



All About Almonds

Fact Sheet 04 – Profile Establishment

Welcome to the fourth edition of “All About Almonds”, Profile Establishment. Fact sheets are distributed to almond growers via email and fax, in addition to being made available for download from the levy payers’ access page on the ABA website: www.australianalmonds.com.au (follow links to the login section of the “industry” page).

The information provided in these fact sheets should be kept confidential.

Background

Most horticultural regions, in particular those areas containing almond orchards, have recently experienced a combination of two scenarios:

1. less rainfall than the already low, average, annual rainfall (e.g. Loxton Research Centre mean annual rainfall from 1984-2008 was 264mm compared with 172mm in 2008), and
2. a recent increase in the use of drip irrigation systems.

If not managed appropriately, the combination of these two scenarios has the potential to greatly affect tree performance and yield.

There is an increasing awareness this scenario could cause and in some cases is causing:

- a) a reduction in root growth due to a lack of soil water content in July, the beginning of the first root flush and the almond season,
- b) a reduction in soil exploration by the rootzone and consequently a restricted root mass and impaired ability to cope with peak, plant water requirements during unexpected or excessive heatwaves,
- c) inconsistent rootzone development and root biomass due to the variable soil water status within differing soil layers, and
- d) an increase in soil salinity within the rootzone and on the margins of the rootzone.

Rectification of these issues can be achieved with drip irrigation through good lateral spread of water and the successful establishment of field capacity within the majority of the rootzone, prior to the first root flush in July. This requires a drip irrigation system which produces minimal or more preferably, no drainage, and ultimately an understanding of:

- soil textures
- soil hydraulic movement
- potential soil water holding capacity
- rootzone depth
- pre-existing soil water status, and
- the average readily available water figure of each irrigation shift.

It is imperative that each grower recognises their individual soil variability and manages it accordingly. Too little water could moderate the result or more importantly, too much water could cause a decline in tree performance through the stimulation of drainage water and waterlogged, anaerobic conditions.

The most successful strategy to achieve lateral spread in a drip irrigation system is to apply water via an on/off cycle. This cycle commonly involves one hour on, one hour off, but this may not always be possible, particularly on heavier soil types and/or high output drippers. Water ponding, a lack of vertical penetration, water runoff down rows or mounds, and orchard access are some of the issues which could be faced if the dripper outputs are too great for the soil infiltration rate. Consequently, there may be some trial and error involved.

Profile establishment to field capacity obviously involves an early allocation of water or an announcement of a carryover allocation and in these current times, this is difficult to achieve. Nonetheless, if the decision has been to irrigate your almond orchard, this practice should be considered as part of a drip irrigation management strategy for the year – or at the very least, a moderated version.

CT Optimisation Trial

The practice of profile establishment has occurred every season at the CT Optimisation Trial. The total amount of water applied has varied each season depending on the pre-existing soil water status, soil salinity levels and in this last season – water availability.

The procedure normally occurs around the later half of July, in time for the first root flush, and involves the following steps:

1. Measure the soil water content of the various sites with the calibrated, neutron probe.
2. Assess and make a decision on the pre-existing soil water status.
3. Begin the one hour on, one hour off cycle with no more than 40mm applied in any one cycle.
4. Once the first 40mm has been applied, allow 24-48 hours for the water to equalise through the soil profile.
5. Reassess the soil water status with the calibrated, neutron probe.
6. If required, begin another cycle of one hour on, one hour off cycle. Again, if necessary, ensure no more than 40mm is applied.
7. This process is repeated until the rootzone has established field capacity.

The effect of this procedure on the soil water content is depicted in the following figures.

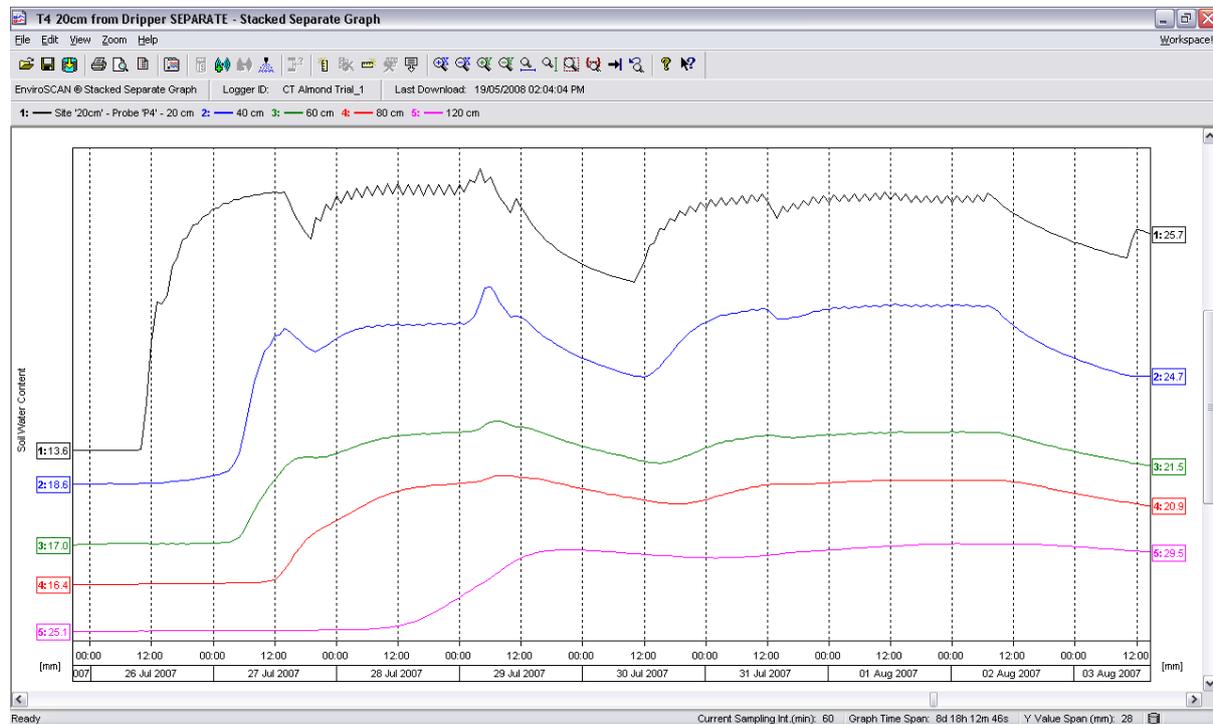


Figure 1. Soil Water Graph for depths 20cm, 40cm, 60cm, 80cm and 120cm – 20cm out from the dripper emitter.

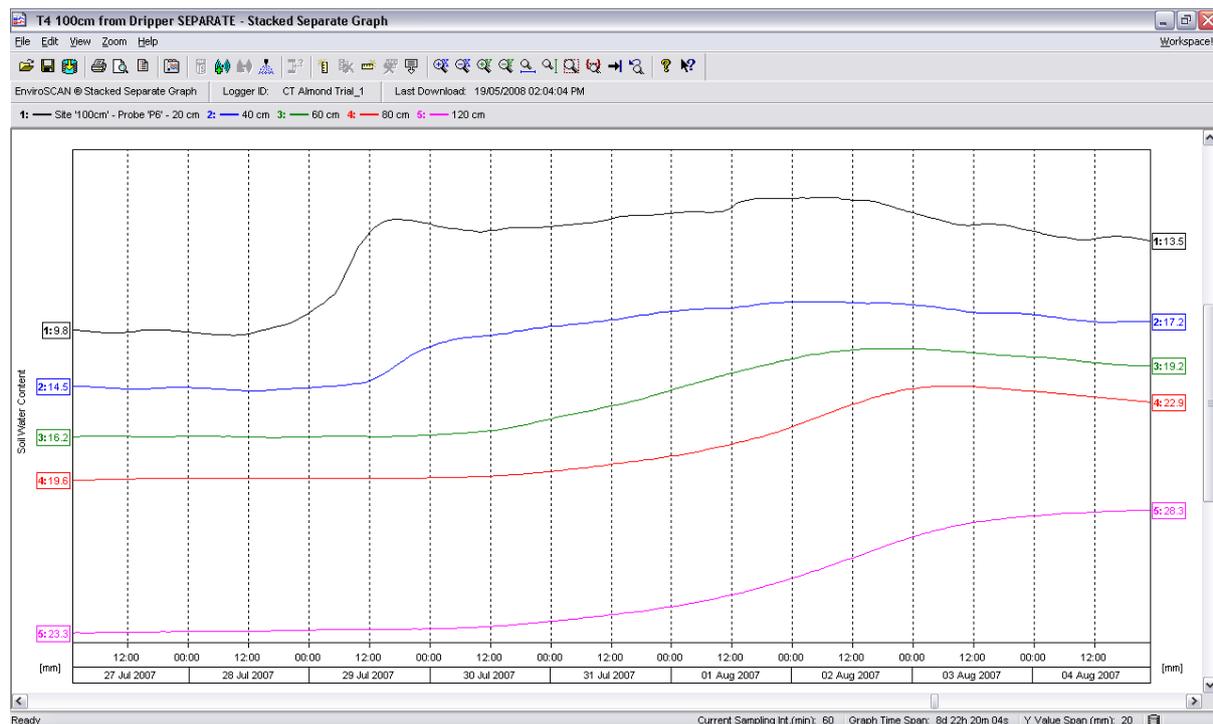


Figure 2. Soil Water Graph for depths 20cm, 40cm, 60cm, 80cm and 120cm – 100cm out from the dripper emitter.

It should be noted that this procedure is highly site specific and each site needs to be managed individually. Not all orchards and soil types will require the same amount of water applied at the CT Optimisation Trial and consequently won't require or achieve the same vertical and lateral spread.

Following the soil profile establishment to field capacity, the first application of fertiliser can take place. Fertiliser must not be applied prior to the irrigation event because of two, quite obvious reasons:

1. avoid the risk of leaching the fertiliser past the rootzone, and
2. avoid the risk of toxicating the rootzone with excessive fertiliser (i.e. another form of salt), which may occur if fertiliser is applied to a dry soil and rootzone.

Following the establishment of the rootzone to field capacity, the procedure from July to September is to apply only supplementary irrigations and to allow for a slight "mining" of the soil water content, and consequently, highly aerated/oxygenated conditions for the remainder of the root flush (Figure 3). From the end of September, the aim is then to re-establish your soil water content in time for pit hardening, shoot extension growth and consequently, the period of peak water use. For more detail, please refer to the crop factors and irrigation and fertiliser spreadsheet on the industry website (login section).

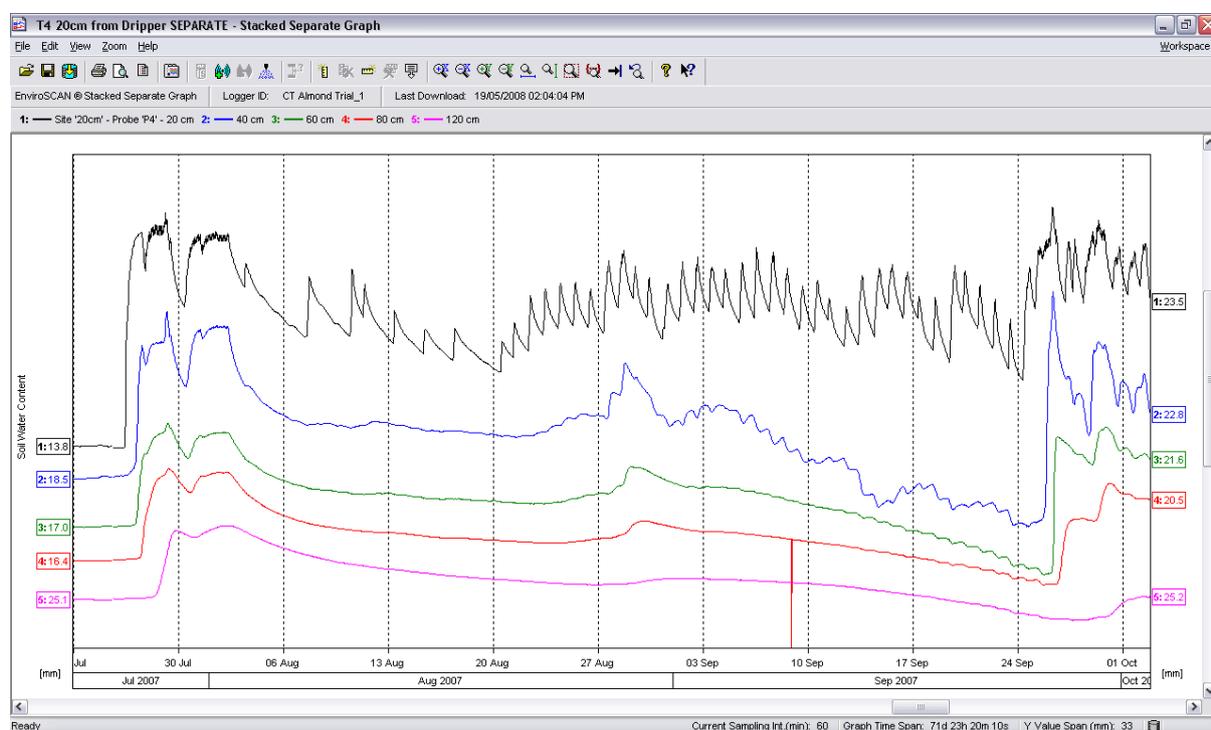


Figure 3. Soil Water Graph for depths 20cm, 40cm, 60cm, 80cm and 120cm – 20cm out from the dripper emitter, end of July to early October.

For further information contact Ben Brown, Industry Liaison Manager

Published by Almond Board of Australia, PO Box 2246, Berri, South Australia 5343

Telephone (08) 8582 2055 Facsimile (08) 8582 3503

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