Plastro Hydrogol dripline



Monitoring the moisture – tools & technology to measure the savings

To measure the water use efficiencies in this trial Sentek's EnviroSCAN, an automated, electronic soil water monitoring system was used.

"EnviroSCAN is like a set of eyes underground watching the changes to the wetness in the soil profile with irrigation and rainfall" says Chantelle. "It tells you when your crop roots are at wilting point or saturation point so you can irrigate with precision and take out the guess work."

Probes capture this data which is displayed as a graph using the system's software, Irrimax.

Future uses for drip irrigation at Lake Mary Pines

"Drip irrigation could allow us to apply the necessary chemicals (to combat nematodes and fungus) and fertiliser straight to the root zone. This normally cannot be done because of our dry weather pattern." says Nathan.

Trial Partners

"Support from the Yeppoon and District Co-op and Growcom has been the key to this trial's success" says Chantelle. "These organisations work with horticulturalists to give them the edge in sustainable production."

FBA and groups like FRCC are working together for a sustainable Central Queensland

Fitzroy Basin Association provides funding and support to sub-regional groups like FRCC.

If you'd like to know more about this project or others in the Fitzroy Basin region, visit our web site, www.fba.org.au, or contact our office (details below).

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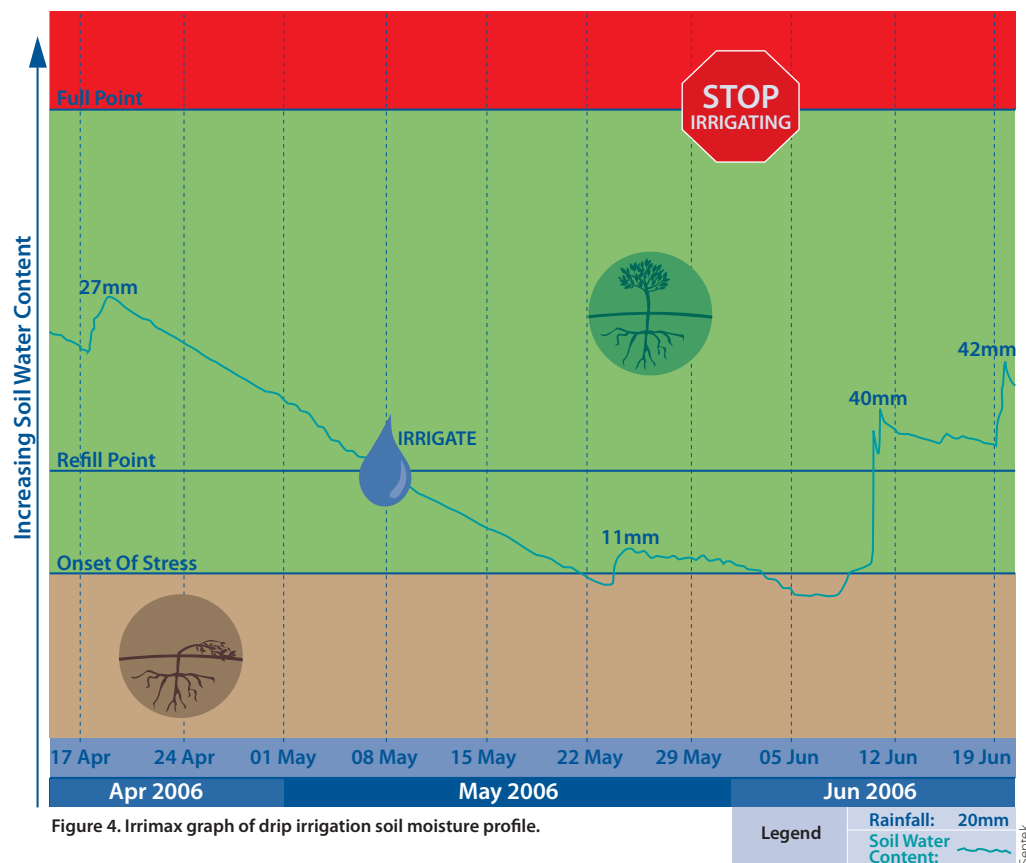


Figure 4. Irrimax graph of drip irrigation soil moisture profile.