Healthy Country

managing the land for healthy waterways

Sustainable nursery practices

FarmFLOW
growth through good practice

Drip irrigation trial

On-going low annual rainfall coupled with tightening of water resource policy has increased water prices and reduced supply to irrigators across southeast Queensland. This has driven the need to trial more efficient methods of irrigation. Traditionally production nurseries have used overhead sprinklers to irrigate plants.

The efficiency of these systems has been questioned. Sprinkler heads often use high volumes of water, and irrigate a larger area than the intended target. Efficient irrigation practices can also reduce nutrient leaching leading to improved nutrient management.

Tropical Exotics, a production scale nursery in the coastal Pumicestone region was recently assisted in an evaluation of the comparative efficiency rates of an overhead irrigation system and a drip irrigation system. The nursery produces a range of indoor plants for distribution to retail markets and uses the traditional overhead irrigation system. The trial was undertaken in a shade-cloth igloo (30 m x 4.5 m or 135 m^2).

Aims

To quantify the amount of water used by an overhead irrigation system (browning spinner) compared to a drip irrigation system (Plastro®) to meet plant requirements in a shade house of ***Pothos totem*** (devil's ivy) in 250–300 mm pots.

This trial evaluated the efficiency of overhead sprinkler (top) and drip irrigation (bottom) systems in a commercial plant nursery.

Healthy Country partners:

SEQ Catchments

Healthy Waterways — Because we're all in the same boat

Queensland Government

SEQTOA

Type	Cycle time	Irrigation schedule	No. of units	Unit vol. per min. (L)	Volume per cycle
Browning spinner	2 x 3 mins	daily	15	7	630
Plastro® dripper	4 x 6 mins	daily	600	0.15	216

What we did

The drippers and spinners were operated under normal conditions for allocated time periods following normal nursery operational procedures. These time periods were predetermined by the operator to ensure field capacity volumes were met. The drippers ran for six minutes four times a day and the browning spinners ran for three minutes twice a day.

We captured the volume of irrigation water required to successfully irrigate under normal conditions. The volume used for both overhead and drip irrigation was measured using the catch can method, where irrigation water is captured at the ground level then measured.

What we found

Each browning spinner irrigation head delivered a volume of 420 litres per hour. Considering the igloo has 15 spinners this amounts to a total supply rate of 6300 litres per hour.

Each Plastro® dripper (4 per manifold) delivered 0.9 litres per hour. The Plastro® drip irrigation system in the igloo contains 600 drippers (two per pot) that collectively have a supply rate of 540 litres per hour. Following the recommended irrigation schedule this equates to the use of 630 litres by the spinners (2 x 3-minute cycles) and 216 litres by the drippers (4 x 6-minute cycles). Therefore drippers were 2.9 times more efficient at meeting plant requirements resulting in a saving of 414 litres of irrigation water per day or 2898 litres a week.

The browning spinner system used 414 litres more water per cycle than the Plastro® dripper system.

While the browning spinners were able to irrigate the entire area of the igloo, they could not adequately cover the whole area as extensively as the middle three metres.
The operator highlighted “when using the overhead spinners we always had to hand water the outside rows of plants to ensure they were adequately watered”. The drippers on the other hand are confined to pots, a surface area coverage of 85 m^2. This reveals that 50 m^2 of floor was unnecessarily irrigated by the spinner system equating to a loss of 233 litres with each six-minute irrigation cycle.

Managing N, P, K

Nursery and Garden Industry Queensland (NGIQ) recommend that a container (pot plant) should not exceed a 12% leaching fraction. Within this leachate there should be detectable levels of nitrogen (N), phosphorus (P) and potassium (K) to demonstrate that there is nutrient continuing to be released from the controlled release fertiliser (CRF) and no excessive salt build-up in the container due to the continual release of fertiliser. Further, the industry environmental management system (EMS) recommends that no more than 40 ppm nitrate and 15 ppm phosphates are detected in run-off water from the property. The key point here is that there are different levels of N, P and K used by plants as they grow from a seedling/tube into a saleable plant. This highlights the importance of continual monitoring of water use and fertiliser requirements to achieve improved irrigation scheduling and fertiliser management.

For more infomation

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The Healthy Country Project is a three-year partnership project between SEQ Catchments, DPI&F, scientists from Healthy Waterways and indigenous representation through the SEQ Traditional Owners Alliance. The other project partners are coordinating river restoration works and water quality monitoring in three ‘focal’ case study areas in the Lockyer, Bremer and Logan-Albert catchments.

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