

Final Report

Technology transfer for pistachio growers

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Delivery partner:

Pistachio Growers' Association Inc

Project code:

PS17002

Project:

Technology transfer for pistachio growers PS17002

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Summary

Two of the key goals from the Pistachio Growers' Association Incorporated Strategic Plan – 2015 to 2020 – were to: -

- a) Develop the industry to a world class standard, and
- b) Develop and maintain effective information extension and technology transfer

Based on the success of project PS13003 and the associated programs there was unanimous support from the members of the Pistachio Growers' Association Inc to continue the project and associated programs for a further 3-year period. This became Project PS17002.

The achievements for the Final Milestone period (August 2020 to January 2021) have included the following: -

- Project team held a Zoom meeting to discuss the project on Tuesday 29th September 2020
- Spring Symposium conducted as a Zoom session and was held on Wednesday 30th September 2020
- One (1) PIT Group meeting was conducted at Mallee Pistachio Orchards at Peebinga, and then at the Almond Board of Australia Centre of Excellence trial site at Loxton on Tuesday 1st of December 2020
- A project exit survey has been undertaken and the results are detail below in the Monitoring and Evaluation section.
- Two (2) Technical newsletters produced and distributed one in October 2020 and the second in January 2021
- Pre-harvest Seasonal notes were prepared and distributed in January 2021
- Three (3) new members to the Pistachio Growers' Association Inc.
- 35 attendees across the one event (1 day).
- Communications through the preparation of notices and invitations, preparing session reports, uploading the presentations and videos onto the Pistachio Growers' Association Inc (PGAI) web site – www.pgai.com.au

The achievements across the life of the project are summarised as follows: -

- Fifteen (15) new growers/entrants joined the Association.
- Sixteen (16) separate PIT group sessions were conducted. The sessions were a combination of on-farm events, workshops, symposiums and a Zoom session.
- Thirteen (13) Australian specialist and/or farm advisers and eight (8) growers/industry representatives gave presentations.
- Four (4) International experts/technicians gave presentations.
- Three (3) sessions were specifically for new members and/or were all inclusive of new and experienced growers.
- Dr Subha Abeysinghe, the Pistachio researcher, gave presentations/update reports to each of the three (3) Spring Symposia (2018, 2019 and 2020) and at other of the Field Days/PIT Group sessions.
- Twenty-one (21) documents and/or specialist videos were prepared and distributed.
- Four hundred and fourteen (414) participants attended across the 16 meetings. This represented an average of 25 per meeting.
- The highest was 55 people for the Spring symposium in 2018.
- Eighty-two (82) different people registered and this meant that each attended 5 events across the life of the project.
- All the PIT group and Spring Symposium sessions have been recorded through the efforts of one of the Pistachio growers – James Simpfendorfer – and have been uploaded onto the PGAI website

Based on the Project exit survey the following is a brief summary of the results: -

- Overall rating was 6.24 out of 7
- 95% of the survey respondents were aware of the technology transfer project for the pistachio industry.
- 90% of respondents attend a PIT group meeting outside of their region

- 90% of the respondents rated the value gained from the technology transfer project as extremely valuable or very valuable
- Have you participated in or used any of the initiatives developed through the technology transfer project that respondents participated in or used? The top three were: -
 - Technical information - fact sheets 95%
 - 'PIT Group' field days/meetings 90%
 - Seasonal Notes 90%
- 81% of respondents indicated that they had made changes in their business as a direct result of participating in, or using information generated by the technology transfer project. The areas of change are summarized below:
 - TREE STRUCTURE and PRUNING 32.4%
 - NUTRITION and FERTILISER 27.0%
 - PESTS and DISEASES 10.8%
 - WATER and IRRIGATION 8.1%
 - CHEMICAL PRACTICES and SPRAY TECHNIQUES 8.1%
 - HARVESTING 2.7%
 - IPM 2.7%
 - WINTER OIL 2.7%
 - TECHNOLOGY TRANSFER 2.7%
- How do you prefer to learn about outcomes of the pistachio R&D program and the latest information and technology from Australia and around the world? The top three were: -
 - 'PIT' workshops and field days 86%
 - Annual Spring Symposium 81%
 - Fact sheets 81%
- 22 e-mail responses were received, from 80 growers sent the survey document, representing a 28% response. The 22 responses represent 1396 hectares of an estimated 2000 hectares (total productive/non-productive).

Public summary

Not required

Keywords

Pistachio; technology transfer; regional grower groups.

Introduction

As part of the Project PS127001 - Study Tour to California the participants made the following comments: -

"Pistachio culture in California is now a major industry. It is well regarded by other older industries like almonds and walnuts, which is a major shift from the reputation it had in the early 1980's. The research and science that has been invested into this crop has paid dividends to the investors and the State. The ability of the extension service to communicate the findings of the research to existing and would be farmers or investors is excellent. All speakers at the 2013 Short Course were highly trained and presented the information extremely well. The Australian pistachio industry is indeed fortunate to be able to avail ourselves to this information and whilst not always able to translate into our conditions much of it is. The connection we have with the researchers needs to be nurtured. Over the years we have had numerous visits from key University of California researchers including Bob Beede, Louise Ferguson, Patrick Brown and soon Themis Michailides. Our involvement and support of field days, conferences and courses such as this Short Course is critical and cost effective to ensure our small industry can piggy-back on a much larger one for answers to the many problems and issues faced over the past 30 years and ones to come."

The important aspects of these comments were in the value the participants saw in: -

- a) Networking with and learning from international researchers and/or farm advisers,
- b) Having international researchers/farm advisers visit Australia and share their knowledge with growers,
- c) Grower field days and information sessions.

Utilising the input from the growers the Pistachio Growers' Association Inc agreed that combining these concepts into a singular approach of establishing regional grower groups and supporting those groups with local and international speakers/advisers was an effective way of technology transfer. Input from growers with experience of grower groups in citrus, almonds and apples assisted in developing the concept of the Pistachio Tech Groups and the establishment of them in the Riverland, Mildura/Robinvale and Swan Hill. Such groups have developed their program of activities and were supported by PGAI through administration and the supply of relevant and appropriate technical people from within Australia and/or from overseas. This concept of technology transfer has been undertaken across 6 years, projects PS13003 and PS17002 and has shown to be an integral part of the Pistachio Industry's activities and processes in delivering technical and scientific information, data and research in an effective extension and adoption process.

The Pistachio Tech Groups delivered practical technology transfer that has led to improved profitability and sustainability of the individual growers and the industry in general.

Methodology

The overall outcomes through PS17002 were to: -

1. Maintain, and where possible expand, the Pistachio 'Tech Groups' within the regional areas of the Riverland, Sunraysia and Swan Hill.
2. Conduct at least four field days/farm walks annually, at relevant times of the production cycle, to further improve the interaction between industry members of these regional 'Tech Groups'.
3. Utilise Australian and/or International Pistachio experts/technicians at field days/farm walks to give presentations on topical industry R&D matters.
4. Compile technical information from overseas and Australia and the presentation of the material in a range of formats that can be utilised by Pistachio growers.
5. Garner industry R&D concepts for submission to the Hort Innovation investment pipeline.
6. Increase grower usage of the website through the addition of new information and timely updates.

The specific activities are detailed below: -

1. **Maintain, and where possible expand, the Pistachio 'Tech Groups' within the regional areas of the Riverland, Sunraysia and Swan Hill.**

PGAI maintained a comprehensive database of current, new and prospective growers and utilised this database to establish listings of growers in each of the regional areas. These lists were utilised by the project team, subject to the PGAI privacy policies, to make growers aware of what growers were in their specific region and who they might network with at any time.

As new and potential growers in these regions become known to the PGAI they were added to both the broad list and each of the regional lists.

Trevor Ranford as the Executive Officer was responsible for the development of the regional listings and they then were utilised by Craig Feutrill as the Project Coordinator to liaise with the growers and promote more regional networking within the project but also at times outside of the project activities.

2. **Conduct at least four field days/farm walks annually, at relevant times of the production cycle, to further improve the interaction between industry members of these regional 'Tech Groups'.**

The success of project PS13003 was the field day/farm walk format with many of the events held on grower properties so allowing the participants to hear the relevant presentations and then discuss the issues within the orchard.

Flexibility was developed across PS13003 with regards the format and whether we undertook three regional meetings, two regional meetings or single combined sessions. The process depended on the topic and/or the availability of the presenter. Similarly, the length of the program and timing of day were also flexible allowing the team to maximise the events.

The project team again used that flexibility to achieve maximum opportunities and the best opportunities for all growers to access at least one session in their region.

The annual program aimed to have sessions in April/May, September and November but had the flexibility to change if the opportunity to access a presenter at a different time arose.

The use of video conferencing and/or webinars was investigated and used on a number of occasions with the aim of offering additional sessions over and above the face-to-face field days/symposiums.

A program was prepared at the beginning of each annual cycle, by the project team, then allowing the planning of venues, speakers, catering and other arrangements to commence. The program and topics were presented to the Project Steering Committee for review and sign-off.

The project team of Trevor Ranford, Craig Feutrill and Ben Thomas were involved with the program development. Once completed Craig Feutrill was responsible for the preparation of each event, organising

the presenters, preparing and distributing the invitations, organising the venue(s) and the background work on the day.

3. Utilise Australian and/or International Pistachio experts/technicians at field days/farm walks to give presentations on topical industry R&D matters.

Through the involvement with the VII International Almond and Pistachio Symposium, held in Adelaide, SA in November 2017 Trevor Ranford was able to meet a wide range of overseas scientists, researchers and extension people.

This information was utilised to select appropriate people to give presentations to the growers either through a visit to Australia and/or the use of video conferencing or webinars for more specific and detailed presentations.

Trevor Ranford was responsible for preparing a list of researchers and research topics and making this available for consideration by both the project team and the project steering committee to view, review and prioritise potential field day/symposium presenters.

Craig Feutrill will then be responsible for coordinating any personnel selected into the annual program(s).

Trevor Ranford, Craig Feutrill and Ben Thomas were responsible for following up their specific contacts within Australia and Internationally to bring topics and concepts to the program.

4. Compilation of technical information from overseas and Australia and presentation of the material in a range of formats that can be utilised by Pistachio growers.

One of the successes of project PS13003 was the collection and collation of all the presentations and uploading them into the 'PIT' Group section of the PGAI website. This continued as an integral part of PS17002.

The videoing of each presentation continued as a formal and integral part of the new project.

Craig Feutrill was responsible for the uploading of the presentations and the videos onto the website.

Appropriate 'Seasonal notes' were prepared each year and distributed to growers and industry consultants via e-mail/hard copy and added to the website.

In addition, 'technical newsletters' and other grower 'case studies' were prepared and distributed to growers and industry consultants via e-mail/hard copy and added to the website.

Ben Thomas was responsible for the collection and collation of the relevant material and prepare the seasonal notes and assistance with the technical newsletters.

Trevor Ranford, using the PGAI e-mail lists, was responsible for the distribution of all relevant material.

5. Garner industry R&D concepts for submission to the Hort Innovation investment pipeline.

Through grower input at each of the events or during the annual cycle, information was collected and collated in relation to topics and/or issues as they relate to the production of pistachios.

Through the event surveys, growers were able to raise topics and/or issues. These were collected and collated by the project team and at the end of each year a report was prepared and presented to the Pistachio R&D Committee.

6. Increase grower usage of the website through the addition of new information and timely updates.

Regular e-mail blasts were sent to growers informing them of new additions and updates to the website with the aim of increasing grower usage of this particular communication 'tool'.

The website was tracked on a regular basis to measure the grower usage and percentage change.

Outputs

OUTPUTS IN THE LAST REPORTING PERIOD:

The following are the outputs for the period from the 1st of August 2020 to the 30th of January 2021: -

- The project team held a Zoom meeting to discuss the project on Tuesday 29th September 2020
- The Spring Symposium was conducted as a Zoom session and was held on Wednesday 30th September 2020

PROGRAM

2:00 PM	Symposium commences - Welcome by the President
2:05 PM	<i>'Overview of the season'</i> Chris Joyce, Chair Pistachio R&D Committee
2:25 PM	<i>'Pathogens and other factors contributing to Dark Stain on Pistachio Shells'</i> AgXtra Team
2:45 PM	<i>'R&D update'</i> Dr Subha Abeysinghe, Pistachio Researcher, PGAI
3:05 PM	<i>'Pistachio opportunities, marketing and promotions'</i> Nigel Carey, CEO, Nut Producers Australia
3:25 PM	<i>'Sustaining energy enhancement on Victorian farms'</i> Anthea Derrington, Policy Manager, Agriculture Policy, Agriculture Victoria
3:45 PM	Q&A
4:00 PM	Close

25 industry participants attended this Zoom session.

- A face-to-face PIT Group meeting was conducted at Mallee Pistachio Orchards at Peebinga, and then at the Almond Board of Australia Centre of Excellence trial site at Loxton on Tuesday 1st of December 2020.

This was a PIT Group session aimed at growers of all pistachio trees, new and old.

PROGRAM:

The program commenced at 12:30 pm and included: -

- Introductions
- Interactive open question and answer on the season, oil sprays, bare limb growth etc.
- A brief update on the 2019/20 season, harvest quality and potential price by Chris Joyce.
- A tour of the extensive MOP plantings, irrigation system, harvest equipment, pre-plant trees/nursery and central leader pruning sites.
- A tour of the ABA Centre of Excellence orchard trial site.

A full report on this event is included in this Final report as Appendix A.

- A project exit survey has been undertaken and the results are detail below in the Monitoring and Evaluation section.

A copy of the Exit Survey – questions and responses - is included in this Final Report as Appendix B.

- Technical newsletters produced and distributed in October 2020 and January 2021

Copies of the two Technical newsletters are referenced in appendices C and D and are supplied as PDF files.

- Pre-harvest Seasonal notes were prepared and distributed in January 2021

A copy of the Pre-harvest Seasonal notes is referenced in Appendix E and is supplied as PDF files.

OUTPUTS ACROSS THE LIFE OF THE PROJECT:

The following are the original outputs set for this project and the outputs achieved are detailed as follows: -

1. Maintain and expand the three-regional pistachio 'PIT' Groups resulting in enlargement of each regional group.

While the original three-region pistachio groups were utilised, the situation allowed for undertaking PIT Group sessions at a range of venues. While there were a number of sessions held in two or more regions as part of linked sessions many PIT Group meetings were held in a single venue like the 2-day session at Kyalite, NSW or the specific visit to Mallee Pistachio Orchards and the ABA Centre of Excellence trial site in the Pinnaroo/Loxton region of SA. The methodology utilised by the Project team did not detract from the concept of regional groups. Instead, it allowed growers to visit many different regions and grower's properties not normally on the program.

As detailed below by utilising the records of attendance for each meeting there were a total of 414 participants who attended across the 16 meetings. This represented an average of 25 per meeting.

At the commencement of the project in 2018 the Pistachio Growers' Association Inc had 63 active members/growers. In January 2021, the Association had 78 active members/growers. This means that we have seen 15 new growers/entrants join the Association during the life of the project.

2. Assist in the further development of a regional 'PIT' Group in Western Australia.

Through earlier work Trevor Ranford had been able to bring together a group of nut growers in Western Australia, which included the relevant pistachio growers.

The group held a joint meeting in January 2018, and while this was outside of the project timelines the meeting helped 'galvanise' the growers into a 'working group'.

The Pistachio Growers' Association Inc and the project team have maintained linkages with this group and all Western Australian growers through e-mail and phone communications. Unfortunately, due to COVID-19 it has not been possible to travel to WA during 2020/21

3. Conduct at least four (4) field days/farm walks annually, at relevant times of the production cycle, to further improve the interaction between industry members of these regional 'Tech Groups'. Representing a minimum of twelve (12) across the life of the project.

Across the life of the project **16 separate PIT group sessions were conducted**. The sessions were a combination of on-farm events, workshops, symposiums and a Zoom session.

The result is that the project exceeded the 12 sessions in the original project output

- **Three** PIT Group sessions across June and July 2018
 - Two in the Riverland, South Australia

- One held at Loxton Research Centre, South Australia on the 27th of June 2018.
 - Field day held at Isaacson's property at Waikerie on the 26th of July 2018.
 - One in the Mildura region, Victoria.
 - Held at the Agriculture Victoria Research Centre at Irymple on the 28th of June 2018.
- **Four** PIT Group sessions across September and November 2018
 - One in the Riverland, South Australia
 - One held at Permedah Fruits, Paringa, South Australia, on the 20th of November 2018.
 - One in the Mildura region, Victoria as the 2018 Spring Symposium
 - Held at CMV Farms/Robinvale Golf Club on the 13th of September 2018
 - Two in the Swan Hill region, Victoria.
 - Held at Lake Powell, Victoria on the 21st of November 2018.
 - One held at Boundary Bend, Victoria on the 22nd of November 2018
- **Two** PIT Group sessions in April 2019
 - One in the Riverland, South Australia
 - One held at Darin Gladigau property at Blanchetown, South Australia, on the 10th of April 2019.
 - One in the Mildura region, Victoria
 - Held at Tim Beards property at Merbein, Victoria on the 11th of April 2019
- **Two** PIT Group sessions in August and September 2019
 - Linked to the Tree IPM MasterClass held on the 8th of August 2019 in Mildura, Victoria with the topic being - 'IN FIELD' MANAGEMENT WORKSHOP
 - PIT Group session was organised and held on the 11th of September 2019 as the annual Spring Symposium at the Mildura Research Centre, Irymple, Victoria
- **One combined** PIT Group session, across two days, in November 2019
 - Organised and held on the 13th of November 2019 at Tooleybuc, NSW
 - Organised and held on the 14th of November 2019 at Kyalite, NSW
- **One** PIT Group session held in March 2020
 - Held on the 10th of March 2020 at CMV Farms, Robinvale, Victoria
- **One** PIT Group session held in September 2020
 - The Spring Symposium was conducted as a Zoom session and was held on Wednesday 30th September 2020
- **One** combined PIT Group session in December 2020
 - A face-to-face PIT Group meeting was conducted at Mallee Pistachio Orchards at Peebinga, South Australia and then at the Almond Board of Australia trial site at Loxton, South Australia.

Due to COVID-19 restrictions a number of planned PIT Group during 2020 had to be postponed.

4. Undertake one (1) half day session for new entrants to the pistachio industry each calendar year. A total of three (3) across the life of the project

- **One** PIT Group session was held at Robinvale and Boundary Bend, Victoria on the 22nd of November 2018
- **One** combined PIT Group session was held on the 13th and 14th November 2019 at Tooleybuc/Kyalite, NSW

- **One** combined PIT Group session was conducted at Mallee Pistachio Orchards at Peebinga, South Australia and then at the Almond Board of Australia trial site at Loxton, South Australia on the 1st of December 2020.

The value of the combined sessions was that new growers could interact and network with more experienced growers and learn from them.

5. Utilise at least six (6) Australian specialist researchers and/or farm advisers over the three-year period to present specific knowledge to the 'PIT' Groups.

A total of thirteen (13) Australian specialist and/or farm advisers and eight (8) growers/industry representatives gave presentations.

The following Australian specialists were used across the like of the project: -

- Ben Thomas (Horticultural consultant servicing the Pistachio Industry)
- Dr Cathy Taylor (AgVictoria – pests and diseases)
- Blair Grossman (AgVictoria – insect pests)
- Stuart Pettigrew (Insects, IPM)
- Dr Belinda Rawnsley (Pathologist, fungal diseases)
- Dr Shane Phillips (Polymer trials, chill hours)
- Brett Rosenzweig (Orchard Sanitation)
- Tim Beard (QA programs, Auditing)
- Charles Griffiths (Irrigation)
- Cedric Geffen (Soil Moisture)
- Damien Heintze (Soil Microbiology)
- Jeremy Giddings (AgVictoria – Irrigation, Water)
- Anthea Derrington (AgVictoria – Energy use)

In addition, there were a number of industry members that gave presentations including: -

- Chris Joyce (Grower, Chair Pistachio R&D Committee)
- Craig Feutrill (Nut Industry Consultant)
- Andrew Bowring (Grower, Kyalite Pistachios)
- Phillip Hewett (Grower, CMV Farms)
- Ian Mau (Grower, Mallee Pistachio Orchards)
- Grant Birrell (Australian Pioneer Pistachio Company, Nut Producers Australia)
- Nigel Carey (Australian Pioneer Pistachio Company, Nut Producers Australia)
- Trevor Ranford (Independent Horticultural Consultant, Executive Officer of PGAI)

6. Utilise of at least three (3) International Pistachio experts/technicians at field days/farm walks/video conferencing to give presentations on topical industry R&D matters.

A total of four (4) International experts/technicians gave presentations.

The following International specialists were used across the like of the project: -

- Professor Bruce Lampinen, Cooperative Extension Unit, University of California.
- Dr Greg Browne - USDA ARS
- Dr Kendra Baumgartner – USDA ARS
- Professor Patrick Brown, University of California - Davis

All four undertook presentations to the industry through face-to-face meetings.

7. Utilise the current and new Research Field Officer to give an R&D report at least one (1) event each year

Dr Subha Abeysinghe, the Pistachio researcher, gave presentations/update reports to each of the three (3) Spring Symposia (2018, 2019 and 2020) and at other Field Days/PIT Group sessions.

Dr Abeysinghe was in attendance at all events and participated where appropriate in the discussions and was available to network with growers and discuss topic/issues of relevance.

8. Collate the attendance records at each event to measure the attendance with the aim of at least 85 %of the Australian Pistachio growers attending one (1) field session each year over the three years of the project.

Utilising the records of attendance for each meeting there were a

- total of 414 participants attended across the 16 meetings and this represented an average of 25 per meeting.
- total of 82 different people registered and this meant that each attended 5 events across the life of the project.

The highest attendance was 55 people for the Spring symposium in 2018.

When events were split across the regions then numbers were smaller for each event but when combined they were at the average of 25 or above. For instance, the two events on the 27th and 28th of June 2018 the total was 26.

The combined events in a single region were always well attended.

The following are the details of the attendance per event: -

- 18 attended the Loxton, SA PIT Group meeting on the 27th of June 2018
- 8 attended the Irymple, Victoria PIT Group meeting on the 28th of June 2018
- 23 attended the PIT Group Field day at Waikerie, SA on the 26th of July 2018
- 55 attended the Spring Symposium in September 2018
- 23 attended the Paringa, SA PIT Group meeting in November 2018.
- 15 attended the Lake Powell, Victoria PIT Group meeting in November 2018.
- 24 attended the New growers PIT Group Field day at Boundary Bend, Victoria in November 2018
- 18 attended the Blanchetown, SA PIT Group meeting in April 2019.
- 19 attended the Merbein, Victoria PIT Group meeting in April 2019
- 12 attended the MasterClass session in Mildura, Victoria on the 19th of August 2019
- 35 attended the Spring Symposium in September 2019.
- 35 attended the afternoon session on the 13th of November 2019 at Tooleybuc, NSW
- 44 growers attended the morning in-field session on the 14th of November at Kyalite, NSW
- 25 attended this session at CMV Farms, Robinvale, Victoria on the 10th of March 2020
- 25 attended this Zoom session held on the 30th of September 2020
- 35 attended the Peebinga/Loxton, SA PIT Group meeting on the 1st of December 2020.

At the conclusion of the program the PGAI had 78 members and an active e-mail list of 97. Based on the attendance records and utilising these figures the goal of reaching 85% attendance was achieved.

9. Video each of the events. (Where an event might include the same sessions in two or more regions only one of the sessions will be recorded.)

All the PIT group and Spring Symposium sessions have been recorded through the efforts of one of the Pistachio growers – James Simpfendorfer – and have been uploaded onto the PGAI website – www.pgai.com.au

They can be found through the following link <http://www.pgai.com.au/industry-videos?ppwp=1>

10. Maintain the 'PIT' Group pages, through the up-loading of all presentations and videos from each of the sessions.

Presentations have been uploaded onto the PGAI website – www.pgai.com.au

11. Increase the utilisation by growers of the 'PIT' Group pages of the web site as measured every six (6) months.

Craig Feutrill, as the webmaster, has regularly supplied information on the website usage.

A copy of the type of report prepared and presented to the Project Team is attached as Appendix F.

NOTE: A final report is being prepared and will be submitted to Hort Innovation when it becomes available.

12. Develop practical written material utilising relevant information either presented at each field session and or gathered from Australian and/or International sources. The material will be utilised in four (4) seasonal notes - Summer/Autumn/Winter/Spring - and two (2) 'Technical Newsletters' per year.

This represents a total of eighteen (18) written documents across the life of the project

A total of twenty-one (21) documents and/or specialist videos were prepared and distributed across the life of the project including the following: -

- Seven (7) sets of 'Seasonal Notes' were prepared and distributed in June 2018, October 2018, January 2019, August 2019, January 2020, July 2020 and January 2021. These were based around Winter, Spring, Summer, Pre-harvest and Post-harvest
- Four (4) 'Technical Bulletin' newsletters were prepared and distributed in the following months/years - January 2019, June 2020, October 2020 and January 2021.
- Three (3) Technical sheets, prepared by Chris Joyce and Andrew Bowring from Kyalite Pistachios, were produced and distributed: -
 - Growing young pistachio trees
 - Copper deficiencies in young pistachio trees
 - Winter chill and young pistachio trees
- One (1) Grower Case Studies was prepared and distributed in relation to Winter Oil application on young Pistachio Trees by Paul Wurst from Waikerie, SA
- Four (4) separate videos on pruning Modified Central Leader trees were prepared by Andrew Bowring.
- Two (2) 'Birds n Nuts' newsletters (produced from a joint nut industry project) were distributed to the Pistachio growers as part of the technology transfer component of the project.
- Numerous e-mail blasts were prepared and distributed with relevant information (some detailed in the Milestone 107 report)

13. Event surveys conducted after each event and the information compiled and made available to the industry via the website.

Across the life of the project a total of five (5) major event and/or exit surveys were undertaken as detailed below: -

- Initial survey form developed and utilised at the June session.
- An exit survey was undertaken at the PIT Group session on the 27th of June 2018 and the results detailed within the relevant milestone report.
- An exit survey was undertaken at each of the PIT Group session in November 2018 and the results detailed within the relevant milestone report.
- An exit survey was undertaken at the PIT Group sessions in April 2019 and the results detailed within the relevant milestone report.
- A survey was undertaken for the PIT Group session in November 2019 and the results were detailed within the relevant milestone report.

- An exit survey was compiled with input from Dr John James of Enablers of Change and then distributed to the growers and/or event participants. The results of the exit survey are detailed within the Monitoring and Evaluation section of this Final report.

14. Reports from each of the sessions to be prepared and utilised within the PGAI newsletters and/or within the Australian Nutgrower magazine.

Reports were regularly prepared and submitted to the Australian Nutgrower magazine either as specific event reports or included as part of the Pistachio industry reports prepared by Trevor Ranford, PGAI Executive Officer.

The following are a couple of samples of the reports prepared and submitted: -

November 2020 report:

"This winter produced amongst the highest levels of chill since the PGA commenced collecting and analysing this data. A special report was prepared (Chill Newsletter 4) so all growers had a record of the high chill.

This season, most growers have reported taking the usual mitigating action between 15th August and 1st September. With such high levels of chill, it will be interesting to learn of any untreated trees and how they perform during budbreak. If any growers have untreated trees, even if only a few, can they please report budbreak to Dr Subha Abeysinghe, subhashini@pgai.com.au. The aspects to look for are the evenness of bud break and the percentage of fruit buds that open.

The Annual General Meeting and Spring Symposium were held on the 30th of September via Zoom. Both events were well attended.

Topics covered at the Symposium included: -

- **'Overview of the season'** from Chris Joyce, Chair Pistachio R&D Committee
- **'Pathogens and other factors contributing to Dark Stain on Pistachio Shells'** from the AgXtra Team
- **'R&D update'** by Dr Subha Abeysinghe, Pistachio Researcher, PGAI
- **'Pistachio opportunities, marketing and promotions'** from Nigel Carey, CEO, Nut Producers Australia
- **'Sustaining energy enhancement on Victorian farms'** by Anthea Derrington, Policy Manager, Agriculture Policy, Agriculture Victoria

All the presentations and the videos have been added to the PGAI website so that growers who could not attend can access them.

Some of the highlights from the Symposium were: -

- *Industry has continued Television, Social media, Point of Sale Advertising, Consumer Exhibitions programs to raise awareness of the healthy aspects of eating Australia pistachios.*
- *The ongoing programs appear to be working as retail sales are up significantly.*
- *Strong retail domestic and export demand.*
- *Consumer support for 'Australian Origin' has strengthened.*
- *Australian pistachios have been a frequent "Special Buy" offering by retailer which has led to stimulating demand.*
- *Commencement of building a niche in export markets where we differentiate Australian from the mainstream USA and Iranian offerings.*

Overall, the message to industry was that "The future continues to be 'green' but with some concerns for 2021 prices".

President Chris Lee reported on another successful year for both the Industry and the Association. PGAI had continued with a wide range of activities including a strong R&D Program and overall, the industry was in a strong financial position.

Chris Lee thanked Chris Joyce and the Pistachio R&D Committee for again developing and maintaining a R&D program that is focussed on practical research and based on sound extension and adoption processes and principles.

Paul Wurst was re-elected to the PGAI Executive Committee for a further two-year term.

The President and members of the Executive Committee would like to wish all growers, their families and staff all the best as we move into the festive season and harvest. May the period be one of good weather and free from major events including storms and fires.”

January 2021 report:

“With good Winter Chill and generally good seasonal conditions the Australian pistachio harvest commenced in the first week of March. As the harvest is delivered to the processing facility in Robinvale, Victoria the industry is looking at another strong off-crop in excess of 2,000 tonnes. A full roundup of the season will be produced for the June edition.

The 1st of December 2020 saw the return of a face-to-face PIT Group meeting – the last of the 3-year project that commenced in 2018.

36 growers descended on Mallee Pistachio Orchard near Pinnaroo, SA for the normal PIT group BBQ lunch, networking, a round table Q&A and a tour of this expansive orchard in the sandy soils of the Mallee region. This was followed by a tour of the Almond Board of Australia Centre of Excellence trial site at Loxton and then a dinner at the Loxton Hotel.

It was a great conclusion to the PIT Group project – PS17002.

With the Pistachio Information Technology (PIT) Group project concluding an exit survey was undertaken. The following is a short summary of the project.

- *Overall rating was 6.24 out of 7*
- *95% of the survey respondents were aware of the technology transfer project.*
- *90% of respondents attend a PIT group meeting outside of their region*
- *90% of the respondents rated the rate the value gained from the technology transfer project as extremely valuable or very valuable.*
- *Have you participated in or used any of the initiatives developed through the technology transfer project that respondents participated in or used? The top three were: -*
 - *Technical information - fact sheets* 95%
 - *'PIT Group' field days/meetings* 90%
 - *Seasonal Notes* 90%
- *81% of respondents indicated that they had made changes in their business as a direct result of participating in, or using information generated by the project.*
- *How do you prefer to learn about outcomes of the pistachio R&D program and the latest information and technology from Australia and around the world? The top three were: -*
 - *'PIT' workshops and field days* 86%
 - *Annual Spring Symposium* 81%
 - *Fact sheets* 81%
- *The responses represent 1396 hectares of an estimated 2000 hectares (total productive/non-productive).*
- *414 participants attended across the 16 meetings. This represented an average of 25 per meeting.*
- *The highest was 55 people for the Spring symposium in 2018.*

At the February 2021 Pistachio R&D Committee meeting Dr Ben Robinson announced his retirement from the Committee. Ben had been an independent member of the Committee for over 15 years.

Dr Robinson was recognised for his contribution by the Pistachio Growers' Association Inc by being presented with Honorary Life Membership.

Due to COVID lockdown in Victoria a formal function could not be held but will be held later in 2021.

All the best for the harvest.”

15. Collate grower issues and topics annually and present a report to the Pistachio R&D committee for consideration and utilisation by the Pistachio SIAP.

The Project Team met in February, June and September each calendar year and held discussions with the Pistachio R&D Committee and relevant Hort Innovation staff. During those meetings the most recent PIT Group session was discussed and planning of future

sessions undertaken. At these times topics raised either by individual growers or through the relevant event surveys were reviewed and taken into account as planning commenced.

The following were the dates on which the Project team met and received an update and discussed relevant topics/issues: -

- 8th June 2018
- 12th September 2018
- 4th/5th February 2019
- 6th/7th June 2019
- 10th September 2019
- 3rd February 2020
- 15th/16th June 2020 (via Zoom)
- 29th September 2020 (via Zoom)

The following topics that have been collected from these meetings have then been included into relevant research projects: -

- Trialing of Polymers to assist chill
- Male trees and pollination
- Insects, scouting and beneficials
- Pruning and the adoption of Modified Central Leader tree structure

The following topics were covered across the life of the project at one or more of the PIT group sessions.: -

- Benchmarking
- Winter pruning – theory and practical
- Web site usage
- Orchard sanitation.
- Tree training including modified central leader
- R&D reports on insects and dark stain
- Use of polymers
- Use of drones
- Tree and soil nutrition
- Pests, diseases and beneficials
- Marketing
- New orchard establishment
- Understanding Pistachio Pollination
- Managing Male Trees
- Pistachio Research 2019 update
- 2019 Pistachio harvest update
- Spray polymer chill trials at Paringa
- Quality Assurance – the importance of a property audit.
- Nutrient Management for quality production
- Managing the orchard to reduce canopy pathogen risk in Trees and Vines
- Management techniques for disease reduction in soils of Trees and Vines
- Insects – nasties and beneficials
- Dark Stain – what have we found
- Irrigation systems update
- Soil moisture management solutions
- Gross Margin Improvement with Soil Microbiology
- Water – availability and management
- Review of the 2018/19 season and outlook for 2019/20
- How to manage young trees
- Leaf symptoms and Zn deficiency in Pistachios

- Orchard Scouting methodologies and recording
- Sap analysis processes and opportunities.
- Demonstration of an overseas over-row mechanical harvester
- Overview of the 2020 season
- Pathogens and other factors contributing to Dark Stain on Pistachio Shells
- 2020 'R&D update
- Pistachio opportunities, marketing and promotions
- Sustaining energy enhancement on Victorian farms.
- Interactive open question and answer on the season, oil sprays, bare limb growth etc.
- A brief update on the 2019/20 season, harvest quality and potential price by Chris Joyce.
- A tour of the extensive MOP plantings, irrigation system, harvest equipment, pre plant trees/nursery and central leader pruning sites.
- ABA Centre of Excellence orchard trial site.

16. Where practical and appropriate video conferencing and/or webinars will be used to compliment the farm walk/symposium events.

- The 2020 Spring Symposium was conducted as a Zoom session and was held on Wednesday 30th September.
- Pistachio growers were invited to (and some did attend) to a Bird management webinar with a specific emphasis on the potential use of lasers. The session was held on the 29th of January 2021 and repeated on the 30th of January.

17. Development and delivery of a program logic and monitoring and evaluation plan with linkage to Hort Innovation and industry/fund objectives.

At the beginning of the project there was the development of a program logic framework through the

- Development of a full Project Work Plan
- Development of a project Monitoring and Evaluation plan
- Establishment of the initial 6-month KPI's.

These documents were submitted as part of milestone 102.

18. Development and delivery of a project register and how risks will be managed.

At the beginning of the project there was the development of a project Risk Register.

This document was submitted as part of milestone 102 and maintained through the life of the project and relevant risks reported on within other milestone reports.

19. Development and delivery of a stakeholder/communications plan.

At the beginning of the project there was the development of a CAI Communications and Engagement Strategy

This document was submitted as part of milestone 102

Throughout the Project Milestone reports were prepared – 102 through to 107 – submitted and approved by Hort Innovation.

Outcomes

This project had been developed to support the implementation of certain aspects of the Australian Pistachio Industry Five Strategic Plan 2015 - 2020 with a focus on achieving the following broad industry objectives: -

1. Maximise sustainable yields of high-quality pistachio nuts from Australian orchards through improved production tools.
2. Maximise returns to Australian pistachio growers by constantly improving orchard efficiencies.

While the broad objectives of the Strategic plan were all inclusive the expected outcomes from project PS17002 were: -

- Stable or improved grower's returns.
- Improve the average quality of the pistachio nuts through the supply and presentation of the individual grower 2018 harvest benchmarking reports and informing them of how to interpret their own reports/results.
- Ongoing productivity gains at the farm level through improved tree training and management.
- Understanding of potential pests and disease and the ongoing implementation of orchard sanitation.
- Better grower data to inform grower decision making through seasonal notes and benchmarking reports.
- Demonstrate a strong ROI of voluntary grower contributions to meet the expectations of the pistachio industry and government through the undertaking of grower PIT Group sessions and field days.

Through the development of the project logic framework and the associated strategies/plans PGAI continued the PIT group concept and has delivered a range of information to ALL pistachio growers through e-mail and website communication channels. In addition, the PGAI has engaged 82 growers through the specific PIT Group sessions/field days.

In assessing the outcomes in relation to the Pistachio Industry the following data gives a good indication of the growth and development of the industry over the past five years: -

- 2018 crop was a record 'on-crop' and the largest Australian Pistachio crop – 3,200 tonnes
- 2019 crop was a record 'off-crop' and larger than most of the earlier 'on-crops' – 1,800 tonnes
- 2020 crop was the second largest Australian Pistachio crop – 2,850 tonnes
- 1,165 hectares of new orchards have been planted between 2014 and 2020
- These new plantings will produce an extra 6,000 tonnes in an on-crop
- The Australian crop is predicated to be approximately 10,000 tonnes by 2030
- There are more new growers entering the industry and also becoming members of the Pistachio Growers' Association Inc.

The following graphs best present the improved profitability and sustainability of the individual growers and industry in general with reference to the

- growth of production, and
- maintenance of the return to growers over the past three years, and
- overall increase in merchantable yield

Table 1: CROP LEVELS FROM 2007 to 2020

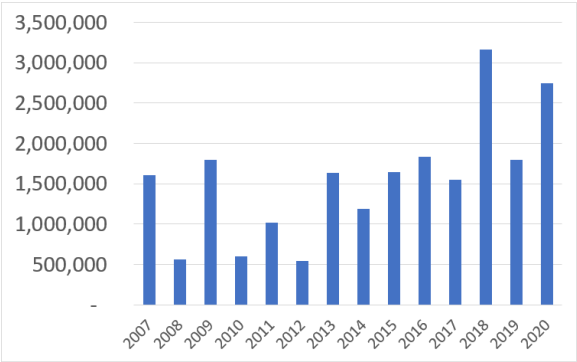


Table 2: AVERAGE GROWER RETURNS

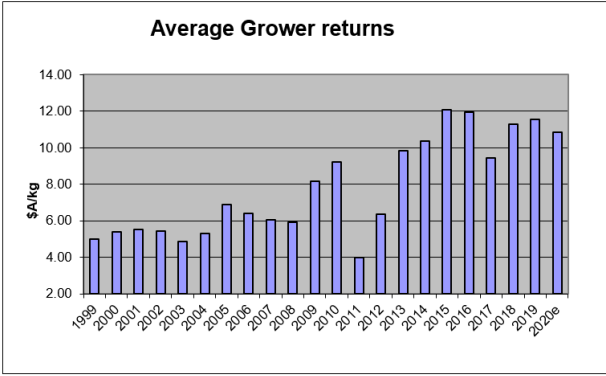
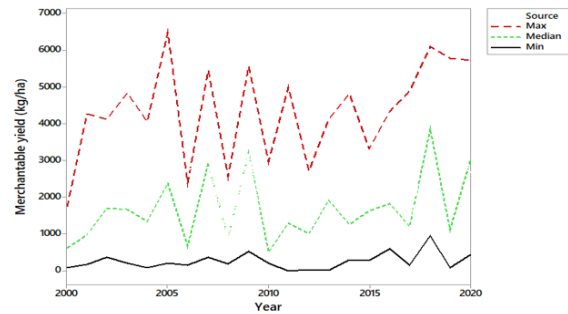


Table 3: CHANGES IN GROWER YIELDS

Best orchards – strong yields/ha
Average orchards – improving yields



This growth and development of the industry can in part be related to the information presented at the PIT Group sessions and the fact that growers have been utilising the information to improve their production.

Monitoring and evaluation

Monitoring and Evaluation was done utilising a number of methods including: -

- a) one-on-one assessments as per June 2018.
- b) survey forms (copies of which were supplied in each relevant milestone report)
- c) major exit survey conducted in January 2021
- d) review by the Project team and the Pistachio R&D Committee at each of the February, June and September meetings held in each calendar year.

The details of when surveys were undertaken are listed as follows: -

- Initial survey form developed and utilized at the June session.
- An exit survey was undertaken at the PIT Group session on the 27th of June 2018 and the results detailed within the relevant milestone report.
- An exit survey was undertaken at each of the PIT Group session in November 2018 and the results detailed within the relevant milestone report.
- An exit survey was undertaken at the PIT Group sessions in April 2019 and the results detailed within the relevant milestone report.
- A survey was undertaken for the PIT Group session in November 2019 and the results detailed within the relevant milestone report.

EVALUATION SURVEYS

Full reports on each of the surveys were detailed in each relevant milestone report but the following is a summary of each: -

JUNE 2018

(Feedback is required as an evaluation of the outputs of Project PS17002 - Technology Transfer for Pistachio growers utilising regional grower Tech Groups & events.)

Please rate the following out of 10 by circling your choice - 1 represents very poor and 10 represents excellent.

- 1) How useful was the day for you? 1 2 3 4 5 6 **7** **8** 9 10

Why? *Pruning, some information seen before*

- 2) How would you rate the quality of the program? 1 2 3 4 5 6 7 **8** **9** 10

Why? *Well run, great food, good venue*

2018 NOVEMBER 'PIT' GROUP SESSION – Paringa, SA

Q1: Did you find the length of the 'PIT' Group session?

Just right 92.9%

Too long and drawn out 7.1%

Too short to cover all topics

OVERALL RATING: 5.6 out of 7 (79.6%)

Q2: Did you find the content of the 'PIT' Group Session?

Just right 100%

Not relevant to my needs

A little too technical

Far too technical

OVERALL RATING: 5.7 out of 7 (81%)

NOVEMBER 2018 'PIT' GROUP SESSION – LAKE POWELL, VICTORIA

Q1: Did you find the length of the 'PIT' Group session?

Just right 88.9%

Too long and drawn out 11.1%

Too short to cover all topics

OVERALL RATING: 6.2 out of 7 (88.6%)

Q2: Did you find the content of the 'PIT' Group Session?

Just right 100%

Not relevant to my needs

A little too technical

Far too technical

OVERALL RATING: 6.9 out of 7 (98.6 %)

APRIL 2019 - BLANCHETOWN, SA

Q1: Did you find the length of the 'PIT' Group Session:

o Just right 100%

o Too long and drawn out

o Too short to cover all topics

Rating: 6.1 out of 7

Q2: Did you find the content of the 'PIT' Group Session:

o Just right 100%

o Not relevant to my needs

o A little too technical

o Far too technical

Rating: 6.2 out of 7

APRIL 2019 - MERBEIN, VICTORIA

Q1: Did you find the length of the 'PIT' Group Session:

o Just right 100%

o Too long and drawn out

o Too short to cover all topics

Rating: 5.72 out of 7

Q2: Did you find the content of the 'PIT' Group Session:

o Just right 100%

o Not relevant to my needs

o A little too technical

o Far too technical

Rating: 5.43 out of 7

NOVEMBER 2019 'PIT' GROUP SESSION/FIELD VISIT

Q1: Did you find the length of the 'PIT' Group Session:

- o Just right 100%
- o Too long and drawn out
- o Too short to cover all topics

Rating: 7 out of 7

Q2: Did you find the content of the 'PIT' Group Session:

- o Just right 100%
- o Not relevant to my needs
- o A little too technical
- o Far too technical

Rating: 7 out of 7

EXIT SURVEY:

An exit survey was conducted across January 2021.

A copy of the survey form and the results are attached as Appendix B to this Final Report

The following is a brief summary of the results: -

- Overall rating was 6.24 out of 7
- 95% of the survey respondents were aware of the technology transfer project for the pistachio industry.
- 90% of respondents attend a PIT group meeting outside of their region
- 90% of the respondents rated the value gained from the technology transfer project as extremely valuable or very valuable
- Have you participated in or used any of the initiatives developed through the technology transfer project that respondents participated in or used? The top three were: -
 - o Technical information - fact sheets 95%
 - o 'PIT Group' field days/meetings 90%
 - o Seasonal Notes 90%
- 81% of respondents indicated that they had made changes in their business as a direct result of participating in, or using information generated by the technology transfer project. The breakdown of areas of change resulting from the project are as follows: -

CATEGORY A: TREE STRUCTURE and PRUNING

12 responses out of 37: 32.4%

- Growing and training for new and older plantations
- Changes in pruning management.
- Different methods for managing seedlings and grafted young trees
- Pruning techniques and methods
- Modifications to the Modified Central Leader (MCL) pruning technique
- Trellising
- Tree shape and training management.

CATEGORY B: NUTRITION and FERTILISER

10 responses out of 37: 27%

- Fertiliser programs, practices and delivery
- Changes in nutrition management.
- Specific nutrient programs (Zinc and Boron)
- Nutrients on young trees
- Changed fertigation methods of young trees to avoid shoot dieback in young trees

CATEGORY C: PESTS and DISEASES

4 responses out of 37: 10.8%

- Included diagnostics, controls and management.

CATEGORY D: WATER and IRRIGATION

3 responses out of 37: 8.1%

- Water trials and irrigation efficiency and management

CATEGORY E: CHEMICAL PRACTICES and SPRAY TECHNIQUES

3 responses out of 37: 8.1%

- Chemical practices, Spray programs and delivery

CATEGORY F: HARVESTING

1 response out of 37: 2.7%

- Changes in harvesting management.

CATEGORY G: IPM

1 response out of 37: 2.7%

- Reduce impact on beneficial insects

CATEGORY H: WINTER OIL

1 response out of 37: 2.7%

- Using winter oil on young non-bearing trees.

CATEGORY I: TECHNOLOGY TRANSFER

1 response out of 37: 2.7%

- Technology transfer and research results have been incorporated into advice
- How do you prefer to learn about outcomes of the pistachio R&D program and the latest information and technology from Australia and around the world? The top three were: -
 - 'PIT' workshops and field days 86%
 - Annual Spring Symposium 81%
 - Fact sheets 81%
- 22 e-mail responses were received, from 80 growers sent the survey document, representing a 28% response. The responses 22 represent 1396 hectares of an estimated 2000 hectares (total productive/non-productive).

PROJECT TEAM EVALUATION:

The Project Team met in February, June and September each calendar year and held discussions with the Pistachio R&D Committee and relevant Hort Innovation staff. During those meetings the most recent PIT Group session was discussed and planning of future sessions undertaken. At these times topics raised either by individual growers or through the relevant event surveys were reviewed and taken into account as planning commenced.

The following are the dates on which the Project team met and received an update and discussed relevant topics/issues: -

- 8th June 2018
- 12th September 2018
- 4th/5th February 2019
- 6th/7th June 2019

- 10th September 2019
- 3rd February 2020
- 15th/16th June 2020 (via Zoom)
- 29th September 2020 (via Zoom)

CONCLUSION:

The end of project evaluation has highlighted similar or stronger results as the midterm surveys: -

- There have been behaviour changes within the orchards as a result of the information gained from the PIT Group sessions.
- There is strong support for the 'Tech Group' meetings as a way of transferring information and networking.
- Growers were aware of the project and attended group sessions outside of their specific regions.
- There were very few 'negatives' in relation to the project BUT there were also some valuable suggestions particularly in relation to more grower 'tools' including
 - Growing season climate research
 - Field days
 - Pruning on older trees.
 - More factsheets perhaps to do with development stages of the crop, any disease or insect presence that may be relevant to be on the lookout from region to region.
 - Perhaps a trip overseas
 - Expanding the benchmarking comparison graphs.
 - Exposure to different industries.
 - Could include growers from other countries.
 - More information on pollination, spraying and pruning.
 - Land valuation on each year of growth
 - Field days and days on new technology

The value of this project and the 'PIT' Group concept can best be covered by the following grower comments: -

"Excellent information being a new grower. It's a fantastic opportunity to learn from experienced growers."

"There is not a lot of information available in regard to growing pistachios, so the things I have learnt and people I have met have been invaluable to me."

"New to the industry and invaluable opportunity to meet and liaise with established growers in the industry. The information presented on establishing trees was excellent to a newer grower in the industry."

"Always receiving the most up to date information as well as networking with industry."

"Improvements to our management and profitability."

The Pistachio Growers' Association Inc is confident that the technology transfer through grower based 'PIT' Groups has been highly successful in achieving 'behavioural' change within orchard practices that have led to increased and improved production. In addition the project has been a valuable 'tool' for new entrants into the Australian Pistachio Industry.

As a result, the PGAI supports the following proposal as discussed by the Project Team, the Pistachio R&D Committee and the PGAI Executive Committee: -

“That the Pistachio Growers’ Association Inc seek to continue the program of ‘Pistachio Information Technology (‘PIT’) Groups for a further three years utilising funds from the Pistachio Collective Industry Fund.”

Recommendations

“That the Pistachio Growers’ Association Inc seek to continue the program of ‘Pistachio Information Technology (‘PIT’) Groups for a further three years utilising funds from the Pistachio Collective Industry Fund.”

Refereed scientific publications

NIL

References

No references or information sources.

Intellectual property, commercialisation and confidentiality

No project IP, project outputs, commercialisation or confidentiality issues to report.

Acknowledgements

The authors would like to acknowledge the

- Financial support by Horticulture Innovation Australia Ltd and The Pistachio Growers' Association Inc,
- Assistance of members of the Pistachio Growers' Association Inc who made available their facilities and orchards for the relevant farm walks. In particular David Crawford and his staff at CMV Farms.
- The members of the Pistachio R&D Committee including Chris Joyce, Chris Lee, Ian Mau, Andrew Hobbs, Andrew Bowring, Darin Gladigau, Dr Ben Robinson, Prue McMichael and Dr Steve Sykes for their input into the program throughout the period of the project.
- Contribution by Craig Feutrill in organising each of the events, the properties and the speakers. Also, our thanks for preparing and cooking all of the BBQ's.
- Contribution by Ben Thomas in preparing the seasonal notes.
- Contribution by Dr Subha Abeysinghe, Pistachio Researcher and Dr Jianlu Zhang, Emeritus Fellow, Pistachio Growers' Association Inc in giving regular updates on their research at each of the Symposia/Field Days/Farm Walks. Their wealth of knowledge on pistachios has been greatly appreciated by all growers.
- Contributions by Australian Pioneer Pistachio Company (APPC) and Nut Producers Australia (NPA) for their regular market reports and seasonal updates.
- Contributions by the four international presenters and the many Australian and local industry presenters who gave of their time to present on their specific fields of knowledge and services.

Appendices

APPENDIX A: A full report on December 2020 PIT Group event

APPENDIX B: Exit Survey questions and the results

APPENDIX C: Technical newsletter in October 2020

APPENDIX D: Technical newsletter in January 2021

APPENDIX E: Pre-harvest Seasonal notes, January 2021

APPENDIX F: Sample copy of the website assessments

APPENDIX A: A full report on December 2020 PIT Group event

PIT Group Session – 1st December Pinnaroo and Loxton, South Australia

Pinnaroo: Tuesday 1st of December, 12 Noon sharp

Address 1: Mallee Orchard Pistachios, 562 Conservation Road, Peebinga, SA, 5304.
72 km from the Loxton roundabout, travelling on the Browns Well Highway (B57)

Address 2: Almond Board of Australia, Centre of Excellence Trial site, 57 Anderson Road, Loxton North.

This was a PIT Group session aimed at growers of all pistachio trees, new and old.

This PIT Group session was just one meeting, held at Mallee Orchard Pistachios at Peebinga, courtesy of Ian Mau in South Australia's Mallee. Starting at noon on Tuesday 1st of December with a barbeque, the meeting then had a general session of introductions and question and answers followed by a tour of the MOP property. The assembly then made their way, 75km back to Loxton for a session with Anthony Wachtel, Josh Fielke and Mark Skewes at the Almond Board of Australia's Centre of Excellence trial site just out of Loxton.

PROGRAM:

The program commenced at 12:30 pm on Tuesday 1st of December.

The program for the Tuesday afternoon included: -

- a) Introductions
- b) Interactive open question and answer on the season, oil sprays, bare limb growth etc.
- c) A brief update on the 2019/20 season, harvest quality and potential price by Chris Joyce.
- d) A tour of the extensive MOP plantings, irrigation system, harvest equipment, pre-plant trees/nursery and central leader pruning sites.
- e) Drive back to Loxton for a 5.15pm meeting at the ABA Centre of Excellence orchard trial site.

The December 2020 PIT Group grower's session at Mallee Orchard Pistachios (MOP) at Peebinga on the 1st of December 2020 was a great success with 35 attending despite the long drive out to the orchard and the gale force winds. Covid-19 protocols were followed with an attendance form filled in and hand sanitiser made available as well as social distancing adhered to.

Being possibly the final PIT Group Meeting for the current project, and at reasonably short notice due to the changing Covid-19 restrictions, it was very pleasing to see 35 pistachio industry people attend the most isolated session we have had at Mallee Orchard Pistachios.

The afternoon began with the customary barbeque. Trevor Ranford led the introductions as we had a few people who had obtained permits to cross the SA frontier to travel the wilds of South Australia to Peebinga. Following introductions Trevor led a general question and answer session where all growers interacted regarding the 2019/20 growing season and harvest, oil sprays and any successes or problems in their orchards. Lively discussion and information sharing continued for over an hour with Chris Joyce providing an update on the quality/potential prices for the 2020 harvested crop.

For the following hour Ian Mau and Tony Green led an extensive tour of the MOP orchards showing the disparate plantings, irrigation system, harvest equipment and modifications required for successful operation on the very sandy soils, nursery trees and central leader pruning sites. As always, the attending growers were keen to gain knowledge from not only Ian and Tony but the other industry leaders such as Andrew Bowring, among others.

A 75 km drive back to the Almond Board of Australia (ABA) Centre of Excellence orchard at Loxton North saw the second major session of the day start at 5.15pm. ABA Orchard manager Anthony Wachtel and SARDI researchers Josh Fielke and Mark Skewes. Anthony, Josh and Mark led the growers through a number of large trial sites looking at varietal, rootstock and density plantings in search of answers for the Australian almond industry.

7pm saw about 25 growers assemble at the Loxton Hotel for a Covid-19 careful dinner.

APPENDIX B: Exit Survey questions and the results

PISTACHIO GROWERS' ASSOCIATION INC.

2021 'PIT' GROUP PROJECT SURVEY SUMMARY

The 2nd three-year Pistachio Industry Development project, *'Technology Transfer for Pistachio growers utilising regional grower Tech Groups & events'*, has been delivered by the Pistachio Growers' of Australia Inc (PGAI) over the period from January 2018 to January 2021.

The project leader was Trevor Ranford and the program of activities was implemented and managed by Craig Feutrill.

The aim of the project was to contribute to developing the industry to a world class standard through informing growers of the latest research and technology in Australia and around the world.

The project focused on:

1. Encouraging networking amongst growers and industry stakeholders.
2. Informing growers of what is happening in Australia and internationally by presenting information on research outcomes and technology.

Deliverables for the project include:

1. Maintain, and where possible expand, the Pistachio 'Tech Groups' within the regional areas of the Riverland, Sunraysia and Swan Hill.
2. Conduct at least four field days/farm walks annually, at relevant times of the production cycle, to further improve the interaction between industry members of these regional 'Tech Groups'.
3. Utilise Australian and/or International Pistachio experts/technicians at field days/farm walks to give presentations on topical industry R&D matters.
4. Compilation of technical information from overseas and Australia and presentation of the material in a range of formats that can be utilised by Pistachio growers.
5. Garner industry R&D concepts for submission to the Hort Innovation investment pipeline.
6. Increase grower usage of the website through the addition of new information and timely updates.

YOUR RESPONSE IS IMPORTANT TO ASSIST IN THE EVALUATION OF THE PROJECT AND PROGRAM AND WILL ASSIST IN DESIGNING ANY FUTURE PROJECTS.

1. In which state are you based? (Percentage of respondents)

- NSW 19%
- ACT
- NT
- Queensland
- SA 43%
- Tasmania
- Victoria 38%
- WA

Please specify the particular region e.g., Swan Hill, Riverland, etc

- Swan Hill
- Griffith,
- Riverina
- Kyalite
- Riverland
- Hay
- Robinvale
- Mallee
- Sunraysia

2. What role do you play in the pistachio industry?

- Grower 86%
- Grower/Packer 9.5%
- Rural Supplier
- Consultant/Agronomist 4.5%
- Researcher
- Other

3. Were you aware of the technology transfer project for the pistachio industry?

- YES 95%
- NO 5% (Response from a relatively new grower)

4. Have you participated in or used any of the initiatives developed through the technology transfer project? (Percentage response from participants.)

- Technical information - fact sheets 95%
- 'PIT Group' field days/meetings 90%
- Seasonal Notes 90%
- 'PI news' – e-newsletter 86%
- Annual Spring Symposium – September each year 86%
- Networking with growers and other industry stakeholders at field/days 86%
- Technical information – website 71%
- 'PIT Group' Video presentations on the website 67%
- Networking with international guests at field days/meetings 62%
- 'PIT Group' Power Point presentations on the website 57%
- I have not participated in or used any of the project initiatives 0%

5. Did you attend a PIT group meeting outside of your region?

- YES: 90%
- NO: 10%

If Yes, please specify which region

- Sunraysia
- Riverland
- Pinnaroo
- Mildura
- Robinvale
- Tooleybuc
- Swan Reach
- Kyalite
- Peebinga

6. Please rate the value you have gained from the technology transfer project

- Extremely valuable 62%
- Very valuable 28%
- Some value 5%
- Little value
- No value
- Not applicable 5% (Response from a very new grower)

7. Please provide comment on why you rated the value of the technology transfer project as you did

- Many different questions and topics arise when growers gather in a casual setting
- Direct communication from researchers and technology providers for the industry.
- Allows interaction between growers from different regions as well.
- Very informative for a new grower as myself.

- Exchange information from other growers
- There is not a lot of information available in regard to growing pistachios, so the things I have learnt and people I have met have been invaluable to me.
- New to the group
- Information is highly valued because it is unbiased
- New to growing pistachios
- New to the industry and invaluable opportunity to meet and liaise with established growers in the industry. The information presented on establishing trees was excellent to a newer grower in the industry.
- Always receiving the most up to date information as well as networking with industry
- Improvements to our management and profitability
- These are great way to get more knowledge on growing Pistachios.
- Great way to see what other growers are doing.
- Good mix of topics and current research projects.
- As a new grower new information and resources are valuable for us in making decisions
- Excellent information being a new grower. It's a fantastic opportunity to learn from experienced growers
- Learning an information.
- Huge help with pruning techniques
- Pruning techniques

8. Have you made any changes in your business as a direct result of participating in, or using information generated by the technology transfer project?

YES 81%

NO 19% (Response from very new growers)

9. If 'yes', please describe the change(s) you have made

- Limited use of mancozeb fungicide where possible to reduce impact on beneficial insects
- Chemical and Fertiliser practices
- Growing and training for new plantations
- Changed fertigation methods of young trees to avoid shoot dieback in young trees
- Changes in pruning, nutrition, harvesting and pest and disease management.
- Different methods for managing seedlings and grafted young trees
- Irrigation efficiency
- Fertiliser utilisation
- Disease control
- Better fertiliser input
- Pest and disease management
- Tree training and irrigation management.
- Expanded on and made small modifications to the Modified Central Leader (MCL) pruning technique.
- Started using winter oil on young non-bearing trees.
- Spray program, Fertilizer program, Pruning, disease level diagnostics
- Water trials
- Zinc trials
- Boron trials
- Pruning trials
- Technology transfer and research results have been incorporated into consulting advice
- Trellising and pruning methods
- Nutrients on young trees
- Different growing methods/tree shaping
- Pruning techniques
- Spraying and fertiliser delivery
- Pruning

10. What aspects of the technology transfer project have you found to be the most valuable?

- Field walks/casual discussion
- Opportunity to meet with researchers
- Pruning and training
- constant reinforcement of best cultural practices
- Tree structure.
- Not applicable – just joined Association
- PIT meetings
- Tech Sheets
- Guest presenters
- All of it most valuable
- E-newsletter has been valuable with links etc during times of limited travel.
- Site visits
- Keeping up with new developments and refreshing the basics
- All
- Field days and symposium
- Pruning methods
- Nutrients for young trees
- Experience from other growers whom have been in the industry for some time
- Field days
- Networking amongst growers
- Utilising website
- Grower contact

11. What aspects of the technology transfer project have you found to be the least valuable?

- None, it has all been very useful
- Hearing some of the same stuff many times
- All valuable to me.
- Not applicable – just joined Association
- Uncertain
- Nil. All valuable
- Hard to say anything isn't valuable
- I find that I get knowledge from all projects.
- Website
- To be honest, I haven't spent much time on the industry website nor networked with any international researchers at this point in time. (New grower)
- Seasonal Notes, starting to become repetitive, but would be good for all newcomers to the industry.
- Technical information on the website.
- None, the more you can learn and take in the better being a new grower
- None
- Technical information on the website

12. To improve the technology transfer project in the future what would you like to see included or changed?

- PIT meetings to start earlier in the day.
- Group viewing/discussion of 2020 Pistachio Short Course sessions
- It has been good and greatly appreciate the information I have been given. It all has been used extensively
- More or less maintain the current schedule of 2 to 4 meetings a year
- Pruning methods.
- Not applicable – just joined Association
- More growing season climate research
- Field days

- Pruning on older trees.
- More factsheets perhaps to do with development stages of the crop, any disease or insect presence that may be relevant to be on the lookout from region to region. At the moment there is not a fulltime qualified agronomist in the area, specific to Pistachios so we are using knowledge of other crop in the region for disease identification and protection in Pistachios.
- Perhaps a trip overseas when we can travel again, our industry is very small and a trip to the larger playing countries will give better insight into how to increase production and quality.
- The benchmarking comparison graphs are very helpful. Would it be possible to expand the benchmarking further to include all the fields that relate to increasing crops and profitability? Perhaps there could be a per Ha calculator for different inputs that growers could fill out (including costs) and a postharvest totalizer showing the dollar value of the inputs/Ha compared to the return/Ha?
- I can't think of anything now.
- More exposure to different industries. Some problems issues being faced by other horticultural industries may have value for pistachio.
- Could include growers from other countries, currently what is in place works very well
- More information on pollination
- Land valuation on each year of growth
- More field days and days on new technology
- More advice on spraying and pruning

13. How would you prefer to learn about outcomes of the pistachio R&D program and the latest information and technology from Australia and around the world?

- | | |
|--|-----|
| • 'PIT' workshops and field days | 86% |
| • Annual Spring Symposium | 81% |
| • Fact sheets | 81% |
| • Website | 62% |
| • You Tube videos | 62% |
| • Pistachio researchers | 62% |
| • Other growers | 57% |
| • Webinars through Zoom or other platforms | 38% |
| • Private consultants | 33% |
| • Rural suppliers | 24% |
| • Social media | 24% |

14. Are there any other comments you would like to make about the technology transfer project or industry development initiatives in the pistachio industry?

- Generally, it is a fantastic program that should continue.
- Keep up the great work
- Good project, keep it going
- It is extremely valuable as there is not a lot of research which has been done on pistachios in Australia and there are many discoveries and techniques which need to be explored.
- No
- Like it to continue
- More information correlated into a user-friendly practical use format
- Apart from the above comment, potentially develop a short advisory type of course of summarise the University of Davis short production course from advisors in the industry.
- Perhaps PGAI could look at the feasibility and viability of getting a grant to develop and run a PGAI App, that concentrates the strengths of the existing initiatives into the constant accessibility smartphone/tablet. Just a thought.
- No
- No

15. What topic(s) would you like to be covered as part of a new project?

- Fertiliser programs for young trees
- Fertiliser and Irrigation, it most likely exists already but if not knowing timing of these 2 activities during the growing season.
- Pruning, tree structure, harvesting, disease and pest management, nutrition, irrigation, de-suckering.
- Losses due to bird strikes – Solutions please
- Fertiliser and water requirements through growing season
- Pruning on older trees and water management
- A regular tree frame development and management segment, to take growers from in initial planting /budding, to maintaining maximised cropping
- All topics that will make me a better Pistachio grower.
- New rootstocks and varieties.
- Focus for me personally on crop nutrients and elements for yield
- Also processing sale of the pistachio and marketing
- Pest and disease, tree shaping, grafting and young tree establishment.
- Pollination
- Property valuation from year to year of growth
- How much does it cost to process and package per kilo of nuts?
- Different spray technologies
- Pruning

16. How would you rate the quality of the 3-year program? (1 being the low rating and 7 being the highest rating)

1	
2	
3	
4	5%
5	14%
6	33%
7	48%

Overall rating was 6.24 out of 7

What was the reason for your rating?

- Everyone seemed to benefit from the program, including new growers
- Informative and reliable
- Very good program.
- I never give 7/7 to anything.
- Extremely informative and valuable networking.
- Any research is a good thing
- The overall value to our farm
- I think the program is very good and only needs small improvements
- Talking to other growers
- Only relatively new to the industry so the content has been great to date.
- Being a newcomer myself i found that the information was available and clear.
- Great information and encouragement for growers and great meeting management
- Great way to learn about Pistachio
- Good speakers and engagement from growers.
- As a new grower to the industry very informative and value of the last three years to me information wise was excellent.
- It's a very open industry and the leaders of the industry are helpful to those starting out.
- I found them to be extremely valuable and I feel like I am becoming a better grower because of the program.
- New information

17. How long have you been growing pistachios?

- A new entrant that has not yet planted trees
- 1 to 2 years with newly planted trees 13%
- 5 years 42%
- 10 years 13%
- 15 years 4.5%
- 20 years 4.5%
- Over 20 years: 23%

18. How many hectares of

- a) Non-productive trees: Response ranged from zero trees to 135 hectares represented a total of 578 hectares
- b) Productive Trees: Responses from zero hectares to 230 hectares and represented a total of 818 hectares.

The responses represent 1396 hectares of an estimated 2000 hectares (total productive/non-productive)

APPENDIX C: Technical newsletter in October 2020

A PDF file is attached to the Final Report

APPENDIX D: Technical newsletter in January 2021

A PDF file is attached to the Final Report

APPENDIX E: Pre-harvest Seasonal notes, January 2021

A PDF file is attached to the Final Report

APPENDIX F: Sample copy of the website assessments

A PDF file is attached to the Final Report