Australian Almond Industry Study Tour of California, USA

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Almond Board of Australia (ABA)

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ALMOND BOARD OF AUSTRALIA

Milestone Report 190

AL09014

Australian Almond Industry Study Tour of California, USA

Prepared by:
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Contents

Purpose

This milestone is to provide a summary of Australian Almond Industry Study Tour of California, USA from Friday, 11th June to Tuesday, 29th June, 2010.

Funded by

Almond Board of Australia Limited
Horticulture Australia Limited

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Study tour participants group photo, Fresno, CA

Media Summary

The Almond Board of Australia hosted a Californian study tour in June 2010, with the aim of giving participants an insight into the Californian almond industry. The study tour was well supported by the four major almond growing regions, with a total of twenty six people in attendance comprising: growers, packers, processors and almond industry representatives. The study tour began in the northern most almond growing region of Chico and travelled south to Yuba City, Davis, Sacramento, Salida, Ripon, Modesto, Fresno and Bakersfield.

The 17 day program included visits to almond processors and a meeting in Modesto with the Almond Board of California.

Agronomic activities during the tour included property visits to gain insights into sub – surface drip, deficit irrigation, organic, pruning, nutrition and tree trellising.

The group saw firsthand the balance between meeting environmental demands, irrigator and urban water needs with tours of the Sacramento Delta and Kern Water Bank.

The participants gained valuable information from the tour in regards to Californian production techniques and irrigation supply and management issues. The study tour also allowed opportunity for the Australian delegates to network, in addition to networking members of the Californian almond industry.

Research information was shared during a visit to UC Davis, a faculty considered to house world leading almond R&D expertise. Presentations on Deficit Irrigation and Light Interception were given by UC Davis researchers: Ken Shackel and Bruce Lampinen, providing an insight into their affect on potential yield and the incidence of hull rot. Ted Dejong introduced an almond software program designed to predict tree growth and subsequent yield potential resulting from differing levels of pruning. Greg Browne presented information in relation to soil pathogens and the relevant steps should be undertaken when replanting existing almond orchards.

Valuable time was also spent with machinery manufacturers and viewing their facilities.

Expected Outcomes

- Provide new, smaller, or less traveled growers the opportunity to take part in an organised study tour of the Californian Almond growing regions, an opportunity that would otherwise not be possible on their own.
- Provide growers and industry representatives an opportunity to learn about the latest trends in the Californian almond industry.
- Build and nurture relationships with new and existing overseas contacts.
- Experience the diversity and similarities of the Californian climate and landscape.
- Learn about pollination techniques and best practice in relation to bee hive management and honeybee diseases.
- Liaise with industry experts in regard to pruning and sub surface drip management techniques.
- Observe new improvements of almond harvesting machinery and manufacturing facilities
- Build ongoing relationships with major machinery manufacturers.
- Meet with core industry researchers to discover the latest findings in relation to:
    - New rootstocks and cultivars
    - Soil pathology and implications for replanting existing almond orchards
    - Nutrition levels and application
    - Water management
    - Salinity management
    - Management techniques for the current drought
    - Effects of light management on yield potential
- Identify and observe opportunities for new rootstock and almond cultivars from major nurseries, and
- Meet with Californian almond growers to compare growing conditions and techniques.

Results of Discussions, Implications and Recommendations

New Cultivars /Rootstocks

One of the objectives of the study tour was to investigate possible rootstocks and cultivars that may be introduced to Australia. The Australian almond industry is continually investigating new rootstocks, with a focus on those with efficiency and high yielding characteristics. This study tour provided an opportunity to converse with researchers and Californian growers about new rootstocks and their experiences in dealing with them in a variety of growing conditions.

Hansen 536 rootstock is a popular choice for most Californian almond growers, especially in the northern part of The Sacramento Valley where there is a higher incidence of wind. Hansen has better anchorage properties than Nemaguard and is more suited to the windier conditions and can potentially reduce the amount of tree or limb loss due to trees blowing over.

The tour group also took keen interest in the pollinator varieties planted with Nonpareil and the configuration of plantings. The Carmel variety was less popular compared to Australia due to the higher incidence and severity of Non Infectious Bud Failure (NIBF). Other cultivars that were predominately planted in California included: Wood Colony, Butte, Aldridge, Avalon, Sonora, Sonoma and Padre.

Implications for the Australian Almond Industry

It is less popular for Californian almond growers to use Carmel as a pollinator for Nonpareil due to the incidence of NIBF, which significantly reduces productivity of the tree. Australian almond growers are starting to observe similar NIBF traits in the Carmel variety and consequently Australia's interest in alternative pollinators is increasing.

A new cultivar that may be of interest in the future is Supareil. It is a self pollinating variety very similar in appearance to Nonpareil, and may be harvested with Nonpareil in a 1:1 planting configuration.

Nemaguard rootstock has a shallow root system and can be prone to wind damage. California has an array of rootstocks being trialled in the Central Valley. These include: GF677, Hansen 536, Nickels, Cornerstone, Atlas, Viking, Empyrean 1 (Barrier), and Avimag. Some of these rootstocks have the ability to be more efficient at nutrition uptake, better anchorage properties and more vigour which can lead to higher potential yields. The American peach x almond hybrid rootstocks (Nickels, Hansen 536 and Cornerstone tend to be the most vigorous, produce large canopies and commonly, the highest yields. Observations of GF677 (European peach x almond hybrid) indicated a slightly smaller tree. Observations of the peach rootstocks (Avimag and Nemaguard) indicated both had a similar sized tree and yields to. Atlas and Viking had slightly larger size trees than Nemaguard and similar yields. Empyrean 1 (Barrier) had similar vigour to the peach x almond hybrids, but yields only slightly higher than Nemaguard. Based on yield data from UC Davis, the three main rootstocks to evaluate further would be Nickels, Hansen and Cornerstone.

Figure 1 *Monterey (left) and Nonpareil (right) orchard, Fresno, CA*

Recommendations for the Australian Almond Industry

The evaluation of Californian cultivars for Australian growing conditions is already underway in two Australian almond orchards. The imported varieties will be assessed for flowering, growth habits and yields in comparison to the Nonpareil variety.

An Australian industry rootstock trial is also being initiated; with plantings to be undertaken in winter 2012.

These two projects, in addition to the feedback gained from growers in California, will help inform Australian almond growers about the characteristics of new rootstocks and cultivars.

Almond Training / Trellising

Study tour participants had the opportunity to meet with Mike Perry from Lassen Land Company. Mike demonstrated a new style of trellising system to suit young almond orchards where a single wire, 60cm high, was laid down the tree row and anchored at either end by wooden posts. Extra wooden posts may be needed down the row for anchorage depending on the tree row length, wind strength and direction. Plastic clips were attached to the wire to hold the tree in place (Figure 2). There was enough movement within the plastic clip to ensure the tree was not ring barked or blown over by strong winds.

Other benefits of this technique include reduced occupational safety issues as compared to the use of pole drivers to knock in wooden stakes. Mike also considers the slight amount of tree movement allowed by the plastic clip may allow better development of anchorage roots in the first years of tree establishment.

Conventional double staking and tying of trees was estimated at US$180/acre, whereas the trellis system was US$160/acre to supply and install.

Implications for the Australian Almond Industry

The implications for the Australian almond industry are two-fold. Firstly, there is a potential cost saving for growers using the wire trellis compared to the conventional wooden stake method. Secondly, the wire trellis system looks to be quicker and safer to install.

Figure 2 Almond Tree trellising clip, Orland, CA

Recommendations for the Australian Almond Industry

Any trellising system that has the ability to increase a grower's efficiency when replanting or establishing a new orchard should be investigated further. One grower has already expressed an interest in using the trellis system and if implemented, a field day could be organised to showcase it to the wider Australian almond industry. Alternatively, an invitation could be extended to Mike to exhibit at the Annual Almond Conference.

Sub Surface Drip Irrigation

The Australian almond industry has great interest in the application and management of sub – surface drip irrigation. Over 90% of the Australian almond Industry is irrigated with drip irrigation which enables higher levels of water efficiency but installed on the soil surface is prone to damage from machinery and vermin. Dripper line installed below the ground, (i.e. sub-surface), solves the problem of physical damage to the dripper tube; however, sub-surface drip suffers from root intrusion and has proved to be a serious problem for those growers who have tried. Consequently, the majority of almond orchards have installed their drip lines above ground.

A long term sub-surface drip irrigation trial was visited at Nickel's Soil Lab. The trial was conducted over twenty years and provides some important conclusions relevant to Australian almond growers:

- The standard RAM drip tube was installed at a depth 40cm and failed after 5 years.
- The dripper tube that was impregnated with a pre-emergent herbicide failed after 15 years.
- No "one-off" measures are suitable for combating root intrusion.

Tomato growers in California have been using regular injections of a pre-emergent herbicide to combat the effects of root intrusion in sub-surface irrigation of their field crops.

Implications for the Australian Almond Industry

The implications for the Australian almond industry are that any grower who has installed, or is planning to install sub-surface drip irrigation will have to plan or take action against root intrusion. The evidence from Nickel's Soil Lab indicates it is a foregone conclusion root intrusion will occur if not dealt with. The information gained at Nickel's Soil Lab should be used in conjunction with information gained from the ABA's current root intrusion trial to help guide the industry with preventative management protocols.

Figure 3 Sub-Surface drip irrigation at Nickel's Soil Lab, Arbuckle, CA

Recommendations for the Australian Almond Industry

The ABA has an existing root intrusion trial to research the appropriate dosage rate and timings of the pre-emergent herbicide Trifluralin. Further sharing of information between UC Davis and Nickel's Soil Lab, will help formulate guidelines for the implementation and management of sub-surface drip.

Minimal Pruning

Two long term pruning trials were visited during the study tour, a) Nickel's Soil Lab, and b) a commercial orchard east of Modesto. Both trials were managed by UC Davis. The pruning trial at Nickel's Soil Lab has trees that have received no pruning for the last 30 years. The trees were established with 3 scaffolds in the first years of growth and were not pruned after that. Trees that were conventional pruned were also established with three scaffolds and then pruned each year to keep the centre of the tree open and remove any crossed limbs. So far over the duration of the trial, there have been no yield differences between trees that have been conventionally pruned and those that have not been pruned.

The second trial at Modesto, run by Roger Duncan from UC Davis, had 10 year old trees with varying levels of pruning. The four pruning treatments are:

1. Standard training and annual pruning – Three scaffold limbs selected and annual pruning to keep centres open and remove crossed limbs

2. Standard training for two years, then unpruned thereafter – Three scaffold limbs selected, trees pruned in the second season then unpruned except for limbs that interfere with machinery.

3. Minimal training and pruning – Shoots were tipped twice in the first growing season to create a bushy tree. At the first pruning, four to six scaffolds were retained and only 3 cuts per tree each winter to keep the centre open thereafter.

4. Untrained and unpruned – Only limbs that were too low for harvest machined were removed, otherwise no scaffold selection or annual pruning.

Trial data indicated the unpruned trees had a higher cumulative yield (an additional 1134lb/acre) over the duration of the trial in comparison to the annually pruned trees. Consequently, the unpruned trees produced an additional income of US$1900/acre.

The Modesto trial also researched the effect of higher density tree plantings. In comparison to traditional tree spacing's, the results indicated higher densities can produce earlier, larger yields and can result in fewer mummies per tree. The higher densities also produce smaller, upright trees that require less pruning for machinery access) and are easier to shake.

Implications for the Australian Almond Industry

The implications for the Australian almond industry are that growers can choose to minimally prune their trees with the knowledge there may not be a detrimental effect on long term yields. Growers should also consider higher density tree spacing's when replanting older orchards as the higher densities will allow the trees to fill the orchard floor faster and achieve earlier, higher yields and a positive effect on the breakeven point for orchard cash flow. The reduced amount of mummies per tree will reduce the pressure of pest and disease and improve orchard hygiene.

Recommendations for the Australian Almond Industry

Further communication should be continued with Roger Duncan, UC Davis, to see if any long term yield differences arise from the pruning and tree density trial. Over time this trial will highlight differences in the yield obtained and any potential changes in the productive fruiting zone of the tree.

A fact sheet could be developed for Australian growers, showcasing the results of the planting density trial. In addition to this, field days could be held at an orchard that has implemented a high density planting program.

Figure 4 High Density planting trial, Modesto, CA

Water Supply

The Central Valley has two main tributaries that flow into the Sacramento Delta, these being the Sacramento River from the north and the San Joaquin River from the south. The water from these two river systems supplies urban and agricultural needs throughout the whole Central Valley but especially the San Joaquin Valley. Bore water is also used for agricultural needs, especially in the Sacramento Valley.

Michael Miller from the Department of Water Resources gave an informative tour of the Sacramento Delta. He highlighted the fragile nature of the levee bank system and the surrounding agricultural land, much of which is farmed below sea level. There is a complex network of canals, cross delta channels and water quality stations that need to be managed. Tidal flows, salinity levels, peat soil subsidence, snow pack melting, preservation of native fish stocks and adequate supply of water for urban and agricultural needs also need to be managed.

Jonathan Parker from the Kern Water Bank Authority gave us a tour of the Kern Water Bank. The Kern Water Bank is in the southwest of the San Joaquin Valley and occupies 30 square miles of land. The Water Bank was established in 1995 to offset the effects of drought and water supply problems in southern California. There are conveyance issues, within the State Water Project, of being able to supply water from water storages on the north to where it is needed in the south. During periods of low user demand, water can be taken from the California Aqueduct, the Kern River or the Friant-Kern Canal and pumped into recharge basins. The water then naturally infiltrates into the surrounding aquifer, where it is stored until needed; and then recovered using a network of bores.

Implications for the Australian Almond Industry

There are similarities between the water supply networks in The Central Valley and the Murray Darling Basin, in that both suffer from not being able to supply the end user their full allocations. In Australia this has resulted from an extended period of drought and a general over allocation of the river system. In California, the under allocations are as a result of not being able to supply adequate amounts of water through the available delivery network and endangered species issues that has reduced the amount of water available for extraction from the Delta.

Recommendations for the Australian Almond Industry

Whilst the river systems in The Central Valley and the Murray Darling Basin are different and the reasons for under-allocation of water entitlements are different; it would be advisable to keep abreast of water supply issues in California. Regular gathering of information directly through contacts established during the study tour will provide updates to the availability of water. The availability of water and allocation of irrigation entitlements can have a direct link to the potential size of the Californian crop and hence the pricing benchmark for the Australian Almond industry.

Irrigation Management

Irrigation systems in the Sacramento Valley are predominately flood, or sprinkler / micro-sprinklers. In the south, in the San Joaquin Valley, flood irrigation is still present but the majority of systems are drip irrigation. Automation of these systems is very rare as labour is relatively cheap as is therefore used as the alternative to the capital cost of installing automated hardware. This means irrigations only occur every few days and for longer durations, even with drip irrigation.

Implications for the Australian Almond Industry

In Australia, over 90% of the almond industry is drip irrigated and has some form of automation. This means shorter, daily irrigations are applied which can lead to more efficient water use. The shorter, more frequent irrigations are more suited to Australia's soil types and corresponding shallow root zones.

Current irrigation practices in Australia are more efficient than the Californian industry, especially in light of results from the 'CT Trial' (Sustainable Optimisation of Australian Almond Production, AL07005). The 'CT Trial' has shown that daily irrigation matched to crop requirement will increase water use efficiency and productivity. This gives Australian growers a distinct advantage when coping with the consequences of drought and reduced water allocations whilst still maintain adequate production levels.

Recommendations for the Australian Almond Industry

Further communication with researchers at UC Davis will help the Australian Almond industry improve fertigation efficiency. The potential for collaboration with UC Davis should be investigated with respect to nutrition trial work.

Environmental Standards

The Central Valley has air quality problems of which Particulates and Nitrogen Dioxide are two of the major concerns. Both of these are relevant to the Californian almond industry as nitrogen dioxide emissions can be linked to nitrogen fertilizer use and the amount of particulates in the air can be linked to burning of agricultural waste and dust raised by orchard operations. Californian growers stated when an old orchard is removed; it must be mulched or physically removed and transported to a co-generation plant and burnt for production of electricity. Orchard waste and residues cannot be burnt.

Of particular interest to study tour participants was the latest improvement in almond harvest machinery. Almond sweepers and pickup machines have the potential to generate significant levels of airborne dust. Combined with the large areas of almond plantations in California and the inversion layer that forms in the San Joaquin Valley, dust generated during harvesting has the ability to affect air quality. As a result manufacturers of almond sweepers and pickup machines are making modifications to their machinery to make them more efficient at removing dirt from the almonds at harvest which results in less dust being generated. This is being done by the use of brushes on the side of sweepers to reduce the amount of air that is needed by the blowers to clear almonds away from the butt line and potentially reduce the number of passes down the row during harvest. The manufacturers of pickup machines have made improvements to the pickup chains to remove more of the dirt before it gets sucked up by the fans. This results in less airborne dust. One manufacturer has also developed a brush that is fitted after the fan to capture the dust particles so that only relatively clean air is blown into the orchard.

Implications for the Australian Almond Industry

The improvement in design of almond sweepers and pickups will have positive implications for the Australian Almond industry for the future. Currently Australia does not have legislative requirements governing air quality and dust levels. However, as improved machinery is adopted in Australia through machinery upgrades, this will assist in further reducing dust levels generated through the harvesting process.

Recommendations for the Australian Almond Industry

The Australian almond industry should maintain a watching brief on Californian air quality legislation. If Australia were to use the information gained from California and adopt it voluntarily, there would be marketing advantage, further enhancing our ‘clean and green’ image. It is also much easier to adopt new technology /management practices voluntarily rather than be forced to by legislation.

The Australian industry should also maintain communication with the Almond Board of California and UC Davis to keep up to date with any R&D trials that are associated with measuring environmental impacts, so that the results may be implemented here in Australia.

Figure 5 Left: Sweeper mounted brush attachment, Flory Industries, Salida, CA; Right: Brush attachment inside a pickup machine, Exact Corporation, Modesto, CA

General Recommendations

The Australian Almond industry should continue to investigate the possibility of cross collaboration with the Californian Almond industry in the areas of: almond nutrition, food safety, pollination and deficit irrigation research. Aside from having similar industries in similar climatic growing regions, the different hemispheres can have a positive influence in mutual R&D programs. This is due to the ability to collect two seasons of research data in one year.

The Almond Board of Australia should continue fostering and developing a stronger working relationship with the Almond Board of California (ABC). Both organisations have sound marketing and food safety programs that can mutually benefit one another.

Alternative locations should be investigated for future study tour trips. This study tour focussed on investigating a long-term, established and structured almond industry. Alternatively, there would be value in a study tour visiting a less intensive almond growing region, or a newly established, emerging growing region that may have the potential to develop into a future competitor.

Dissemination of Information

- A summary article was included in the August 2010 edition of the ABA's quarterly newsletter, In A Nutshell (refer to attachments).
- A presentation will be made to the Australian Almond Industry at the annual Almond Conference to be held in Mildura on 27th to 29th October, 2010.
- This report will be made available to stakeholders through the levy payer log-in section of the Almond Board of Australia's website: www.australianalmonds.com.au
- Interview for ABC radio segment, Riverland Today.
- PowerPoint presentation made to UC Davis researchers (refer to attachments).

Acknowledgements

- Horticulture Australia Limited
- Almond Board of Australia
- Californian hosts
- Hastwell Travel and Insight Vacations

Attachments

Almond Industry Study Tour – Itinerary - California 2010

DATE	DAY	TIME	LOCATION	TRAVEL TIME	CONTACT	TOPIC
11th June	Friday	All day	San Francisco		Sheraton Fishermans Wharf	Tourism – City lights – Own choice Dinner
12th June	Saturday	All day	San Francisco		Sheraton Fishermans Wharf	Tourism – City lights –
13th June	Sunday	AM	San Francisco			Tourism – City lights
		PM	Sonoma	2.0 hr	Fairmont Sonoma	Tourism – Napa Valley wine region – Own choice dinner
14th June	Monday	7.30 AM	Sonoma			Travel to Arbuckle
		9.30 AM	Arbuckle	2.0 hr	John Edstrom, UC Davis	Nickel's Soil Lab – Pruning, Subsurface Drip, General
		2 PM	Arbuckle	0.3 hr	Dan Cummings	Large grower, Large beekeeper
		4.30 PM	Chico	1.5 hr	Holiday Inn Chico	Own choice dinner
15th June	Tuesday	8.30 AM	Orland		Mike Perry	Lassen Land Co, almond trellis systems
		12 PM	Chico	0.3 hr	Weiss McNair	Machinery visit & lunch Sierra Nevada Brewery
		4 PM	Yuba City	1.0 hr	OMC	Machinery visit
		PM	Yuba City	0.3 hr	Hampton Inn	Tour dinner with Don Mayo, OMC
16th June	Wednesday	7.15 AM	Yuba City	1.0 hr		
		8.30 AM	Davis, Sacramento		Michael Miller	Dept. Water Resources. – Delta Tour
		PM	Davis	0.5 hr	University Park Inn	Own choice dinner
17th June	Thursday	8.30 AM	Davis		Greg Browne, UC Davis	Soil pathogens, replant experiences
		8.30 AM	Davis		Ted Dejong, UC Davis	Modelling experience
		8.30 AM	Davis		Bruce Lampinen, UC Davis	Light interception & hull rot
		8.30 AM	Davis		Ken Shackel, UC Davis	Deficit Irrigation & hull rot
		1 PM	Sacramento	0.5 hr	Blue Diamond	Processor & handler
		4.30 PM	Ripon/Modesto	1.5 hr	Earl Anderson, Jack Rabbit	Machinery visit
		6 PM	Modesto	0.5 hr	Richard Waycott	Almond Board of California
		PM	Modesto		Doubletree Inn Modesto	Tour Dinner with Earl Anderson, Jack Rabbit
18th June	Friday	9 AM	Modesto	0.3 hr	Exact	Machinery visit
		11 AM	Salida	0.5 hr	Flory	Machinery visit & BBQ lunch
		1.30 PM	Modesto	0.5 hr	John Duarte, Duarte Nurseries	Large nursery, *in vitro* propagation of rootstocks
		3 PM	Bass Lake	3.0 hr	Pines Resort Bass Lake	Tourism - Own choice dinner
19th June	Saturday	All day	Yosemite N.P.		Pines Resort Bass Lake	Yosemite National Park – Own choice dinner

20th June	Sunday	AM	Bass Lake		Pines Resort Bass Lake	Tourism – Free morning
		2 PM	Modesto	3.0 hr	Doubletree Inn Modesto	Own choice dinner
21st June	Monday	8.15 AM	Modesto	0.3 hr	Lectroblast	Machinery visit
		10.30AM	Escalon	0.5 hr	Nick Bavaro	Grower and BBQ lunch
		1 PM	Modesto	0.5 hr	Roger Duncan, UC Davis	Farm advisor – rootstocks, pollinators/cultivars, general
		3 PM	Denair	0.5 hr	Monte Vista	Processor & handler
		PM	Fresno	1.5 hr	Four Points By Sheraton	Tour dinner, Applebee's
22nd June	Tuesday	8 AM	Fresno	0.5 hr	John Slaughter, Burchell Nurseries	Large nursery, exclusive cultivars e.g. Wood Colony, Supareil
		11.30PM	Reedley	0.5 hr	Air-o-fan	Machinery
		3 PM	Fresno	0.5 hr	Mike Farrell	Netafim and dinner
		PM	Fresno		Four Points By Sheraton	Tour dinner with Netafim, Di Cicco's
23rd June	Wednesday	9 AM	Mendota	1.0 hr	Greg Myers	Grower
		12 PM	Harris Ranch	1.0 hr	Ed Kuykendall	Grower & Lunch, Harris Ranch Restaurant
		2.30 PM	Lost Hills	1.0 hr	Paramount Farms	Processor and handler
		PM	Bakersfield	1.5 hr	Bakersfield Marriott Hotel	Tour dinner with Ed Kykendall, Woolgrowers Restaurant
24th June	Thursday	9 AM	Bakersfield	0.5 hr	Bakersfield Marriott Hotel	Grower panel Q&A
		11.30 PM	Bakersfield	0.5 hr	Joe MacIlvaine, Paramount Farms	Large grower, processor & handler
		2.30 PM	Shafter	0.5 hr	Randy Bloemhoff	Grower
		PM	Bakersfield	0.5 hr	Bakersfield Marriott Hotel	Own choice dinner
25th June	Friday	8 AM	Bakersfield	0.5 hr	Kern Water Authority	Water Authority / Water Bank
		1 PM	Bakersfield	0.5 hr	Blake Sanden, UC Davis	Farm advisor – water management, salinity
		PM	Los Angeles	3.0 hr	Kyoto Grand	Own choice dinner
26th June	Saturday	AM	Los Angeles			Tourism
		PM	Los Angeles		Kyoto Grand	Tour dinner, Engine Co No28
27th June	Sunday	AM	Los Angeles			Tourism
		Late PM	Depart Los Angeles			

Contact List

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Earl Anderson	Jack Rabbit	Machinery Manufacturer	471 Industrial Ave, Ripon, CA, 95366	(209) 599 6118	(209) 765 4375	earl@jackrabbit.bz
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Australian Almond Industry
Study Tour of California, USA

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Joe MacIlvaine	Paramount Farming Company	Almond Grower / Processor	33141 E. Lerdo Highway Bakersfield, CA, 93308 9767	(661) 339 4456	(661) 331 9990	joemac@paramountfarming.com
John Edstrom	UC Davis	UCCE Farm Advisor, Nickel's Soil Lab, Colusa County	100 Sunrise Boulevard, Suite E Colusa, CA 95932	(530) 458 0570	(530) 218 4798	edstrom@sunset.net
John Slaughter	The Burchell Nursery Inc	Almond Nursery	6705 S. Clovis Ave Fowler, CA,93625	(559) 834 1661	(559) 285 3113	john@burchellnursery.com
Jonathan Parker	Kern Water Bank Authority	Kern Water Bank	1620 Mill Rock Way, Suite 500 Bakersfield, CA, 93311	(661) 398 4900	(661) 303 7069	jparker@kwb.org
Larry Demmer	Weiss McNair	Machinery Manufacturer	531 Country Drive, Chico, CA, 95928	(530) 891 6214	(530) 518 9223	ldemmer@weissmcnair.com
Mark Ryckman	Progressive Ag Inc	Machinery Manufacturer	1336 McWilliams Way Modesto, CA, 95351	(209) 567 3232	(209) 595 6020	mryckman@proaginc.com
Marlin Flory	Flory	Machinery Manufacturer	4737 Toomes Rd, Salida, CA, 95368	(209) 545 1167	(209) 652 7820	mflory@floryindustries.com
Michael Miller	Dept of Water Resources	Sacramento Delta Tour	1416 9th Street, Sacramento, Ca 95814	(916) 651 6947	(916) 716 7935	mmiller@water.ca.gov
Mike Farrell	Netafim	Irrigation Manufacturer	5470 E. Home Avenue Fresno, CA, 93727			mfarrell@netafimusa.com
Mike Perry	Lassen Land Co	Orchard Manager	320 E South St Orland, CA, 95963	(530) 865 7676	(530) 624 9265	mjperry3@hotmail.com
Nick Bavaro	Bavaro Farming	Orchard Manager / Advisor	24532 Clough Rd Escalon, CA, 95320	(209) 838 8646	(209) 484 1010	bavarofarming@sbcglobal.net

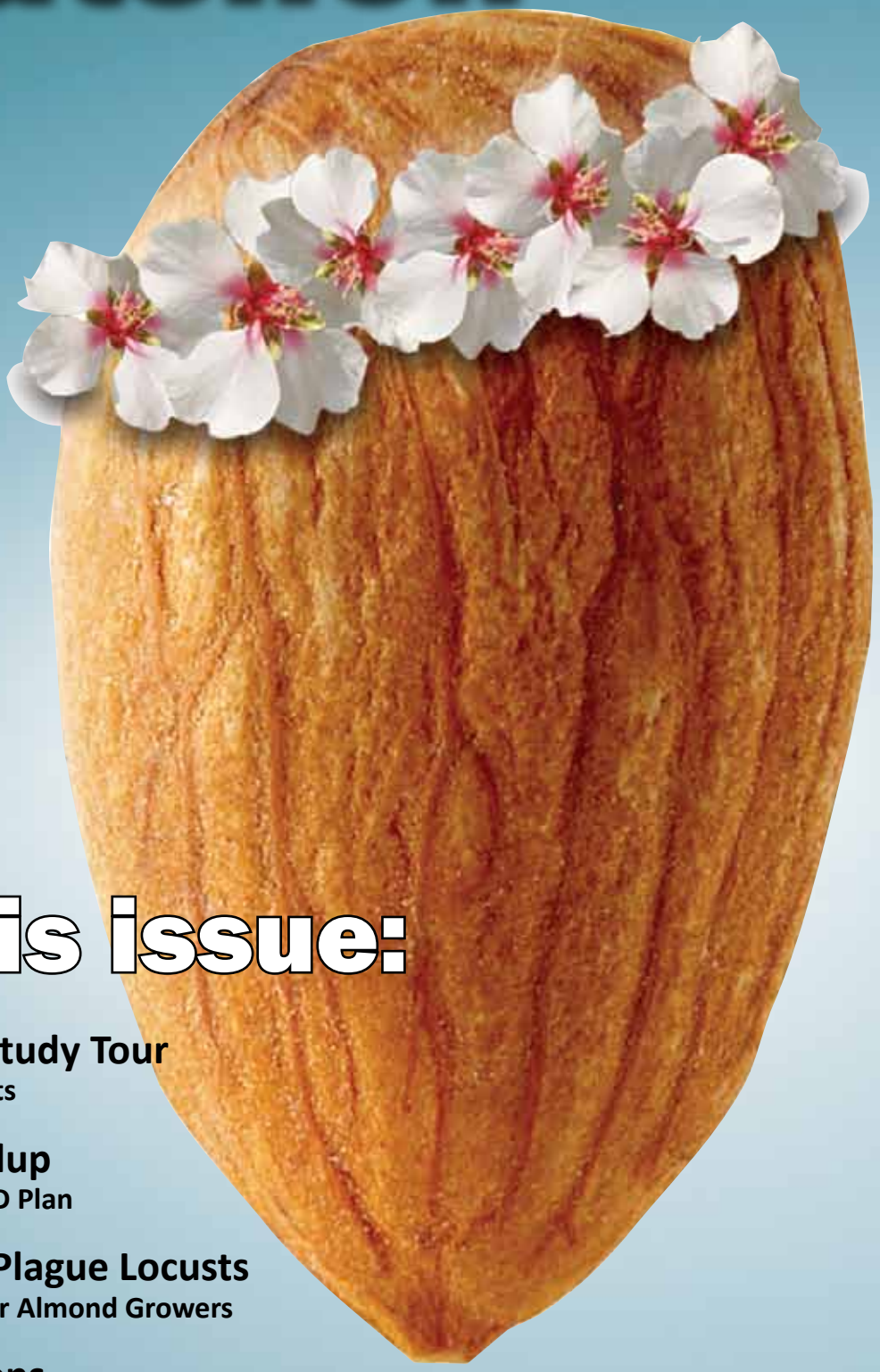
Australian Almond Industry
Study Tour of California, USA

NAME	ORGANISATION	TOPIC / EXPERTISE	ADDRESS	PHONE	MOBILE	EMAIL
Patrick Brown	UC Davis	Researcher	One Shields Avenue 3019 Wickson Hall Davis, CA, 95616	(530) 752 0929	(530) 304 1390	phbrown@ucdavis.edu
Randy Bloemhoff		Almond Grower	28709 Fresno Ave, Shafter, CA, 93263	(661) 746 6475	(661) 979 8989	randy@supremealmonds.com
Richard Waycott	Almond Board of California	Peak Industry Body	Suite 1500, 1150 Ninth Street, Modesto, CA, 95354	(209) 343 3215	(209) 402 7707	rwaycott@almondboard.com
Roger Duncan	UC Davis	UCCE Farm Advisor, Stanislaus County	3800 Cornucopia Way UCCUE Stanislaus County, Modesto, CA, 95358	(209) 525 6800	(209) 658 889?	raduncan@ucdavis.edu
Sara Eidman	Duarte Trees & Vines	Rootstock Nursery	1555 Baldwin Road Hughson, CA, 95326	(209) 531-0351	(530) 263-4479	sara@duartenursery.com
Tom Weber	Netafim	District Sales Manager	5470 E. Home Avenue Fresno, CA,		(559) 284 3929	tweber@netafimusa.com

In A Nutshell

ALMOND BOARD OF AUSTRALIA

August 2010



In this issue:

AUSTRALIAN ALMONDS
www.australianalmonds.com.au

Contents

Memberships Due

A reminder that ABA memberships are now due, with 2010/11 fees as follows:

- Grower Member - Category A (equal to or less than 500Ha) - $200 AUD
- Grower Member - Category B (greater than 500Ha) - $500 AUD
- Marketer Member - $500 AUD
- Associate Member - $100 AUD
- Australian Nutgrower Subscription ONLY - $80 AUD

Membership application forms are available from ABA office or www.australianalmonds.com.au

Edition	Advertising Deadline	Material Deadline
February	15th January	10th February
May	15th April	10th May
August	15th July	10th August
November	15th October	10th November

In a Nutshell
The Almond Board of Australia is the peak industry body representing the interest of almond growers, processors and marketers in Australia in matters of national importance including regulation, legislation, marketing research and development.
In a Nutshell is published quarterly by the ABA in February, May, August and November to bring news to all industry contacts and members.

Membership
The Almond Board of Australia offers membership to growers, processors, marketers and interested parties. Please contact the Almond Board of Australia for current membership fees and inclusions.

Advertising/Editorial
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Some of these projects were facilitated by HAL in partnership with the Almond Board of Australia. They were funded by the R&D levy and/or voluntary contributions from industry. The Australian Government provides matched funding for all HAL's R&D activities.

CEO Update

by Julie Haslett

This issue comes during almond blossom season, an exciting and important time in the orchard. Pollination takes place at this point in the growing cycle. Billions of bees are brought into orchards across our growing regions to undertake this critical function. This edition highlights some of the other key activities taking place in the orchard at this time of year.

Blossom season provides a major focal point for the ABA's consumer promotions program. In store promotions, public relations and online media have all be utilised to further raise awareness of the natural goodness of Australian grown almonds. This season is also celebrated through regional almond blossom festivals now being conducted in both Willunga, South Australia and in the Mallee region, Victoria.

With the imminent (but delayed) release of the draft Murray Darling Basin Plan, water will continue to be a critical issue for the almond industry to address in a range of ways. To further inform on this matter, Danny O'Brien CEO of the National Irrigators' Council (NIC) will be presenting at this year's Almond Conference being held in Mildura, 27-29 October.

Detailed information about the conference is enclosed in this issue, including an overview of the program and keynote speakers. If you haven't already registered, please do so to ensure that you don't miss this "must attend" event. I look forward to seeing you there!

A reminder that ABA Membership subscriptions for 2010/11 are now due. The ABA recently received very positive feedback from our survey of members. The information provided through this survey is now being used to assist future planning across the breadth of ABA activities. Thank you to all who provided evaluation responses and special thanks to our members for your continued support.

Almond Planting Survey - 2010 Update

Updated surveys should be returned to the Almond Board of Australia in the prepaid, confidential envelope by Friday, 24th September 2010.

Please do not hesitate to contact Bronte McCarthy if you have any questions relating to this survey email: bmccarthy@australianalmonds.com.au

2010 USA Study Tour

by Brett Rosenzweig

The Almond Board of Australia hosted a study tour of California from the 11th to 29th June. The aim of the study tour was primarily to give new, younger or first time travellers an insight into the Californian almond industry that they may not otherwise be able to experience. The study tour was well supported with twenty six people joining the tour and each of the four almond growing regions was well represented.

Once the jetlag subsided, with the help of some tourism activities in San Francisco and the Napa Valley, the study tour started at the top of the Central Valley at Chico. Here we met with John Edstrom who gave us an insight into sub–surface drip, deficit irrigation, organic and pruning trials conducted at Nickel's Soil Lab, a research facility at Arbuckle which is co-operatively run with UC Davis.

Australian Almond Delegation

Mike Perry from Lassen Land Co gave the group a tour of one of the properties he manages near Orland. He also demonstrated a new style of almond trellis / tree tie system that replaces the traditional wooden stake style of tree support and will show great promise for anyone considering new plantings in the Australian almond industry.

Valuable time was spent at the Weiss McNair, OMC, Jack Rabbit, Flory, Exact Corporation, Lectroblast and Air-O-Fan manufacturing plants observing the machinery options and how equiment is assembled before delivery to Australia. As usual, all the machinery manufacturers showed enormous hospitality and were all very eager to show us through their facilities.

Visit to Exact Corporation - Modesto CA

We spent an enjoyable and eye-opening day with Michael Miller from the state Department of Water Resources on a tour of the Sacramento Delta. Here we saw firsthand the competition between meeting environmental demands, meeting irrigator and urban water needs, and the maintenance work carried out on the Deltas levy system to enable farming to be conducted on land that is below sea level.

San Fransicso

Time was also spent with researchers from UC Davis, getting updates on their latest projects. Presentations were given on deficit irrigation, light interception, replant diseases and almond modelling. There were also field visits with UC Davis extension officers, Blake Sanden and Roger Duncan, who showed us their pruning, tree spacing and irrigation management trials.

The group was able to gain an appreciation of the differences between Australian hullers and processors and our Californian counterparts. Visits were made to two of the largest processors in the state, being Blue Diamond and Paramount Farms - the size of their operations was hard to comprehend. A visit was also made to Monte Vista Farming with a tour through their operations.

In addition to this we were given a presentation by Richard Waycott and Julie Adams from the Almond Board of California. They gave us a warm welcome to California and a brief information session about the current state of the Californian almond industry.

A number of grower's properties were visited with Dan Cummings, Nick Bavaro, Greg Myers, Ed Kuykendall, Randy Bloemhoff and Paramount Farms all giving up their valuable time to show us around their properties and share their almond growing expertise with the group.

The group spent a morning at the Kern Water Bank where we were shown how water authorities in Kern County were managing their water supplies. It was interesting to see how the Kern Water Bank was taking water from the surrounding aqueduct and rivers during wet periods to recharge the underlying aquifer, store the water and then recover the water for irrigation and urban uses during the dry period.

Visits were also made to Duarte's and Burchell 'sNurseries. At Duarte's Nursery, John Duarte gave the group a detailed look at their in-vitro propagation of rootstocks and subsequent budding and growing of almond trees. At Burchell Nurseries, John Slaughter took us on a field trip to show the group examples of their exclusive varieties. He also gave us his thoughts on the optimal training, pruning and fertigation techniques that he has observed in the Californian industry.

Despite the hectic touring schedule, time was allowed for some sightseeing, reflection on what the group had observed and learnt. Aside from the time spent in San Francisco and the Napa Valley at the start of the study tour, a weekend was also spent at Bass Lake and Yosemite National Park and the final weekend was spent in Los Angeles before our departure back to Australia.

The study tour went very smoothly with all tour participants having an enjoyable and valuable trip. There are a number of people that made the study tour the success that it was. A big thank you must go to all of our Californian hosts who gave up their valuable time, freely exchanged information and showed immense hospitality to the tour group. Thank you also to the staff at Hastwell Travel and Insight Vacations for organising the airflights, accommodation, tour coach and on ground support for the duration of the tour. The last acknowledgment must go to HAL for their generous funding support of the study tour.

Visit to Nickels Soil Lab - Arbuckle CA

If you have any queries regarding the study trip, please contact:

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AUSTRALIAN PLAGUE LOCUSTS

BY BEN BROWN

Recently there has been a lot of publicity about a potential spring hatching of Australian Plague Locusts (APL), possibly the most severe hatchings in forty years.

The summer rains of last season produced a large growth in vegetation in the channel country and an initiation of a significant swarm of adult locusts. In autumn these locusts arrived in the Sunraysia and Riverland regions from south west Queensland, mid-west New South Wales and north east South Australia. On arrival they laid eggs which have the potential to produce a spring outbreak from mid to late September, the exact timing dependent upon weather temperatures and degree days. Expected dates and severity will become more accurate closer to spring.

Key Points for Almond Growers

Plan ahead. Do not underestimate the damage from either hoppers or adult locusts in perennial horticulture, annual crops or pastures:

- Eggs laid in autumn will produce a generation of **high density nymphs** in spring, but if effectively controlled the population can be decreased and damage minimised.

- It is this **early stage of hatchings that are recommended for control**, specifically the second and third instars (hoppers) which band together and are easily controlled before they develop their wings and develop into adults.
- **Ground application of chemicals should occur via weedicide booms or knapsacks targeting hoppers** and under no exception should there be spraying of these chemicals into the almond trees.
- **Hatchings should occur after the almond pollination period** and the removal of beehives. However, if there are small and isolated earlier hatchings of locusts spraying is not to target bees and your beekeeper needs to be notified for further arrangements.
- **Coordinated approach.** Locusts know no boundaries. There are three levels of locust control – strategic interstate (Australian Plague Locust Commission), state level (state departments) and local (landholders). Effective control on all three levels is vital to widespread plague containment.
- **Be vigilant.** Look for hatchings from early spring. Check the APLC website regularly for updates to the forecast hatching dates for your region.
- **Report outbreaks.** All locust outbreaks, be they adult swarms or hatching nymphs, should be reported immediately to authorities. If after assessing the risk of outbreak on your property you are concerned at how you will manage it, please seek assistance from the authorities.
- **Landholders have obligations** under state legislation to report and/or control locusts on their property. If you are unsure of your obligations, please check your state agency's website or contact their hotline.
- **Insecticides must be approved for locust control by the Australian Pesticides and Veterinary Medicines Authority (APVMA).**
- **The chemicals used for APL control are very toxic to humans** (except metharizium) and full personal protective equipment (PPE) as per label directions should be worn during the spraying operations
- The **almond industry currently has no insecticides permitted or registered** for the control of locusts, but the ABA is currently applying for Minor Use Permits for a range of chemicals suitable for control. It is expected that permits will be ready by the end of August, at which time processor/marketers will be better able to advise appropriate action. **Please ensure that you consult with your relevant processor/marketer prior to undertaking control measures.**
- **You must observe withholding periods (WHPs)** following the use of any registered or permitted chemicals to control locusts. Note: all producers need to be aware of Maximum Residue Levels (MRLs) and must follow the label instructions.

IDENTIFICATION, FACTS & CONTACTS

Predicted Hatching Dates by Region as of 16 August 2010

Dates will become more accurate closer to spring, so check updates on the APLC website
http://www.daff.gov.au/animal-plant-health/locusts/current#hatchtable

	Hatching	Mid-instar	Fledging
NSW			
Brewarrina-Bourke	22 August	7 September	17 Ocotober
Hay - Balranald	26 September	11 October	31 October
Narrandera - Griffith	5 October	19 Ocotber	6 November
VICTORIA			
Mildura - Ouyen	25 September	10 October	31 October
Swan Hill - Boort	6 October	19 October	10 November
SOUTH AUSTRALIA			
Renmark - Morgan	26 September	10 October	24 October

Source: Australian Plague Locust Commission (http://www.daff.gov.au/animal-plant-health/locusts/current#hatchtable)

Description

Adults

Adults of the Australian plague locust can be readily distinguished from other species by the large dark spot on the tip of the hindwings and distinctive scarlet hindleg shanks. Adult body colour is variable and can be grey, brown or green. Adult males measure 25-30 mm long while females are 30-42 mm long.

Adult Australian plague locust

Dark spot on locust hindwing

Nymphs

The nymphs have five growth stages or instars.

Fifth instar Australian plague locust nymph

First instar nymphs are about 3mm long, pale brown to dark brown or black, and sometimes have a white stripe along the back of its first body segment just behind the head. At each stage the developing wings become more noticable and can be used to determine which instar a locust nymph is in. Later instars are grey or brown and sometimes have a white stripe along the back.

For Further Information or to report outbreaks:

New South Wales

All outbreaks must be reported to your local Livestock Health and Pest Authority (LHPA) office. For further information visit the LHPA website at www.lhpa.org.au, or the Industry and Investment NSW – Primary Industries website at www.dpi.nsw.gov. au/agriculture/pests-weeds/insects/ general/locusts or phone the I&I NSW Plague Locust Hotline 1800 814 647.

South Australia

Locust activity in South Australia should be reported to your nearest Primary Industries and Resources operating base (after September 1), Loxton T: 1800 833 451 For more information in SA go to www.pir.sa.gov.au/locust

Victoria

All outbreaks in Victoria should be reported to the DPI Victoria Locust Hotline, 1300 135 559. For further information in Victoria, go to www.dpi.vic.gov.au/locusts or contact your local DPI Victoria office.

References

Australian Plague Locust Commission. http://www.daff.gov.au/animal-plant-health/locusts/current#situation

Henry, K. 2010. The Australian Plague Locust Factsheet. Government of South Australia, Primary Industries and Resources SA.

Plague Locust Control Fact Sheet. August 2010. Australian Plague Locust Commission (APLC) and Grains Research and Development Corporation (GRDC).

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Australian Almond Conference 2010

27th - 29th October Mildura, Victoria

The Almond Board of Australia is pleased to present the 2010 Australian Almond Industry Conference 'New Horizons' being held Wednesday, 27th October to Friday, 29th October in Mildura, Victoria.

This Annual Almond Conference is the premier event for the Australian almond industry, bringing together approximately 200 delegates from all facets of the industry including growers, processors, marketers, researchers and industry suppliers.

Earlybird registration has been extended until the end of August, so register now and save! To register go to:

www.australianalmonds.com.au/industry/conference_2010

Due to overwhelming support from past sponsors and exhibitors, only limited sponsorship opportunites remain.

For further information about registration or sponsorship, please contact Jo Ireland - Communications Coordinator at the ABA office or email: jireland@australianalmonds.com.au

Social Program

Proudly sponsored by JACK RABBIT

Welcome Reception

'PV Mundoo'

27th October

Join us for an evening dinner cruise on the Paddle Vessel Mundoo. Built in 1987 at Goolwa, South Australia - a steel hull construction, 34.9 metre long paddleboat, featuring attractive quality timber ceilings and bar facilities. This twilight cruise will depart the Mildura Wharf at 7pm SHARP and cruise upstream from Mildura. Live entertainment will be provided giving delegates the opportunity to sit back and enjoy the tranquil floodlit river banks created by the PV Mundoo's powerful floodlights.

Proudly sponsored by SELECT HARVESTS

Golf Day

Wentworth Golf Club

27th October

Enjoy a memorable day of golf teeing off at 11am with fellow delegates in an ambrose style competition at the beautiful Wentworth Golf Club. The course boasts lush fairways between stands of large river gums, whilst tree-lined fairways wind their way around eight lakes, coming into play on nine of the course's holes. Tackle tricky bent grass greens, subtle contours and a true surface that will always reward a good putt.

Proudly sponsored by Elders

Conference Dinner

The Setts Bar & Function Centre

28th October

Don't miss the Annual Conference Dinner conference, commencing with a Sponsors Drinks session at 6:30pm, for 7pm dinner. This social evening is a chance to network with other conference delegates in a relaxed atmosphere. Dinner tickets are included with full registration prices, and extra tickets are also available. Partners are very welcome.

Be sure to attend the Conference dinner - it will be an evening to remember!

Australian Almond Conference Proudly Supported by HAL

Australian Almond Conference 2010 Preliminary Program

Wednesday, 27th October

11.00am	Social Golf Day (registered participants only) & 19th Hole	Golf Sponsored by: SELECT HARVESTS	19th Hole Sponsored by:
7.00pm	Welcome Reception - Paddle Boat Dinner Cruise	Sponsored by: JACK RABBIT	

Thursday, 28th October

8.00am	**Registrations & Trade Exhibitions**		
9.00am	Almond Board of Australia AGM		
10.00am	Official Conference Opening		
10.30am	Morning Tea & Trade Exhibition	Sponsored by:	mildura
11.00am	Annual Levy Payers Meeting	Sponsored by:	HAL
12.00noon	Lunch & Trade Exhibition		
1.00pm	Almond Research & Development Highlights	Sponsored by:	Scholefield Robinson HORTICULTURAL SERVICES
2.30pm	Afternoon Tea & Trade Exhibition		
3.00pm	Irrigation: Efficiency & Nutrition Spotlight	Sponsored by:	NETAFIM
5.00pm	Day Close		

6.30pm	Pre Dinner Sponsor Drinks	Sponsored by:	Elders
7.00pm	Annual Almond Conference Dinner		

Friday, 29th October

8.00am	Tea & Coffee, Trade Exhibition		
9.00am	Promoting Australian Almonds	Sponsored by:	LARAGON PTY LTD ALMOND PROCESSORS
10.30am	Morning Tea & Trade Exhibition		
11.00am	Almond Industry Perspectives	Sponsored by:	BEST GETS EVERYTHING SORTED
12.30pm	Lunch & Trade Exhibition		
1.00pm	Bus Departs for Lake Cullulleraine Orchard Visit		
3.15pm	Afternoon Tea		
3.45pm	Bus departs from Lake Cullulleraine for airport and hotel drop-off		

The Conference Organisers reserve the right to amend this program at any time, please visit www.australianalmonds.com.au/industry/conference_2010 for updated program details

Australian Almond Conference Proudly Supported by HAL

Keynote Speakers

Stefano de Pieri

Celebrity Australian Chef

The gastronome from Mildura, and Australian almond ambassador, who calls himself a cook (not a chef) is famous for his cooking. As host of the acclaimed TV series A Gondola on the Murray, author of four culinary books, and the genius behind one of the country's greatest regional restaurants, it might be assumed that he is all-consumed by the world of food. He isn't.

Stefano created a restaurant – from a dingy cellar basement and transformed it in to the best regional restaurant in Victoria. His business success emulates his life experience of coming from Italy with his brother in 1974 and a suitcase, to becoming one of the most well known cooks in Australia. His restaurant has become the gastronomic epicentre of Australia, and winner of many awards including the prestigious the Age Good Food Guide restaurant of the year award.

Stefano has also created a range of beers (Mildura Brewery – available through Dan Murphy's nationally) and wine (Stefano's available nationally through Cellarmasters), made with grapes sourced in Mildura and various other locations, like the Clare, King and Barossa Valleys, the range having two objectives: to be affordable and to be suitable for food.

Also involved in the arts, Stefano established the Mildura arts festival and has been chair of the Australian Alternative Varieties Wine Show, the most successful new wine show in Australia.

"I'm interested in the relationship between food and the environment because I believe that the two are intimately connected." Stefano also promotes a constant philosophy on quality of product and service.

Danny O'Brien

CEO - National Irrigators Council

Danny O'Brien was appointed CEO of the National Irrigators' Council in July 2009. A former journalist, he comes to the NIC with a background in public affairs, politics and government, having worked for MPs in Victoria and as a Senior Adviser for a Deputy Prime Minister. He is based in Canberra.

Sara Grafenauer

Accredited Practising Dietitian & Nutrition Lecturer University of Wollongong

Sara is an Accredited Practising Dietitian of 13 years. She is a graduate and academic at the University of Wollongong and consults specifically to the food industry. Sara's research interest is in the area of satiety signaling and functional foods. She has a passion for food, cooking and naturally, she loves almonds!

New Horizons
Australian Almond Conference 2010

Darren Lehmann

Australian Cricketing Legend

From the time he burst on to the scene at age 17, Darren has amassed a huge amount of runs but only ever been rewarded by the national selectors with a One-Day international place. Darren is also a useful slow left-arm bowler with a knack of picking up important wickets. He is a powerful attacking batter and loves to despatch the ball to all corners of the ground, he is also great at manufacturing shots when the bowlers are giving little away.

Lehmann's talents won him regular opportunities in Australia's one-day international team, particularly during the late 1990s, and on the restructuring of the country's limited-overs squad in early 2002. In 1999 he had the honour of hitting the winning runs in the 1999 World Cup final against Pakistan at Lord's, and was a key member of the side that defended the title four years later. On the domestic front he was no less effective, and was an integral member of winning Sheffield Shield sides in 1990-91 and 1995-96 and Yorkshire's victorious County Championship team of 2001. He is now the leading run scorer in Sheffield Shield/Pura Cup history and showed his desire had not waned in 2005-06 by piling up 1168 runs at 89.84. The peak came during a career-best 301 against Western Australia at the Adelaide Oval, an innings that ended with 116 from 87 balls in the second session.

He has a sharp cricket mind and is genuinely likeable, and now works closely with the South Australian Cricket Association to provide aspiring cricketers with the opportunity to develop their game at the Darren Lehmann Cricket Academy, giving young players the unique opportunity to undertake intense training at the world renowned Adelaide Oval and hone their cricket skills in Australian conditions.

For program updates and more speaker profiles please visit
www.australianalmonds.com.au

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In The Orchard...

by Brett Rosenzweig

The first three months of the almond growing season is the busiest and most important time of the year.

From the moment the buds begin to swell in early August until pit hardening in early / mid October, the orchard is abuzz with rapidly changing phenology. Careful observations and correct timing in the orchard now could have beneficial results later at harvest time. Whilst the kernel has not begun to develop prior to pit hardening, the potential kernel size is determined and negatively influenced by any stresses on the tree. The following is a list of things that should be considered over the next three months:

- Dormant oils sprays should have already been completed.
- Pre–season irrigations should have already been applied to ensure good soil moisture conditions prior to bud burst. Pay careful attention to sub soil moisture levels as the current winter rainfall may not have been adequate to maintain subsoil moisture. Dig a hole or check soil moisture monitoring equipment!
- Consider your spring weed control program before bee hives start arriving in the orchard to reduce the need to weedicide while bees are in the orchard and remove any competing pollen and nectar source.
- Consider any orchard operations that may impact on bee activity. Take care not to engage in any activities that will detrimentally affect bee hive strength e.g. spraying Glyphosate near hives. If needed, check hives on a regular basis to keep an eye on bee activity.
- Apply a boron foliar spray of Solubor (2.5 Kg/1000L) at late bud swell / early pink bud to assist fruit set.
- Copper should be applied at early pink bud stage for bacterial and fungal protection.
- Second boron foliar spray using boric acid (100g/1000L) can be applied mid to late bloom for improved fruit set.
- Full bloom fungicide for Blossom Blight and Brown Rot, e.g. Iprodione.
- Shuck fall fungicide using a registered group Y fungicide for Brown Rot and Rust, e.g. Mancozeb or Chlorothalonil.
- Monitor for Black Peach Aphid on flowers and emerging shoots. Any previously affected areas may be a problem again this year.
- Monitor for European Earwigs which attack flowers and newly emerging shoot growth. Check underneath leaf matter or soil at the base of the tree trunk, underneath the drip hose at the end of the rows and tree guards of young trees. Any previously affected areas may be a problem again this year.
- Foliar nutrition should start once adequate canopy cover is present. Foliar nutrition is important to improve leaf size, fruit size and maximise shoot and fruit elongation. Foliar nutrition is especially important to 'force-feed' critical nutrients during cooler conditions when water and soil nutrient uptake is minimal and slow.
- Keep an eye on Bryobia Mite (Brown Mite) during September. Juveniles generally hatch in the first two weeks of September and this period will be an important part of your pest monitoring program. Check for the presence and severity of juvenile numbers to determine if control is required or not.
- During the cooler months, it is better to fertigate using ammonium or nitrate based sources of nitrogen (e.g. ammonium nitrate, liquid ammonium nitrate, potassium nitrate, calcium nitrate, MAP, etc). These will provide optimal uptake of nitrogen when the soil temperatures are below 18oC measured at 10 to 20cm in depth. Do not use urea or UAN below 18oC. When soil temperatures consistently exceed 18oC, Urea and UAN fertilisers may be used. Remember to check with manufacturers for compatibility when mixed multiple products together.

For further information contact:

Brett Rosenzweig
Industry Development Officer
Almond Board of Australia
P 08 8582 2055 or 0429 837 137

E: brosenzweig@australianalmonds.com.au

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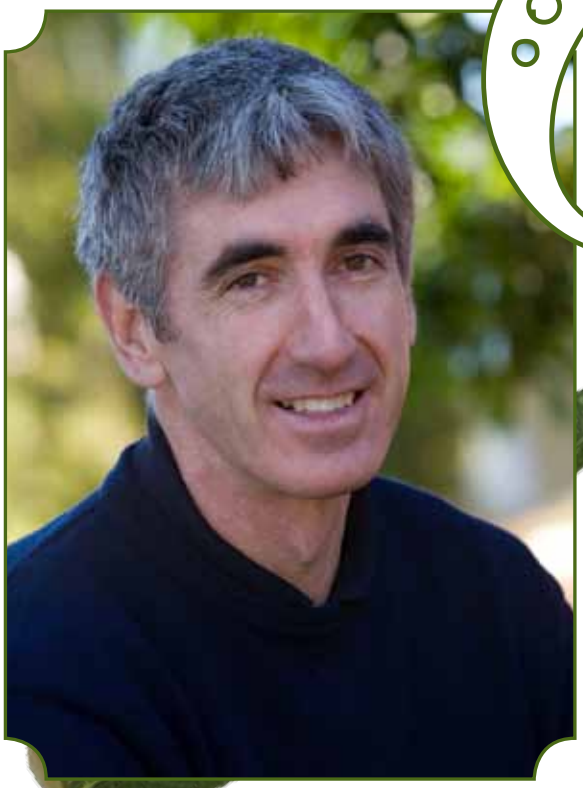

Grower Profile

Tim Millen

Group Horticultural Manager, Almond Division - Select Harvests

Favourite Quote:

"Be a good listener, your ears never get you into trouble"

Education/Training:

Secondary – St Patrick Wellington New Zealand

Massey Uni –Palmerston North, NZ- Diploma of Horticulture- Distinction

Orchard/s:

19 orchards Select Harvests & Investors

18 in the Robinvale VIC

1 North of Perth WA

Varieties Grown:

Non Pariel, (some still call it Californian Paper Shell), Carmel, Price, a few Baxendale, Mission, Peerless, Ne Plus & Monterey

Employment history in the almond industry:

Have been with Select Harvests for 14 years.

Select Harvests Group Horticultural Manager – Almond Division

Managing with a great team across all aspect of the 41,500 acres, from Nursery to stockpad.

How do you see the almond industry changing over the next 10 to 20 years?

I see new rootstocks increasing yields with potentially less inputs, replanting with new varieties as orchards age, and I see the main challenge being to maintain high standards of almond quality post harvest – from orchard floor to processor.

What do you see as the almond industry's biggest asset?

The people involved, and 'Mother Nature'.

If you weren't involved with the almond industry, what do you think you'd like to do?

Overseas volunteer helping others with my skills.

If you were to invite three people to dinner (fictional, dead or alive) to brainstorm the future of the Australian almond industry, who would you invite and why?

A bee keeper, fertiliser salesperson and a US Almond Trader. Once we were all seated, would leave the table and ask them to meet me at the bar when they'd worked it all out. Costs & price.

Why is it important to you to be a member of the ABA?

To be involved, stay in touch with other growers, to be part of a greater team, make friends, opportunities, learn, contribute, assist other growers & stake holders.

Just for Fun

I should have.....
been an All Black.

I wish that I could.....
Wish for NO rain during harvest!! Please!!

The first thing I do when I get to work is.....
Turn the light on.

If you would like to nominate someone for a Grower Profile:

Please contact Jo Ireland
at the ABA on
08 8582 2055
or email
jireland@australianalmonds.com.au

R & D Roundup

Strategic R&D Plan

by Ben Brown

Due to strong growth in the industry over the past few years, Australian almond production is predicted to increase to more than 80,000 tonnes by 2015. Associated with this growth in production will be an increase in R&D levy collection. Over the next 5 years, the Australian almond industry, the Commonwealth government and other funding partners are likely to invest between $10 - 15 million in R&D for the industry.

This substantial amount of money provides a major resource with which to drive the development and world competitiveness of our industry. It is critical that it is invested wisely.

Accordingly, a new R&D investment plan - the Almond Industry R&D Strategic Plan 2011-2016, is needed to prioritise investments of statutory levy funds, industry voluntary contribution funds and matching federal funds, in almond R&D.

The process of developing this plan started in May 2010, with a two day workshop in Mildura with representation from growers, researchers, service providers, processors and marketers. Following the completion of the workshop, the industry's Vision, Mission, Objectives, Strategies and Actions were developed and the plan will now provide a platform from which further detail will evolve.

The next six months will involve a consultation period at grower meetings industry strategic committee meetings, and the IAC meeting. The R&D objectives and strategies will be justified and prioritised with an emphasis placed on an analytical business case. The process will involve rigour and comparison between competing research investment areas using both subjective and objective tools. The R&D objectives and strategies will be ranked based on urgency, importance, impact and likelihood of success and then the potential benefit assessed in relation to the expected costs. The end result will be an expected Net Present Value figure and a Benefit Cost Ratio figure for a specific project investment.

The IAC and the Strategic Committee's will ensure the investment portfolio reflects both the industry's priorities and the Australian Federal Government's Rural Research and Development priorities.

The plan will allow all stakeholders to look forward and to investigate the next generation of production, processing and marketing technologies that will ensure Australia retains its position as a preferred supplier of high quality, value for money almonds, produced in risk minimizing, cost competitive sustainable production systems.

For further information contact:

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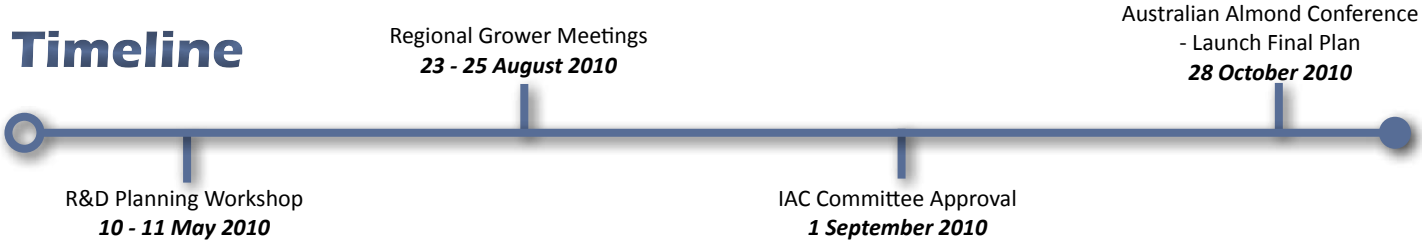
E: bbrown@australianalmonds.com.au

Strategic Plan - Draft Framework

Timeline



Nuts for Life

www.nutsforlife.com.au
Follow us on twitter

Market research results

Consumer Insights has once again undertaken our biannual market research tracking study to ensure Nuts for Life is achieving its goals of increasing the nut health knowledge of health professionals and to monitor the consumer opinion of nuts.

Health professional study

435 health professionals (just over 100 of each: GPs, dietitians, fitness leaders and naturopaths) completed the online survey in January 2010.

GPs continue to gain knowledge and show increased awareness of the health benefits of regular nut consumption particularly in the areas of cholesterol/ heart disease and diabetes. They are still confused about the role of nuts in weight management given nuts high fat content. They are also aware of the repetitive message to "eat less fat" and the importance of replacing with low fat varieties.

The nuts they recommend to patients in descending order are: Mixed nuts> walnuts> almonds> macadamias> Brazil nuts, cashews, none> peanut, pecan, pistachio> hazelnut> pine nuts> chestnuts

GPs are more likely to tell patients nuts are OK when asked then raise the issue with patients.

Dietitians

Dietitians are better informed however they do have reservations about nuts and weight management.

The nuts they recommend to patients in descending order are: Mixed nut> almond> walnut> pecan> macadamia> cashew> peanut> Brazil nut> pistachio> hazelnut> pine nut> chestnut> none.

The majority of dietitians are more likely to raise the issue of eating nuts with clients and specifically recommending them.

Consumer study

222 consumers, (equal males and females) completed the online survey in January 2010. While these numbers are small a tracking study helps to understand consumer sentiment.

- Consumer who eat nuts more frequently than once a month has dropped from 67% in 2008 to 63% in 2010, however those that don't eat nuts at all has remained steady at 12-13%. Of those that eat nuts 42% report eating a 30g handful. Consumers don't seem to recognise nuts as an everyday food and are concerned about the fat content and weight gain.
- 38% said a healthy professional had recommended they eat a handful of nuts daily.
- The most common occasions to eat nuts are at parties> on planes> pre-dinner with a drink> afternoon tea> at work desk> watching TV> morning tea.
- The common 3 nuts to snack on were cashews, mixed nuts and peanuts.
- 91% of consumers said their consumption of nuts had gone up or stayed the same in the last year with the number eating less going down.
- 96% said their frequency of cooking with nuts had increased or stayed the same in the last year
- Consumers are clearly confused when it comes to eating nuts regularly and the impact this has on weight. Interestingly their knowledge of the effect of nuts on cholesterol, heart disease, weight and diabetes is increasing.
- 46% said nuts were as healthy as fruits and vegetables, 37% didn't know and 17% said no.
- 43% said nuts were a 'superfood', 38% unsure and 19% said no.
- Sources of information continue to be magazines and newspapers although the internet continues to grow.

In general nuts are a high fat food in a fat phobic world. Better education of the role healthy fats play in the diet is needed with an emphasis on how nuts can be eaten in a weight management diet. Those that "don't know" are in a position to move to a more positive place with more education. This is an opportunity for Nuts for Life.

Consumer PR program

Porter Novelli have again outdone themselves with the achievements to date for the consumer PR program.

- 5 of 7 media releases have been distributed to date on topics such as: weight management with a 7 day meal plan, Coeliac Disease/gluten free, nuts as superfoods, 10 days 10 nuts, healthy heart for heart week
- Our 2 Tweets a day Twitter program is being followed by 205 people who are in turn followed by just under 300,000 people. We too are following about 320 other health professionals and health professional organizations and foodies.
- Nuts for Life has sponsored another Arbor Nutrition newsletter on nuts which is distributed to 15,000 health professionals around Australia and New Zealand
- NutENews is now being distributed to 1220 subscribers quarterly and has been rated as a good explain of an email newsletter by Catherine Saxelby at the DAA National Conference
- Nuts for Life website polls – every couple of months the polls on the website change take a look and respond. Stats from these are used in Twitter and NutEBytes.

To date this has resulted in 205 media articles (around 30% in long lead magazine media) and we have another two months of the program to go. Our key messages of a handful a day and 2+5+a handful have been well utilized by journos.

Contributors staff education meetings

Around 60 staff members of Nuts for Life Contributor Companies have attended a Nut Myth Busting workshop conducted by Lisa Yates. All of Queensland and Northern NSW and some of Melbourne has been covered. Lisa plans to get to Adelaide and the remaining Melbourne companies in July/ August 2010. Lisa will be in contact with those companies shortly.

Lisa Yates
Program Manager and Dietitian
Nuts for Life
Ph 02 9460 0111
Email admin@nutsforlife.com.au

Smoked Trout & Almond Salad

This easy-to-assemble salad is sweet and tasty, big on flavour and makes a great light lunch or supper.

Serves 4

Ingredients

- Mixed lettuce leaves
- 6 roma tomatoes, sliced
- 2 tablespoons capers, rinsed
- 350g smoked trout
- 100g whole almonds

Dressing

- 3/4 cup apple vinegar
- 2 tablespoons mustard oil
- 2 tablespoons sweet chilli sauce
- 50g flakes almonds, toasted

Method

Place the salad ingredients into serving bowls. Combine the dressing ingredients in a cruet or screw topped jar; shake or whisk to combine; toss salad with dressing before serving.

Calendar

August

31
ABA Board Meeting
ABA Office, Berri, SA

September

1
Industry Advisory Committee Meeting
ABA Office, Berri, SA

13 - 16
Fine Foods Australia Exhibition
Melbourne Convention & Exhibition Centre
www.finefoodaustralia.com.au

October

27-29
Almond Industry Conference
"New Horizons", Mildura, Victoria
www.australianalmonds.com.au

November

12 - 14
GPCE Melbourne
Melbourne Convention & Exhibition Centre
www.gpce.com.au

March 2011

17
Australian Almond Marketing Forum
"Better with Almonds"
Sydney Mariott Hotel, Sydney, NSW
www.australianalmonds.com.au/forum

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F +61 8 8582 3503
admin@australianalmonds.com.au
www.australianalmonds.com.au

ALMOND BOARD OF AUSTRALIA

Analysis of Optimal Nutritional & Irrigation Applications by Growers

Presented by:
Brett Rosenzweig
Industry Development Officer
Almond Board of Australia

HAL

ALMOND BOARD OF AUSTRALIA

Introduction

1. Trial Experimental Materials & Methodology
2. Trial Results & Discussion
3. Trial Adoption by Growers
4. SoluSampler Trial Data
5. Deficit Irrigation Trial
6. Future Directions

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ALMOND BOARD OF AUSTRALIA

1. Trial Experimental Materials & Methodology

- Almond Optimisation Trial (aka CT Trial)
  - Began 2001/02
  - 50% Nonpareil, 33% Carmel, 17% Ne-Plus Ultra
  - Drip irrigation, pulsed 1hr on / 1hr off
  - Peak irrigation capacity of 14.28 mm/day
  - Daily irrigation scheduling with Epan, Calibrated Neutron Probe & EnviroSCAN's, and Crop Factors
  - Fertiliser injected 5 out of 7 days in second last pulse

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1. Trial Experimental Materials & Methodology

		FERTILISER		
		240:400 (N:K)	320:600 (N:K)	480:800 (N:K)
WATER	60% ETc			
	100% ETc			
	160% ETc			

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1. Trial Experimental Materials & Methodology

- Based on phenology and consumptive use
  - Stage 1 = Bud Swell to Early Flowering
  - Stage 2 = Early Flowering to Petal Fall
  - Stage 3 = Petal Fall to Early Pit Hardening
  - Stage 4 = Early Pit Hardening to One Month Prior to Harvest
  - Stage 5 = One Month Prior to Harvest until End of Harvest
  - Stage 6 = End of Harvest to Leaf Drop
  - Stage 7 = Dormancy (Leaf Drop to Bud Swell)

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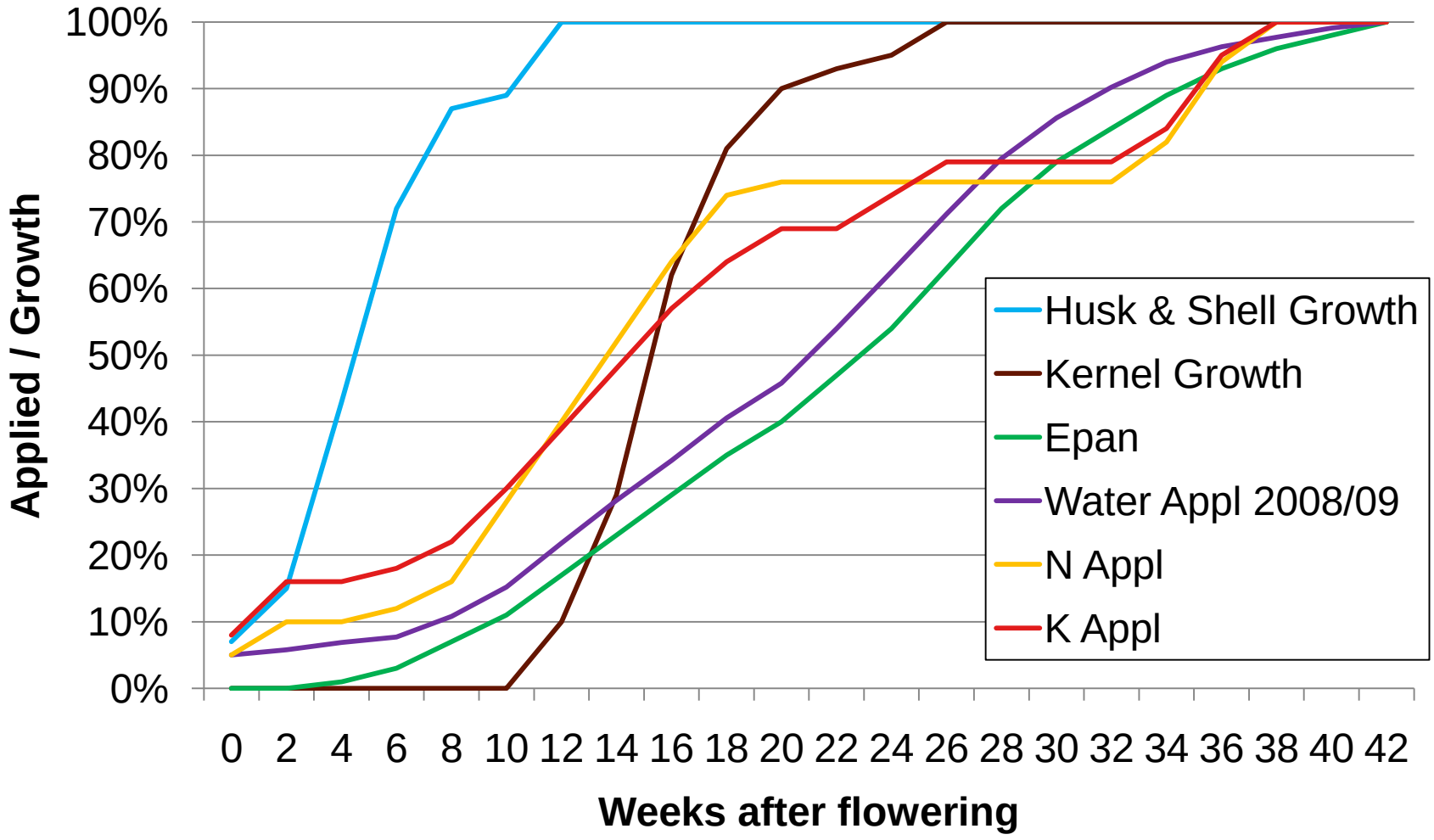
australian almonds


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Applied / Growth
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42
Weeks after flowering
Husk & Shell Growth
Kernel Growth
Epan
Water Appl 2008/09
N Appl
K Appl

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2. Trial Results & Discussion

Treatment	ETc	Water Appl / Irrigation Season Epan	Avg Water Application (ML/ha)	Nitrogen (kg/ha)	Potassium (kg/ha)
1	100%	90%	17.93	240	400
2	100%	91%	18.06	320	600
3	100%	91%	18.05	480	800
4	100%	92%	18.05	320	600
5	160%	147%	27.97	320	600
6	60%	56%	11.20	320	600
7	Irregular	75%	13.87	180	87

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2. Trial Results & Discussion

Treatment	ETc	Avg Water Application (ML/ha)	Nitrogen (kg/ha)	Potassium (kg/ha)	Avg Yield* (kg/ha)
1	100%	17.93	240	400	4,204*
2	100%	18.06	320	600	4,305*
3	100%	18.05	480	800	4,292*
4	100%	18.05	320	600	4,309^
5	160%	27.97	320	600	4,719#
6	60%	11.20	320	600	3,997*
7	Irregular	13.87	180	87	2,586*

*2003/04 to 2008/09, ^2003/04 to 2007/08, #2003/04 to 2006/07

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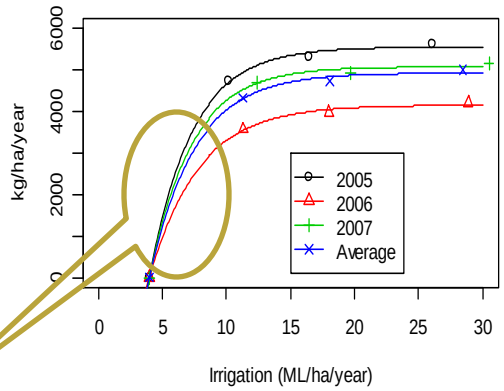
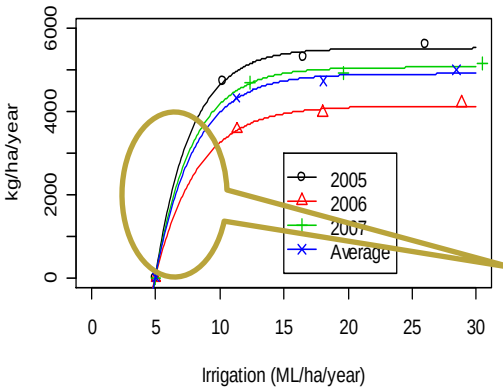
2. Trial Results & Discussion

- Effect of irrigation applied on yield

Minimum taken as 4 ML/ha/year



Minimum taken as 5 ML/ha/year



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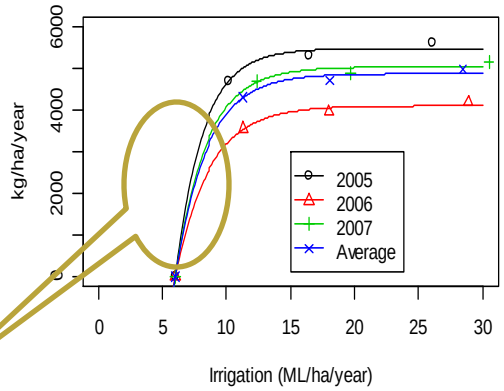
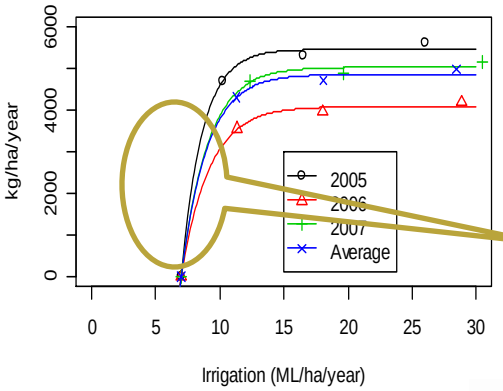
Unsure ????

Minimum taken as 6 ML/ha/year



Minimum taken as 7 ML/ha/year



Unsure ????

Unsure ????

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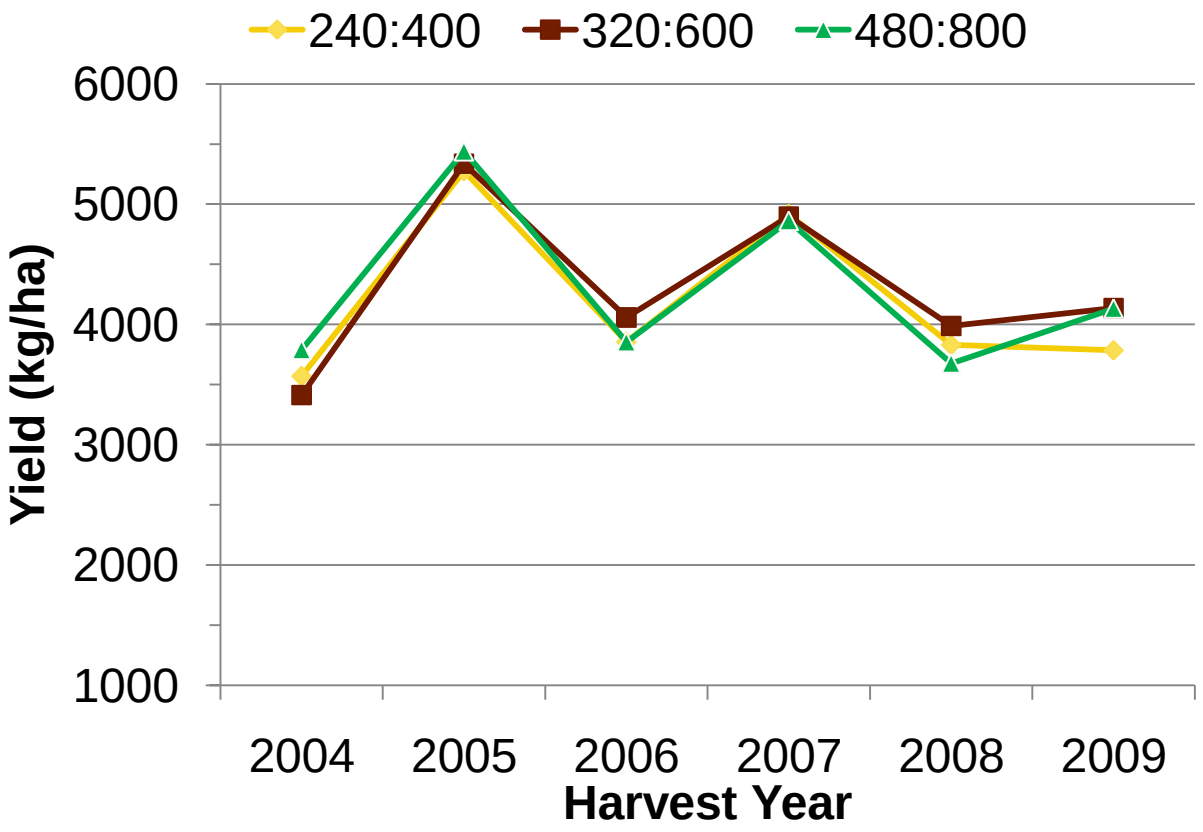
2. Trial Results & Discussion

- Effect of N & K applied on yield



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2. Trial Results & Discussion

- Fruit Analysis – CT Trial 2010 Harvest

		T1			T2			T3		
	Wet Weight	Husk	Shell	Kernel	Husk	Shell	Kernel	Husk	Shell	Kernel
N	%	0.73	0.82	3.86	0.82	0.91	4.24	1.00	0.88	4.08
P	%	0.13	0.09	0.48	0.12	0.10	0.39	0.12	0.08	0.46
K	%	3.16	2.62	0.74	3.21	2.51	0.59	3.67	2.78	0.70
Ca	%	0.20	0.31	0.25	0.17	0.24	0.15	0.20	0.19	0.22
Mg	%	0.09	0.09	0.27	0.10	0.09	0.24	0.10	0.08	0.27
Na	%	0.03	0.03	0.02	0.03	0.03	0.02	0.03	0.03	0.02
Cl	%	0.22	0.20	0.17	0.26	0.22	0.16	0.23	0.20	0.17
Zn	mg/kg	23.69	18.39	36.52	27.54	18.68	37.48	31.25	19.16	37.72
Mn	mg/kg	17.08	14.39	27.43	15.79	14.14	23.73	17.49	13.29	36.14
Fe	mg/kg	202.54	80.99	52.13	204.91	71.07	48.53	257.38	52.87	55.47
Cu	mg/kg	3.34	4.63	7.97	3.07	3.68	6.16	3.31	3.44	7.59
B	mg/kg	66.04	57.58	19.33	55.08	48.91	13.63	60.74	47.31	16.12
S	%	0.04	0.05	0.16	0.05	0.05	0.14	0.05	0.05	0.15

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ALMOND BOARD OF AUSTRALIA

2. Trial Results & Discussion

- Nutrient Removal (Kg/Ha) – CT Trial

HARVEST	NITROGEN			PHOSPHORUS			POTASSIUM		
	T1	T2	T3	T1	T2	T3	T1	T2	T3
2008	291	279	304	26	27	24	357	332	342
2009	179	208	209	18	19	21	224	259	281
2010*	227	266	259	31	29	30	295	332	334
Average	**232**	**251**	**257**	**25**	**25**	**25**	**292**	**308**	**319**
Avg Ratio	**1.00**	**1.00**	**1.00**	**0.11**	**0.10**	**0.10**	**1.26**	**1.23**	**1.24**

*2010 yield not finished, assumes average yield of each Treatment since 2004 harvest

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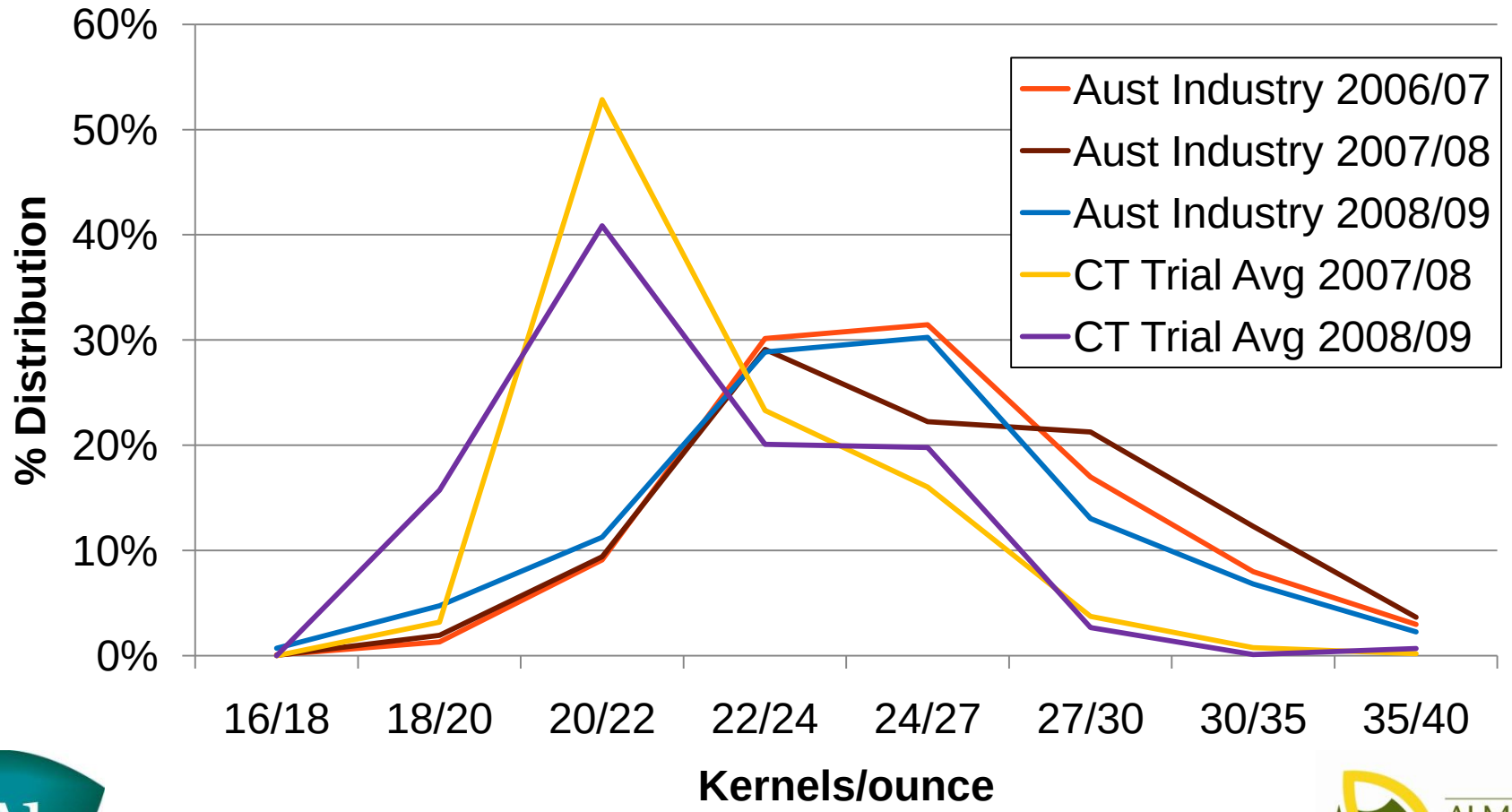
2. Trial Results & Discussion

Size does matter!



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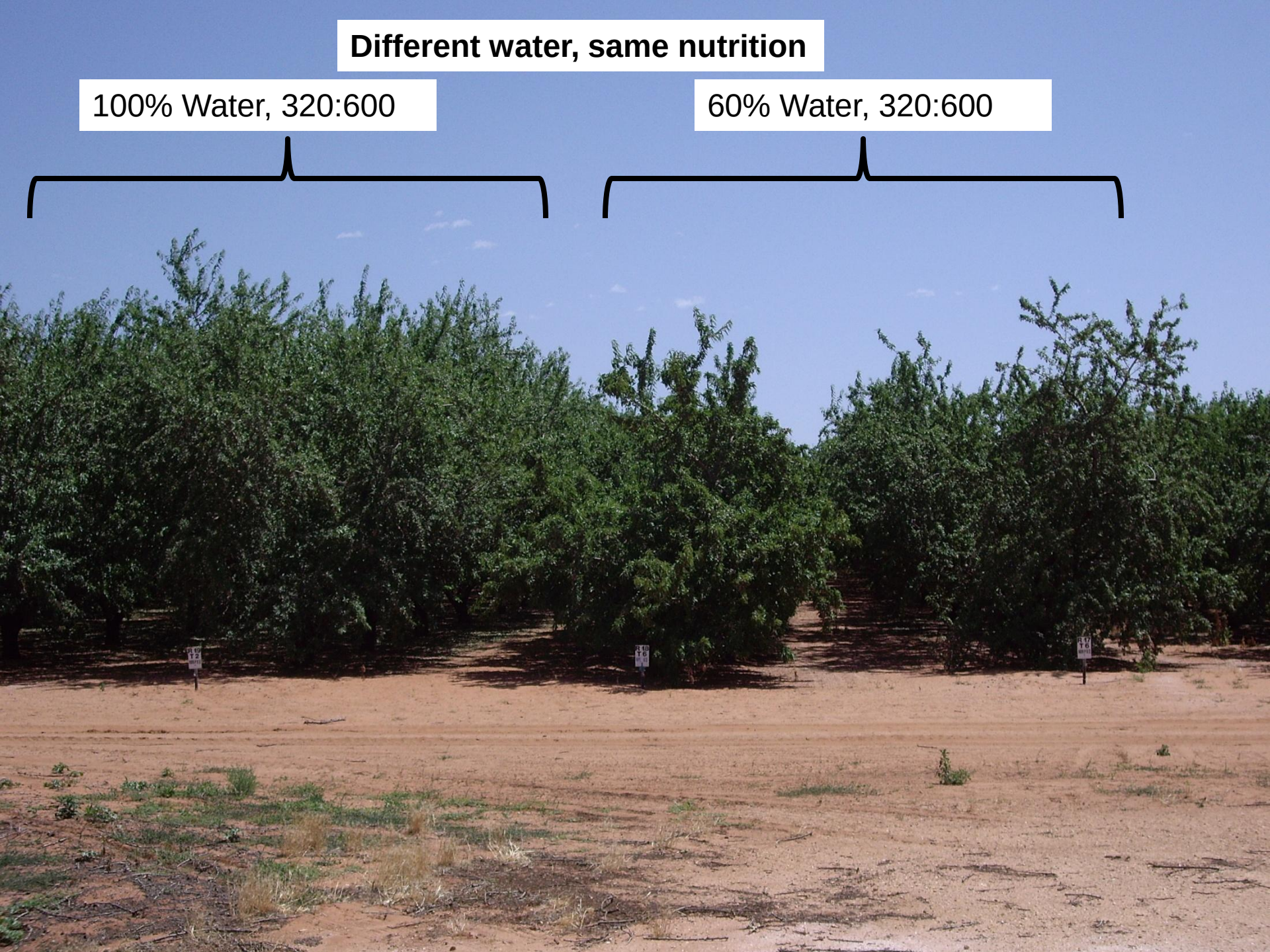
Different water, same nutrition
100% Water, 320:600
60% Water, 320:600

60% Water, 320:600

100% Water, 320:600

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3. Trial Adoption by Growers

Management Practice	CT Trial	Growers
Daily water (drip irrigation)	Yes	Yes
≥ 5 days of fertigation	Yes	Most
# KNO_3 dormancy breaking sprays	2-3	None
# Boron budswell sprays	0	Very few
# Boric Acid bloom sprays	2	Some, 1
# Boron shuckfall sprays	1	None
# NZn, KNO_3, Lo-bi Urea sprays	16-20	4-6
# Magnesium sprays	1-2	Some
# Lo-bi Urea post-harvest, bud conditioning sprays	3-4	Some, 1-2
Defoliation spray	Urea	Mostly urea

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ALMOND BOARD OF AUSTRALIA

3. Trial Adoption by Growers

ITEM	UNIT	SURVEY DATA (inc CT Trial)	CT TRIAL T1,2 & 3	SURVEY v's CT TRIAL
Average tree age	years old	11	7	↑
Average water application	ML/Ha	14.28	18.30	↓
Average yield	T/Ha	3.35	4.08	↓
Average N applied	Kg/Ha	263	349	↓
Average P applied	Kg/Ha	22	33	↓
Average K applied	Kg/Ha	261	604	↓
Average leaf N	%	2.73	3.13	↓
Average leaf P	%	0.14	0.14	↔
Average leaf K	%	2.47	2.68	↓
Average leaf Ca	%	3.18	2.31	↑
Average leaf Mg	%	0.67	0.45	↑
Average leaf Na	%	0.04	0.07	↓
Average leaf Cl	%	0.31	0.32	↔
Average leaf Zn	mg/Kg	149.61	332.53	↓
Average leaf Mn	mg/Kg	338.37	175.29	↑
Average leaf Fe	mg/Kg	180.75	74.22	↑
Average leaf Cu	mg/Kg	17.70	5.62	↑
Average leaf B	mg/Kg	36.90	39.62	↓
Average leaf S	mg/Kg	0.21	0.19	↑

3. Trial Adoption by Growers

- Nutrient Applications
  - Current Leaf Analysis Critical Values (CV's)
    - Last reviewed in 1976 (California) and 1981 (Australia)
    - Inheritably variable
    - Will ensure mean yield rather than optimum yield
    - Will result in 50% of the tree population below mean
    - Australian benchmark yield has increased by 30% in last 8 years and considerably more since 1981

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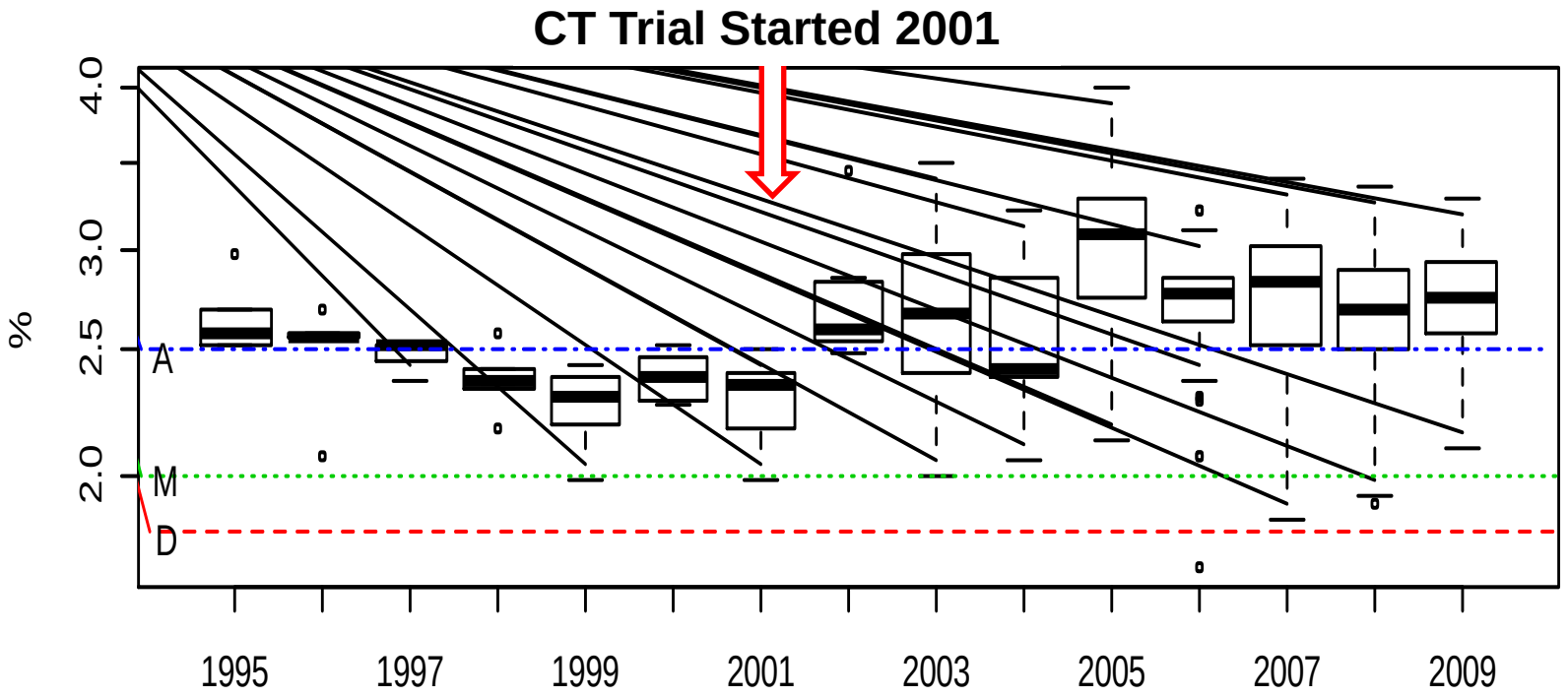
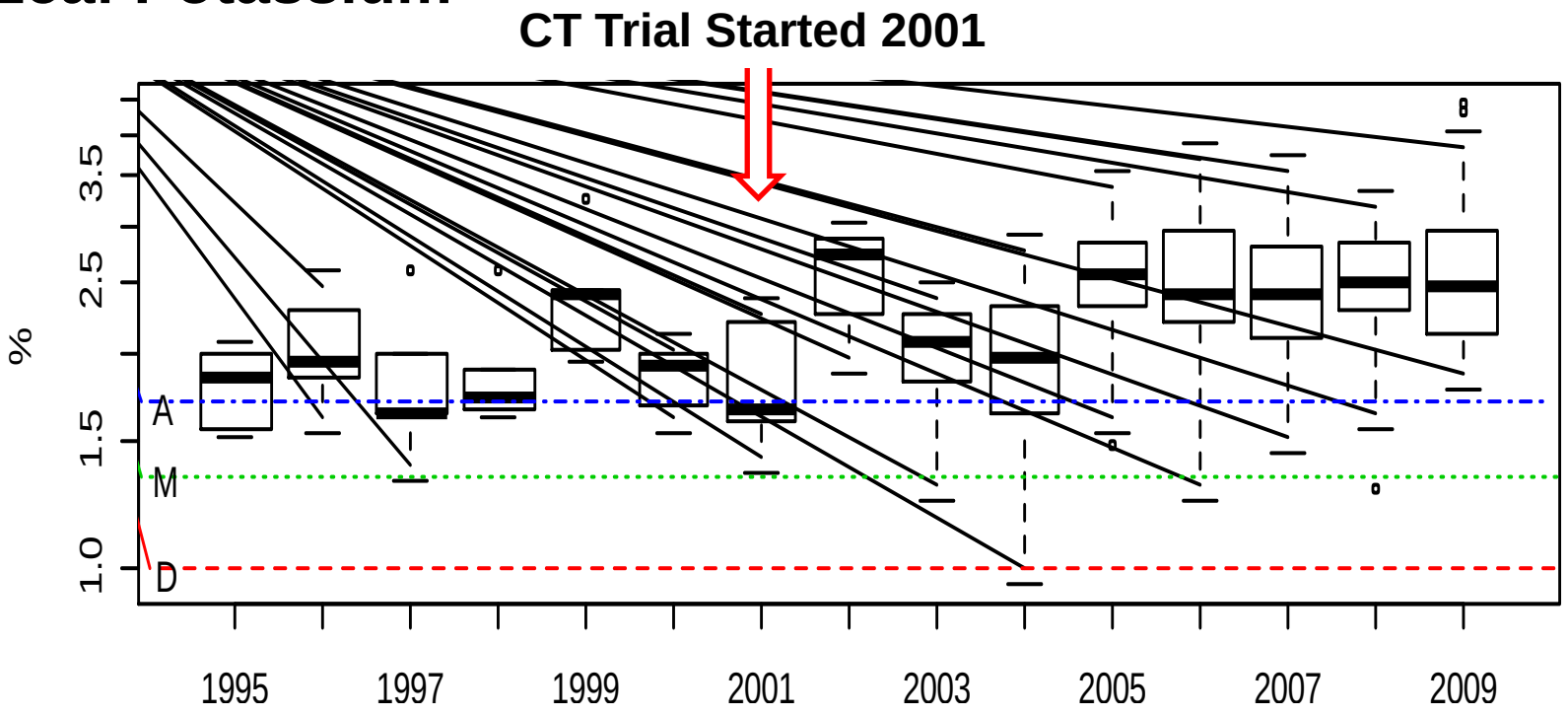
3. Trial Adoption by Growers

Leaf Nitrogen



3. Trial Adoption by Growers

Leaf Potassium



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3. Trial Adoption by Growers

- Influence of Potassium
  - Since the CT Trial started in 2001 potassium applications have increased significantly
  - Potassium applications have increased by 300-400 units/ha
  - Addition of potassium to soils naturally high in soil potassium has likely influenced cation balance, i.e. Ca, Mg, K & Na ratio's

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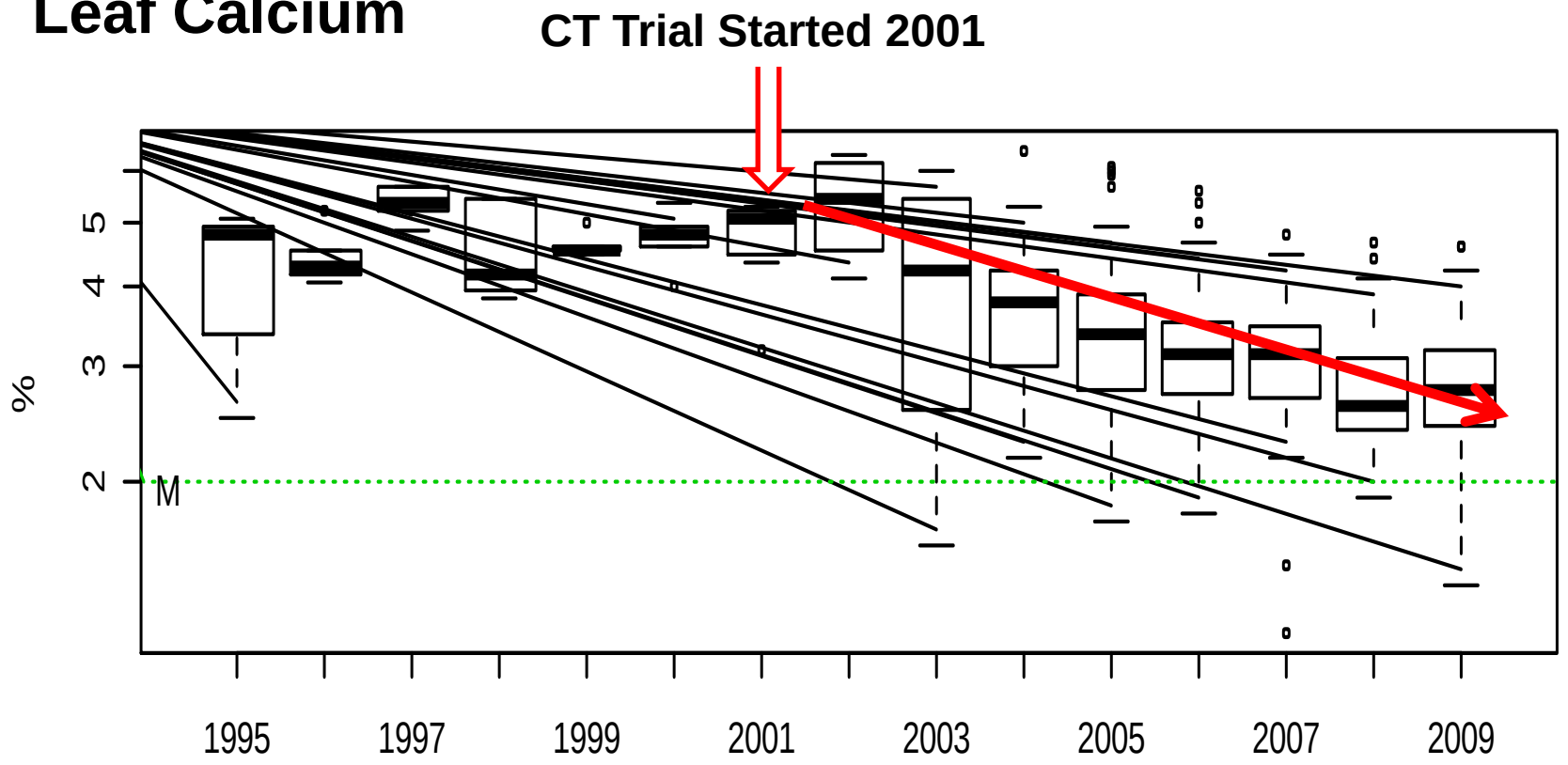
ALMOND BOARD OF AUSTRALIA

3. Trial Adoption by Growers

Leaf Calcium



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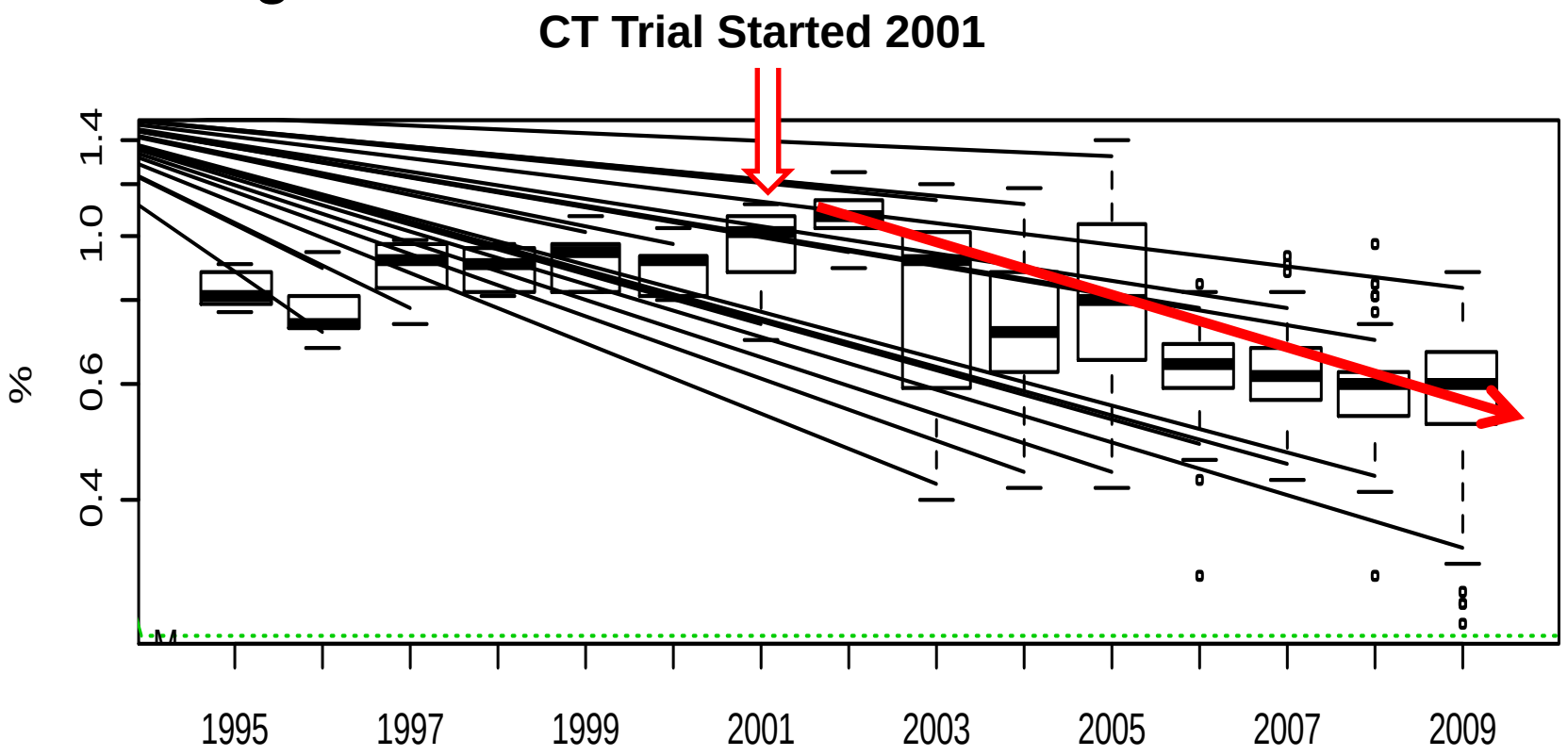
3. Trial Adoption by Growers

Leaf Magnesium

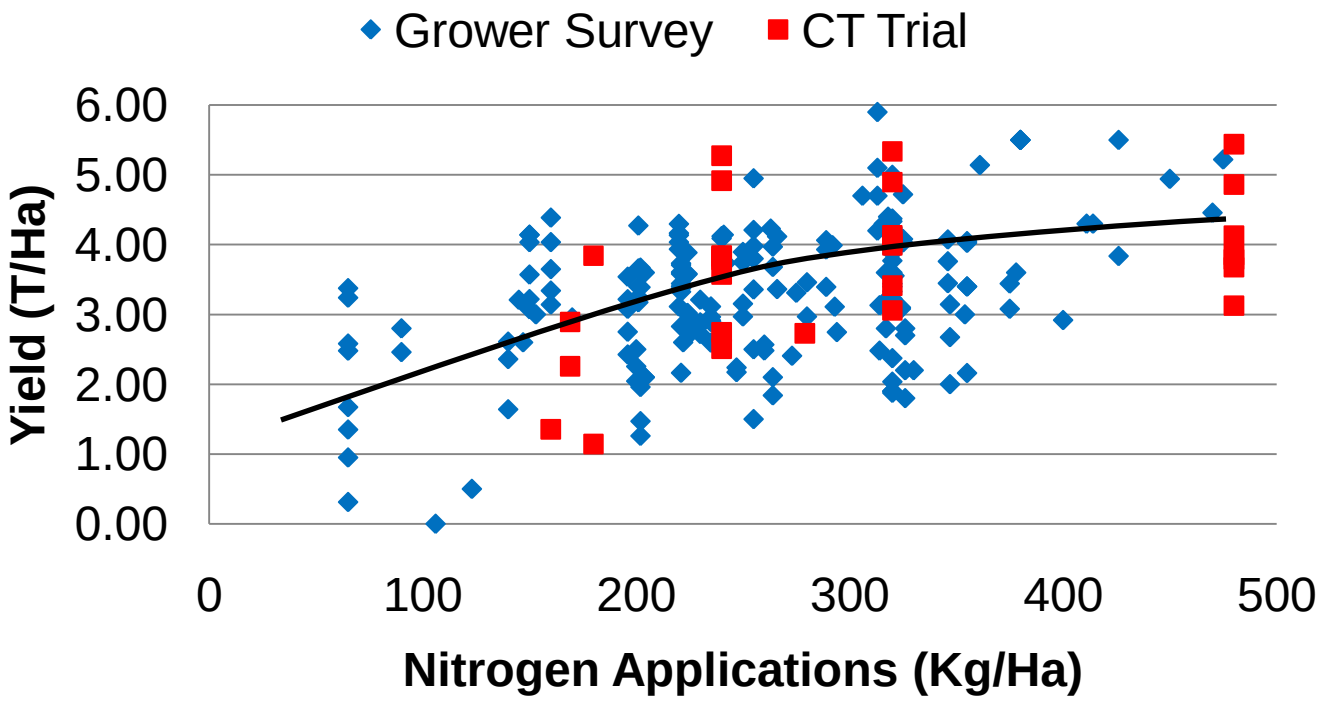


Almond Leaf - Critical Values

Nutrient		Current Australian	Current Californian	CT Trial Averages	Proposed New Australian
N	%	2.0 – 2.5	2.2 – 2.5	3.48	2.5 – 2.7
P	%	>0.1	0.1 – 0.3	0.16	>0.1
K	%	1.4 – 1.7	>1.4	2.78	2.2 – 2.5
Ca	%	>2.0	>2.0	2.09	>2.0
Mg	%	>0.25	>0.25	0.43	>0.4
Na	%	<0.25	<0.25	0.07	<0.25
Cl	%	<0.3	<0.3	0.32	<0.5
Zn	mg/kg	25 - 30	>15	336	>30
Mn	mg/kg	>20	>20	166	>20
Fe	mg/kg	-	-	73	>50
Cu	mg/kg	>4	>4	6	4-10
B	mg/kg	25 - 65	30-65	42	30-50
S	%	-	-	0.19	>0.15

3. Trial Adoption by Growers

- Grower survey & CT Trial
  - Yield Response to Nitrogen Applications



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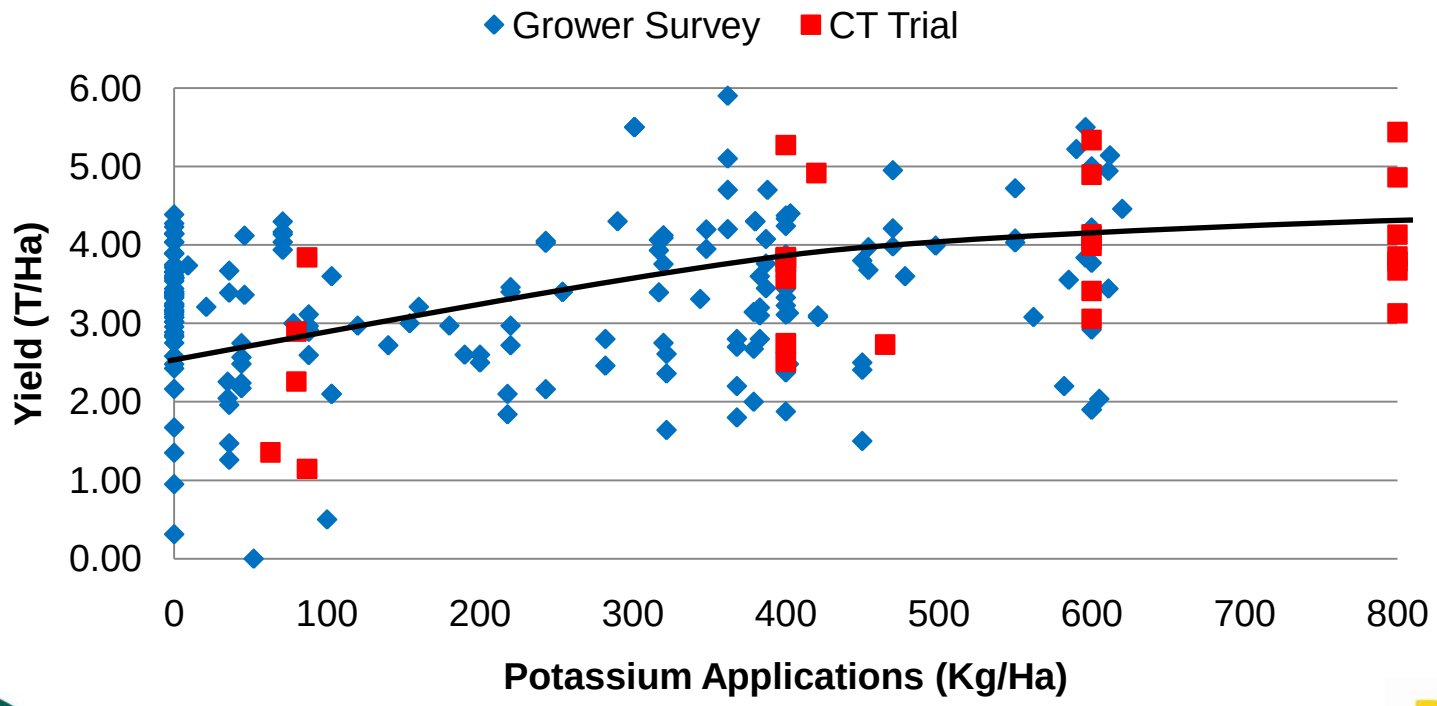
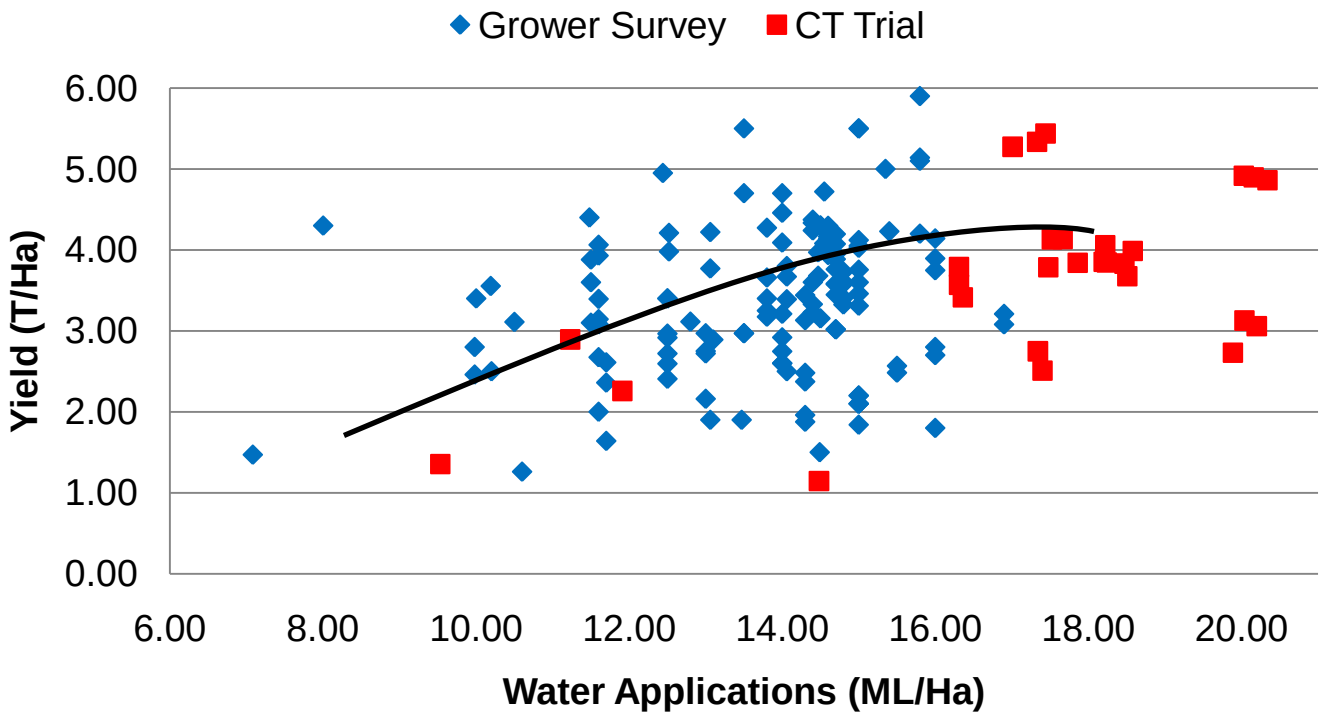
3. Trial Adoption by Growers

- Grower survey & CT Trial
  - Yield Response to Potassium Applications



3. Trial Adoption by Growers

- Grower survey & CT Trial
  - Yield Response to Water Applications



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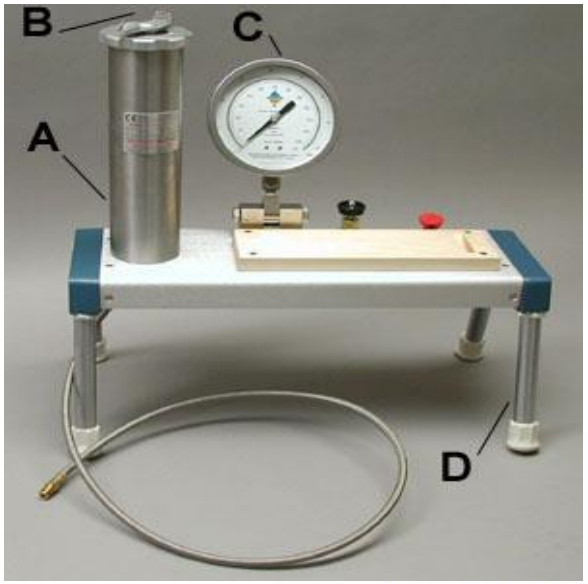
NEUTRON PROBE

SOLUSAMPLER

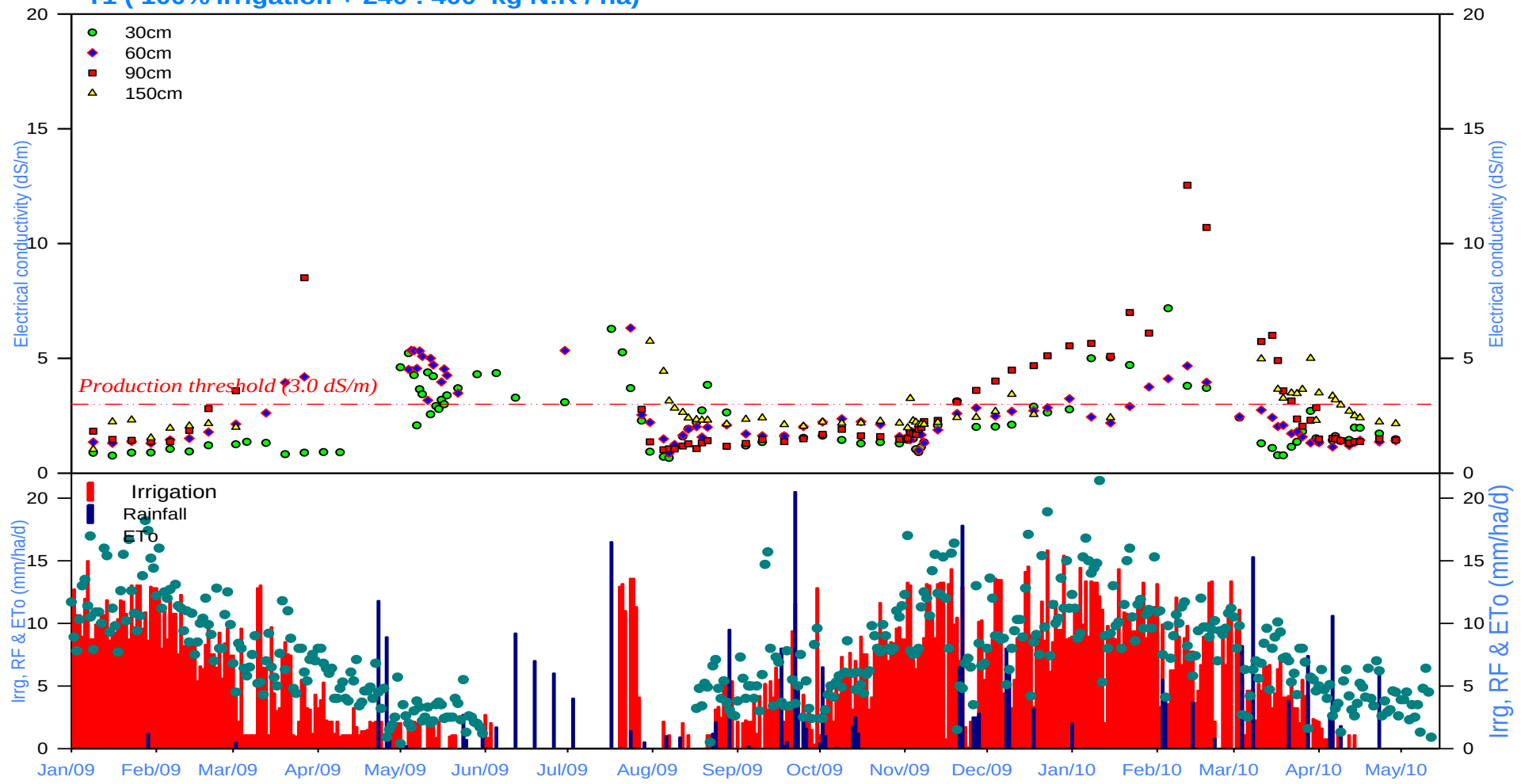
LOGGING TENSIOMETERS

SAP FLOW - Heat pulse velocity compensation method

LEAF AND STEM WATER POTENTIAL (ψ)



T1 (100% Irrigation + 240 : 400 kg N:K / ha)



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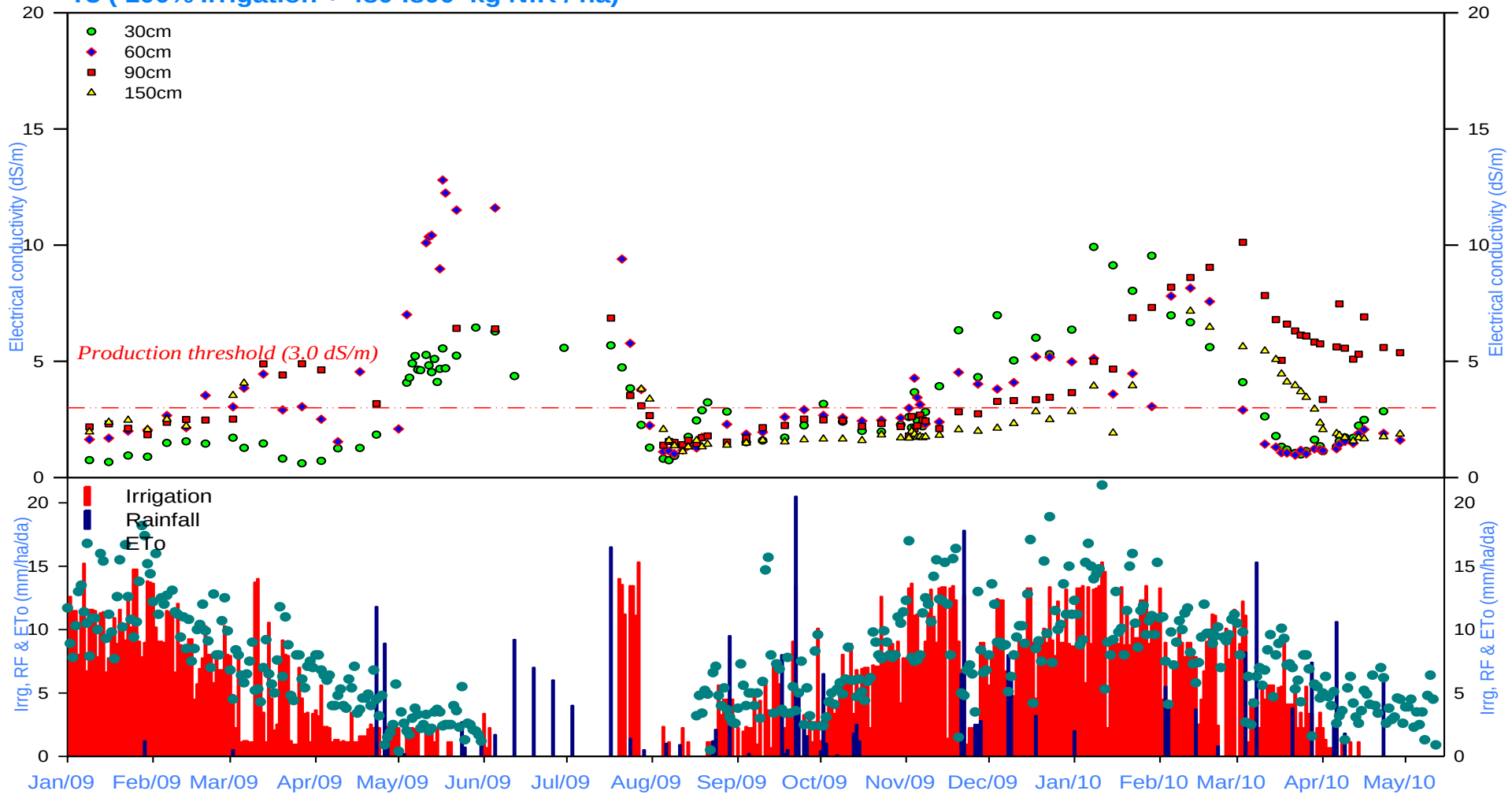
T3 (100% Irrigation + 480 :800 kg N:K / ha)



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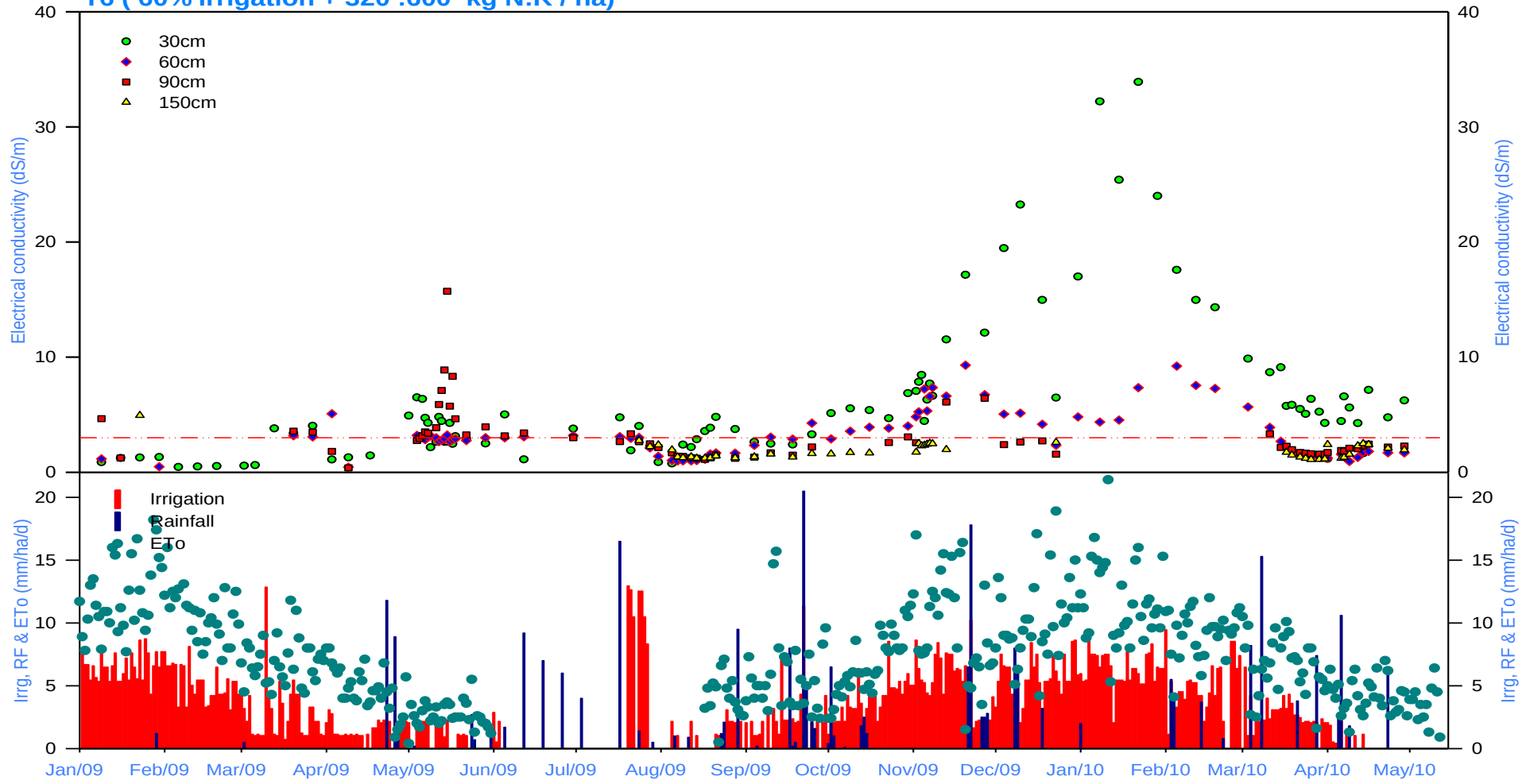
T6 (60% Irrigation + 320 :600 kg N:K / ha)



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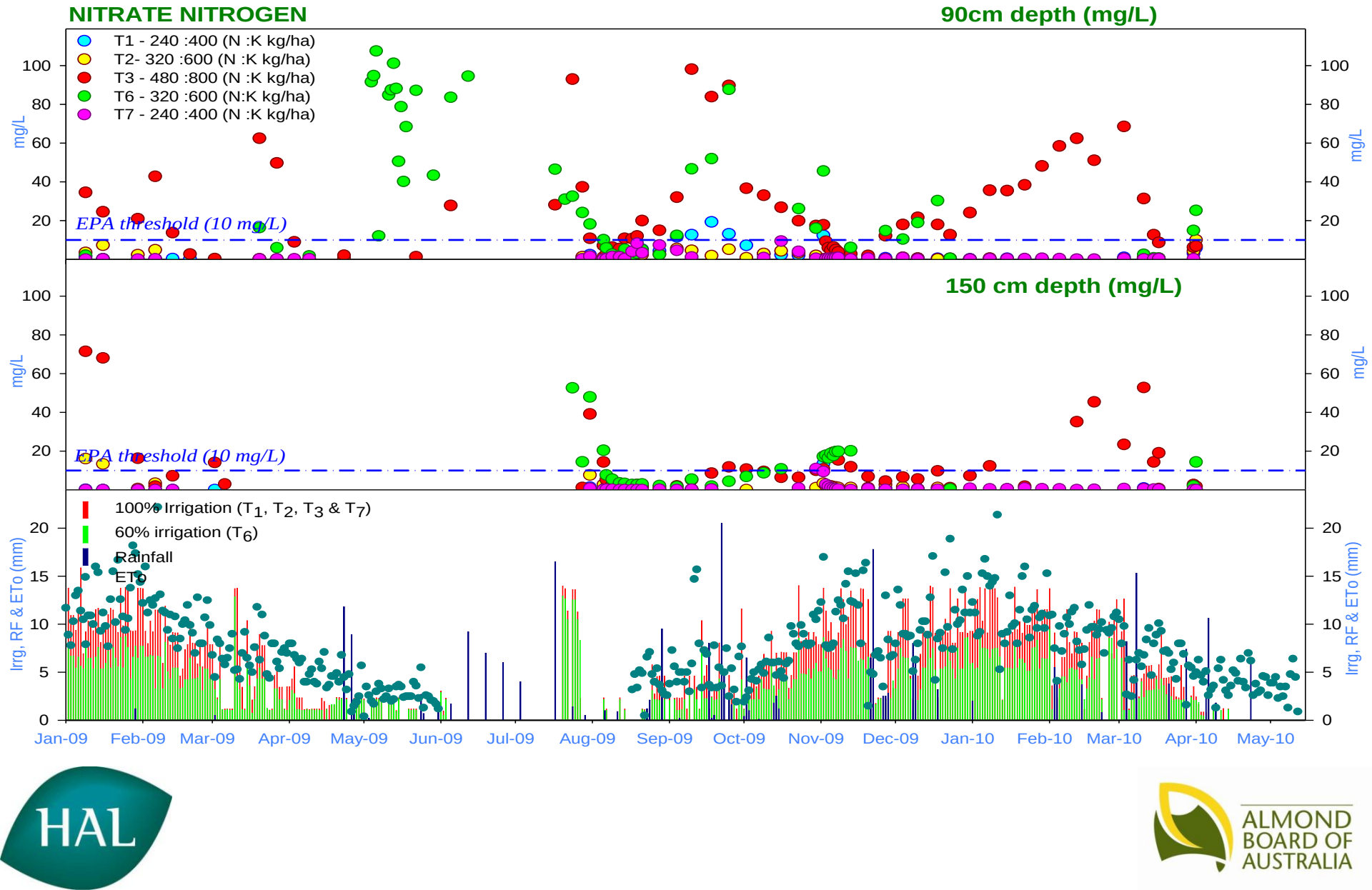
NITRATE NITROGEN



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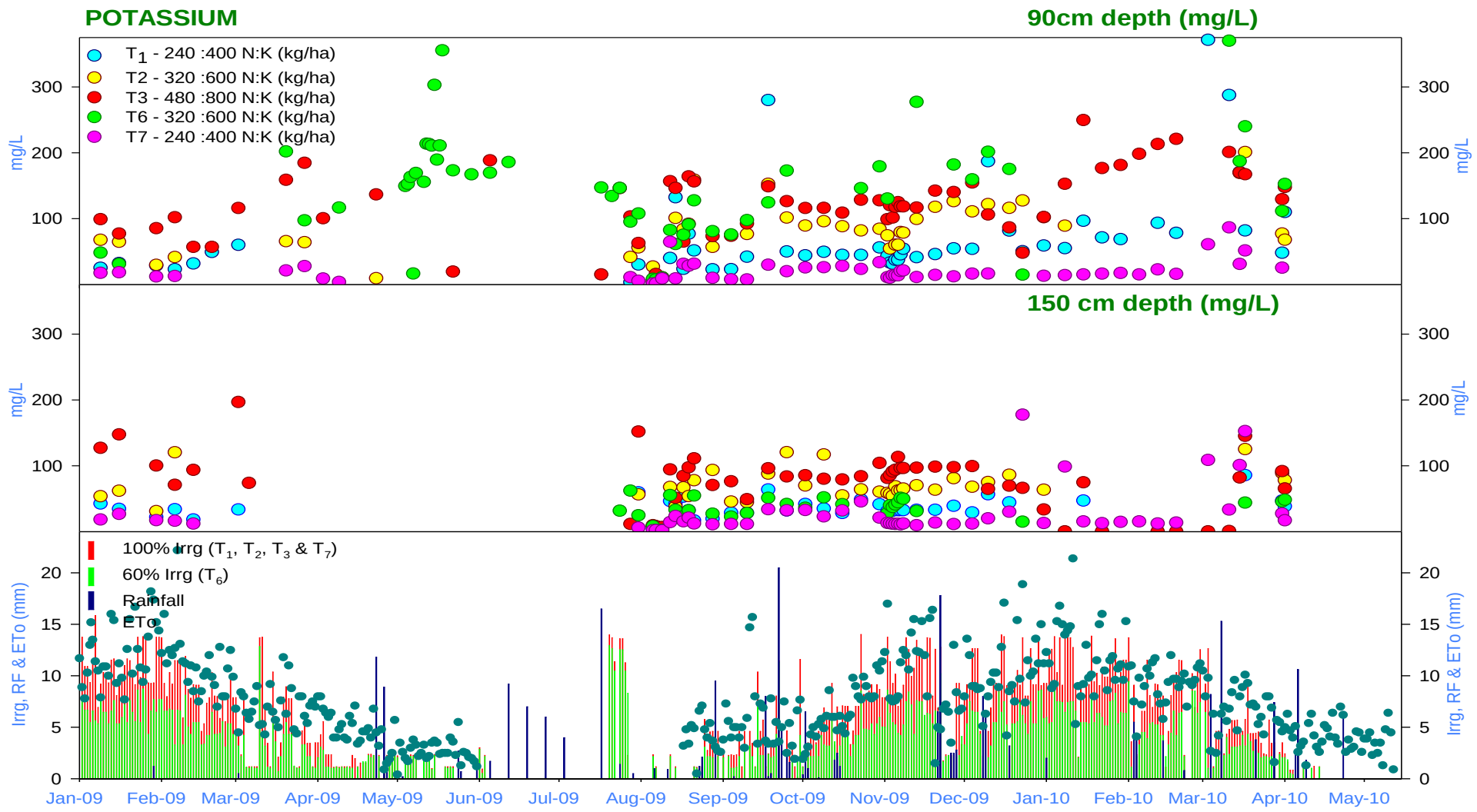
POTASSIUM



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Irrigation treatments, irrigation volumes, effective rainfall, effective rainfall + irrigation volume and timing of deficit applications. Rainfall and irrigation applied 1 August 2009 to mid May 2010.

Treatment		Irrigation (mm)	effect. rain (mm)	Irrig. + effect. rain (mm)	Deficit timing
Control		914	146	1061	-
Wet		1103	146	1250	-
SDI	85%	786	146	932	all season
	70%	676	146	822	all season
	55%	522	146	668	all season
RDI	85%	816	146	962	10/01/10 - 17/02/10
	70%	646	146	793	12/11/10 - 17/02/10
	55%	535	146	681	17/09/10 - 17/02/10

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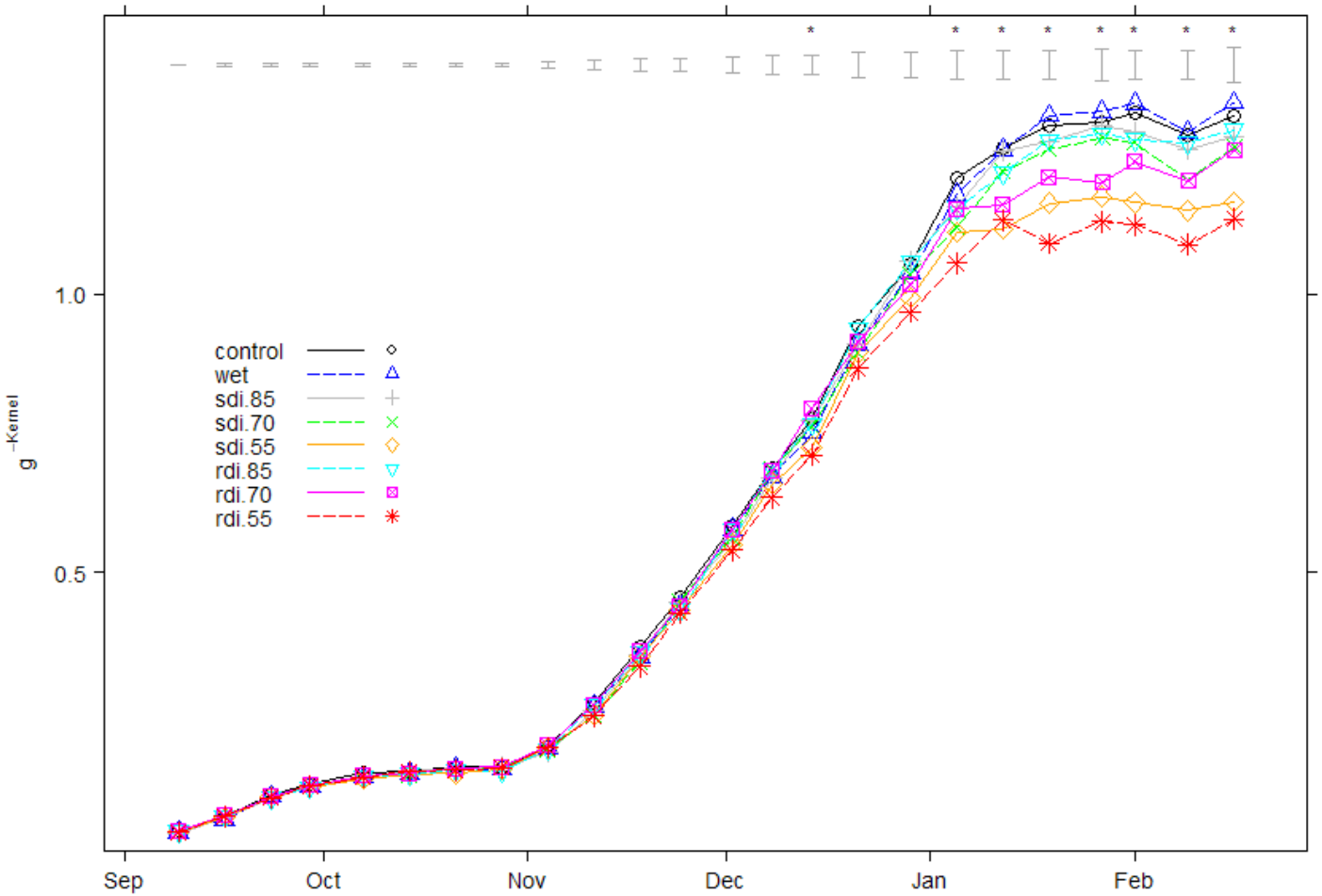
Kernel dry weight (g) ± SEM



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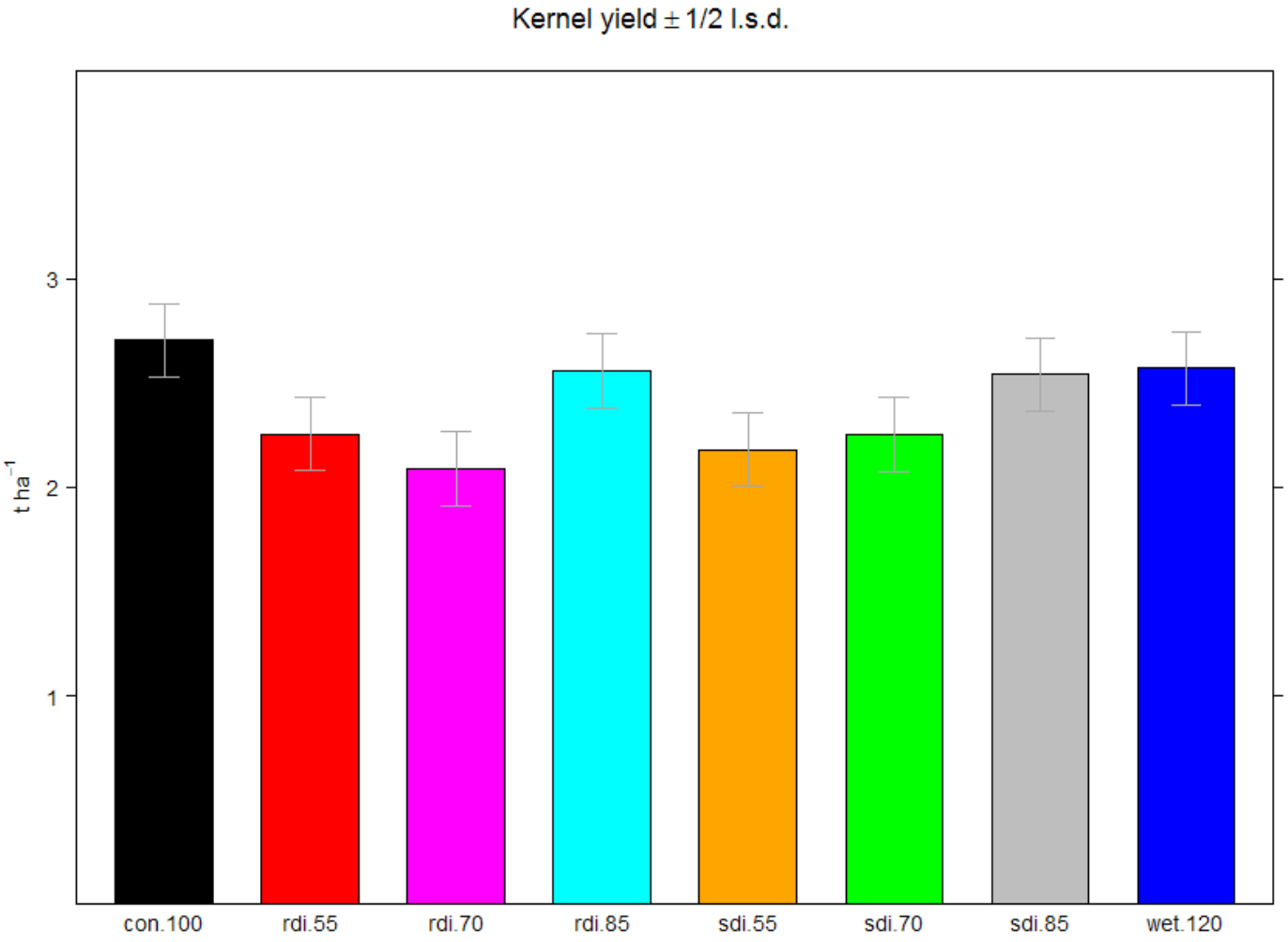

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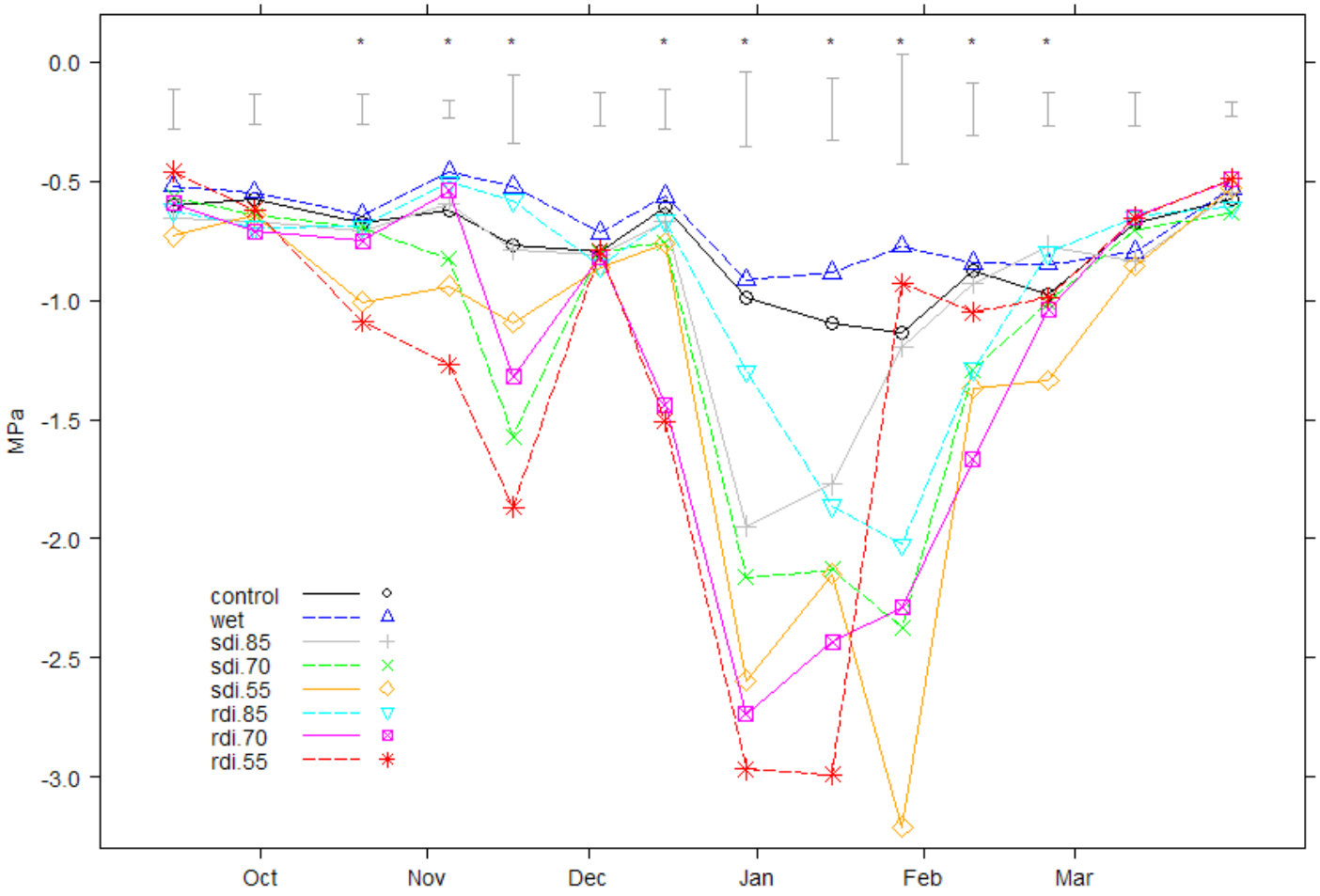
Midday stem water potential ± SEM



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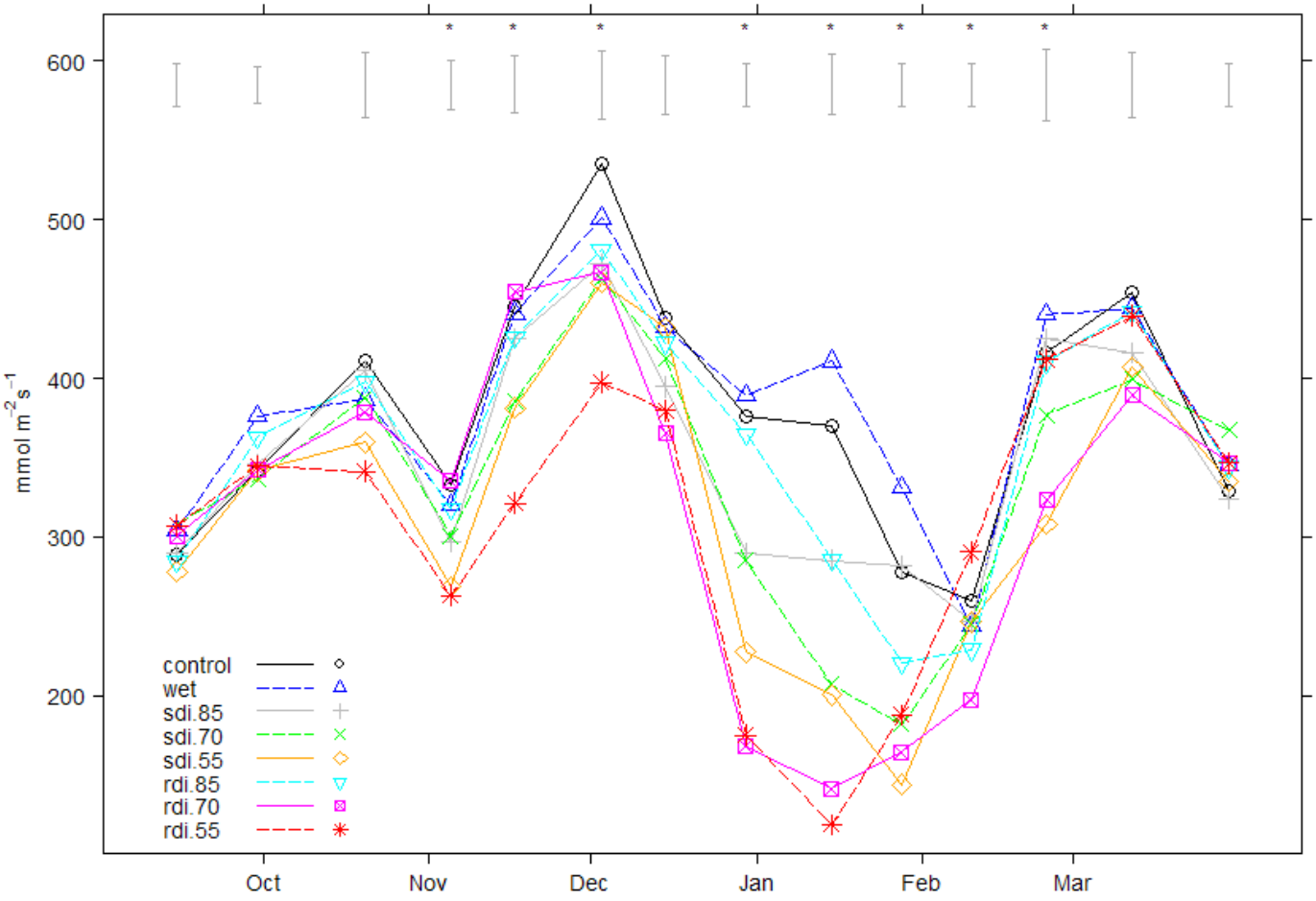
Stomatal conductance ± SEM



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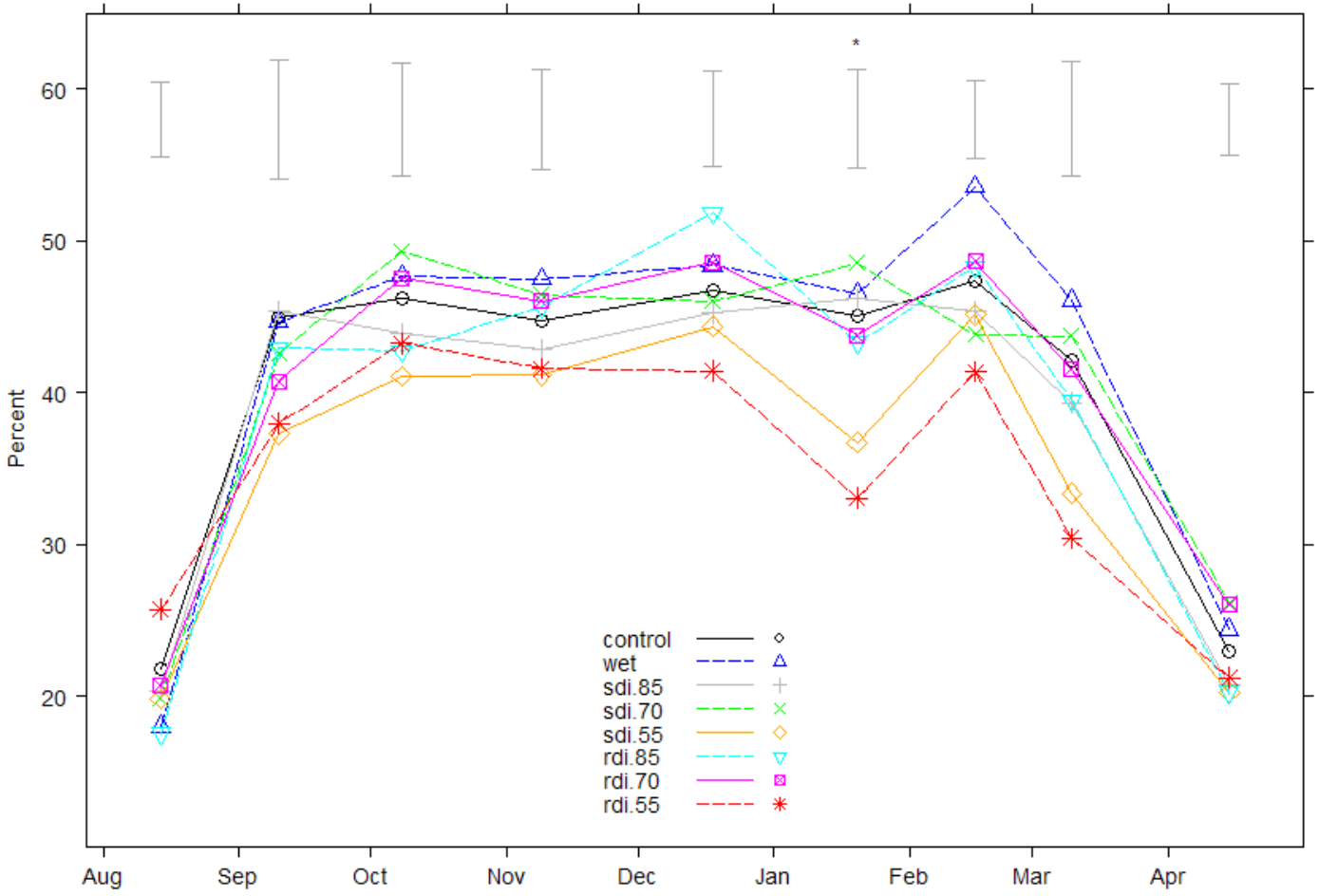
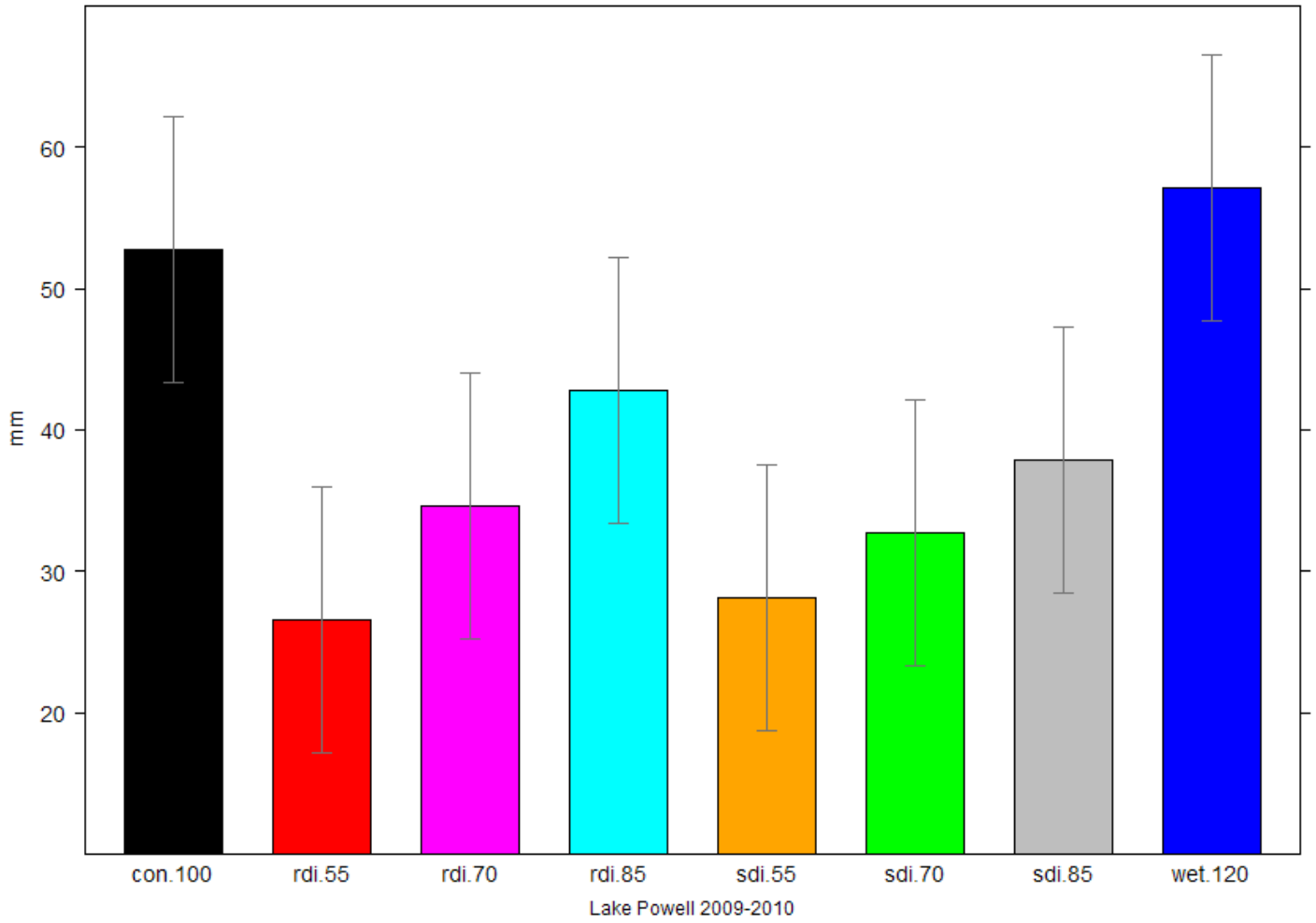
Midday light interception ± SEM



Seasonal growth in stem circumference ± LSD



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6. Future Directions

- Efficiency & productivity gains
  - Reduce cloudiness / outliers in data
  - Rootstocks
  - Planting densities
  - Reduce variability across valves, orchards & seasons
- Interaction and behaviour or various elements on one another & consequences for plant, fruit & soil
- Interaction between water & fertilisers
  - i.e. water is the limiting factor, how do we optimise water and fertiliser inputs, e.g. Concentrations, ratio's, etc

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Acknowledgements

- Almond Board of Australia (ABA)
- Horticulture Australia Limited (HAL)
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- Karl Sommer & Cathy Taylor (DPI Vic)

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Feedback Form

Australian Almond Industry Study Tour of California, USA 2010

Date: .....

Name (optional): .....

Did the study tour provide you with what you expected to learn?	Less than expected — More than expected 1 2 3 4 5
Did the itinerary include enough items of interest? If not, what else could have been included?	Less than expected — More than expected 1 2 3 4 5 ....
Do you intend to implement any knowledge gained from this study tour into your business?	☐ Yes ☐ No ☐ Unsure
Overall, how satisfied are you with the organization of the study tour?	Dissatisfied — Satisfied 1 2 3 4 5
Overall, do you think the study tour was value for money?	Disagree — Agree 1 2 3 4 5
Would you attend another organized study tour?	☐ Yes ☐ No ☐ Unsure
If yes, how often would you attend an organized study tour?	Number of years between study tours 1 2 3 4 5
Suggested future destinations?	....

Please turnover.

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What was the main reason for attending this study tour?	☐ Destination ☐ Itinerary ☐ Business opportunities ☐ Building overseas relationships ☐ Improve knowledge of competitors ☐ Timing ☐ Other?.....
How did you find out about the study tour?	☐ Email ☐ Internet ☐ Fax ☐ Post ☐ Other? .....
Any other comments or suggested improvements?	....

Thank you for taking the time to complete this form. Please return to study tour leader or forward to Almond Board of Australia, PO BOX 2246, Berri SA, 5343 or fax (08) 8582 3503