

Irrigation Scheduling Basics

Plants require different amounts of water depending on environmental conditions, plant type and plant size. Many nurseries just water to keep their plants alive, and this usually means that the plants that have the highest water requirement dictate the irrigation schedule for the other plants in the same area.

Daily fluctuations in weather conditions can vary up to 300 percent in summer and, in winter, plants can sometimes go for days without irrigation. If the irrigation schedule is not adjusted to take these variations into account, water use will be excessive, leading to excessive leaching of nutrients, poor plant growth, leaf drop, poor internode spacing, excessive drainage and elevated or contaminated water tables.

The amount of water used by a plant depends on solar radiation, temperature, wind and humidity. If there is not enough water available or it becomes too hard to extract from the potting mix, then the plant stops growing and starts to wilt. If this occurs on a regular basis, then your bottom line is being affected by poor plant growth and too many throwaways.

Plants in the open, which are exposed to full sunlight and wind, will use more water than plants under shade cloth, where solar radiation, temperature and wind are all reduced. Plants in poly or glass houses can experience higher temperatures and humidity but are exposed to less radiation and wind so will generally use less water than plants outside in summer. However, the opposite could be the case in winter and during periods of wet weather.

Therefore, to determine the optimum irrigation schedule, the daily evaporation at the nursery and the amount of water the plants are using needs to be measured.

To apply the correct amount of water to achieve an appropriate level of leaching and not overwater the plants an objective means of determining scheduling needs to be used. Automatic weather stations, measuring daily evaporation, and weighing containers are all methods that can be used to determine irrigation scheduling.

There are many automatic weather stations now available that will calculate evaporation and provide it on a daily basis. Alternatively, you could install a Class A evaporation pan and read the previous day's evaporation first thing in the morning, before setting the irrigations. Another, but less accurate alternative, is to download the daily evaporation from the Internet –sites where this information can be found are:

http://www.australianweathernews.com/forecast_OCF.htm and
<http://www.bom.gov.au/climate/dwo/IDCJDW0400.shtml>.

Once the daily evaporation has been determined, the irrigation time can be adjusted by using the budgeting function on the irrigation controller. For example, you might set the controller to apply 10mm at the 100 percent setting. If the evaporation rate is multiplied by 10 this gives the percentage setting to set the controller to e.g. 5mm x 10 = 50%. On a cool day, the evaporation may only be 3mm, so by changing the percentage adjustment setting to 30 percent, all blocks will get the prescribed water. If it is a hot dry day and the evaporation is 10mm, then the setting is adjusted to 100 percent.

Some simple measurements taken at various stages of plant development will give you an understanding of the range of water requirements across your nursery. To begin measuring the actual water use of your plants, follow these steps:

- Select the container size and plant that is going to dictate the irrigation frequency for each block.
- Once the containers are at their maximum water holding capacity, weigh a representative sample of the pots (containing plants) that have received the average application rate for these blocks.
- Before you next irrigate, weigh the same containers to determine the water (weight) loss. The amount of water lost in millimeters can then be calculated from Table 1.

By measuring and recording the weights of a range of plants and containers in various blocks within the nursery, you can start to group plants into areas with similar water requirements. This information can also be used to schedule the irrigation e.g. if a 100mm pot has lost 50g of weight this is equivalent to 5mm of irrigation. Checking crop water requirements over the growing cycle of the plants, over a number of years will develop a picture for the full range of plants grown.

For a more detail refer to the Nursery Paper “Scheduling Irrigation to Maximise Efficiency” August 2006.

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Container size (mm)	Weight loss (g) for 1mm of water
80	5
100	10
150	20
170	25
200	30
250	50
300	70

Table 1: Water Loss for pot size