

The Importance of Irrigation to Growers



In depth interviews with 110 irrigators across the South East of England have shown that:

- Over 70% of growers regard irrigation as 'Crucially Important' to their business
- There is typically a 2 to 4 fold difference in water use efficiency between growers
- There is strong correlation between optimising irrigation water use and financial returns

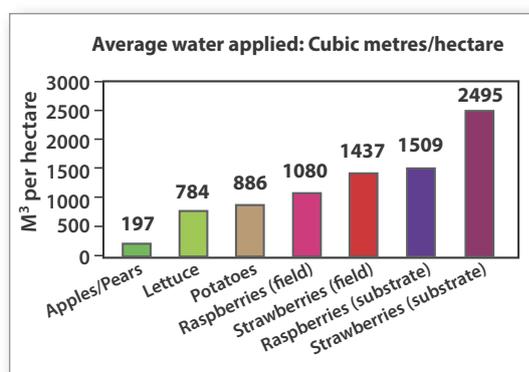
substrate-grown raspberries

The Challenge of Substrate Irrigation

Although trickle or drip systems are highly efficient methods of irrigation delivery, they must meet 100% of the crop's water requirements. The intensive nature of substrate production, and the extended growing period, means that substrate crops use significantly more water per hectare than field and spray irrigated crops.

With the expansion of substrate production, there has been a major growth in water used for trickle irrigation. In Kent, where the majority of soft fruit growers are based, volumes of water used

for trickle irrigation have doubled in the past 5 years, resulting in demand for irrigation water growing by a third. With the pending removal of the extraction licence exemption for trickle irrigation, growers face potential restrictions on water availability, and the need to improve water use efficiency will be critical.

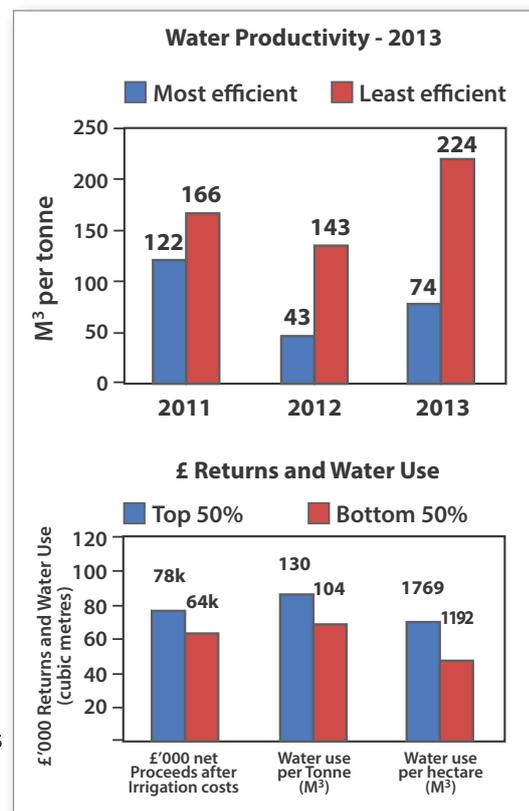


Raspberry Water Use Efficiency and Financial Returns

The WATER R research confirmed that raspberries are particularly demanding in terms of irrigation water requirements. On average, substrate raspberry growers used 111 cubic meters per tonne of crop produced which was significantly higher than that for most other crops. However, there was a 2 fold difference in water use productivity between growers, ranging on average from 80 up to 178 cubic metres per tonne.

There was also a strong correlation between water use performance and financial returns:

- The Top 50% of growers in terms of financial returns achieved net proceeds after irrigation costs of £78,000 per hectare on average, compared with £64,000 for the Bottom 50%.
- Unlike other crops in the survey, these Top growers used 25% more water per tonne of crop produced than other growers, reflecting the responsiveness of raspberry yields to water volumes used
- Although this may be due to other factors such as cropping densities, optimising water inputs is more important than water efficiency per se in maximising yields and returns. By so doing, the Top growers achieved average marketable yields of 14 tonnes per hectare which were 23% higher than other producers



Irrigation Best Practice: Grower Perspectives

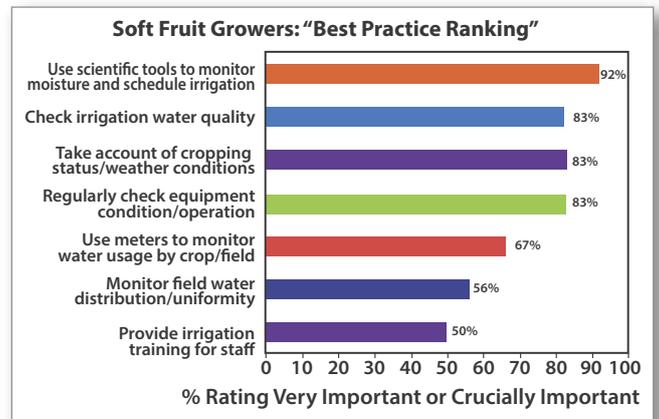
'Best Practices' regarded as most important in optimising irrigation performance and financial returns:

- Using scientific tools to monitor soil and substrate moisture levels to optimise scheduling was ranked as 'very' or 'crucially important' by over 90% of growers. There is, therefore, extensive use of probes and computerised systems to optimise irrigation frequency and duration
- Taking account of crop status and weather conditions was similarly rated by 83% of growers.

However, growers need better integration of these technologies with other scheduling and application systems

- Regularly checking irrigation equipment condition and operation was also highly ranked by over 80% of growers. Equipment malfunction can be extremely costly and growers emphasised the importance of

using the latest systems and undertaking regular monitoring and servicing



Optimising Water Use in Substrate Raspberries – Latest Research Findings

Currently, excessive fertigation to substrate-grown raspberry crops results in vigorous vegetative growth which makes crop management difficult and harvesting costly. Improved management of water and fertiliser inputs is needed to optimise productivity and quality in the sector.

Research conducted at EMR has developed and tested several different approaches to optimising water and fertiliser inputs to substrate-grown raspberry crops, including a precision automated irrigation system, based on continuous measurements of coir moisture content. In experiments, the precision irrigation system delivered water and fertiliser savings of 14-45% in different growing systems, and improved marketable yields by 25% compared to commercial values. The precision closed loop system also has

potential to be used to impose targeted root-zone moisture deficit stresses to reduce cane vigour without affecting marketable yields or quality.

Improving the efficiency of production and harvesting will become increasingly important for many fruit growers following the announcement by Government of the new National Living Wage in the Summer Budget 2015. A grower-facing Decision Support System that integrates data from coir moisture sensors, models of cropping responses to environmental metrics and weather probability forecasting is being developed in a new Innovate UK-funded project at EMR; this will help substrate raspberry growers to manage their crops more effectively and optimise productivity, quality and environmental sustainability of the sector.



Summary

Irrigation is complex and time consuming. Maximising returns requires optimisation of many variables, in particular substrate moisture monitoring, irrigation frequency and duration. As one grower put it:

"It's about getting the right amount of water to where it's required at the right time."

This factsheet highlights the specific irrigation performance of substrate raspberry growers participating in the WATERR Project 'Irrigation Business Review' interviews and covers 10 irrigated crops over the period 2011 to 2013.

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