Control Technology For Substrate Production

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PHOTO: To make better adjustments and achieve the highest yield, climate sensors can measure temperature, relative air humidity and CO_2.
By adding a plant temperature camera you can also gain precise insight into the transpiration from your crop, the cell-division speed, cell differentiation (generative / vegetative) and cell stretching

Growers around the world have been considering substrate production as an alternative to traditional soil growing techniques.

Factors such as the need to sterilise soil, the risk of soil-borne diseases, increasing cost and scarcity of competent labour, environmental issues, and the increasing cost and availability of good quality irrigation water have driven the need for change.

Substrate production involves growing plants on a growing medium and the benefits include the precise control of the plants' root environment and nutrition, allowing the grower to 'steer' the crop in achieving the optimum balance of quality and production.

At the same time, water and fertiliser consumption can be accurately and carefully managed to minimise waste.

Growers have also been adopting increasingly sophisticated levels of technology.

One example of this is the adoption of different techniques for injecting fertiliser with water. Many growers do this by mixing fertilisers in a large tank before the irrigation of the crop.

The next level is the adoption of simple water-driven proportional fertiliser injectors, such as Dosatron injectors which draw concentrated fertiliser solutions from stock tanks.

As calcium nitrate does not mix well with any form of sulphate when in concentrated form, there are usually at least two dosing injectors needed, each drawing from separate stock tanks.

Apart from the need to adjust the dosing levels manually, these types of units are limited in capacity, and may wear over time causing their accuracy to diminish.

More recent fertiliser dosing technologies now involve a direct injection dosing unit, controlled by a suitable controller.

The dosing unit features electrical conductivity (EC) and pH sensors, a pump and dosing channels. Each dosing channel draws from a separate stock tank. Often there is also a separate dosing channel to draw from the tank with acid or alkali used to correct pH of the irrigation water.

The controller uses water measured through a flow meter, the strength in the stock tanks, the capacity of the dosing channels and the desired EC and pH to determine the optimum level of dosing needed to achieve the set targets.

Apart from scheduled irrigation, many controllers these days also use light to automatically trigger irrigation, more often during sunny periods and less often during dull days.

A more recent advance has been the use of scales to measure changes in plant weight to determine transpiration, which automatically influences irrigation scheduling.

Once configured, such automatic systems free up the grower to focus on other aspects of crop management.

These systems are now starting to feature in many properties across Australia.

Other advancements have been in crop and labour registration and management.

Recent systems use cloud-based services which allow managers to register activity both in the field and in the pack house; allowing them to improve staff efficiency and provide staff performance incentives, on the recorded outcomes achieved.

It also allows different crops to be tracked and the incidence of pests and diseases to be recorded.

More information on this technology and case studies that illustrate how it can be successfully used in your business can be obtained from Powerplants Australia.

These advances in crop production will help you to grow top quality tomatoes, berries, flowers and other crops, whilst also saving on time, water, energy, labour and money.

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