

# In A Nutshell

Winter 2017

Cracking good  
**new facility**  
opened in **Swan Reach**

**2017 R&D  
Forum &  
Field Day**

registration now **OPEN**  
& program preview

**Almond  
Insights 2016/17**

Up to date assessment of  
Australian almond industry  
statistics - publication preview

**Almond Centre of Excellence  
Where to from here?**

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**50**  
Years of Growth







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The Official Newsletter of the Australian Almond Industry



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## On the Cover:

Adrian Pederick MP, Member for Hammond, Hon. Geoff Brock, South Australian Minister for Regional Development at the official opening of Costa Brothers' hulling and shelling facility at Swan Reach.

## In A Nutshell

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The Almond Board of Australia is the peak industry body representing the interest of almond growers, processors and marketers in Australia. In a Nutshell is published by the ABA to bring news to all industry contacts and members.

### Advertising & Editorial Content

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### Funding

The Almond Industry Communications project has been funded by Horticulture Innovation Australia Limited using the research and development almond levy and funds from the Australian Government.

Some articles within this publication refer to projects managed by Horticulture Innovation Australia Ltd (HIA) with funding from the grower R&D levy and matched by the Commonwealth Government.

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ALMOND BOARD OF AUSTRALIA

## ABA Membership Why become a member?

The ABA is the peak representative body for the Australian almond industry and as such addresses many issues that impact on all participants in the industry including growers, processors and marketers and those that supply inputs. These impacts can be positives such as free trade agreements or promotion to stimulate demand and hence prices or they can involve minimising negative situations such as food safety issues, market access problems, chemical registrations etc.

The ABA develops and drives the implementation of the Australian industry's strategic plan which is done to benefit all producers and other industry participants. The strategies involve building domestic and export markets, the key to strong grower returns, addressing a wide range of risks from the availability of production inputs to government policies that impact on costs and yields. These matters effect on the bottom lines of almond enterprises. The ABA's whole of industry strategies have been successful and have worked to ensure the large increases in production have been cleared.

The ABA operates a number of activities that support industry and generate revenue to fund its operations and keep membership fees at a low and affordable cost. Being an ABA member provides crucial support for your industry body that we need and appreciate. A strong membership base provides added force in our representation of industry to government and in the wider community.

Join the ABA today, in the knowledge you are assisting the industry and yourself to move forward as Australia's most valuable horticultural industry.

Join the ABA by visiting our website, phoning 08 8584 7053 or emailing [admin@australianalmonds.com.au](mailto:admin@australianalmonds.com.au)

# Executive Update

**The strong optimism surrounding the 2017 crop being a record dissipated as harvest progressed. The pre harvest forecast of 87,000 tonnes was reduced to 82,000 tonnes with still some uncertainty surrounding the size of the final tonnage whilst hulling and shelling continues.**

The 2015 and 2016 crops were very similar in size to this year's, with kernel weight tonnages of 82,509 and 82,333 respectively. With new orchards coming into bearing and young orchard trees maturing it is a disappointing result that the 2017 crop did not set a new industry tonnage record.

An unusually high volume of blanks has been reported by some producers as a contributing factor to why forecasts have proven inaccurate. In addition, the kernels despite good size are not weighing as heavily as would be expected and this is being attributed to the cool weather conditions during nut development that resulted in the delayed maturity of the crop.

In a nutshell, the crop on the majority of industry acreage that was assessed to be above average whilst it hung on the tree has not been there once the nuts have been hulled, shelled and weighed.

The upside of this year's crop is the excellent quality, with much of the crop being assessed in the top grades.

Insect damage remains a concern and has led to slow throughputs at processing facilities to separate damaged nuts. The variability of damage between orchards is pronounced and there is a strong correlation between the number of overwintering nuts and insect numbers. Those orchards where mummies left in trees and on the orchard floor have been removed have markedly lower issues with insects.

Insect control techniques are being researched and will receive

a further funding boost in future to better address pest management from the orchard through to storage. In the meantime, orchard hygiene is the key to reduced insect damage.

The interaction between hull rot disease and increased numbers of stick tight nuts, that are difficult to remove during harvest and reshaking, means improved disease management is also needed to better manage insect populations in orchards. The new R&D investment plan has also prioritised disease management for elevated funding.

The interactions involved in orchard management are complex as we know irrigation and nutrition have an impact on the prevalence of hull rot.

The large size of mature almond trees works against pest and disease management with challenges to achieving: adequate spray coverage; clean shaking; unreachable nuts during poling etc. Size limiting rootstocks and reduced planting spacings are being investigated for future orchards. New varieties with sealed shells and improved disease resistance will also assist in future but that still leaves 36,000 hectares of current plantings needing improved management practices.

At the recent ABA Production Committee meeting it was acknowledged that an area wide management approach is necessary if insect populations are to be heavily reduced. Hotspot orchards with overwintering nuts that host insects pose an issue for neighbouring orchards.

All in all, the 2017 harvest has delivered mixed results in terms of yields but the market shows signs of strengthening and the quality of the vast majority of our crop is very good.

The 2016/17 season has been successful but expected rewards have not been reaped.



Neale Bennett, Chairman

Ross Skinner, CEO

*Neale Bennett*

*Ross Skinner*



# ALMOND CENTRE OF EXCELLENCE



## Where to from here?

**The ABA has been working with the Government of South Australia and Horticulture Innovation Australia Ltd (HIA Ltd) to establish the Australian Almond Centre of Excellence at Loxton.**

The support of the South Australian government extends to providing funds to both develop the 60 hectare experimental orchard at Loxton and support up to five researchers.

The Victorian government has also been supportive with a 25 hectare research orchard in Mildura and the employment of researchers.

The funding of the South Australian and Victorian governments has, in part, been matched by funds from the Commonwealth Government in the \$10 million "Advanced Production Systems for Temperate Nut Crops" project. This project was prepared collaboratively by researchers and the ABA, and submitted by Horticulture Innovation Australia Ltd. It has added significant research capacity for the almond, walnut and other temperate nut industries.

The ability of the state governments and their departments to work together at a Ministerial, Executive and researcher level has been instrumental in the industry securing the research facilities in both the Riverland and Sunraysia.

The South Australian Government has also provided land at the Loxton Research

Centre for a second budwood orchard to provide nurseries with high health status varietal material to ensure growers can plant trees knowing they are virus tested, true to type and with proven production characteristics. In 2016/17, the ABA provided two million almond buds to nurseries to produce trees to meet the current planting boom. The new budwood orchard will expand the number of mother trees to meet for demand for newly released varieties.

The experimental orchard in Loxton will be planted to both conventional and new production systems. Conventional orchard plantings will be used to improve the efficiency of inputs such as water, nutrient, energy and labour. The new production systems aim to develop orchards that have higher yields, allow shake and catch harvesting and controlled dehydration, thus achieving a consistent product that processes more efficiently and results in a very high quality product.

New varieties bred by the University of Adelaide combined with size limiting rootstocks from Spain and the USA offer the potential for new production systems based around smaller trees grown at higher densities.

Research trials scheduled for the experimental orchards cover: improving soils to enhance water use efficiency and tree nutrition; new variety and rootstock evaluation; input optimisation for existing orchards; enhanced pollination; climate change adaptation; and new production systems including harvesting equipment and postharvest handling and storage.

An important aspect of developing these experimental orchards is to involve experienced researchers from Australia and overseas to help develop young researchers and to provide the Australian nut industry with a stronger research capacity.

### Features of the Centre:

- Orchard plantings to help facilitate research into adaptation of existing practices to improve yield, reduce production risks and enhance product quality.
- Field laboratory with investment in irrigation and nutrition infrastructure to enable well resourced, long lived trial sites to determine efficient use of key inputs such as water and fertiliser, and performance of new varieties and rootstock combinations.
- Sectors of the conventional orchard to be used to investigate soil and tree management practices to improve pest and disease management and better manage severe weather events such as heat waves, wind, frost and other risks including alternative pollination practices.
- Evaluation trials of new orchard designs that look to the future when replanting of existing orchards will be required and for new orchards.

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# ALMOND CENTRE OF EXCELLENCE

## Where to from here?

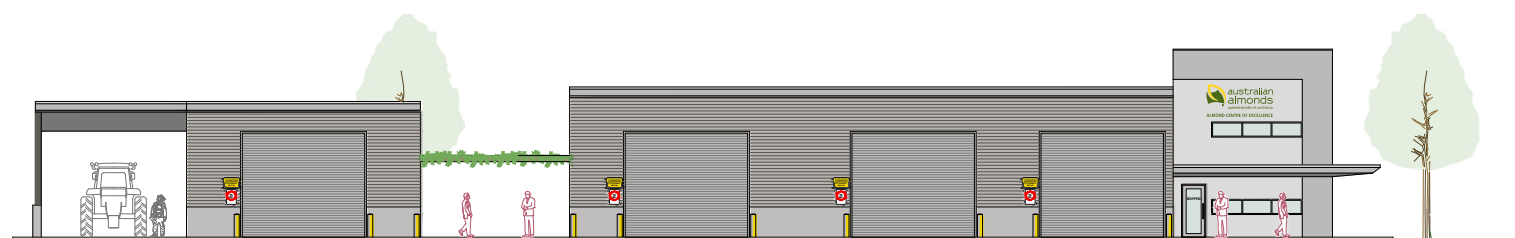
- Trials of higher density production systems developed with a holistic approach to maximising yield and also eliminating crop loss and food safety risks by striving to harvest product into a controlled environment in the least amount of time rather than onto the ground. Shake and catch systems lie at the heart of this concept but this will not be easily achieved and will require a number of hurdles to be overcome.
- Commercial trial sites providing necessary economic data.
- New variety and rootstock evaluation to be accelerated to provide quicker access to high yielding, self-fertile, closed shell, disease and nematode resistant trees producing good quality kernel and other almond products.
- Small scale processing facility to hull and shell almonds enabling more efficient assessment of varietal kernel quality as part of the University of Adelaide breeding project and other projects focussed on product quality.
- Training facilities on site. Training is a key area supported by the industry and the Centre will enable an interactive learning experience with Australian and overseas researchers, extension staff, and agronomists presenting to industry growers and orchard staff.
- Assessment of rootstock /scion compatibility for new varieties on a range of rootstocks.
- Pruning systems for conventional and new orchard designs evaluated, and economic data obtained.
- Tree training and canopy management guidelines.
- High yielding orchard designs focusing on fruit numbers rather than tree size evaluated and economic data obtained.
- Analysis of production benefits associated with managing smaller trees including ease of harvesting with lighter and less powerful equipment, fewer mummies to overwinter insects and disease, better spray coverage, less pruning, etc.
- Artificial pollination technology.
- Enhanced soil health through cover crops, amendments and reduced orchard traffic to better hold and release moisture and nutrients.
- Soil and orchard floor management guidelines.
- Enhanced biodiversity both above ground and below.
- Closure of nutrient escape by utilising hulls in the orchard.
- Disease epidemiology and management guidelines for diseases.
- Seasonal phenology and management guidelines for pests.
- On farm hulling to reduce the cost of transporting product to processors.
- Shake and catch harvesting technology to reduce harvest inputs, crop losses, and avoid product coming into contact with soil for food safety and quality reasons particularly in wet harvest seasons.
- Robotic farm vehicles to spray, slash, weedicide, monitor yield and disease, and guide harvesting equipment.
- Controlled environment drying and storage facilities on farm.
- Demonstration site to extend research findings to industry.

The objective of investing in research is to deliver project outputs that deliver knowledge and technologies that enable the industry's strategic plan to be implemented. The following are a list of the project outputs required to assist with the industry's strategies to improve yields, reduce costs, lessen risks, enhance quality, build demand and facilitate a good operating environment:

- Precise and efficient application of water, nutrients and chemicals.
- Phenology and yield based nutrient model.
- Water management guidelines for optimum yield / water use efficiency.
- Selection of most appropriate on-plant and remote plant stress monitoring technologies.
- Sustained tree health by maintaining tree vigour by improved management of pests, diseases, mechanical damage and physiological impacts from severe weather events.
- New varieties with superior production characteristics suited to conventional and higher density plantings by evaluating the crosses remaining for assessment and testing the best of these in the major growing regions.
- New rootstocks suited to conventional and higher density plantings and the range of soils, root pests and weather in production regions.

The experimental orchard will provide a research site for higher risk transformational projects that deter cooperating producer's involvement due to loss of income and management challenges. The orchards will enable trials to be maintained to obtain long term data which under the current R&D model does not occur.

The development of the research community supporting the almond industry is a key industry strategy and objective of this initiative. It is envisaged the facility will conduct undergraduate and postgraduate research and host international researchers to work in close proximity to researchers from local research providers.



Above: Concept drawing for Almond Centre of Excellence Workshop





# Almond 2016-17 Insights Industry Overview

*Almond Insights* provides an up to date assessment of the Australian almond industry using information provided by growers, processors marketers, government and other organisations.

Highlights in this edition are:

- Orchard area planted to almonds increased by 15.8% or 4,904 hectares in 2016 to now total 35,886 hectares
- The number of almond trees now planted in orchards totals more than 10 million
- Two million virus tested buds were delivered by the ABA to nurseries for grafting to produce healthy trees
- 2016 production of 82,333 tonnes was slightly less than the 2015 harvested crop
- Australia produced 7.7% of the global crop to sustain its place as the world's second largest producer behind the USA that grew 80% of world production
- Almonds were 62% of Australia's total in shell tree nut crop that includes macadamias, walnuts, pistachios, hazelnuts and chestnuts
- 97% of almond orchards are efficiently irrigated using drip systems managed by soil moisture monitoring technology
- Per capita annual almond consumption in Australia is increasing strongly and exceeded one kilogram for the first time in history
- Australia ranks #6 in per capita consumption globally
- Domestic sales tonnage increased by 9.9%
- 46.7% of Australian households purchased almonds in the year ending February 2017
- Almond demand by manufacturers was boosted with 274 new products reaching supermarket shelves in 2016
- Australian almonds were exported to 46 countries
- Almond exports earned the nation \$464 million
- For every one tonne of almonds sold in Australia 2.7 tonnes were sold overseas
- India was the single largest destination for exports
- Europe as a region consumed 43.2% of Australia's exports
- East Asia is an emerging market for Australian almonds taking 13% of total exports

With the almond orchard expansion currently underway, orchard area will increase to around 50,000 hectares, Australia's productive capacity will reach 150,000 tonnes with associated exports of 120,000 tonnes delivering revenue of approximately \$1 billion. This industry expansion will benefit river communities impacted by the Murray Darling Basin Plan. The water market will ensure that limited water resources are directed to those industries delivering the most value from their use. The benefit to the communities in almond producing regions is evident as the capital investment in establishing orchards and the revenue generated from them stimulates economic prosperity.

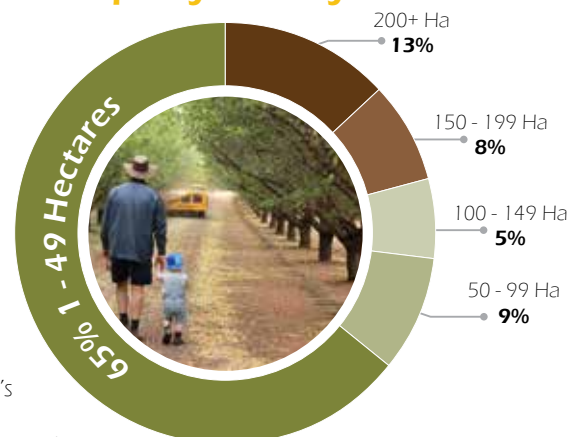
The total area planted to almonds has increased from 3,555 hectares in 2000 to 35,886 in 2016, representing a nine-fold increase in orchard area. Plantings spiked during 2006 and 2007 when over 12,500 hectares of orchard were established. In the ensuing eight-year period plantings were steady with approximately 7,000 hectares added. Significant new plantings occurred during 2016 with 4,904 acres planted, and further orchard expansion is predicted with an estimated 5,000 hectares to be planted in 2017 and again in 2018.

Almond trees take three years to bear a crop and around seven years to reach mature production levels at conventional tree spacing. Presently, 7,115 hectares or 19.8% of orchard plantings are not yet bearing a crop, and 7% of bearing trees are not yet fully mature. Australian almond production will continue to trend upwards in coming years towards 110,000 tonnes regardless of future plantings, and should reach 150,000 tonnes by 2025 if orchard development continues as planned.

## Almost 75% of Australian almond properties are 100 hectares or less

According to ABA data there are around 150 Australian almond growing enterprises and of these, 74% consist of family owned properties of 100 hectares or less. Many of these are owned or operated by third, fourth or fifth generation farmers. Small farms are the cornerstone of agriculture of Australia, but it is important that both small farms and large commercial farms coexist to contribute to the country's food security. Corporate farms contribute to the rapid growth in Australian almond production, lending themselves to operational efficiencies, precision growing practices and technology advances.

### Property Size by Grower



Available for download from:

<https://growing.australianalmonds.com.au/2016/04/21/australian-almond-insights-statistics/>

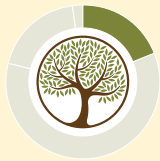
# Over 10 Million almond trees planted in Australia



Victoria  
**6,099,000 trees**



South Australia  
**1,938,000 trees**



New South Wales  
**1,884,000 trees**



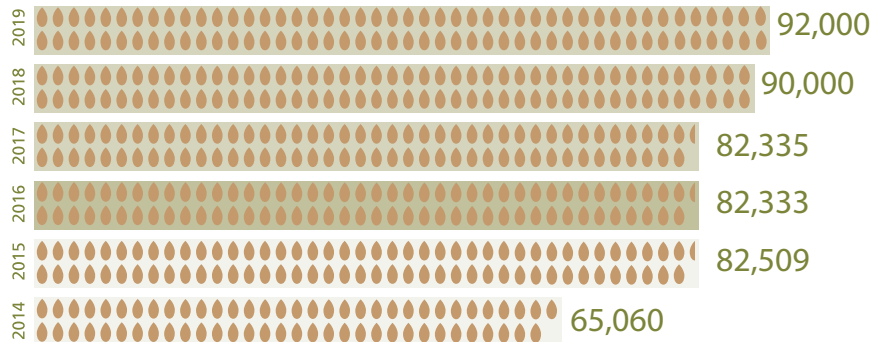
Western Australia  
**223,000 trees**



The global almond industry is growing very rapidly in terms of production. Worldwide almond production has more than doubled since 2004 to hold steady at 1.1 million tonnes in 2016.

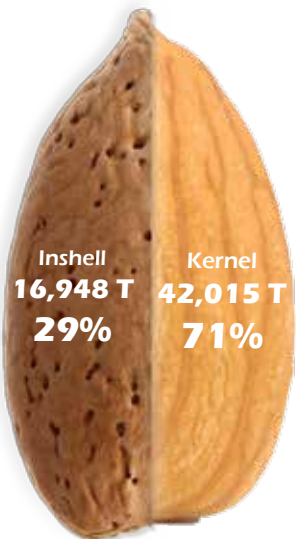
Rapid growth in local production has meant the Australian almond industry has an export focus. For every tonne sold in Australia, nearly three tonnes are exported. Consumer demand for almonds continues to increase globally and this trend is expected to continue due to the positive health benefits of eating almonds and increasing incomes, particularly in Asian and Middle Eastern countries.

## Almond Production - Past & Present (Kernel)



## Exports by Type

(2016/17 Marketing Year)

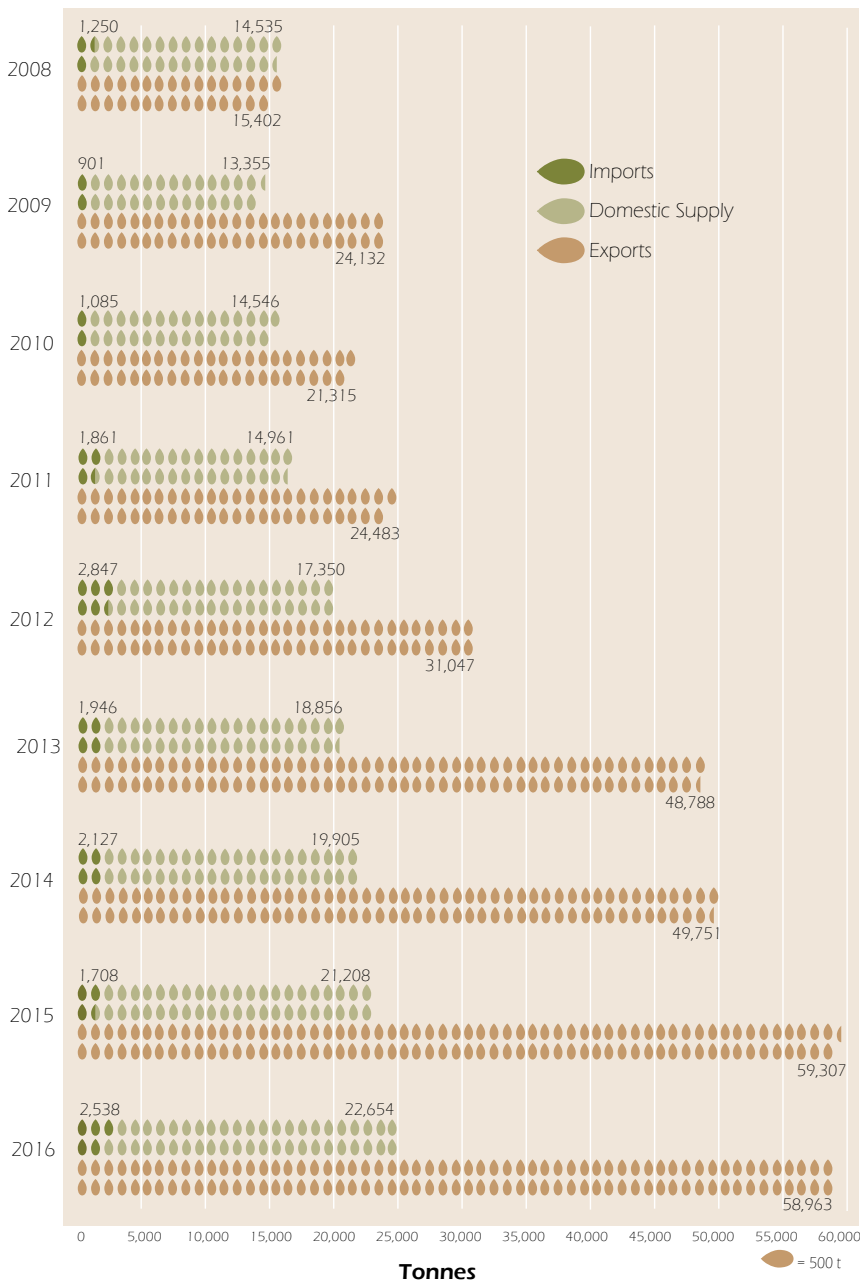


**In 2016/17 almond exports were worth \$464 Million**



## Australian Export & Domestic Supply

(Marketing Year) Kernel equivalent



India remained Australia's largest export market, with a preference for in-shell product. European countries received 43.2% of Australian almond exports, and Asian countries, including China, received approximately 39%. Dynamic economies and large populations of increasingly prosperous and health conscious consumers mean that these markets will continue to import more almonds well into the future.

A key feature of our Export Market Development Program is our collaborative work in marketing the brand 'Australian Almonds' in export markets. International programs are strategically focused on expanding almond consumption in priority markets to optimise returns. During 2016/17, the industry exhibited at major international trade fairs covering current major markets and potential growth regions at events in Germany, the UAE, Japan, Korea, and China attracting key members of the nut trade from Europe, India, the Middle East, and Asia.

Trade education regarding Australia's productive capacity, good growing environment and agricultural practices are important components of our market development program, enabling continued market growth. The ever expanding knowledge on the health benefits from eating almonds is also a major driver of consumer demand.

With more than 70% of Australia's almonds exported, the ABA works closely with industry and government to identify and recommend solutions to issues that could impact on almond export sales.

## 2016/17 Almond Production - by State (Kernel)



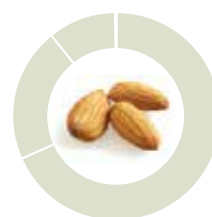
Victoria  
**68%**  
56,328t



South Australia  
**21%**  
17,097t

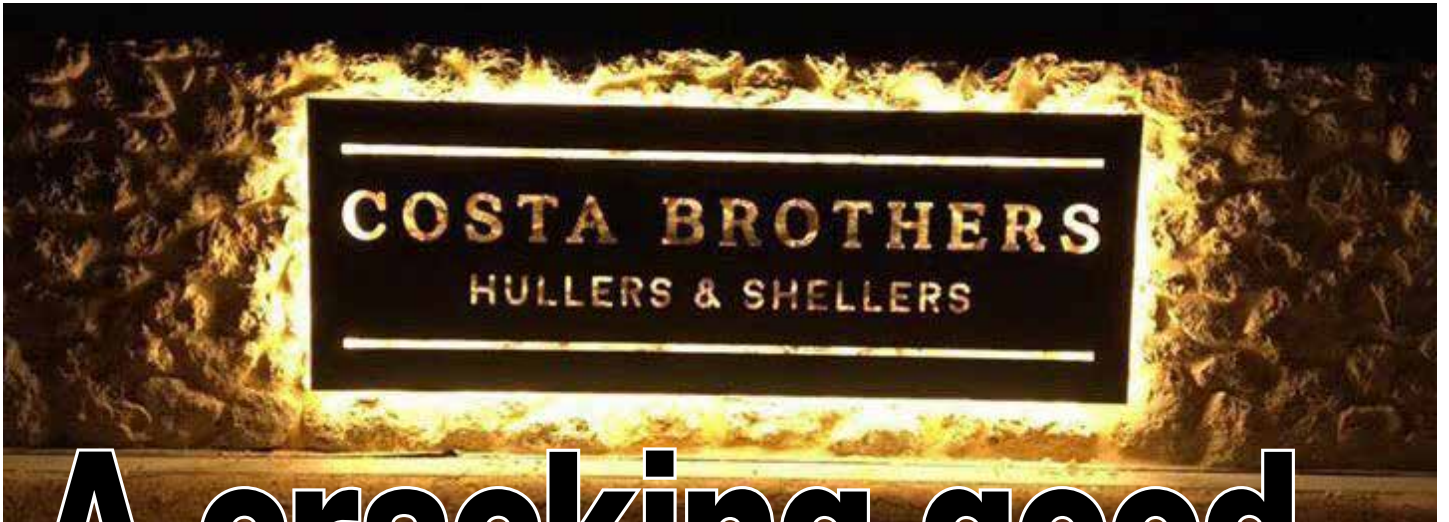


New South Wales  
**11%**  
8,765t



Western Australia  
**.2%**  
143t





# A cracking good new facility

**Riverland producers are welcoming the growing almond market with a new \$6 million cracking and hulling plant, operated by Costa Bros in Swan Reach.**

Costa Bros received a \$1.85 million Regional Development and Innovation Fund grant to build the facility, which is expected to create more than 30 new full-time positions.

The RDIF is an initiative under the \$265 million South Australian River Murray Sustainability Program (SARMS).

Regional Development Minister Geoff Brock said, "The goal of the RDIF is to fund projects that make long-term sustainable and strategic contributions to the region's economic development through activities which leverage regional strengths,"

"The grant was to help Costa Bros to relocate and expand their operations in almond farming which would address a real need for that type of operation in the State's growing almond industry,"

"The introduction of a hulling and shelling plant in the Swan Reach area will also contribute to the region's economic diversification." Mr Brock said.

Operations Manager Tony Costa said the plant will have a knock on affect for almond growers both in the Murray Mallee and interstate, increasing output over the next three years.

"Almond growers from South Australia, New South Wales and Victoria will see direct benefits to their bottom line from this development. Expanding hulling

and shelling capacity in Swan Reach will significantly reduce transport costs for some producers and increase processing options for the industry."

One of the company's three directors, Phillip Costa, said the new plant opened to meet the pressures of the growing industry.

"Even though there are all these acres going in there wasn't a lot of production to be able to meet demands", Mr Costa said.

Predictions show the new facility is expected to increase the region's hulling and shelling capacity from 8,000 to 22,000 tonnes a year.

"The site will be running for 20 hours a day and also takes into account for the future plantings going in, so there's another 1,000 acres of new plantings going in over about five stages ... about 2021 is when we're looking at getting to the last stage," Mr Costa said.

"We moved up here in 2007 and that was our toe in the water for the area and the people have been super supportive of us.

"As much as it's [the facility] here for us, it's here for the local people too, so we're really appreciative of them."

The directors of the Swan Reach Cracking and Hulling plant said everything on the site was fully recyclable.

The hulling and shelling plant is projected to produce up to 16,500 tonnes of almond hull and shell to be used in the animal feed industry, with the company looking at expanding to solar power energy sources.



# MARKETING MATTERS

**Domestic Update** The Australian almond domestic marketing program has taken a step up with the introduction of our partnership with the AFL Players Association which is supported by our social media programs on Facebook and Instagram and PR activities across both mainstream and online media.

An important feature of our promotional campaign with our AFL player ambassadors has been our 'Australian Almond Hard Nut Award' promotion inviting consumers to nominate their favourite 'Hard Nut'. This could be a sports person or a person that has demonstrated the strength to work through adversity. Among our winners so far, we have had a husband nominate his wife for her tireless effort in developing local women's football and a daughter nominate her father as a Gulf War veteran who is fighting through Post Traumatic Stress Disorder (PTSD).

Our PR Communications agency (Mango PR) has amplified our content around the partnership and the 'Hard Nut Awards' as well as negotiating with prominent social media influencers in the 'fitness and food' space to post and share about the health benefits of Australian almonds.

The interim program results (February to April) are that 20 pieces of media coverage have appeared, including publications such as the Herald Sun and online news platforms, with a total reach of 19.1 million people.

Our Facebook and Instagram communities have grown significantly during this period with our Facebook channel now exceeding 30,000 likers, which is more than double the number of followers at the start of this financial year.



Over the past twelve months, three Rotary Clubs (Brighton North, Albert Park and Melbourne) have developed a project to help improve the nutrition of Aboriginal children and their families in remote communities called 'Footy Nuts'.

The first 'Footy Nuts' product is a 30gm pack of dry roasted Australian almonds and Dr Sara Grafenauer, Accredited Practising Dietitian, is giving her time to help us develop a Healthy Snacking program for Aboriginal children.

In order to create interest in eating healthy Australian almonds, the Footy Nuts team is in the process of recruiting some AFL footballers and NRL players to act as Ambassadors and role models for healthy eating with Kevin Sheedy agreeing to help the team.

The Almond Board of Australia's marketing program has agreed to Sponsor the Footy Nuts project for one tonne of almonds. This means that when the AFL and NRL players are wearing the Footy Nuts apparel, the Australian Almonds logo will also be featured. It is anticipated that there will be high value content developed through this sponsorship that will be featured in the Australian Almonds' PR and social media programs.



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# MARKETING MATTERS

**Export Update** Over the past three months, “Australian Almonds” have exhibited at four major international food fairs: **Gulfoods Dubai, February 26 – March 3; Foodex Tokyo, March 7 – 10; Food & Hotel Indonesia, Jakarta, April 5 – 8; and Sial China, Shanghai, May 17-19.**

Our export development plan is based on a two-pronged growth strategy:

- Continue to grow our Established Markets of India-Middle East and Europe; and
- Develop our emerging markets of North-East and South-East Asia.

Gulfoods, held in Dubai in February each year, is a valuable opportunity for our marketers to meet with customers from the Middle East and India. During this year’s exhibition, we again held an ‘Australian Almonds Networking Event’ which included an Industry Update by Ross Skinner on behalf of the Australian almond industry, the event was a success with more than 70 customers attending.

In March ‘Australian Almonds’ exhibited at Foodex, the major food fair in Tokyo. We partnered with the Australian Vegetable Industry to create an “Australia Fresh” stand. Our promotion was augmented by a seminar on the first afternoon of the exhibition which was very well attended and over 40 Japanese nut and almond buyers participating.

In April we exhibited in Jakarta at Food & Hotel Indonesia. This is a biennial trade fair and the third time the Australian almond industry has participated. The ABA has engaged marketing agency Morelink Asia Pacific, in Jakarta who specialise in assisting Australian food industries enter the Indonesian market. Morelink provided a translator for the stand and also organised a number of meetings with potential customers.

The last trade exhibit for this period was Sial China in Shanghai and our stand was situated within the Australian Pavilion which continues to grow in size each year. The FTA between China and Australia is currently 4% and will reduce to zero in 2019 providing us with a tariff advantage over almonds from other origin countries.

The first ever AFL match for premiership points was held in Shanghai on the Sunday prior to Sial China. This match (Port Adelaide v Gold Coast Suns) provided an opportunity for us to promote our Australian Almonds branding throughout the game and also provided the impetus to engage a marketing agency in Shanghai to create an ongoing Weibo social media presence for Australian Almonds in China.







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# JOIN US!

## OCTOBER 24TH & 25TH 2017

The latest developments in growing and processing almonds will again come under the spotlight in October when researchers, agronomists, advisers and growers converge in Loxton for the Australian Almond R&D Forum.

On June 12 2013, the inaugural 'Activated Almond Research R&D Forum' was held, and every second autumn since Australian almond industry committees and collaborating researchers take part in a forum to present the latest updates on almond projects, and we invite all members to attend.

Organised by the Almond Board of Australia, the forum covers R&D in topics ranging from the likely impact of climate change on almond growing regions, the newest varieties, food safety and the nutritional characteristics of kernels.

Advances in almond processing such as on-farm hulling are also on the agenda in a joint presentation by Professor John Fielke, Michael Coates, and Dr Maryam Shirmohammadi from the University of South Australia, who will also provide a demonstration of their equipment at the Machinery Field Day on the second day of the program.

### Registration

Please follow [this link](#) to register for the forum and field day. Registrations close on Monday, 23rd October 2017. It is not possible to attend without registering.

### Accommodation

Accommodation in Loxton is limited and we recommend the [Loxton Hotel](#) or the [Loxton Courthouse Apartments](#). These venues are located within the township of Loxton and a short distance from both the Loxton Research Centre and Century Orchards. For further information on accommodation in Loxton or other nearby towns please contact the ABA.

## PARTNERS, SPONSORS & EXHIBITORS



We sincerely thank our partners and sponsors of the 2017 Australian Almond Research & Development Forum



This forum is your opportunity to hear all the latest in almond research, speak directly with the researchers and to network with other members within the almond industry.

# PRELIMINARY PROGRAM

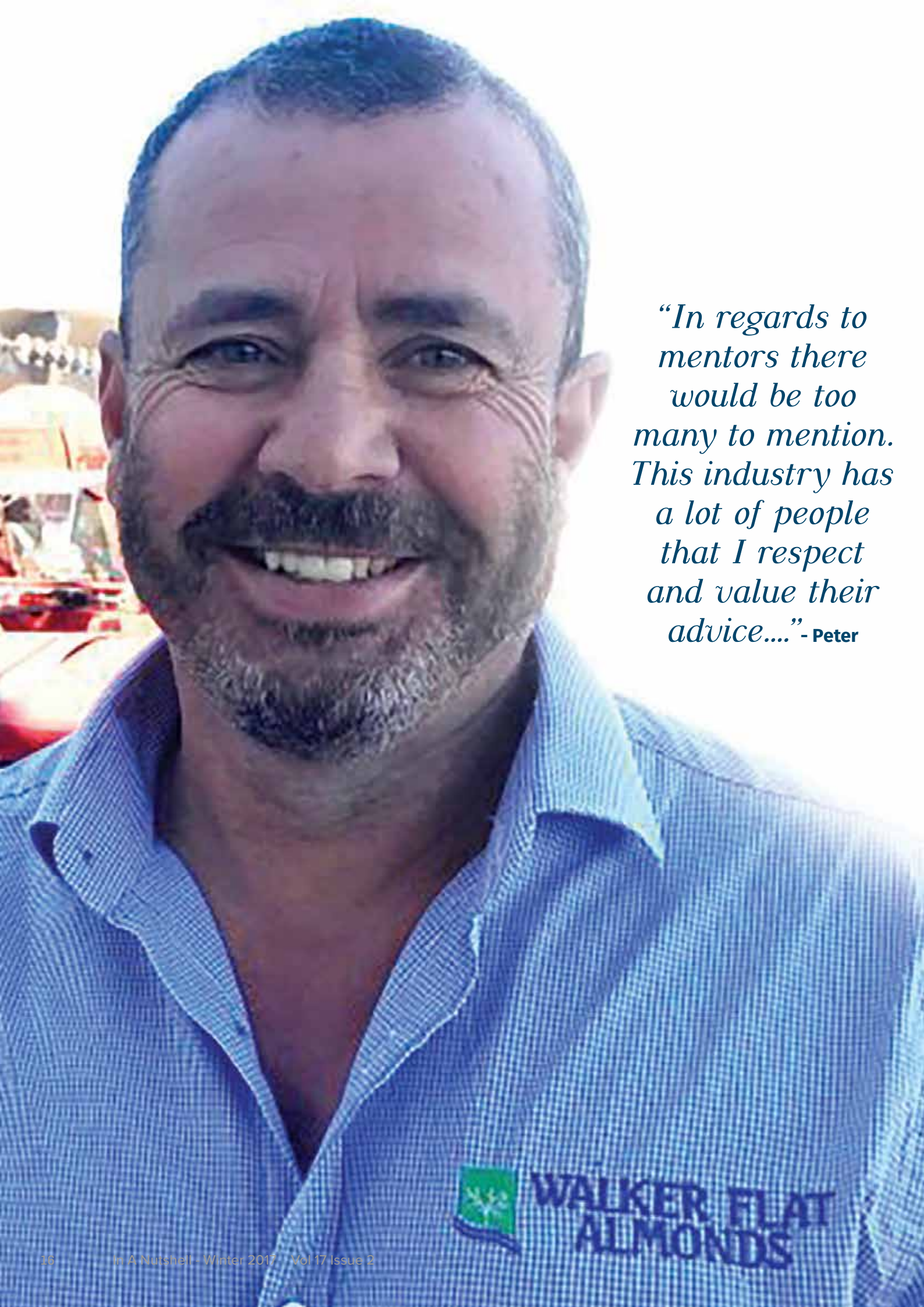
## Tuesday, October 24th - Loxton Research Centre

<b>8:00</b>	<i>Registration</i>	
9:00	Official opening & welcome address	<b>Neale Bennett &amp; Ross Skinner, Almond Board of Australia</b>
9:10	<b>A Word from our Signature Industry Sponsor</b>	<b>Trevor Dennis, HAIFA</b>
9:20	Horticulture Innovation Australia Update	<b>Corrine Jasper, Horticulture Innovation Australia</b>
9:40	New Australian Almond Varieties (PBR & Commercialisation)	Michelle Wirthensohn, University of Adelaide
<b>10:10</b>	<i>Morning tea</i>	
10:30	Almond Centre of Excellence Orchard Update	<b>Andrew Downs &amp; Brett Rosenzweig, Almond Board of Australia</b>
11:00	USA Research Projects Overview	Almond Board of California
11:30	Update on VIC Research Developments & Spur Dynamics	<b>Michael Treeby, DEDJTR</b>
12:00	Water Use Efficiency Project Update & Rootstocks	<b>Everard Edwards &amp; Mandy Walker, CSIRO</b>
<b>12:30</b>	<i>Lunch &amp; AGM Sign In</i>	
13:30	<b>ABA annual general meeting</b>	<b>Neale Bennett, Ross Skinner, Joseph Ebbage, Shannon Harkins</b>
14:15	Advance Processing of Almonds Project Update	John Fielke & Michael Coates, University of South Australia
<b>14:45</b>	<i>Afternoon Tea</i>	
15:15	<b>Integrated Pest &amp; Weed Management in Almonds</b>	<b>Matt Strmiska, Adaptiv Consulting (USA)</b>
16:00	Pests & Almonds Session	TBC
<b>17:00</b>	<i>Day Close, Light catering &amp; refreshments</i>	

## Wednesday, October 25th - Century Orchards Loxton

<b>8:30</b>	<i>Registrations, Sign In, Maps &amp; Timetable</i>	
9:00	<b>Welcome &amp; Overview of Century Orchards &amp; Farm Practices</b>	Brendan Sidhu
9:30	Machinery Demonstrations & New Australian Varieties Tours	
10:00	Machinery Demonstrations & New Australian Varieties Tours	
10:30	Machinery Demonstrations & New Australian Varieties Tours	
11:00	Machinery Demonstrations & New Australian Varieties Tours	
11:30	<b>Advanced Processing of Almonds Demonstration</b>	John Fielke & Michael Coates, University of South Australia
<b>12:00</b>	<i>Lunch &amp; day conclusion</i>	

# REGISTER NOW!



*“In regards to mentors there would be too many to mention. This industry has a lot of people that I respect and value their advice....” - Peter*



**WALKER FLAT  
ALMONDS**



# 5 minutes with...

# Peter Cavallaro



WALKER FLAT  
ALMONDS

This edition of 5 minutes with "branches" out to one of our Riverland growers, with a long history in the almond industry. Peter Cavallaro was originally an Adelaide Plains boy, but now has his feet firmly planted in the soil in Walker Flat.

**Name:** Peter Cavallaro

**Property Name:** Walker Flat Almonds

**Total area of almonds:** 400 acres

**Varieties Grown:** Nonpareil, Carmel, Price, Maxima, Carina.

**Did you grow up on a farm? What brought you into farming (i.e. inheritance, family business, opportunity etc)?**

The Cavallaro Family has been involved in almonds for the last 44 years. I came back to the industry in a full time capacity in 1992, after finishing my apprenticeship as a panel beater, then a stint in earthmoving but finding my real passion was farming.

**What did you grow on the farm when you first started? What crops do you grow now (if others apart from almonds)?**

We started growing flowers which we did for twelve years as well as almonds. Then I came to my senses and moved permanently into almonds.

**Are there any differences between your farm now and your farm when you were a kid?**

There are probably two distinct differences one being fertiliser inputs with a lot more going in these days compared to when we first started to maintain higher yields. The other would be harvest machinery, which it has come a long way from beating the tree with a rubber mallet and trailers and hessians. If anybody remembers those days they would agree.

**What would you say have been the biggest changes (business aspects, management, machinery etc) you've implemented since you've been farming?**

It's probably the way a property gets micro managed in regards to fertilizer inputs to soil testing, leaf and sap testing to water management, production targets, training staff and the cost effectiveness of all that.

**How have advances in technology such as machinery, genetics, or chemicals, affected your orchard?**

This is an area that is forever changing. In regard to technology, it is amazing how we are now able to control our property from anywhere in the world, for example irrigation and fertilizer applications (as long as someone has put it in the tanks). Genetics is now allowing us to plant better varieties, better rootstocks and very good control over our budwood supply.

**How has labour on the farm changed from when you started until now? What has had the biggest impact?**

The biggest impact that comes to mind is the lack of people wanting to go into the farming sector as a career. I find you can employ people to do jobs but it's the passion to want to stay and further their career in farming which is missing. These days people are chasing technology jobs which is good obviously but farming is a life choice that in the long run gives a lot of challenges but can give a lot of rewarding benefits.

**What do you think has been the most useful advance in farming to date?**

Machinery advances have allowed farmers to plant more hectares as they are able to harvest a lot quicker than they have in the past

**Have you observed changes in the number, size and type of farms that are found in your area? What trends have you noticed?**

The size of properties has definitely been the biggest change I have noticed, be it almonds or even grain properties. With the introduction of better and larger machinery it has allowed farmers to get over their land a lot quicker and more efficiently.

**What is the hardest part of farming for you?**

I would say the weather has been the area that has been the hardest to contend with at flowering or rain at harvest.

## What would you say most motivates you to do what you do?

Well that is easy I love what I do, I work in an industry that has very good people who are only a phone call away. But my main motivation is to be better than the year before be it quality or quantity.

## What are you most passionate about in your job?

To produce the best quality possibly; also to work with people who have the same industry minded goals and to be able to teach the next generation of almond growers.

## What would you say to people who believe many conventional farming practices have a negative impact on the environment? Have you taken any steps to make your farm more environmentally friendly?

We cannot afford to compromise our land or the environment because this is our livelihood. Our business has spent time and money on improving our irrigation practices, maintaining native vegetation around our boundaries and ensuring we use the most efficient machinery for our agronomic practices.

## What changes do you predict farming will see over the next 25 years?

I would say the changes would come from production and harvesting procedures in regards to closer plantings and catch and

shake. Also with new varieties that don't suffer from hull rot.

## What advice could you give to any young greenhorns interested in getting into farming?

I would encourage anyone new to the farming industry to take on the challenge as farming is very rewarding.

## Did you have any key mentors or people who deeply influenced who you are, what you believe in and what you're committed to in your work and life? Tell me about them.

That would be my family and the values and support that they continue to bring. In regard to mentors there would be too many to mention. This industry has a lot of people that I respect and I value their advice. They have been in this industry for a very long time and continue to support and pass down their knowledge.

## What are the key relationships that matter most in your working relationships? What do you see as the key sources of support?

Good people and the support and trust they bring. The almond industry in general is very unique in the sense that everyone will talk

and support each other. It has a very good base that starts with the Almond Board which is run by very good people who are there for the good of the industry.

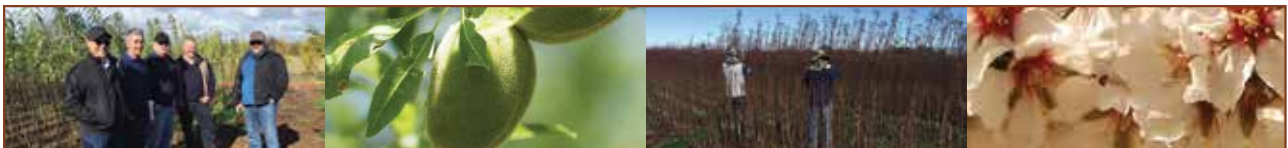
We are lucky in the almond industry that we are able to build relationships with a wide range of people who we are able to ring and get support when it is most needed.

## What are the most difficult or challenging aspects you see facing the almond industry?

Increased production on the world stage and the way Australia is able to deal with this marketing challenge. Pest and disease pressure and how we are able to deal with these and becoming a sustainable industry that can grow consistent quality crops with less inputs.

## When you think of the future of the almond industry, what gives you a sense of hope?

I see an industry that is very strong, very cohesive. We are lucky as an industry that we have people who are working toward the same goals and that is pushing the almond industry to be the best it can possibly be on the world market.



## L&T Nursery – Supplying the Almond Industry with Quality Nursery Trees

Located within the irrigation district surrounding Robinvale, Victoria, L&T Nursery is a quality producer supplying growers in the area and across NSW and SA with almond trees. With over 20 years of experience in the almond sector and 30 years at a primary production level, L&T Nursery has a well-grounded understanding of how the industry operates. The company has a strong commitment to expanding the production of Australian almonds through the production and distribution of quality young trees.

The University of Adelaide has developed several new almond varieties; these new cultivars have opened up new pathways for growers and new opportunities for the industry. L&T Nursery are committed to supporting the almond industry in these ventures through providing an avenue for access to both traditional and new varieties. Traditional varieties have shown their capacity in relation to quality and yield, however, several varieties recently released have shown strong results in these areas. It is the distribution of these promising new varieties, alongside continuing production of traditional varieties that L&T Nursery is excited to explore. The growth of the Australian almond industry depends upon a solid foundation, with innovation and expansion from this central core. The approach that L&T Nursery has employed is modelled around this ideal.

We have a commitment to unrestricted supply of high quality trees. It is a great time to visit and view the trees and see why feedback from growers has been so positive. L&T Nursery is excited about building upon this success with further growers, to help strengthen the Australian almond industry.

Alongside involvement in nursery production, L&T Nursery are also almond growers. This gives L&T Nursery a holistic understanding of the most important elements of almond production and the requirements of growers. This knowledge allows L&T Nursery to better cater to grower requirements in the production of young trees.

L&T Nursery understands that planning ahead and securing trees is critical to create a well-functioning orchard; as such **we are currently taking orders for both the 2017 and 2018 winter planting.** Orders are also currently being taken for the current winter season for any re-planting or development needs. L&T Nursery are happy to work closely with growers throughout the cultivation of their trees.

**L&T Nursery** have a good supply of the following rootstocks to support your almond variety requirements:

**Traditional Rootstocks** – Hansen (peach and almond hybrid), Bright's Hybrid (peach and almond hybrid).

**Predominant Rootstocks** – Nemaguard (peach seedling), GF677 (peach and almond hybrid).

**New Rootstocks** – RootPAC-R (plum and almond hybrid), Garnem (almond and peach hybrid).

**Enquires relating to orders or nursery visits, may be directed to:**

**Tim on 0407 883 992 or [timmillen68@gmail.com](mailto:timmillen68@gmail.com)**

**or**

**Lynn on 0408 225 831 or [lynnolley@live.com.au](mailto:lynnolley@live.com.au)**



## EPPR Levy Update

### Next steps

The process of implementing the EPPR Levy has progressed in accordance with the guidelines outlined by the Department of Agriculture and Water Resources. From the previous edition of 'In a Nutshell', the next steps were outlined.

- March 8th, 2017: application to the Minister was sent requesting the activation of the EPPR Levy following the completion of an Objection Period.
- 13th April, 2017: Objection Period commenced
- 12th May, 2017: Objection Period Closed

As there were no objections received during the period by either the ABA or the Department of Agriculture and Water Resources, this has allowed the department to commence their activation process immediately.

There are a number of steps that need to be completed before the levy can be activated, which are all managed by the Department, including seeking agreement to the proposal costings from Treasury, seeking policy approval from the Deputy Prime Minister, and drafting the amendment regulations. Levy payers will be notified 30 days before the levy is activated. The Department is working towards an implementation date of 1st October 2017.

### Who pays the levy?

The EPPR Levy will be collected in the same manner as the compulsory industry Research & Development Levy.

The levy will be activated to a rate of **\$0.00100 per kilogram for almonds in their shells; and \$0.00133 per kilogram for shelled almonds** until the cost to the almond industry is recovered.

The producer (the person who owns the almonds immediately after harvest) is liable to pay the levy.

If the producer sells their produce through an intermediary, such as a first purchaser, buying agent, selling agent or merchant, the intermediary must pay the levy and submit all return forms on behalf of the producer. The intermediary can recover from the producer the amount of levy paid, by offset or otherwise.

If the producer sells almonds by retail sale—for example, direct to the consumer at roadside stalls or through shed or farm gate sales—they must pay the levy and submit all return forms directly to the Department of Agriculture - Levies.

The producer—that is, the person who owns the product at the time of export from Australia—is liable to pay the export charge and submit return forms to the Department of Agriculture - Levies.

If the producer exports the product through an exporting agent, the agent must pay the charge and submit all return forms to the Department of Agriculture - Levies on behalf of the producer. The agent can recover from the producer the amount of charge paid from the producer (the owner of the product at the time of export).

### Questions?

- Andrew Downs, ABA Industry Development Manager [adowns@australionalmonds.com.au](mailto:adowns@australionalmonds.com.au) or 08 8584 7053 or [levies.policy@agriculture.gov.au](mailto:levies.policy@agriculture.gov.au)

## NEW FACTSHEET HELPS TACKLE THE SCOURGE OF GAZANIAS

Celebrity gardeners aren't joking when they describe gazanias as hardy plants suited to a range of tough environments. Unfortunately, that's not such good news when you're trying to get rid of them.

Gazanias have become such a problem to some growers in the Riverland that the Riverland Wine Viticulture Technical Group (RWVTG) organised a comprehensive two-year trial to work out how best to eradicate them.

The recommendations can be found in a factsheet available from the Wine Australia website, and it is relevant to growers in any region where gazanias are a problem. Based on the trial results, it was concluded (as explained in the factsheet) that the best treatment is a combination of Glyphosate and Hammer®. Interestingly, this is most effective when the plants are healthy, and preferably actively growing.

'Under dryland conditions, this means that there is a window of opportunity in winter and spring that must be taken advantage of', the [factsheet](#) says. In a dry year, this window can be very narrow. Plants under stress or with fully matured leaves will not absorb the Glyphosate as well and subsequently the treatment is likely to be less effective.



# IN THE ORCHARD

**Brett Rosenzweig** INDUSTRY DEVELOPMENT OFFICER

In this edition of In The Orchard... we will discuss the important tasks that need to be considered over the winter months leading up to the beginning of the new season

## Pollination

Liaise with your beekeeper about their anticipated ability to provide full strength hives for pollination in August. Early communication should be a part of a normal management program to maintain an ongoing business relationship with your beekeeper. Topics discussed should include:

- Any problems arising from last season's pollination period
- Current hive strength and seasonal conditions that may impact on hive strength at pollination
- Planting of temporary forage crops to support bee health in the early stages of almond flowering
- Discuss and reinforce the message that all types of spraying will be kept to a minimum and if needed, will occur late in the day or at night to minimise any disturbance to bee activity or health
- Current pollination fee and contract
- Any other ways the grower may help the beekeeper to do their job when dropping down and picking up hives, e.g. providing an accredited driver to help transport around the property, and providing suitable amenities for the beekeeper to take required logbook breaks.

As the time gets closer to flowering, ensure that all important weediciding in the orchard is finished prior to hives being dropped in the orchard, especially Glyphosate. Plan any required foliar spraying operations to be conducted late in the afternoon or at night.

Whilst there is always lively discussion around whether the chemicals almond growers use during flowering have an impact on bee health or activity, I urge everyone to act with caution until more rigorous scientific evidence exists. Spraying when bee activity is low could be one of those operations that contribute an extra 1% productivity, on its own may not resemble much but could have a greater impact in the bigger picture. Make sure any

orchard prunings are burnt prior to hives being brought into the orchard. This includes bee/burn areas where hives will be located and headlands to facilitate easy access for the beekeeper's equipment.

## Pruning

Pruning can be a valuable part of any orchard management strategy. Whether you consider the time and expense of hand pruning to open the centre of the tree or whether you judge the cheaper option of mechanically hedging to facilitate good mid-row light interception, pruning can help maintain the required light interception for good canopy health and reinvigorate the tree. The best hand pruning regime encountered so far is where a combination of the number of cuts and size of cuts is instructed to the pruning contractor or orchard staff i.e. two pruning cuts no larger than 5cm to open the centre of the tree.

In regards to mechanical hedging, the best practice to date involves hedging every second row in half of the orchard, the other half of the orchard can then be hedged every alternate row in the following season i.e. winter 2018. Every other unpruned row of the first half of the orchard can be hedged (winter 2019) followed by the last unpruned rows in the second half of the orchard in winter 2020. The need to re-hedge the orchard can be accessed after the four-year pruning program with most growers electing to restart the program after six years i.e. a four-year pruning program with a two-year break. When using mechanical saws in the orchard, for either mid-row hedging or 45 degree skirting cuts, consider mulching the prunings instead of pushing them out for burning. There are pruning contractors that can 'shred' the prunings very finely and with the changes in the types of pick-up belts used at harvest time, the residual layer of mulch won't interfere much with the sweeping and picking up operations at harvest. The mulch will decompose very quickly with sprinkler irrigation or winter/spring rainfall in drip orchards and provides a major benefit in adding organic matter back into the soil.





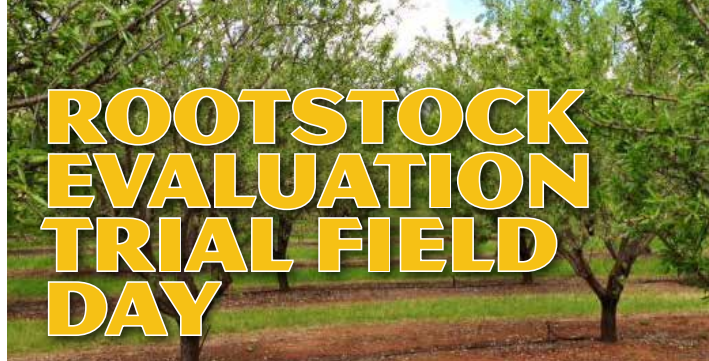
# Almond Industry Levy Snapshot

The almond levy is hard at work - let HORTLINK show you how!

For an update on all levy-funded activity in the almond industry, check out the latest edition of Hortlink from Hort Innovation: [www.horticulture.com.au/hortlink-2017-edition-2/almond/](http://www.horticulture.com.au/hortlink-2017-edition-2/almond/)

Hortlink includes easy-to-read project updates, results and resources you can use in your business, plus case studies from across horticulture, industry contacts and more. So what are you waiting for? Check it out now!

Remember that paying a levy doesn't automatically make you a member of Hort Innovation, the grower-owned, not-for-profit research and development corporation for horticulture. But becoming a member is free and easy at [www.horticulture.com.au/membership](http://www.horticulture.com.au/membership).



On the 25th May 2017 the ABA hosted the inaugural field day at Lacton Pty Ltd, Lindsay Point looking at the almond rootstock trial. The rootstock trial was planted in 2013 to look at new and existing rootstocks in Australia that are suitable for Prunus species but have not been tested or used for almonds. The 3.7Ha trial was established as a randomised, replicated trial meaning that the 15 treatments (rootstocks) were reproduced in a random manner to account for variability in soils and irrigation system performance. The rootstocks listed below were grafted to 50% Nonpareil, 25% Peerless and 25% Carmel.

Nemaguard	Monegro
GF557	Bright's Hybrid
GF677	Hansen 536
GF749	Cornerstone
Adafuel	Krymsk 86
Garnem	Nemaguard (spare plot)
Felinem	

The aim of the rootstock trial is to investigate the potential of new rootstocks to replace Nemaguard in a replant situation and in general, more efficient use of water, nutrition and increased yield capacity. Most are Peach X Almond hybrids, while a few include Plum in their breeding which provides some tolerance to heavy soils and root asphyxia. Most are tolerant of calcareous soils and some are better in regards to pathogen resistance. An earlier glasshouse trial looked at the tolerance of Prunus rootstocks to root-knot nematodes. More information on the results of this trial can be found on the ABA website in the fact sheet titled 'Tolerance of almond rootstocks to root-knot nematodes'.

Yields have been collected for the past two seasons and a summary was presented at the field day. For the 2016 harvest (hand harvested) the top three rootstocks were GF677 followed by the two Nemaguard treatments. In the recent 2017 harvest (machine harvested) the top three rootstocks were Monegro, Garnem and Bright's Hybrid. Little can be concluded from the initial yields as the tree vigour needs to be considered i.e. did a poor yielding rootstock perform better this year? These questions will be answered in the future as further yield results are collected and matched with the tree circumference which is recorded each winter. Whilst some early results from the trial can be reported, they should be interpreted with caution until more data is collected and a robust statistical analysis conducted.



# MANAGING FOOD SAFETY RISKS IN ALMONDS



In common with many types of nuts, almond kernels are often consumed as a 'ready-to-eat' (RTE) food. RTE foods need to meet strictly prescribed food safety standards because they do not undergo further treatments that remove or reduce microbial contaminations.

## KEY POINTS

- ▶ Almonds need to be maintained at the recommended moisture content to ensure optimum shelf life and safety.
- ▶ Exposure of almonds to wet conditions can encourage growth of micro-organisms, which leads to spoilage. Some micro-organisms have the potential to cause food safety risks.
- ▶ This fact sheet lists best practice guidelines that can be implemented to limit contamination and growth of micro-organisms during the growing, harvest and storage stages of the current almond

## BACKGROUND

**In common with many types of nuts, almond kernels are often consumed as a 'ready-to-eat' (RTE) food. RTE foods need to meet strictly prescribed food safety standards because they do not undergo further treatments that remove or reduce microbial contaminations.**

### WHAT ARE READY-TO-EAT FOODS?

RTE foods are consumed in the same state as that in which they are sold or distributed, without further processing such as hulling, peeling, washing or cooking by the consumer.

### WHAT MICRO-ORGANISMS CAN POSE FOOD SAFETY RISKS?

For low moisture foods, such as nuts, two examples of potential food-borne pathogens are some *Salmonella* and *Listeria* species. These pathogens have been isolated from the environment, and can persist in the processing chain.

Microbial infections can lead to spoilage, production loss and degradation of produce quality. Certain fungi, such as *Aspergillus* spp., can pose food safety risks because they produce mycotoxins. Some of these fungi are commonly found in the environment and can colonise and survive on a wide range of hosts and substrates.

### LOW TOLERANCES FOR FOOD-BORNE PATHOGENS AND MYCOTOXINS

Foods produced in Australia and exported to different overseas markets need to meet very low or nil tolerance for food-borne pathogens; and low tolerances for aflatoxins, in the level of parts per billion. Within Australia, major retailers have different food safety and quality assurance requirements. Therefore, adoption of production practices that prevent or limit microbial contamination will help with meeting the stringent quality and food safety standards.

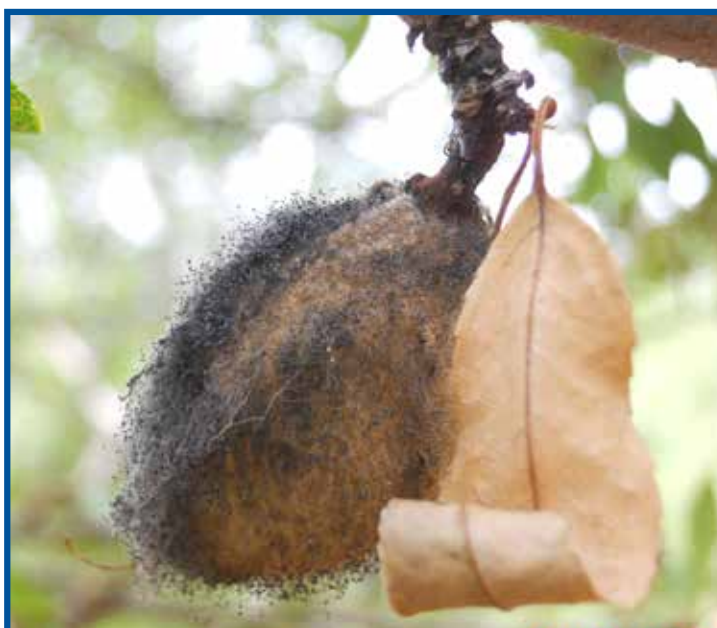
### WHAT CONDITIONS PROMOTE MICROBIAL GROWTH?

Microbial species known to be found on foods can grow over a wide temperature range. For example, the temperature range for

*Salmonella* spp. is 5.2-46.2°C, with an optimum of 35-43°C. *Aspergillus flavus* can grow in the range of 10-38°C, with optimal growth at 32-33°C. These temperature ranges also prevail in orchards, soils and stockpiles (Fig 1). This means these temperatures are unlikely to limit the growth of these microbial species.

### WHY IS IT IMPORTANT TO KEEP NUTS DRY?

Both temperature and moisture have a major influence on microbial growth and mycotoxin production. These conditions also have a major impact on the quality and shelf life of low moisture foods such as almonds. Micro-organisms grow best when water is readily available in the substrate; this is described as the water activity ( $a_w$ ). Controlling moisture content is one of the most important factors for limiting



Large *Rhizopus inoculum* load on a hull rot infected fruit.



## RISK PROFILES OF ALMOND ORCHARDS AND STOCKPILES

The potential areas of risk during production and stockpiling of almonds are summarised in the Table 1. The risks are categorised as low, medium and high to direct focus on key areas that need risk mitigation.

### WHAT MEASURES CAN BE IMPLEMENTED TO REDUCE FOOD SAFETY RISKS?

Based on the above risk profiles, a range of orchard and stockpile management options can be implemented to reduce microbial infections or contaminations in almonds.

Because these micro-organisms are present in the environment and can grow in the temperature range that prevails in the orchards and stockpiles, measures that can mitigate these risks need

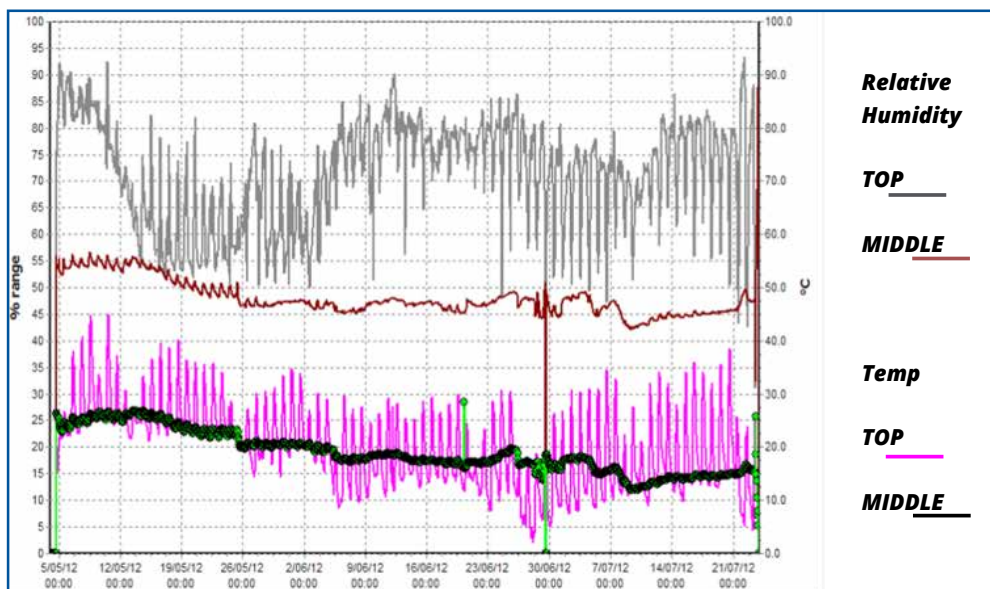


Figure 1. Large fluctuations in the relative humidity and temperature in the top layers of a stockpile covered with a clear tarp.

#### WHAT IS WATER ACTIVITY?

Water activity ( $a_w$ ) refers to the water requirements of micro-organisms in a particular food or substrate. It is a measure of the ratio of water vapour pressure of the food substrate to the vapour pressure of pure water at the same temperature.

Therefore, the RH and temperature of the storage environment has an influence on the  $a_w$  of a food product.

Even when dry nuts are loaded into stockpiles, moisture can still condense on the under surface of the commonly used PVC tarps. The condensation will contact the surface layers of stockpiles, run off and pool around the base, valleys and pockets of depressed spots in the stockpiles. This creates prolonged moist conditions if the stockpile is not uncovered and aerated.

Research has shown that tarps made of breathable, waterproof material enable release of moisture from the stockpile, minimising the quantity of almonds in the at-risk zones of stockpiles and helping them to remain dry over several months.

microbial growth in low moisture, RTE foods. The lower  $a_w$  limit for growth of *Salmonella* is 0.94, whereas the level is lower for *Aspergillus* spp., at 0.80. This means *Aspergillus* can grow on substrates with a low  $a_w$ . For this reason, almonds are best maintained at optimum  $a_w$  levels of 0.3-0.6. It is recommended that the moisture content of almond kernels should not exceed 5-6%.

Almonds can absorb moisture from an environment with high relative humidity (RH). The hulls of whole almond fruit have greater capacity than the kernels to absorb moisture, this helps to retain moist environments in stockpiles (Fig 2). Therefore, prior to dehulling, it is important that stockpiles are kept dry to prevent migration of moisture into the whole fruit and kernels.

Table 1. Ranking of microbial infection risks in almond orchards and stockpiles

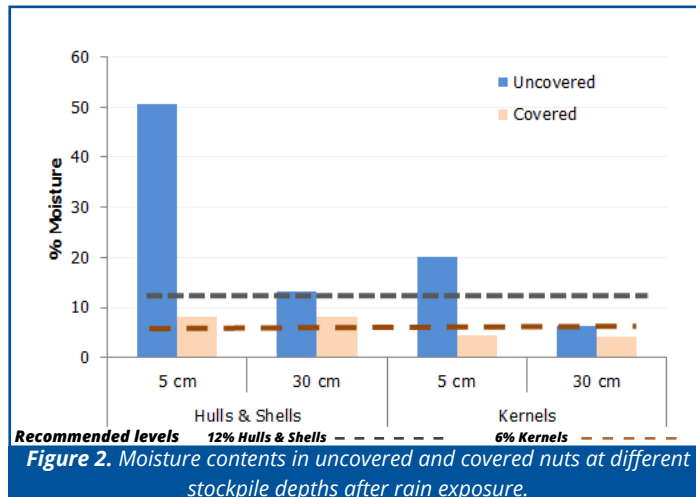
LOW	MEDIUM	HIGH
Green fruit on trees	Mummies on the ground	Nuts on wet orchard floor at shaking & drying
Mature fruit on trees	Dry nuts and/or kernel on the ground	Moist nuts/kernels on the ground
Dry nuts	Mechanically damaged kernels	Storage of nuts exposed to moisture
Dry, hard shelled nuts	Nuts/kernels damaged by insect/rodent/bird feeding	Storage of insufficiently dried nuts
Low microbial inoculum levels	Over-wintering nuts on ground	Poor drainage of water from stockpads
Low organic matter on ground	Clean and dry orchard floor	Condensation build up/run off under tarp
No over-wintering nuts on ground		Lack of aeration of damp stockpiles
		Damp nuts/kernels in the surface layers, in gullies and depressed spots of stockpiles
		Damp nuts/kernels in the basal layers near or on wet ground of stockpiles

to focus on: (1) preventing contamination, and (2) limiting microbial growth.

An understanding of which aspects of orchard and storage operations that have the potential for almonds to be exposed to or increase the risks will help to target the control measures.

Therefore, targeting the critical control points in the growing and storage operations will have a major impact in preventing or reducing microbial contamination, to ensure the raw almond materials are clean and of high quality, prior to undergoing processing, pasteurisation or manufacturing processes.

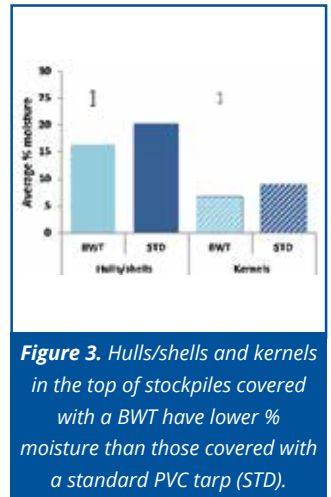
It is recognised that orchard and stockpile management approaches vary between different growers and processors. Some growers are already HACCP accredited. Processors have HACCP and SQF2001 (Safe Quality Foods) accreditation, and almond products are tested by third party laboratories with NATA (National Association of Testing Authorities) accreditation; these serve to



ensure products are of high quality and safe. The following guidelines aim to highlight a range of measures that can be adopted/adapted into existing practices to firstly prevent contamination, and secondly, to further limit microbial growth.

### ORCHARD MANAGEMENT

- Reduce hull rot infection and minimise damage by insect pests such as Carob Moth and Carpophilus beetles.
- Remove mummies from previous season/s.
- Ensure good pollination to minimise early abortion of inadequately pollinated nuts, which become substrates on the ground for microbial infection.
- Improve light penetration and air circulation in tree canopy to enhance drying of nuts.
- Prune large overhanging limbs, so that nuts do not become damaged or knocked off by orchard machinery.
- Manage irrigation and nutrient feeding to enhance drying of nuts.
- Remove nuts left on the orchard floor, alternatively, encourage breakdown of nuts to remove overwintering substrates for microbial infection, insect and rodent feeding.



- Ensure hull piles are not dumped near orchards or stockpile sites. Dispose of or encourage breakdown of hull piles.

### PRE-HARVEST

- Avoid shaking if rain is forecast.
- Prepare orchard ground before harvest, pre-sweep to remove trash and branches, and infected or infested nuts.
- Ensure orchard ground is level and not prone to ponding of water.
- Inspect irrigation lines so that there are no leaky drippers.

### AT HARVEST

- Monitor nut moisture contents and ensure nuts are dry (kernels <6%, whole nuts <9%, hulls <12%) prior to pick up for stockpiling.
- Ensure sufficient equipment capacity is available to harvest, sweep and pick up quickly before exposure to rain.
- Avoid turning on irrigation whilst nuts are still on the ground under the tree canopy.
- Sweep nuts from under the tree canopy into the



**Figure 4. Condensation under a clear tarp** Image Source: ABA



**Figure 5. Covering stockpile with a breathable, waterproof tarp** Image Source: Chin Gouk, Agriculture Victoria



windrows to aid faster drying of nuts.

- Where resources are available and logistically feasible, a shake-and-catch approach for young trees will help to avoid drying of nuts on the ground. This reduces the risks of rain exposure and cross-contamination.
- Remove nuts on young trees that are not old enough to be shaken so that these do not act as infection/infestation sites for hull rot, *Aspergillus* spp., Carob Moth and *Carpophilus* beetles.

### POST-HARVEST

- Reshake to remove left-over nuts from the trees as they provide carry-over inoculum for hull rot and act as overwintering sites for pests.
- Collect and clear nuts from orchard floor.
- If the reshaken nuts are not collected for processing, sweep nuts into the windrow and flail mow these to encourage break down so that they do not become a substrate for microbial infection (e.g. hull rot), or a food source for almond pests.

### STOCKPILE MANAGEMENT

- Segregate nuts from at-risk orchard blocks into separate stockpiles, e.g. nuts exposed to the rain, or those harvested before reaching optimum dryness.

- Segregate nuts from orchard blocks with high levels of pest infestation, e.g. Carob Moth or *Carpophilus* beetles.
- Ensure good hygiene in stockpads and surrounding grounds. Remove and dispose of any old nuts around the stockpad.
- Ensure the stockpad or storage ground is well compacted and gently sloped to drain away water from the base of stockpiles.
- Orientate the long side of the stockpiles in a North-South direction to reduce the area prone to shading.
- Improve construction of stockpiles to minimise formation of troughs on the ridges and slopes where condensation accumulates.
- Avoid widespread spilling of nuts around the base of stockpiles to prevent too many nuts being on wet ground, i.e. using an elevator to create steeper edges rather than spreading edges around the base of stockpiles.
- If a bunker is not available, avoid creating a spreading stockpile base as it is prone to damage by machinery.

### STOCKPILE COVERAGE & AERATION

- Cover stockpiles with an opaque, waterproof tarp to protect nuts from the rain or heavy dew.
- Avoid use of a clear tarp unless frequent aeration can be conducted (Fig 3).
- Use a breathable, waterproof tarp (BWT) that enables moisture to evaporate from the stockpile (Fig 5).
- Ensure stockpile tarps are wide enough to extend to cover the ground surrounding the base and to prevent moisture seeping back into the stockpile.
- Avoid putting tyres or heavy objects on stockpile slopes to hold down the tarp, as they create depressions for condensation to accumulate (Fig 6). This in turn encourages microbial growth. Instead, place these objects on the part of the tarp that covers the ground.
- Ensure effective fumigation of stockpiles for insect control.
- Aerate stockpiles to dry off condensation that accumulates under PVC tarps and run-off onto the top

surface and depressions in stockpiles.

- Avoid mixing wet nuts with dry nuts to prevent migration of moisture and spreading of fungal and bacterial loads to dry nuts.
- Shed storage provides better protection from the rain. Consider this option if economically viable.

### PICK UPS

- Shorten stockpile duration as much as possible.
- Ensure trucks and trailers are clean before they are used to transport nuts.
- Remove and segregate mouldy and rotten nuts in damp patches in stockpiles to minimise contaminating other kernels, the hulling and shelling plants and grading machinery.
- Test nut moisture content before hulling and cracking to form decisions on drying requirements.

### MORE INFORMATION

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Agriculture Victoria, Department of Economic Development, Jobs, Transport & Resources (DEDJTR)

#### Acknowledgements:

The project team thanks HIA for commissioning the project. We thank the Almond Board of Australia for their knowledge, support and assistance with extending the research findings and recommendations to industry stakeholders. The DEDJTR project team thanks the almond industry growers and processors for their interest in the findings of the project and collaboration in the trials.



**Figure 6.** Damp, mouldy nuts under tyres

Image Source: Chin Gouk, Agriculture Victoria



**Figure 7.** Damp and mouldy nuts

Image Source: Chin Gouk, Agriculture Victoria



# Costa almond operation in strong growth mode



Phillip with some of the irrigation and fertiliser injection infrastructure at the family's Angle Vale orchard.



Phillip checks the growth of some of the young almond trees planted at the family's Angle Vale property last July.



## LIKE many across the almond industry,

the Costa family is busy expanding their almond growing enterprise, as well as their commercial hulling, shelling and packing business.

Today, brothers Phillip, Michael and Tony are the third generation at the helm after taking over from their father, Don, who earlier followed the footsteps of his own father.

The family's original property at Angle Vale in the Northern Adelaide Plains comprises 70 hectares, while their holding near Swan Reach in the Riverland has expanded to 690ha, of which 485ha is approved for planting.

The Costa Brothers hulling and shelling operation has also been transferred to Swan Reach, where a new facility was recently commissioned and offers expanded capacity from handling 1500 tonnes to 5000t of kernels per season.

The facility will process material from as far north as Mildura, down to a region south of Adelaide.

While Costa Brothers is an approved huller and sheller for Almondco and the family's produce heads to the company, it is also an independent facility for Riverland Almonds and it packs and returns produce to grower customers. Hulls and shells are also sold for stockfeed.

At Angle Vale, some of the family's trees are 20 years old and they have been replanting for the past five years. The orchard comprises Nonpareil, Carmel, Price and Keane varieties.

At Swan Reach, the existing orchard comprised trees ranging from 25 years old to 14 years old, including Nonpareil, Carmel, Fritz, Peerless and Ne Plus varieties.

The family planted another 40ha in 2014 and 35ha last year.

Phillip said they were planning for five stages of plantings with varieties including Nonpareil, as well as newer varieties Wood Colony and Monterey.

He said row spacing remained at 7 metres, but tree spacing was now at 5m, also enabled by the smaller, compact Wood Colony variety.

"The trends are toward a lighter coloured almond, and so the new varieties going in are lighter," Phillip said.

"They are also higher yielding and are on better rootstocks – we are aiming for 1.4-1.5t per acre.

"On the heavier land at Angle Vale, we use the hybrid rootstock GF677, whereas up on the sandy country at Swan Reach, we use Nemaguard. The Wood Colony there is also on Cornerstone, which offers better vigour."

The Swan Reach property has required significant infrastructure upgrades, including drilling through cliffs to install two 650-millimetre pipes.

Water quality and the conditions are much better at Swan Reach and they apply 10-14 megalitres/ha, while due to the salt content at Angle Vale, they "shandy" recycled water and groundwater and apply it at 8-10ML/ha.

Soil surveys at Swan Reach showed it was unsuitable for drip irrigation and so micro sprinklers provide full cover in the orchard, while at Angle Vale, 30 per cent of the orchard floor is covered.

Nutrition is fertigated and the full cover irrigation system also allows them to dry spread fertilisers. Any fungicide applications also have nutrients added.

Phillip said for new plantings, they apply chicken compost and normally some gypsum, as well as a base fertiliser of MAP or an NPK product prior to planting from late June or July.

Soil sampling followed by leaf sampling once growth begins to occur around September-October provides a guide on the effects of the base

and pre-plant fertiliser applications and sets the course for the nutrition strategy.

"Once the leaves start, we feed them. We irrigate and fertigate every three days," Phillip said.

"The nutrition really needs to be in proportion with the tree and in balance with yield. You want fruiting growth, not just vegetative growth."

The Costas use Haifa's Multi-K potassium nitrate throughout the season and its Poly-Feed Greenhouse Grade NPK water soluble fertiliser from October onwards.

Poly-Feed comprises pure plant nutrients, is free of sodium, chloride and other detrimental elements, and is enriched with high levels of micronutrients.

Safe for use with all irrigation and spraying systems, it provides plants with optimal, balanced nutrition throughout the growing season, feeding them according to their needs and thereby maximising nutrient use efficiency.

As highlighted in the Costa's operations, Poly-Feed can also be used with water of varying quality, however a water test is always recommended, as well as a jar test to ensure compatibility.

"They have always been very good, high quality fertiliser products and we have no problems with their solubility. With cheaper products, you can get problems," Phillip said.

"We also use calcium, urea and ammonium nitrate and we apply eight to 10 foliar treatments at Angle Vale and six to eight in the Riverland, with the drier conditions there.

"We use different blends at Angle Vale because of the water. The recycled water can be 1500 ppm of salts and the ground water 600-700 ppm, whereas in the Riverland it is 200-300 ppm.

"Over an annual period, we apply 200 kilograms/ha of elemental N, 50kg/ha of P and 400kg/ha of K. Two-thirds of the nutrition is applied from July to November and the last third is applied post-harvest, when the tree is storing reserves for the new season.

"Our soils are fairly high in potassium, but we have previously taken samples and thought no more would be required, but then the potassium hasn't been available at critical demand periods."

He said they use about half the nutrition rates in year two and three before then applying the full program.

Some of their biggest concerns are the housing pressures around the Angle Vale orchard and energy requirements at Swan Reach, where there is no mains power. For the latter, they are currently running diesel generators and batteries, but they are planning to trial solar power, including for their river pumps.

**Media information:**  
Jon Corona,  
Haifa Australia,  
on 0408 568 605.



**LEFT: Phillip Costa with the micro sprinkler irrigation system at his family's almond orchard at Angle Vale. The trees had recently been shaken and the fruit was drying prior to sweeping for harvest.**

# Almond Industry Hort Innovation Update

Corrine Jasper  
Relationship Manager – Hort Innovation

Horticulture  
Innovation  
Australia

## Almond Strategic Investment Plan – the roadmap for levy investments

The almond industry's Strategic Investment Plan (SIP) is now complete. The SIP will be used to help guide Hort Innovation's strategic investment of the almond R&D levy, ensuring that levy investment decisions align with industry priorities. The SIP has been developed in close consultation with growers and other industry stakeholders – so thank you to everyone who shared their valuable time and ideas.

The SIP can be downloaded from Hort Innovation in full [here](#) or as a two-page 'at a glance' document [here](#).



## Strategic Investment Advisory Panel (SIAP) update

The Strategic Investment Advisory Panel (SIAP) met at the new Loxton Research Centre (Almond Centre of Excellence) in South Australia on March 22, for the purpose of identifying current gaps in R&D and advising on future investment opportunities.

Concepts for future investment that the SIAP discussed included:

- Integrated pest management
- Irrigation systems management
- Benchmarking
- Post grad/summer students.

Pollination was highlighted as an additional area for investment to be discussed at the next meeting.

SIAP meeting summaries can be accessed from Hort Innovation's almond grower page [HERE](#)

Updates

## Research & Development Project Update

### The following projects have been recently contracted by Hort Innovation:

- Development of high health status mother plantings for new Australian almond varieties (AL16004)
- Australian almond industry innovation and adoption program (AL16001)
- Australian almond industry conferences and field days 2017-2021 (AL16700)
- Almond study tour (AL16701)
- Enhanced National Bee Pest Surveillance Program 2016-2021 (MT16005)
- Horticulture trade intelligence reporting 2017-2019 (MT16011)

You'll find details on these new projects, plus updates on all other almond levy investments, in the next edition of Hort Innovation's Hortlink (2017, edition 2). The publication will be available in early June [HERE](#). To be notified when it's available, and to receive other timely updates from Hort Innovation, [become a Hort Innovation member](#).

### Up-and-coming projects

Hort Innovation is also progressing ideas in the space of post-harvest best practice (particularly in relation to moisture), educating health professionals, integrated pest and disease management, European market development and more.

### Want more information?

Apart from Hortlink, further information on Hort Innovation's almond investments – including an overview of the program financials – are available from the [grower page](#).

If you have any questions or would like to discuss anything related to the almond program, you can also contact the industry's Relationship Manager at Hort Innovation:

#### Contact

Corrine Jasper  
Relationship Manager

0439 433 885 [corrine.jasper@horticulture.com.au](mailto:corrine.jasper@horticulture.com.au)



## Redoubling Australia's bee protection efforts

The nation's busiest pollinators have received a boost after the official launch of a multi-faceted effort to maintain the health of Australia's bees along with the country's \$1.8 billion pollination-reliant horticulture and grain industries.

Horticulture Innovation Australia, the Australian Honey Bee Industry Council and Grain Producers Australia have joined forces to deliver a \$3M program that will see bee surveillance bolstered at 32 of the nation's riskiest ports.

Horticulture Innovation Australia chief executive John Lloyd said the new enhanced bee pest surveillance program would provide the best chance for early detection and eradication of exotic industry pests.

"We are fortunate that a lot of the pests and diseases that are serious threats to bees, and plant food industries, are not on Australian shores," he said, listing Varroa and other mites, exotic bees and certain beetles as high priority pests.

"However that isn't luck. It's the result of intensive, world-leading research efforts combined with the vigilance and support of organisations and government agencies across the country."

Led by Plant Health Australia, this project will include a boost in the number of catchboxes that trap exotic bees and pests at various ports, and more teams will be on the ground using nets to detect any exotic bees foraging on key plants within a 600m zone of the ports.

On top of that, there will be an increase in the number of honey bee hives located across ports with surveillance officers trained in the latest hive inspection measures to detect Varroa mite and other exotic pests.

Throughout the program, engagement will continue with Commonwealth biosecurity teams including the Northern Australia Quarantine Strategy, Operational Science Services, and all state and territory governments and beekeepers.

Chair of the Australian Honey Bee Industry Council Lindsay Bourke said the new program supports 13,000 registered beekeepers who operate around 500,000 hives, and complements the smart-trap hive program, which employs advanced monitoring technology.

"The potentially devastating impact of exotic pests such as Varroa mite, which is yet to take hold in Australia, pose a significant threat to our honeybees and our pollination services," he said. "Hence, doing everything we can to help fight this risk is vital."

The enhanced bee surveillance program complements more than \$12M in research Horticulture Innovation Australia is delivering – with industry levies, and funds from the Australian Government and its partners – to protect and enhance the nation's pollinators.

Learn more about bees and pollination in the [Pollination Aware Fact Sheet](#)

## About the National Bee Pest Surveillance Program

The National Bee Pest Surveillance Program (NBPSP) is an early warning system to detect new incursions of exotic bee pests and pest bees. The program involves a range of surveillance methods conducted at locations considered to be of most likely entry of bee pests and pest bees throughout Australia.

The NBPSP supports two primary objectives:

- Exotic bee pest and pest bee early warning: To act as an early warning system to detect new incursions of exotic bee pests and pest bees. This greatly increases the possibility of eradicating an incursion, and limits the scale and cost of an eradication program.
- Trade support: To facilitate the export of queen bees and packaged bees to countries sensitive to a range of bee pests and pest bees. This Program will provide technical, evidence based, information to support Australia's pest free status claims during export negotiations and will assist exporters in meeting export certification requirements.

Exotic bee pests targeted for in the NBPSP include Varroa mites (*Varroa destructor*, *V. jacobsoni*), Tropilaelaps mites (*Tropilaelaps clareae*, *T. mercedesae*) and Tracheal mite (*Acarapis woodi*).

Exotic pest bees targeted include exotic Asian honey bee (*Apis cerana*), giant honey bee (*Apis dorsata*), red dwarf honey bee (*Apis florea*) and exotic strains of the European honey bee (*Apis mellifera*), including Africanised honey bees (*A. m. scutellata*) and Cape honey bees (*A. m. capensis*).

Regionalised pests such as braula fly (*Braula coeca*), small hive beetle (*Aethina tumida*) and Asian honey bee (*Apis cerana*) are also monitored in specific states and territories.

For more information about each of these pests, and the damage that they could cause if they entered Australia, or spread to other parts of Australia, please visit [beeaware.org.au/pests](http://beeaware.org.au/pests)



# Nothing comes free from nature... unless you're an almond producer

SARINA MACFADYEN (CSIRO), JOEL ARMSTRONG (CSIRO), MICK NEAVE (CSIRO), SAUL CUNNINGHAM (ANU)

**Over a three-year period, a study was conducted on whole-tree pollination to observe the trees' response to consistently high levels of pollination. Our research has shown that "almond trees that experience higher pollination rates produce more nuts, and that trade-offs at the spur level are very small" said Dr Sarina Macfadyen, Principal Research Scientist at CSIRO Agriculture & Food and science coordinator on the project, with Dr Saul Cunningham from the Australian National University.**

Each season "we tagged, hand pollinated and followed flower spurs in different positions in the tree canopy to observe pollination effects at the spur level" said Dr Cunningham. Pollen was collected from bee hives on-site and applied as a pollen suspension (with boron added to support pollen viability) onto the flowers, across entire trees, to simulate maximum pollination (Fig 1.). Trees were sprayed twice: at 40% and at close to 100% bloom. The researchers found that "whole tree pollination using sprayed pollen raised whole tree yield above that of non-treated trees by up to 15% in some, but not in all years". The relationship between pollination and fruiting depended on the light environment (interception?) in that part of the canopy.

So as was expected, spurs in higher light environments supported more nuts. Interestingly, production of a large number of nuts did not tend to lead to smaller nuts. That is, there was no detectable size versus nut number trade-off.



**Figure 1:** Experimentation with whole-tree pollination of almonds. Bee-collected pollen being used as a spray solution on to flowers to promote pollination and nut production.

As noted by Dr Macfadyen "we can use these research findings to help us manage pollination to increase yield but at the same time ensure that nut size and quality are maintained". The research will also help to determine what characteristics of new trees and orchard layouts will give us the best productivity in the future. Future studies could further explore options for increasing pollination efficiency at the whole-tree level, and scaling that up to orchards that may have a mix of varieties, including newer self-fertile varieties.

The research was designed to answer important questions about constraints to nut production and how they interact with pollination. Our results confirm 'that managing for a high pollination rate is a critical first step towards producing a good yield'. But we also know that there are many other factors influencing yield that interact with pollination rate. Even pollinated flowers often do not make nuts. If further increase in productivity is to be gained, "we need to understand these other factors that influence yield, and how they interact with pollination" the scientists concur. This research project has been conducted in collaboration with other projects investigating influences on almond productivity to ensure that the different insights add up to a bigger picture.

So the take home message from this research is that if you give trees ample pollination, they have the resources to give you more nuts, and our results indicate that there is not an adverse effect on nut quality. This is contrary to what we would have expected given that nothing comes free in nature.

Acknowledgements: The research was supported by funding from Horticulture Innovation Australia (AL14004). The research was conducted by CSIRO Agriculture & Food staff in collaboration with other partners at Australian National University (Saul Cunningham) and other collaborators including Victorian Department of Environment and Primary Industries (DEPI: Dave Monks) Plant and Food Research Australia (Andrew Granger), SARDI (Dane Thomas) and CSIRO Land & Water (Everard Edwards). The Almond Board of Australia initiated the project and provided critical support along the way. The staff at the Lindsay Point CMV orchard generously allowed access to the site and were always helpful.



# 2017 Events

## JULY

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

### July

- 3** Almond Grower Regional Meeting, Adelaide Plains  
Virginia Horticulture Centre
- 4** Almond Grower Regional Meeting, Riverland  
Loxton Research Centre
- Almond Grower Regional Meeting, Sunraysia  
Mildura Golf Resort
- 5** Almond Grower Regional Meeting, Riverina  
Griffith Ex-Servicemen's Club
- 31** ABA MEMBERSHIPS DUE

## AUGUST

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

### August

- 3** Plant Improvement Committee Meeting, Adelaide
- 23** ABA Market Development Committee, Loxton Research Centre
- 24** ABA Board Meeting, Loxton Research Centre  
Production Committee Meeting, Loxton Research Centre

## SEPTEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

### September

- 6** ASIA Fruit Logistica Exhibition, Hong Kong

# Low Carb Herb, Garlic & Olive Loaf

This paleo style, gluten and grain free loaf bursts with savoury flavours of garlic, herbs and olives.

Serve fresh, toasted, as a dipping bread to soup or simply on its own for a nourishing snack. I love serving slices of this loaf with fried eggs for breakfast or even topped with shredded chicken, tomato and avocado and lightly toasted under the grill.

## Ingredients:

- 6 large Free Range Eggs
- 3/4 cup Sparkling Water
- 4 Garlic Cloves, crushed
- 2 tablespoons Dried Herbs of choice (Rosemary, Thyme, Oregano)
- 12 large Olives, pitted and chopped
- 2 1/2 cups Almond Meal
- 3 tablespoons Tapioca Flour
- 2 teaspoons Gluten Free Baking Powder
- Pinch Pink Salt

## Method:

Pre-heat fan-forced oven to 180°C.

In a large mixing bowl whisk eggs. Add sparkling water and whisk to combine.

Mix through garlic, herbs and olives.

Add almond meal, tapioca flour, baking powder and salt and mix until well combined.

Spoon batter into a lined loaf tin.

Bake in oven for 45 minutes or until cooked through.

