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Royal Botanic Gardens Melbourne

Fostering Plant Conservation

Founded over 150 years ago, the Royal Botanic Gardens Melbourne, Australia is a leading institution committed to advancing the knowledge and enjoyment of plants and fostering their conservation. The Royal Botanic Gardens aims to make people more aware of the essential role that plants play in all life on earth. Vaisala's automatic weather station was installed in the Gardens in 1998 to provide weather information and reference evaporation data.



There are four key areas within the Royal Botanic Gardens – the Royal Botanic Gardens Melbourne (RBGM), the Royal Botanic Gardens Cranbourne, the National Herbarium of Victoria, and the Australian Research Centre for Urban Ecology.

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Evaporation issues in focus

A key requirement in estimating Readily Available Water (RAW) in the soil is accurate and site-relevant evaporation information. When the RBGM implemented its Water Budgeting Model (WBM) – see definitions in the box – it first relied on data supplied by the Melbourne Bureau of Meteorology.

Trials were carried out by inputting the evaporation data from sites at Laverton and Spring Street, Melbourne into the Water Budgeting Model. The conclusion was that this data was not representative enough of the actual evaporation rates at the RBGM. It was also difficult to obtain accurate enough data for the Irrigation Index during this time. Investigations were therefore commenced with Burnley College to obtain and site an A-Class Evaporation Plan.

However, in May 1997, an outbreak of bacterial disease believed to be fireblight in the Royal Botanic Gardens again highlighted the necessity to monitor weather conditions. The Department of Agriculture therefore provided funds to purchase an Automatic Weather Station (manufactured by Vaisala) to be sited within or near the RBGM. Consequently, Vaisala's automatic weather station was installed in February 1998. In addition to providing data to assist in disease management, a modified Penman-Monteith algorithm was implemented in the weather station software to provide the necessary reference evaporation data.

During February 1999, the management of Government House grounds reverted back to the Office of the Governor of the RBG. By late February 1999, the automatic weather station had been relocated to the newly developed Observatory Gate precinct.

Weather station for weather monitoring

The Vaisala automatic weather station is equipped with sensors for wind speed and direction, temperature, relative humidity, solar radiation and rain-

fall. Data is transmitted via a modem link to the Irrigation Control Room. The Vaisala Qterminal program is used to access current weather information and displays of rainfall and evaporation values for the previous four days from the automatic weather station. Apart from supplying rainfall and evaporation information, the weather station can also provide details of rainfall intensity, a useful property in assessing water infiltration of the soil and run-off data during storms.

The information is used by the Royal Botanic Gardens to:

- assist in the control and management of plant pests and diseases,
- program the Automatic Irrigation System,
- educate students about weather conditions, and
- record rainfall for the Bureau of Meteorology and other government agencies such as the City of Melbourne.

Accurate and reference evaporation data

Providing an optimum site for an automatic weather station in a 150-year-old public garden can be a difficult task. The eventual location depends on a number of factors such as sig-

nificant landscape values, internal and external requirements, location security and the ability to measure representative weather conditions.

The present location of the weather station has proved invaluable in providing accurate and reference evaporation data which is representative of the general site conditions at the RBGM. ■

Definitions

Readily Available Water (RAW)

This is the water potentially available for plant growth between the matric potentials of -10 kPa and -300 kPa at a particular soil depth.

Water Budget Model

A management system that estimates water deficits in the soil and controls irrigation. It considers variables such as effective rain, root depth, RAW, irrigation efficiency, reference evaporation and crop factors.

Irrigation Index

A performance indicator to compare the water applied to the estimated water requirement over the irrigation season.



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