# PORTABLE WEIGHT BASED SCHEDULING TOOL

The Portable Weight Based Scheduling Tool has been developed to assist growers in Nursery Production obtain a better understanding of their irrigation scheduling options to improve on-farm water use efficiency.

The Portable Weight Based Scheduling Tool (PWBST) has been developed under the South East Queensland Irrigation Futures (SEQ-IF) program by the National Centre for Engineering in Agriculture (NCEA) at the University of Southern Queensland.

The PWBST provides growers with a snapshot of the changing water balance within nursery growing containers over time in an irrigation zone or block. Growers traditionally have scheduled their irrigation using their experience, an assessment of current weather conditions, the visual appearance of the plant, apparent moisture level of the growing media, and more recently rainfall and evaporation data.

Overseas research has shown that significant water use efficiencies can be achieved utilising soil moisture sensors and computerised irrigation controllers in field production systems.

While there are a number of soil moisture sensors available in the market place, most sensors have been developed for use with mineral soils and several issues complicate their operation in containerised nursery production. The physical size of many of the currently available moisture sensors restrict their use in all but the largest nursery containers and the ingredients and structure of growing media developed for nursery production also often restricts the successful operation of many sensors.

*"Irrigation Scheduling decisions historically have been made using a combination of experience and observation, this new tool provides an opportunity for a grower to fine tune those skills"*
*Barry Naylor 04.04.2011*

The Portable Weight Based Scheduling Tool (PWBST) identifies and records the weight changes of nursery containers in an irrigation zone or block. The changes in weight of a growing container can be increased due to the application of irrigation or rain events or decreased, initially as free water on the foliage and container is lost to wind and/or evaporation, and then subsequently through water lost from the container through leaching and/or evapotranspiration.

The PWBST provides growers with the opportunity to analyse the effectiveness of their current irrigation scheduling practices and also identify and trial possible alternative scheduling adjustments.

On-farm testing has shown the PWBST data can identify plant stress points, container irrigation refill points, container field capacity, evapotranspiration, irrigation events, rainfall and grower irrigation practices, and present this data to the grower in an easy to interpret graph form.
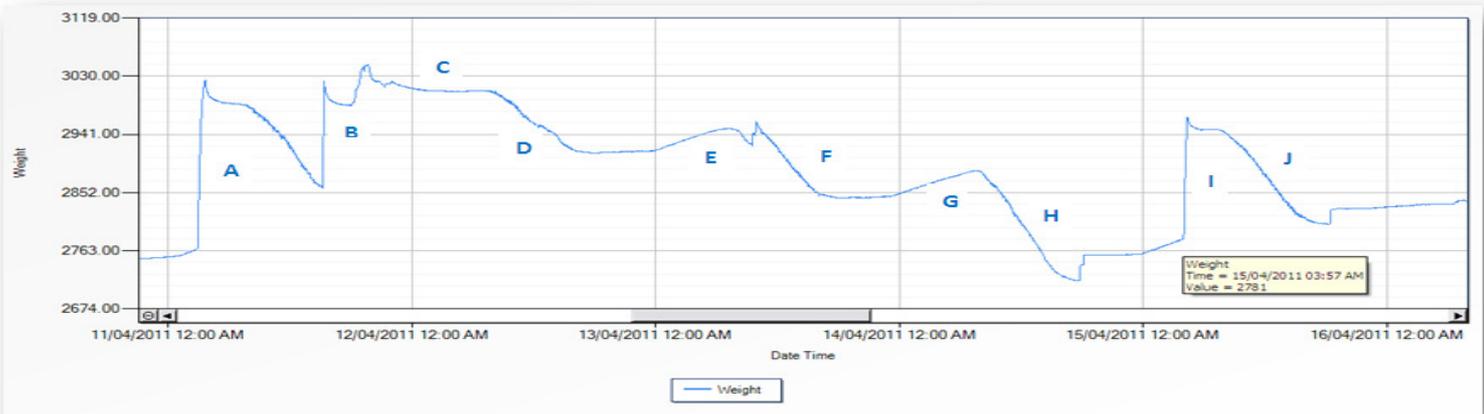


The PWBST graph above identifies the water balance in 200mm containers located within a shade structure in a production nursery over a five day period. Irrigation events (A&I) are easily identified from the data recorded on the graph, along with a significant rainfall event (B), other rainfall (E&G), and evapotranspiration (C,D,F,H,J). The container weight identified on the 'left Y axis' is used to quickly highlight the comparison between the irrigation events on the 11th (2:50am 2.766kgs, 3:40am 3.024kgs), a scheduled irrigation event, and the 15th (4:00am 2.780kgs, 4.20am 2.968kgs) were the grower initiated a smaller irrigation application in anticipation of forecast rain. The data gathered on-farm is best analysed by irrigation professionals along with the grower to identify water use efficiency (WUE) opportunities.

Growers have identified opportunities to utilise the PWBST to compare alternate irrigation scheduling practices, compare growing media blends and additives, identify stress, refill and container field capacity points and identify the efficiency of irrigation systems within various plant canopy densities.
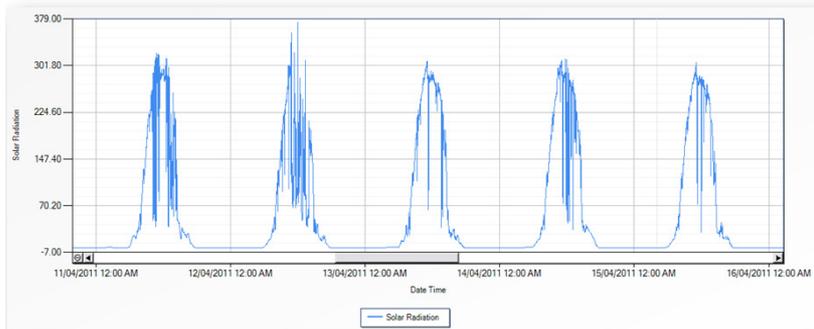


The PWBST also captures data on solar radiation and the surrounding air temperature to allow evaluation against the measured container weight changes.