

Where should I place my probe? Micro placement of C probes in cotton

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Capacitance based soil moisture probes have progressively overtaken the neutron probe as the preferred method of soil moisture monitoring for irrigation scheduling in cotton. This is largely due to the clarity and precision of continuous data and the ability to connect the probes to telemetry providing data at your fingertips.

Given inter-row cultivation and the general traffic associated with cotton farming, the obvious location for probes has always been in the plant row. But as growers have adopted this new capacitance technology, a reoccurring question has emerged regarding the difference in the sphere of influence of the two instruments.

This question was best summarised by one grower who asked “If you put the probe in the plant line, and it measures the soil moisture in the plant line, yet the roots

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C-Probes installed across the furrow at Keytah, Moree.

presumably explore all the inter-row space, how do I know I am extracting all the moisture available to the plant and I am not leaving moisture behind?"

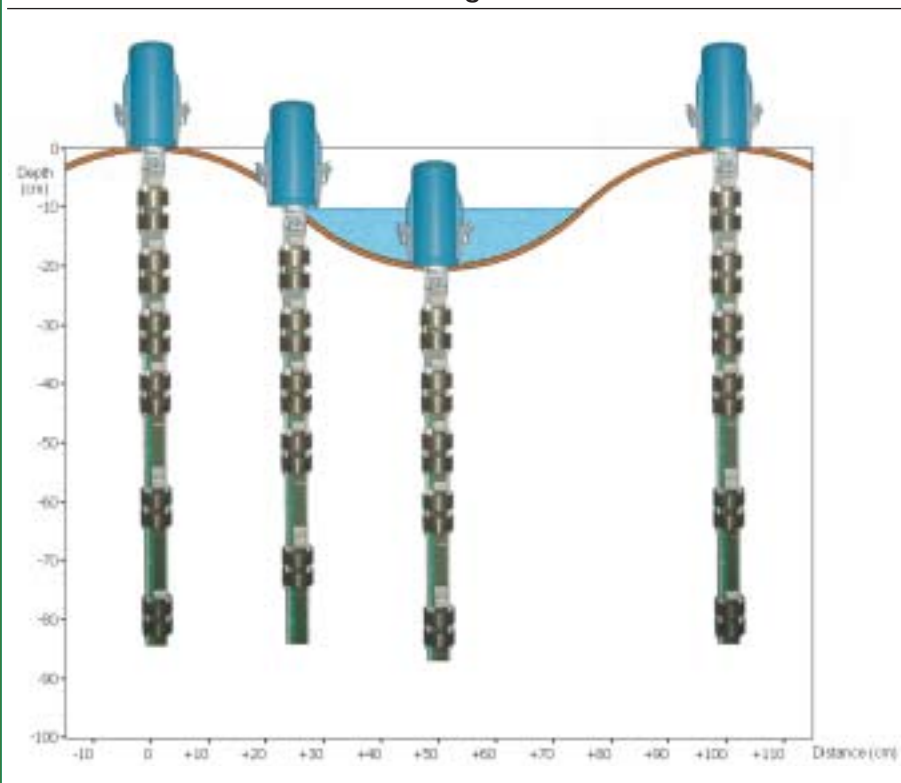
This question prompted an investigation to examine the micro placement of C-Probes and whether placing them in the plant line for convenience was actually the agronomically correct thing to do.

Four C-Probes were set up across an outside watered furrow (Figure 1) and the data was recorded at 15 minute intervals for a whole season. A series of pictures were then produced by interpolating the readings from each sensor across the furrows to produce a two dimensional picture of soil moisture.

These snapshots, representing the soil moisture conditions every three hours, were then spliced together to make an animated movie of the soil wetting up and drying down throughout the season. This animation illustrates very clearly what happened in the furrow, away from where we would normally monitor soil moisture and provides answers regarding C-Probe micro placement.

The probes were placed in a commercial crop and irrigation scheduling was based on the C-Probe in the plant line

FIGURE 1: C-Probe and sensor arrangement across the furrows

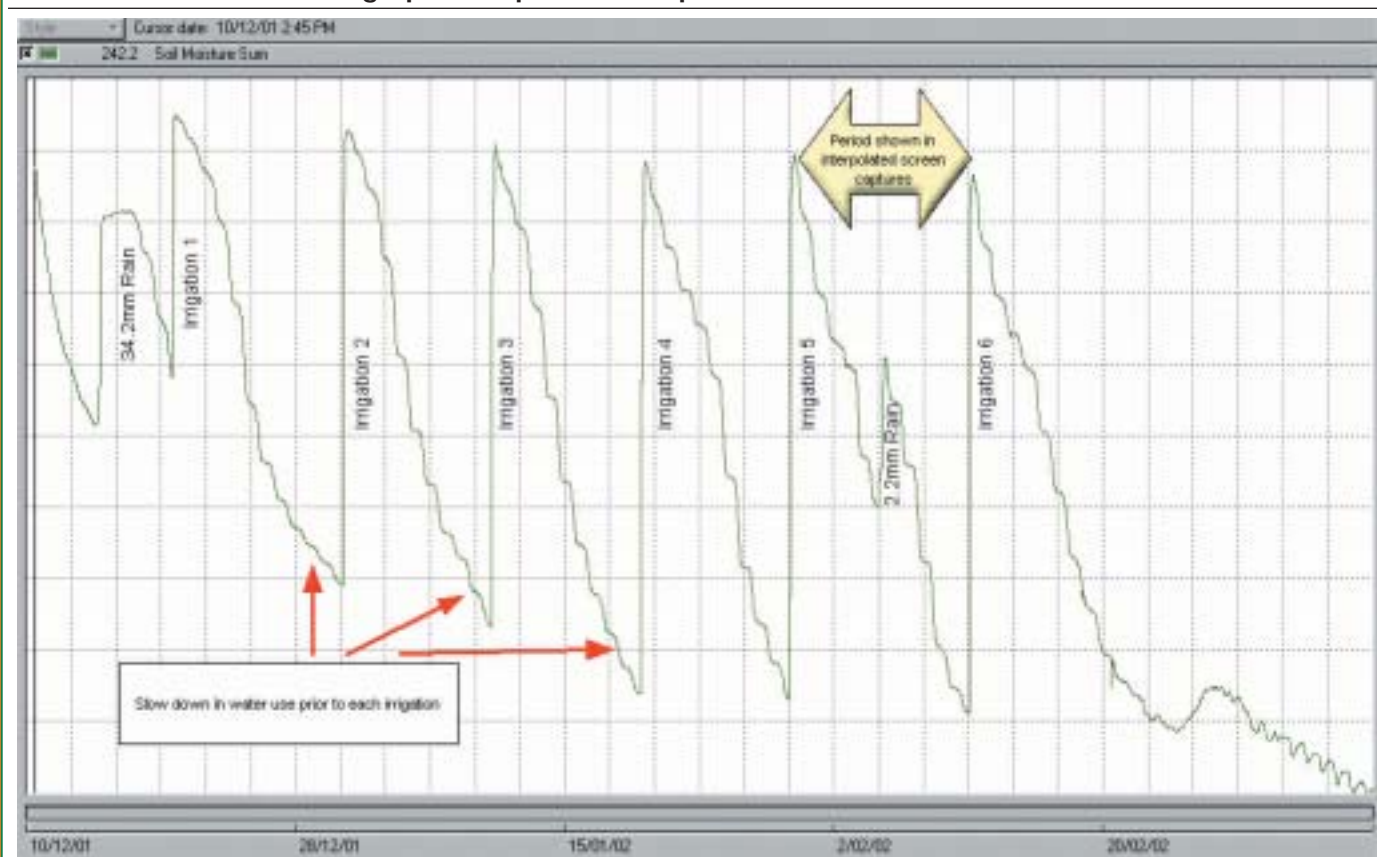


(Figure 2). The field was irrigated when this probe showed a slow down in water usage (as per standard practice).

shots of the dry-down between the 5th and 6th irrigations (6 irrigations applied in total) and clearly illustrates that all soil moisture in the inter-row space was

Figure 3 shows a sequence of snap

FIGURE 2: C-Probe summed graph from probe in the plant line



depleted before the 6th irrigation (Figure 3j).

What is also evident is that the plants tended to use water from depth (60cm–80cm) before accessing moisture higher in the profile straight after the 5th irrigation (Figure 3b-d). This is a common phenomenon and is probably related to waterlogging, where the soil may be less saturated at depth.

There was a small rainfall event on February 5 (Figure 3e) and it appears that the moisture has run off the wetted area in the centre of the furrow and moved laterally into the bed (Figure 3f) rather than drain deeper into the profile. It is also evi-

dent that the area at about 30–40cm below the top of the bed had the least root activity later in the season (Figure 3f) and could indicate compaction or other structural issues.

The last moisture to be extracted was about 30cm below the bottom of the furrow and the ball of moisture that is evident (Figure 3i) shows root activity above and below, indicating that this is the area that the roots found least attractive for moisture extraction.

This trial has shown that:

- Placing C-Probes in the plant line is the best location for both management and agronomic reasons;

- All moisture was accessed in the inter-row space;
- The moisture under the furrow (away from the detection of the sensor) was the last to be extracted and may act as a buffer when the probe itself is showing a decline in water use.

For more information or a copy of the full animated version, please contact David Sloane, Agrilink (0419) 803 332 or dsloane@agrilink-int.com

Students in the field

A team of more than 50 university students recently visited the Narrabri region to examine advances in cotton farming systems and productivity stimulated by the adoption of new biotechnology, best management practices, and integrated pest, disease and weed management.

Cotton CRC Team leader for the visit, Dr John Stanley, said 10 of the visiting students were completing studies in cotton production at the University of New England, while the rest are studying agronomy, soil science and agricultural and environmental chemistry at the University of Sydney.

The students spent a week in the Namoi and Macquarie cotton growing regions, being hosted by the Cotton Research and Development Corporation, the Cotton CRC, and the Australian Cotton Research Institute.

They also visited local cotton farms, were introduced to various segments of the industry service sector, studied environmental issues, including a visit to the Macquarie Marshes, and met with grower, industry representatives socially at a Narrabri Cotton Centre BBQ.

For further information, contact Dr John Stanley 02 6773 3758.



Students at the Australian Cotton Centre, Narrabri.

FIGURE 3: Drying down between 5th and 6th irrigations

