# Detecting Through Drainage Under Onions at Gatton

By monitoring soil water status on a regular basis, soil structural problems and inefficiencies in water application can be identified and improved. Then, from the neutron probe readings, critical soil water levels can be established and maintained in conjunction with optimum plant nutrient levels to achieve consistent yield and quality of vegetables at harvest.

This case study from a commercial onion crop illustrates the importance of regular soil water monitoring for irrigation efficiency.

The Lockyer Valley is a large scale vegetable growing area based on medium to heavy textured, well drained, self mulching clay soils. In recent years the principle source of irrigation water from underground bores has been in short supply as a result of poor replenishment of the aquifer from rainfall and over use by farmers.

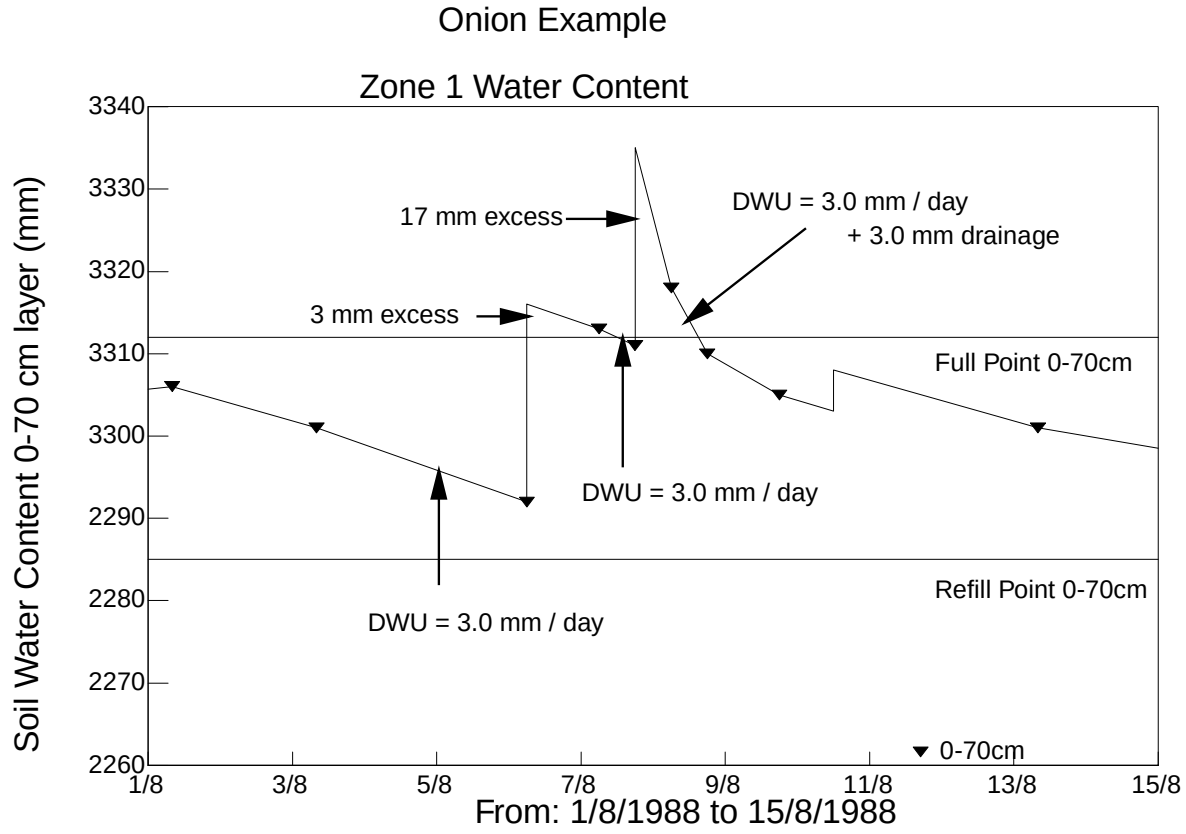


**Figure 1: Soil water content in the surface 0-70 cm during an Irrigation cycle for drip irrigated onions at Gatton**

At Gatton, over watering of a trickle irrigated onion crop resulted in drainage of water below the root zone. T-Tape drip irrigation tubing was used with a 12" emitter spacing and a design output of 3.0 mm/hr. The normal practice of this farmer was to replenish the profile by twice weekly, night-time irrigation of 8 hours duration thus supplying a weekly application of 48 mm to the crop.

The daily water use as determined by neutron probe readings was 3.0 mm/day for the 3 days prior to irrigation on 6/8 (Figure 1). Irrigation commenced at 6:00 pm on 6/8 for 8 hours at 3.0 mm/hr (24 mm total). Neutron probe readings taken immediately before and after irrigation showed a 21

mm increase in soil water content from 292 mm to 313 mm (0-70 cm), indicating that 3.0 mm had been lost as through drainage.

The daily water use on 7/8 was measured to be 3.0 mm (Figure 1). A further irrigation of 8 hours (24 mm) commenced at 6:00 pm on 7/8, despite the soil being close to the full point as a result of the previous night's irrigation. Neutron probe readings taken immediately before and after irrigation showed an increase of only 7.0 mm indicating that 17 mm had drained through the profile during the course of the overnight irrigation.

The daily water use on 8/8 was measured to be 6.0 mm (Figure 1). The soil moisture profile graphs (Figure 2) show a large decrease in water content below 50 cm on 8/8 compared to that for the normal water extraction pattern for the 3 day period from 3/8 to 6/8 prior to irrigation. From previous measurements of plant daily water use (3.0 mm/day), this indicates that a further 3.0 mm of irrigation water had drained through the profile in the 12 hours following irrigation.

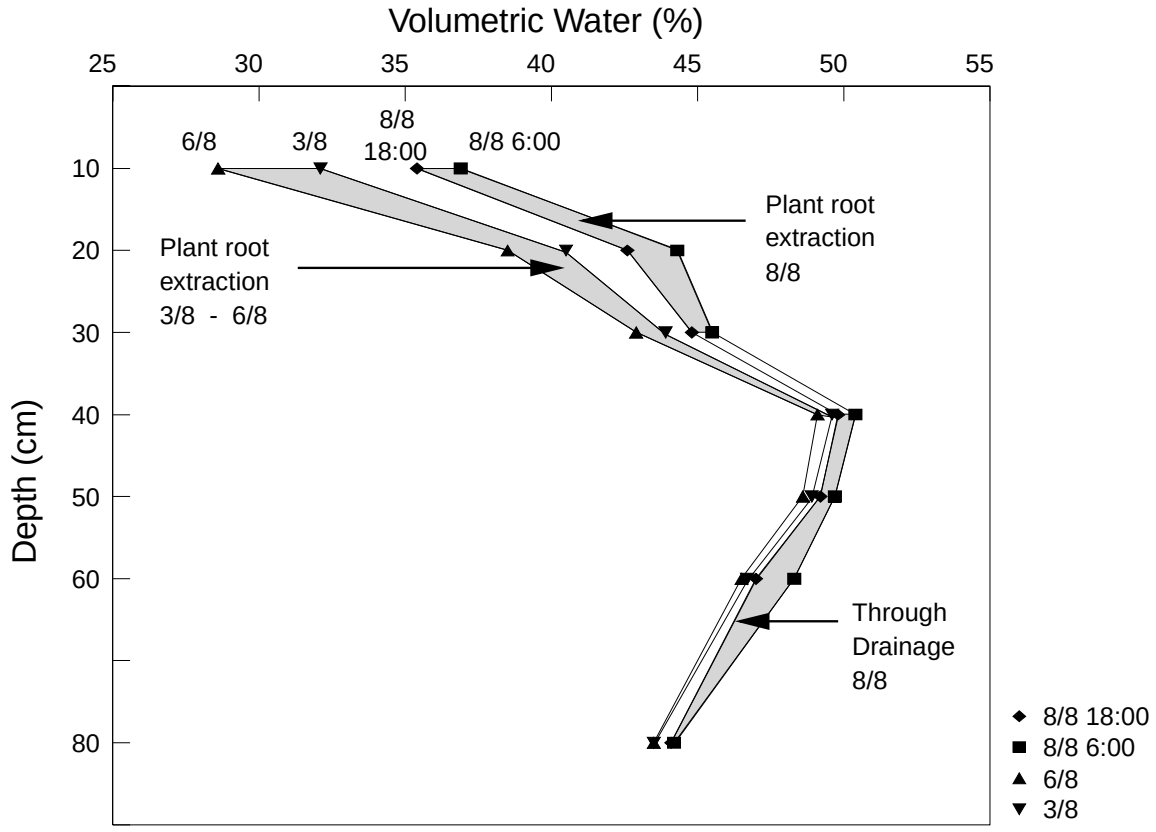


**Figure 2: Plant root extraction and through drainage profiles for drip irrigated onions at Gatton**

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