



All About Almonds

Fact Sheet 02 – Post Harvest Nutrition

Welcome to the second edition of “All About Almonds”, Post Harvest Nutrition. Fact sheets will be 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.australionalmonds.com.au (follow links to the login section of the “industry” page).

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

Background

The idea of post harvest application of fertilisers and the issues discussed below will not be new information for most growers; however the aim will be to revisit the basics. In addition it is a good time as well to consider whether there is a place for the bud-building foliar sprays used to improve bud strength at the ABA’s Almond Optimisation Trial located at CT Farms (“CT Trial”).

Post Harvest Fertiliser

Post harvest fertiliser applications have long been a management practice in deciduous crops to:

- ensure good bud initiation and differentiation in autumn;
- ensure adequate nutrient storage over dormancy and into the following spring; and
- enhance the new season activities of root, leaf, shoot and fruit growth and blossom.

Almonds are quite unique in that they begin their new season by initiating their first root flush in the middle of winter (mid to late July), followed by blossom towards the end of winter (August), all of which with little or no presence of foliage. Transpiration which “pulls” nutrients from the soil into the tree does not start until the trees leaf out. What little “pulling” of nutrients may occur is further minimised by cool soil temperatures and further minimised again by the slow conversion of urea based fertilisers which are not directly taken up by the roots. This is why nitrate based fertilisers such as potassium nitrate are used in early spring.

A commonly used “rule of thumb” for the post harvest fertilising of deciduous trees is to apply approximately 25% of the whole season’s fertiliser. This is very similar to what occurs at the CT Trial, but with one subtle difference: the two fertiliser treatments in the Trial that seem to be commercially relevant, Treatment 1 (240:50:400) and Treatment 2 (320:50:600) receive the same amounts of nitrogen (approximately 75Kg/Ha of actual N) and potassium (approximately 130Kg/Ha of actual K) post harvest, independent of the seasonal total. This equates to a post harvest application of 31% nitrogen and 33% potassium for Treatment 1 and 23% nitrogen and 22% potassium for Treatment 2.

What fertiliser?

When the CT Trial began, nitrogen and potassium were applied as ammonium sulphate and potassium chloride, respectively. Over the life of the Trial soil acidification and soil salinity, have built up and consequently the post harvest fertilisers have been changed to urea and potassium sulphate which are less acidifying and contribute less salinity. Note however that urea can also contribute to soil acidification.

How much fertiliser?

While the forms of fertilisers have changed, the amounts of actual nitrogen and potassium applied have not. Approximately 165Kg/Ha of urea and 310Kg/Ha of potassium sulphate are now applied.

When to apply?

As the name suggests, post harvest fertilisers are normally applied after harvest is finished, but there has to be some flexibility depending on the season and the situation. The fertilisers should not be applied too early as ripening of the fruit may slow, nor too late as defoliation will be near and the uptake of the fertiliser may be inefficient. At the CT Trial, the post harvest fertiliser is applied over a four week period between the middle of March and middle of April. It is injected for an hour each day, five out of every seven days through each week of this period, and in the second last pulse of each day.

Those growers who try to apply fertiliser after the harvest of the last pollinator but find the leaves have deteriorated too much, could safely apply their fertiliser after the completion of the Non-Pareil harvest.

Warnings and thoughts in years of drought and water restrictions

In the current season of low water allocations there has been less opportunity to apply adequate amounts of water and consequently, a diminished ability to maintain rootzone and subsoil moisture levels and leach salt from the soil profile. These issues will be even more difficult to deal with as irrigation scheduling is juggled through the harvest period. Early defoliation is a strong possibility this year.

With this possibility in mind, a strategy is needed to minimise either the risk of causing further toxicity or stimulating re-growth of stressed trees. The following approach to post harvest fertiliser application could be considered:

- Soil salinity test – collect samples at say 15 cm depth intervals through the rootzone both within the wetted profile and on the margins (for drip irrigators) or at 2-3 positions within the sprinkler pattern (for sprinkler irrigators).

- Determine the effect of salt build up - use the critical threshold of about 2dS/m to decide if there is a potential salinity problem.
- If water allocations allow, re-establish a satisfactorily wetted profile straight after harvest and **prior** to post harvest fertilising. This should help leach salt from the profile.
- Begin to apply post harvest fertiliser on top of the “wet” profile. Use the strategy of **little amounts but more often**. For those who irrigate every day, as a minimum requirement, inject fertiliser five out of every seven days and over at least one hour each day. If salinity is a problem it would be safest to inject over the whole irrigation event at a lower rate per hour (same or slightly lower daily amount) and over five to seven days every week. This approach should assist in keeping the salinity of the mainline solution low (<1.0dS/m), uptake efficient and the risk of toxicity low.
- For those who irrigate less frequently (e.g. with sprinklers or micro-jets) inject the fertilisers over the last one third of the irrigation. That way the fertiliser will be placed in the root zone, but the concentration in the soil solution will not be too high.

Bud-Building

The use of post harvest, foliar nutrient sprays, in particular lo-bi (low biuret) urea, has been researched across numerous crops such as citrus and apples. The results of this research have varied. However, there is a strong suggestion based on some of the successful research trials in deciduous crops such as apples (Fallahli *et al.* 2002 and Guak *et al.* 2001) and the visual observations on the almond trees at the CT Trial, that post harvest, foliar applications of lo-bi urea provide a benefit in improving the nitrogen content of the buds and consequently bud strength and flower development in the following spring. For those who would like to try the program as used in the trial, or a modification of it, the bud-building sprays used on the CT Farms trial have involved two different spray routines:

1. 30th April to 10th May – 3 to 4 sprays of lo-bi urea (0.45% biuret) at 1% (10Kg/1000L).

Once again, there is an opportunity to apply the sprays earlier in March/April for maximum uptake; however spray coverage could marginally be better once the fruit is off the tree.

2. 3rd Week in June – 2 sprays of urea (1.5% biuret -fertiliser grade urea) at 4% (40Kg/1000L).

This spray may also assist in defoliation. The impurity biuret, is quite toxic to plants, so the use of fertiliser grade urea as a foliar spray has some risk. To date no problems have been encountered when it has been applied to the trial trees at this rate.

Note; the use of urea (1.5% biuret) as a defoliation spray at 5-7% (50-70Kg/1000L) in place of zinc sulphate could also be helpful in “bud-building”. This is also a spray routine on the CT Farms trial.

For further information contact Ben Brown, Industry Liaison Manager

Published by Almond Board of Australia, Po Box 2246, Berrri, South Australia 5343
Telephone (08) 8582 2055 Facsimile (08) 8582 3503

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