Pistachio Information & Technology Groups

27th & 28th July 2022

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PGAI

Pistachio Growers' Association

Hort Innovation Strategic levy investment | PISTACHIO FUND

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TOPICS

- **Research update**
  - Oil-polymer trial
    - Oil vs unoiled trees
- **Benchmarking**
  - why ?
    - What it means?
      - How to read?
        - 2022 results
- **Research plan for 2022-23**
  - Updating grower details for benchmarking
    - Polymer trial
      - Tinytag – locations : data collection & interpretation

Evaluating pistachio tree response to oil and polymer application in chill deprived Riverland, SA (2021-22)

Date	Chill	
	Hours < 7°C	Dynamic Units
15th Aug 2021	590	50
31st Aug 2021	678	56

Treatments		No. of trees				Date of application	
		Female	Male	Total	To cover	Polymer	Oil
T1	Polymer ONLY	3	1	4	4	25/08/2021	NON
T2	Polymer followed by Oil	3	1	4		25/08/2021	31/08/2021
T3	Oil ONLY	3	1	4		NON	31/08/2021
T4	Oil followed by Polymer	3	1	4		7/09/2021	31/08/2021
T5	Control (NO polymer NO oil)	3	1	4	4	NON	NON
	Total	**15**	**5**	**20**	**8**		

Materials & Method

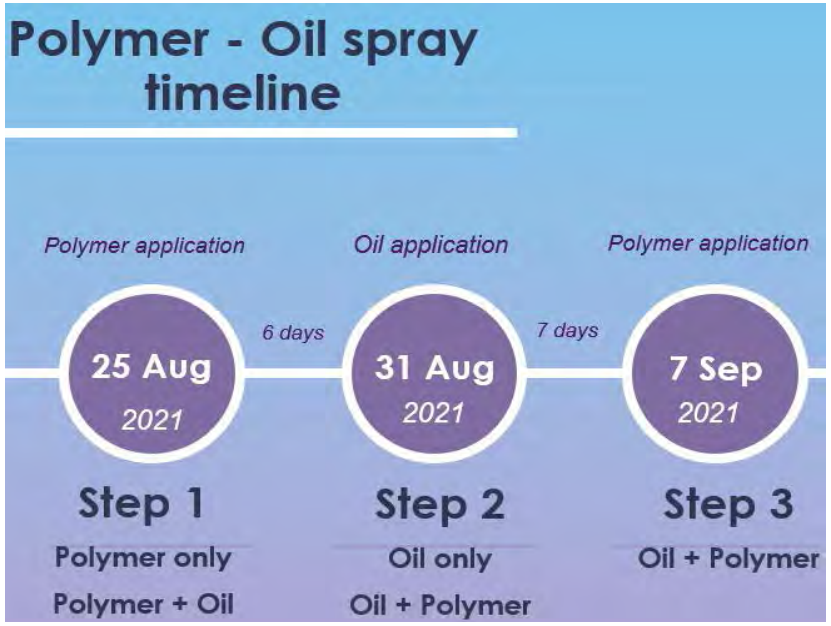
Location ***: Richard Issacson's Orchard, Waikerie (34.18^{O}S, 139.96^{O}E)***

Variety & age : Eight-year-old Sirora on PG1 rootstock (7 x 5m)

Polymer : 0.5% (5L/1000L water)@ 1500 L/ha & 3.2KPH

Oil : 6% (60L/1000L water)@2100 L/ha & 3.2KPH

Treatment execution



Phenological response : Bud Burst

First sign of movement

18th Sep 2021

Polymer ONLY & Control

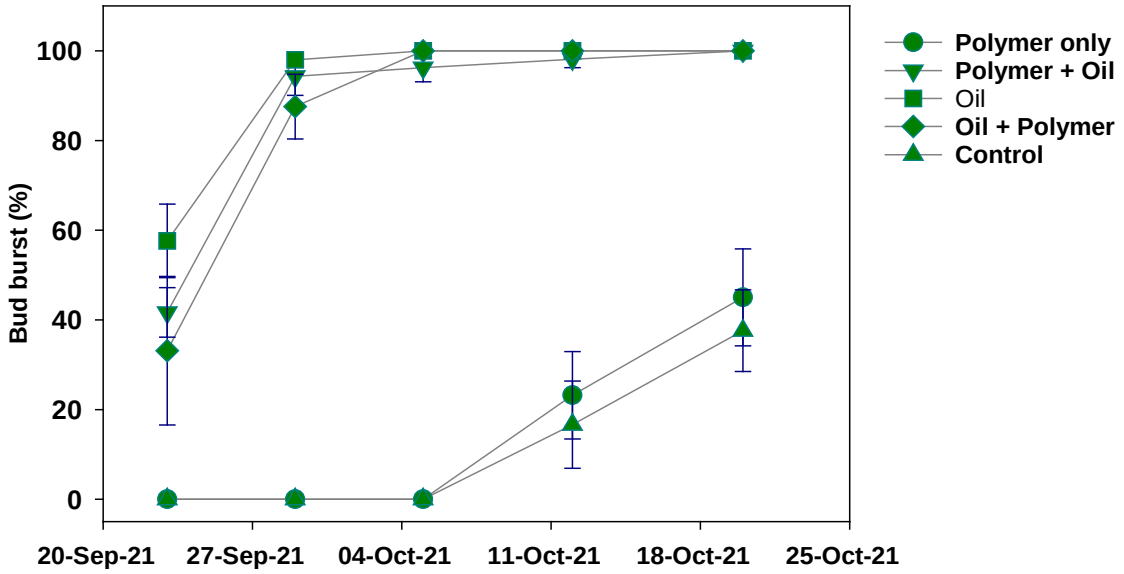
Delayed by 22 days

As on 23/09/2021

Observations

- Polymer – Delay
- Oil - Earliest & Narrow window (9 days)
- Polymer + Oil & Oil + Polymer – Treatments similar
- Control – Delay

Phenological response : Bud burst



Bud burst	P-value				
	23rd Sep21	29th Sep21	5th Oct21	12th Oct21	20th Oct21
Treatment	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Phenological response : Flowering

First sign of Flowering

29th Sep 2021

(oil & oil +Polymer)

Observation

Polymer + Oil / Oil / Oil + Polymer

Early & narrow window

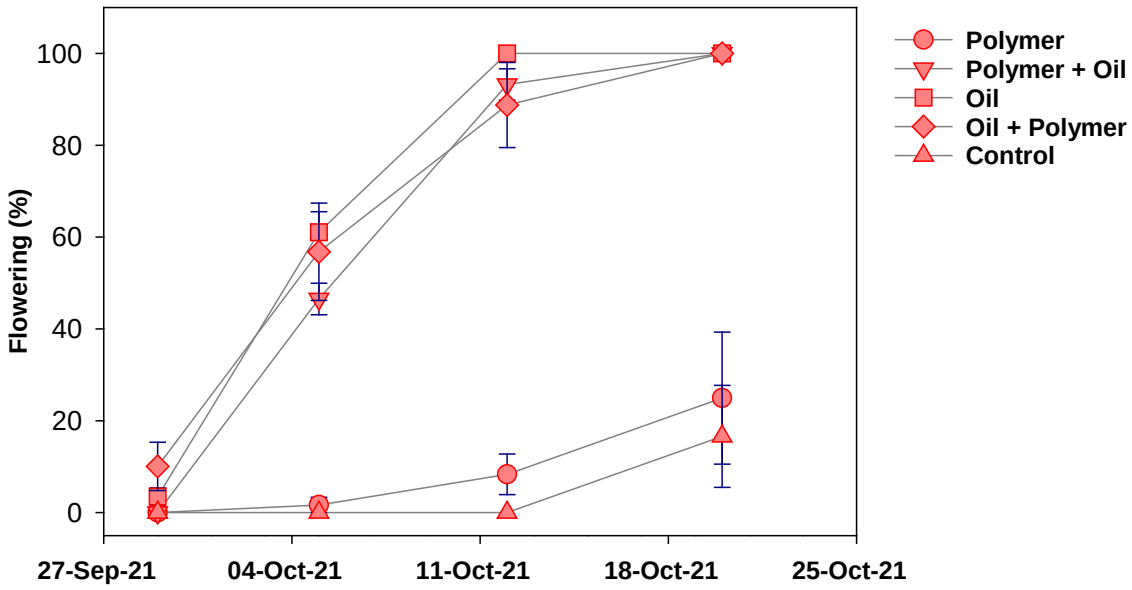
Days to 100% flowering : 10

Polymer only & Control

Delayed : 15-20 days

Never reached 100% flowering

Phenological response : Flowering



Flowering	P-Value			
	29th Sep 21	5th Oct21	12th Oct21	20th Oct21
Treatment	0.0160	<0.0001	<0.0001	<0.0001

As of 20th October 2021


Oil sprayed female


Polymer only female


Polymer only male


Oil sprayed male


Control female


Control male

As of 10th November 2021


Oil sprayed female


Polymer only female


Polymer only male


Oil sprayed male


Control female


Control male

HARVEST

Tagged shoots

- **Harvested separately : Direction – Canopy levels**
- **Records: Bund - Nut count - weight**

Tagged trees

- **Harvested separately- bagged–labelled–transported-weighed-quality assessed in APPC**

Date of harvest

Polymer + Oil / Oil / Oil + Polymer

- **1st Shake : 08/03/2022**
- **2nd shake : 30/03/2022**

Polymer only & Control : **30/03/2022**

- **One shake & delayed by 22 days**

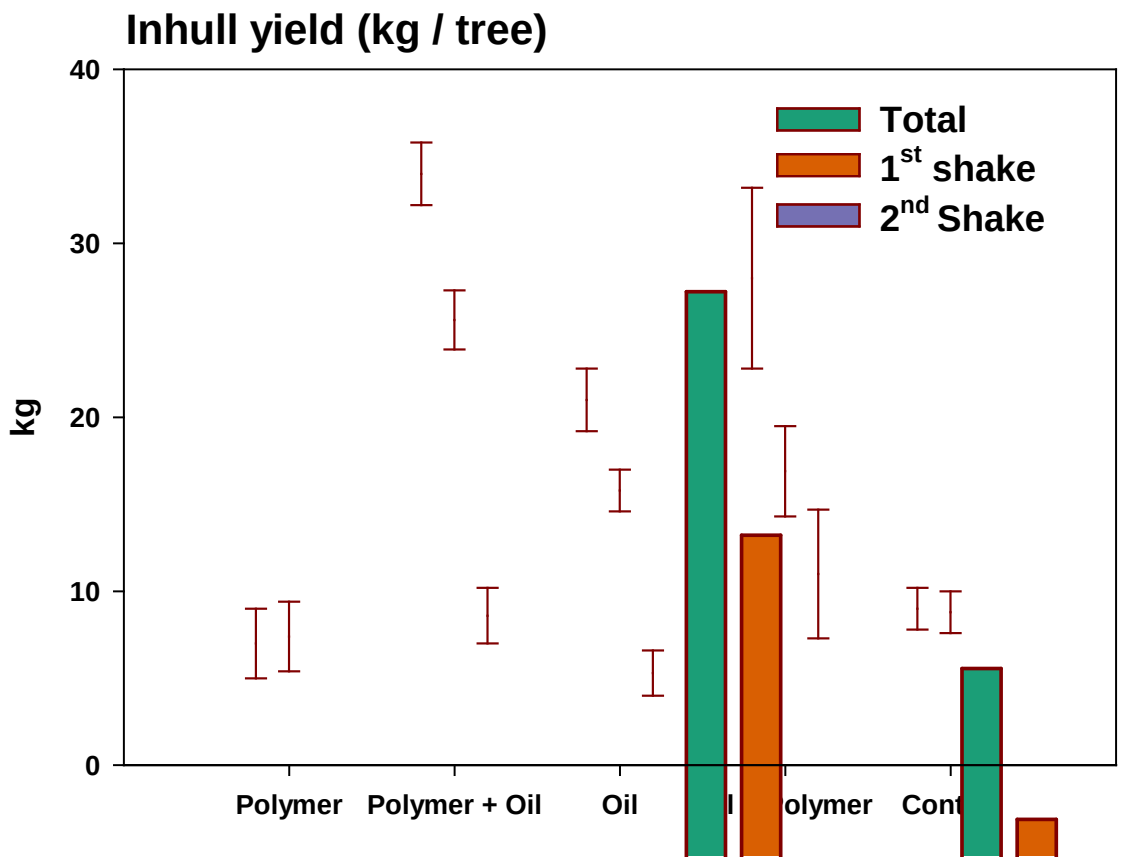
Results….

Directions & Canopy levels

Yield and yield components			
P- Values	No. of nuts/shoot	No. of bunches/shoot	Inhull yld (kg)
Treatment	0.0142	<0.0001	<0.0001
Directions	NS	NS	NS
Levels	NS	NS	<NA>

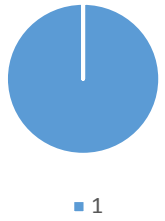
P values	<0.0001
	<0.01
	<0.05

Yield



Inhull yield kg/tree			
	Total	1st Shake	2nd shake
Polymer	7 c	7 c	
Polymer + Oil	34 a	26 a	9
Oil	21 b	16 b	5
Oil + Polymer	28 a	17 b	11
Control	9 c	9 c	
P-Values	0.0002	0.0002	NS

Polymer & Control

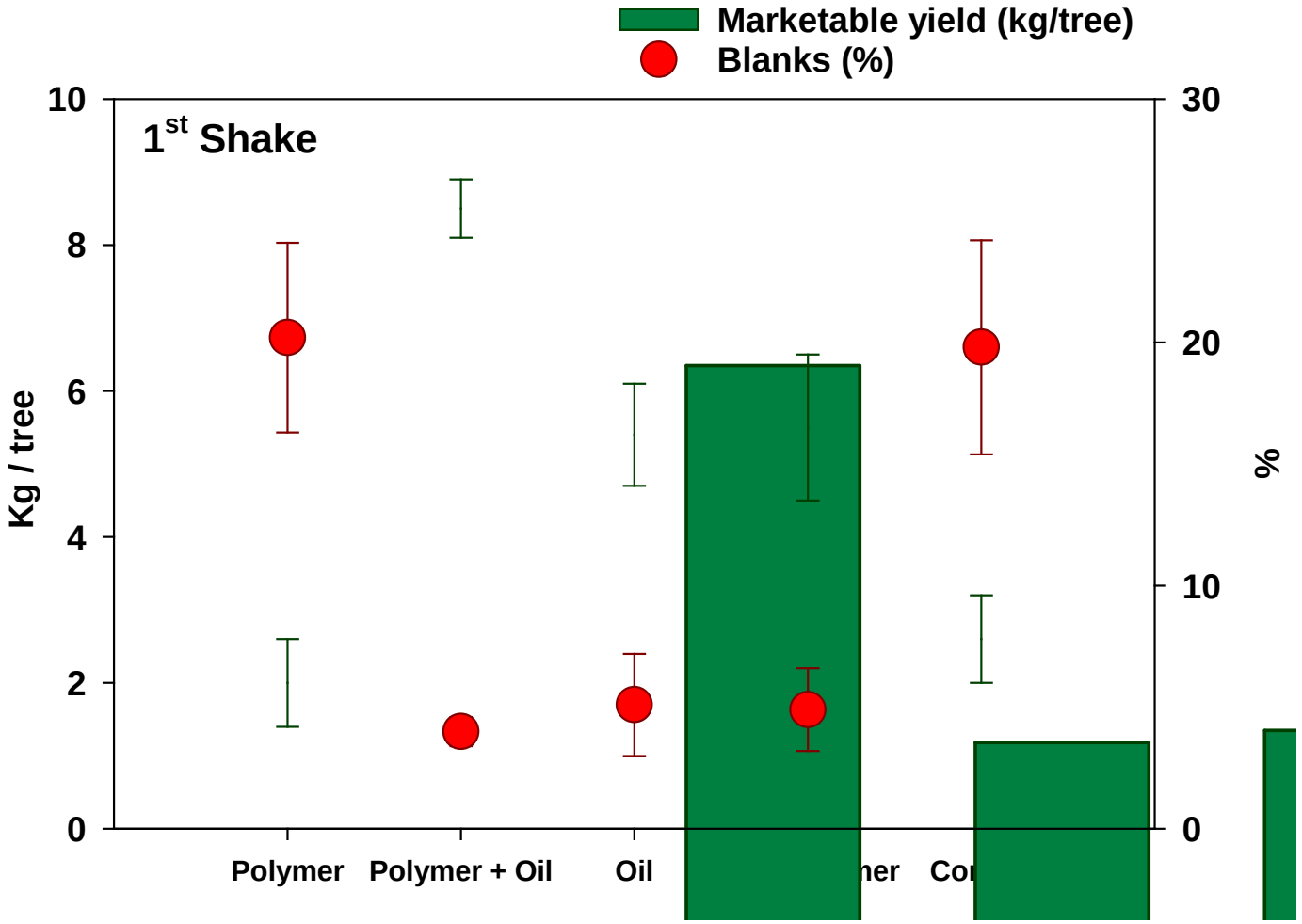


Polymer + Oil & Oil only

Oil + Polymer

Marketable yield & Blanks

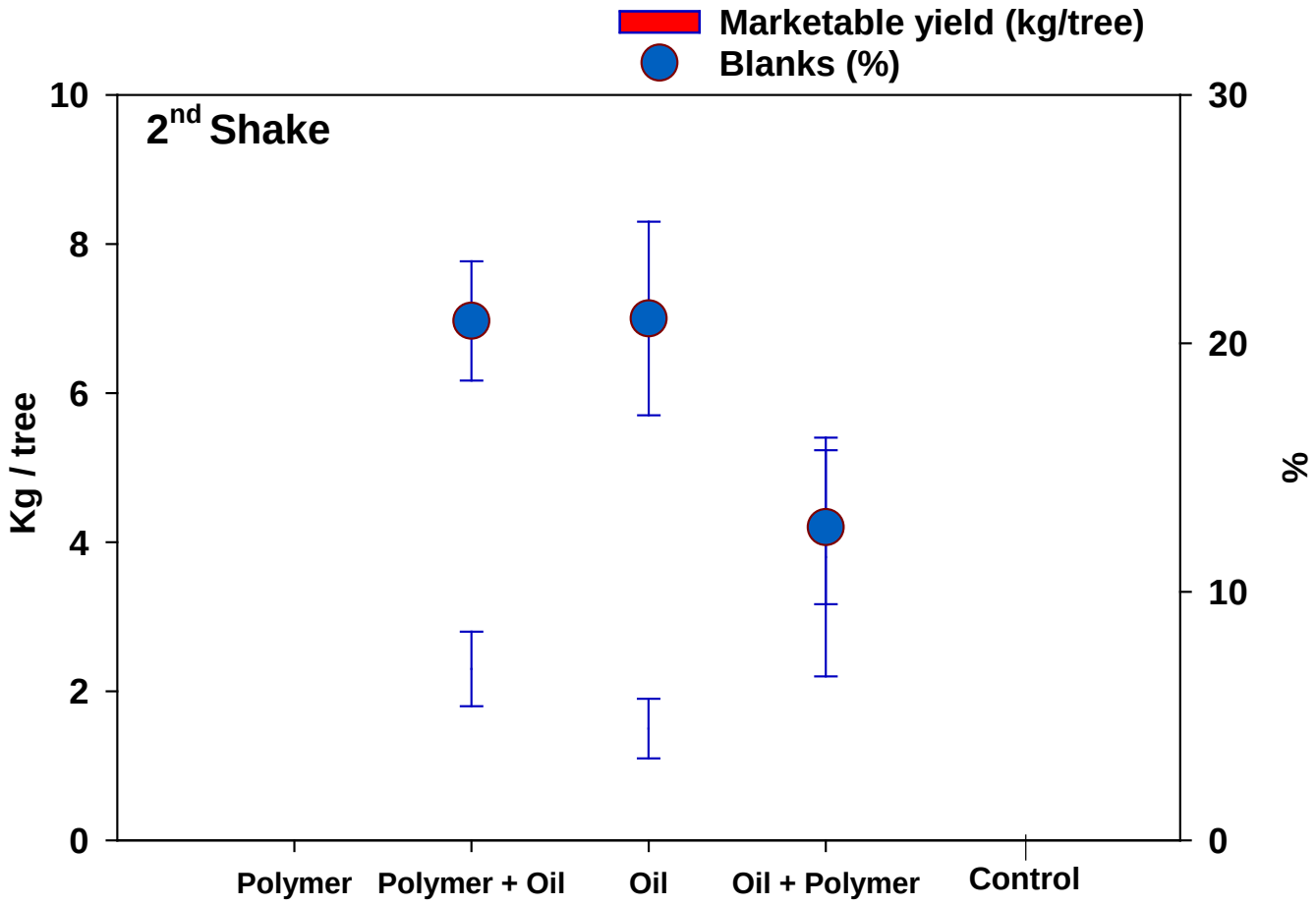
1st Shake



1st Shake	Blanks (%)	Marketable yield (kg/tree)
Polymer	20 b	2 c
Polymer + Oil	4 a	9 a
Oil	5 a	5 b
Oil + Polymer	5 a	6 b
Control	20 b	3 c
P-Values	0.0028	0.0004

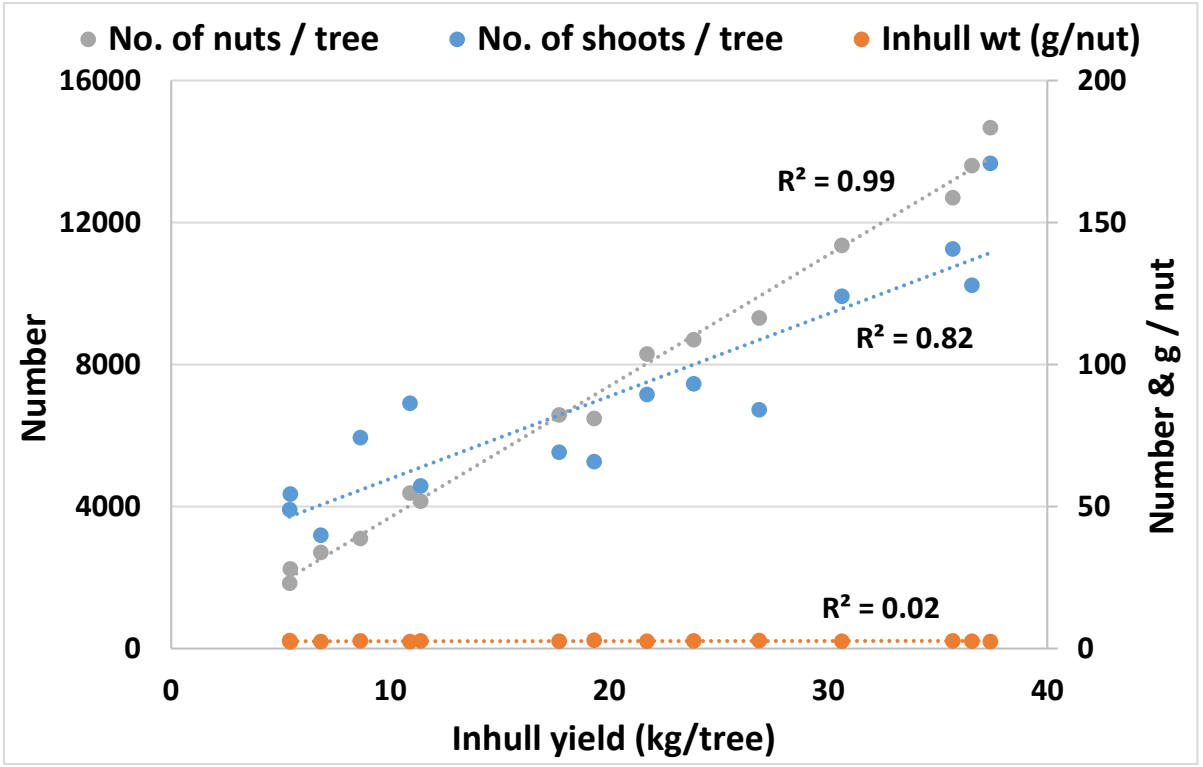
Marketable yield & Blanks

2nd shake



2nd Shake	Blanks (%)	Marketable yield (kg/tree)
Polymer		
Polymer + Oil	21	2
Oil	21	2
Oil + Polymer	13	4
Control		
P-Values	NS	NS

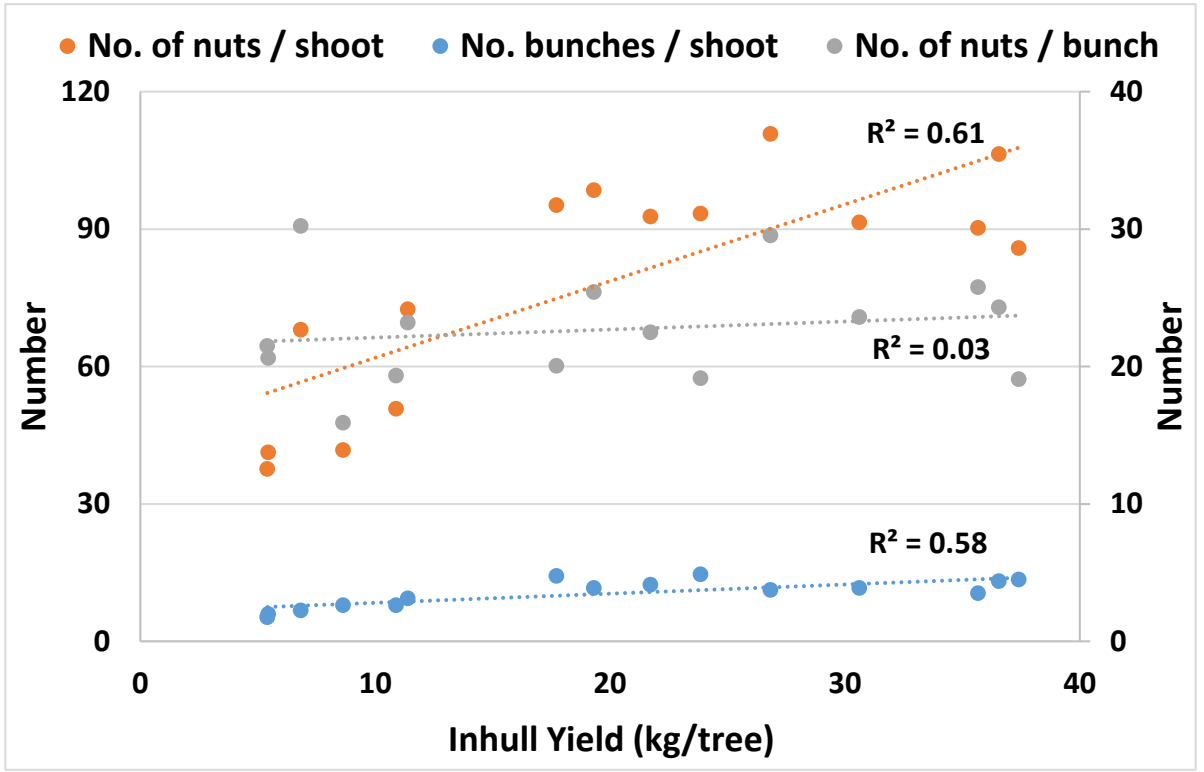
Yield contributing traits



*** P < 0.0001

*** P < 0.0001

NS

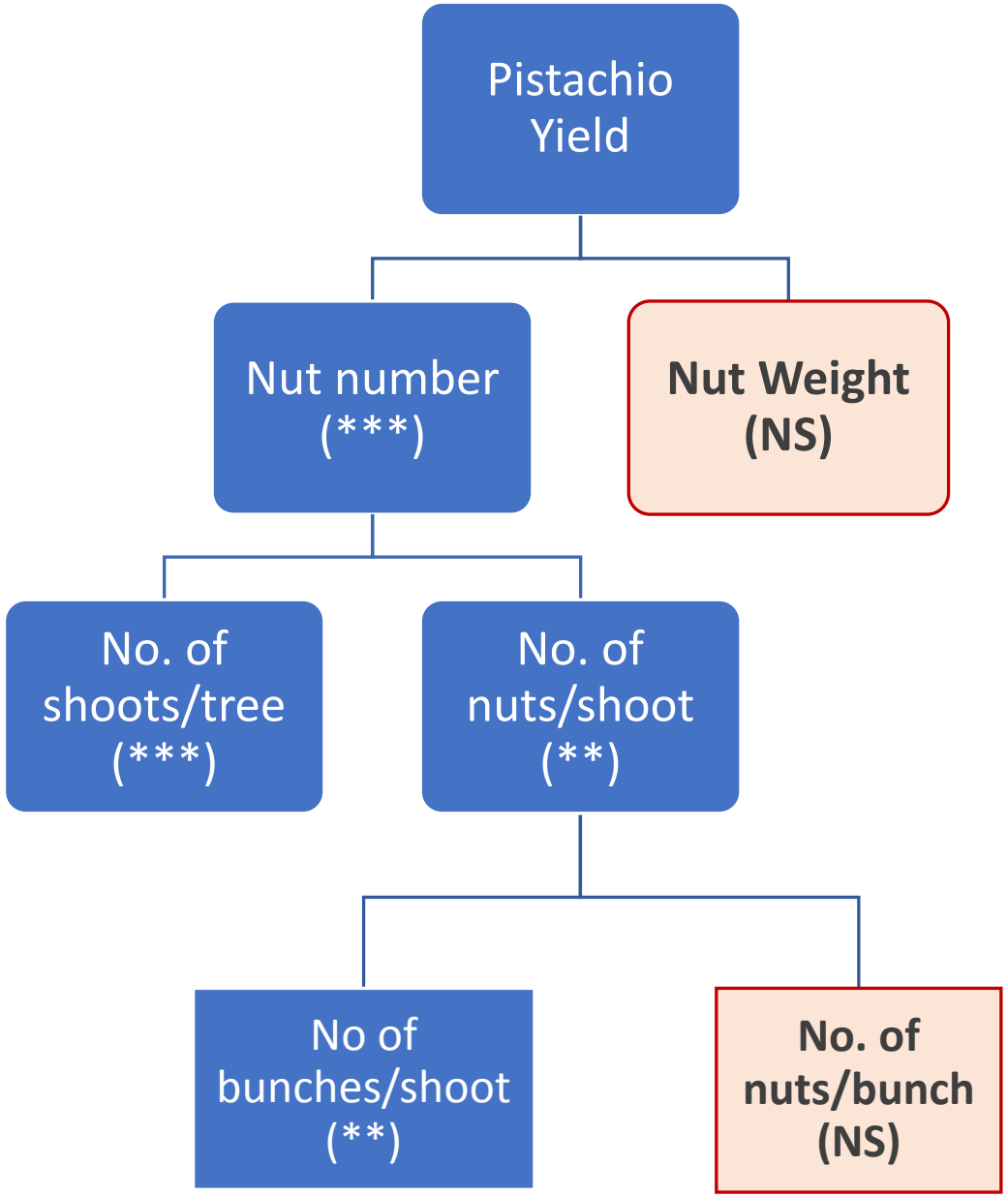


** P < 0.01

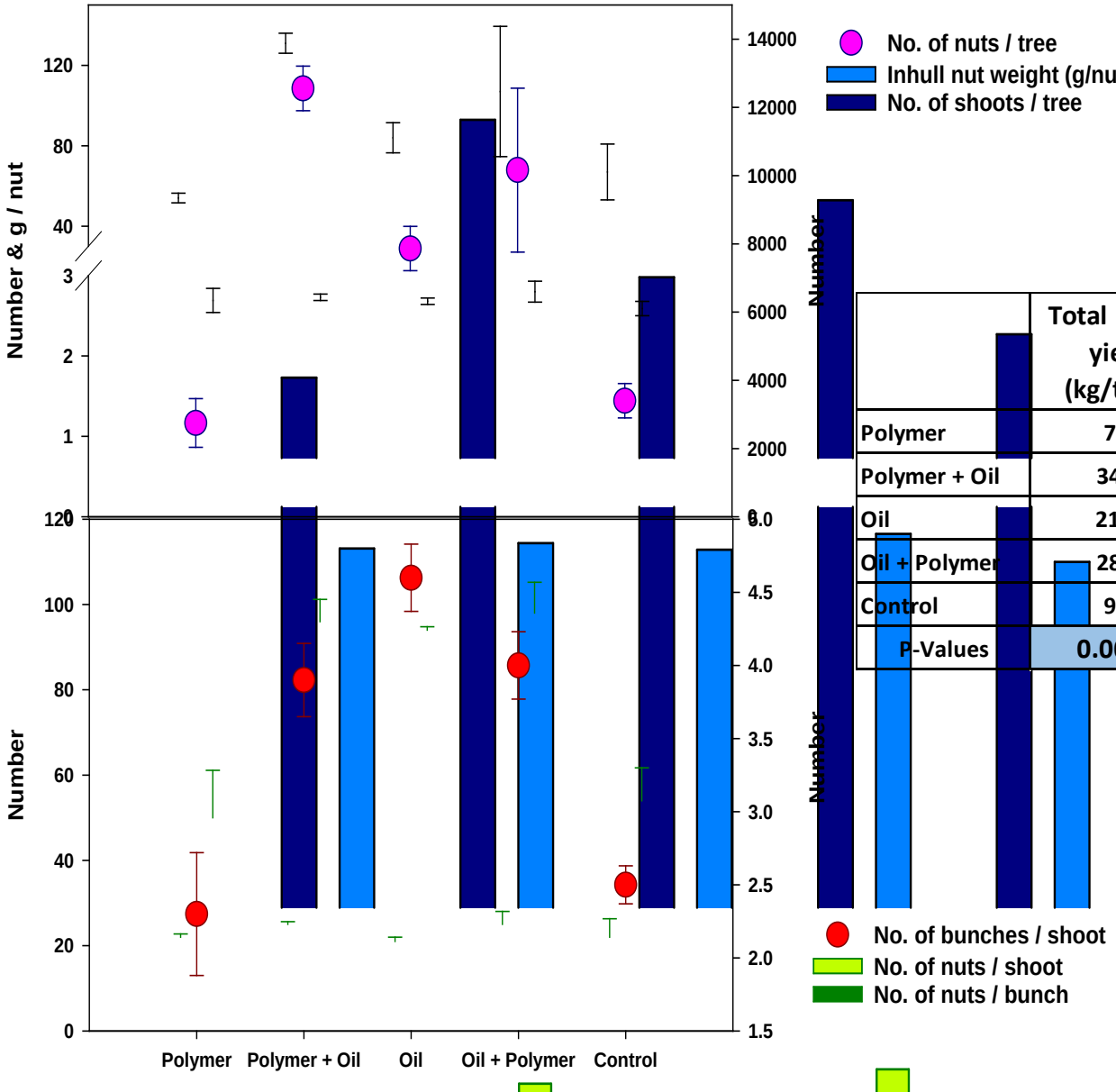
** P < 0.01

NS

Yield as flow chart

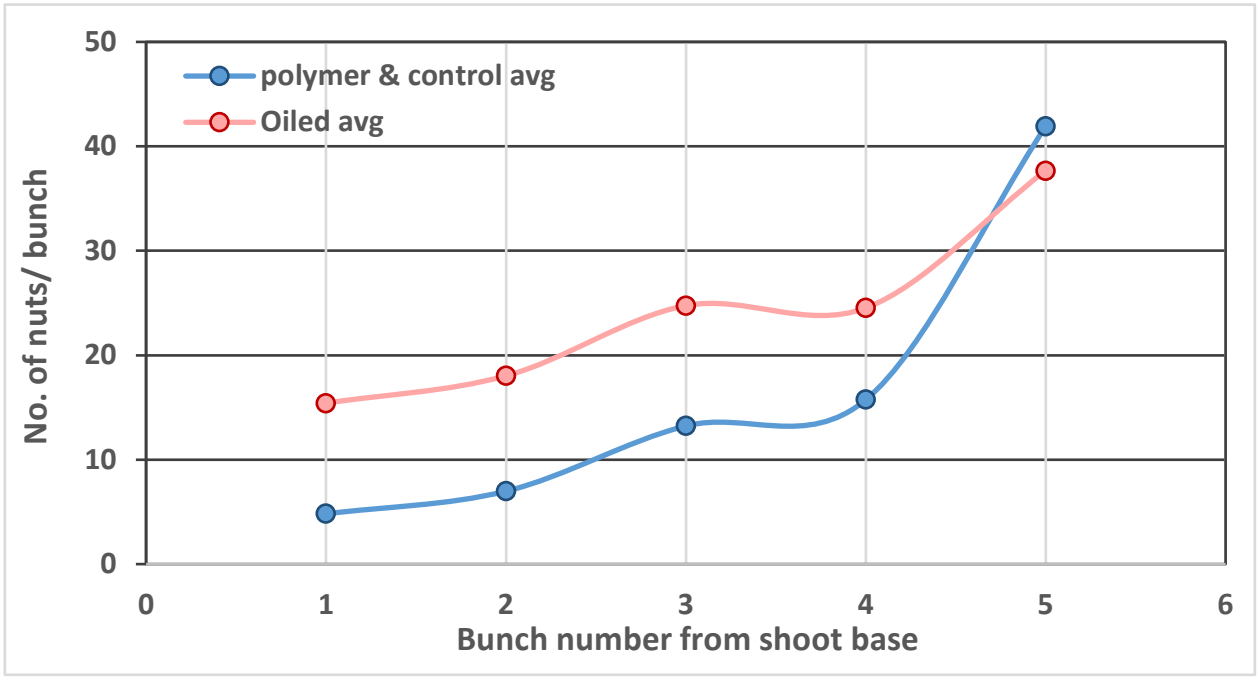


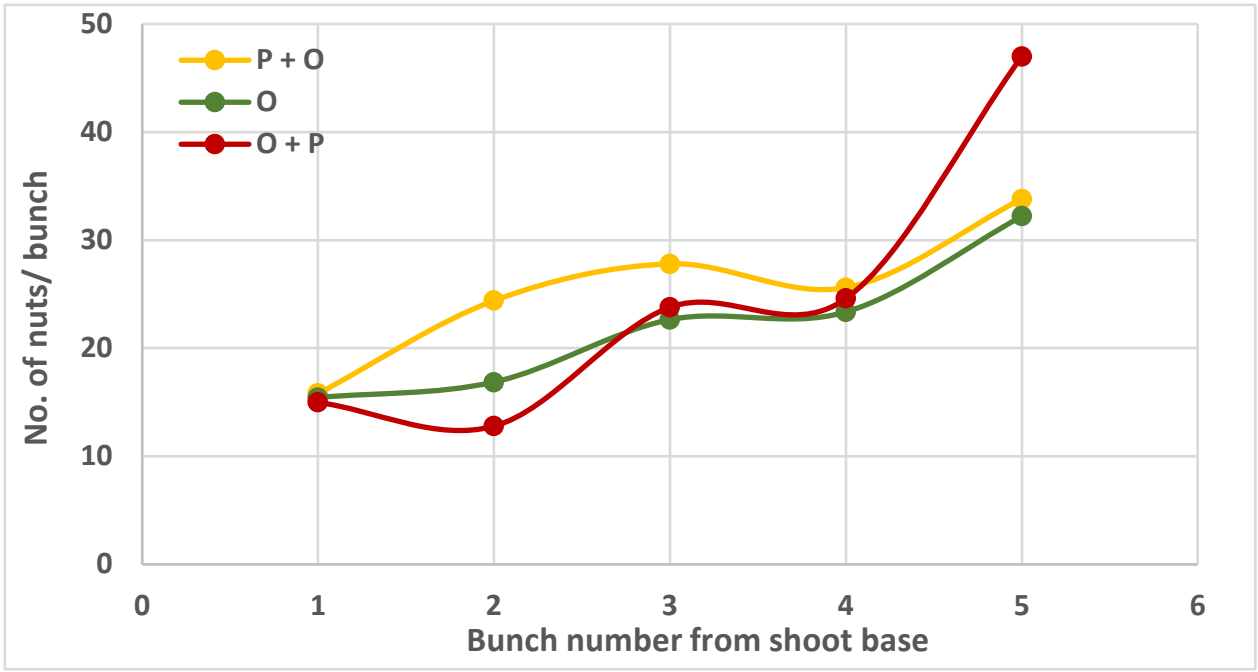
Effect of treatments on yield components



	Total inhull yield (kg/tree)	No. of nuts / tree	Inhull nut wt (g/nut)	No. of shoots / tree	No. of nuts / shoot	No. of bunches / shoot	No. of nuts / bunch
Polymer	7 c	2751 c	3	54 c	50 b	2 b	22
Polymer + Oil	34 a	12557 a	3	131 a	96 a	4 a	25
Oil	21 b	7864 b	3	84 abc	94 a	5 a	21
Oil + Polymer	28 a	10162 ab	3	107 ab	98 a	4 a	25
Control	9 c	3402 c	3	67 bc	54 b	3 b	22
P-Values	0.0002	0.0007	NS	0.0453	0.001	0.0004	NS

Distribution of nuts in a shoot





Conclusion..

Results One season – One location
Needs more testing before recommending

Directions & canopy levels
NS for all traits observed

Polymer & Control
- Phenology
  - ~ delayed by 20 days – bud burst, flowering & harvest
- Yield & quality
  - ~ 76% lower In hull yield
  - ~ 73% lower marketable yield
  - ~ 80 % more blanks

Oil only
- Phenology
  - Most advanced
- Yield & Quality
  - ~ 38% lower in hull yield
  - ~ 36% lower marketable yield (1st Shake)
  - ~ 22% more blanks (1st Shake)

Polymer + Oil or Oil + Polymer
- Phenology
  - Advanced
- Yield & Quality

Polymer + Oil
- Out yielded (In hull & marketable yield) & lowest blanks %

Oil + Polymer
- ~19% reduced in hull yield
- ~35% lower Marketable yield
- ~19% more blanks

Inadvertent trial

Bob Hodgson ‘s orchard, Renmark

Bob Hodgson ‘s orchard, Renmark

Continuation…..

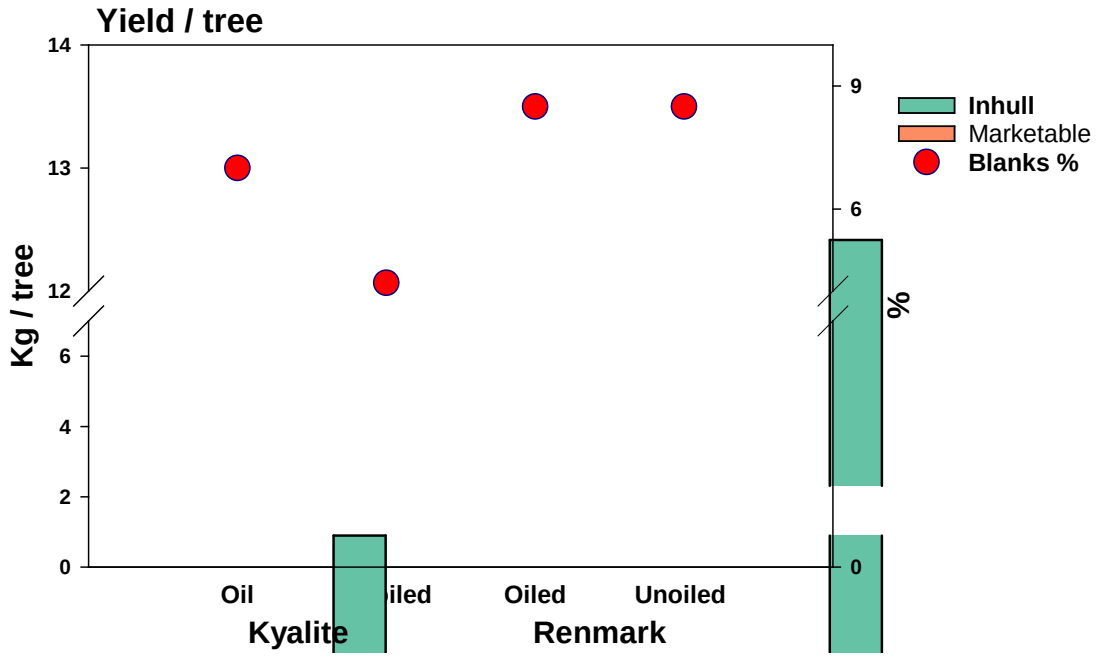
Oiled trees

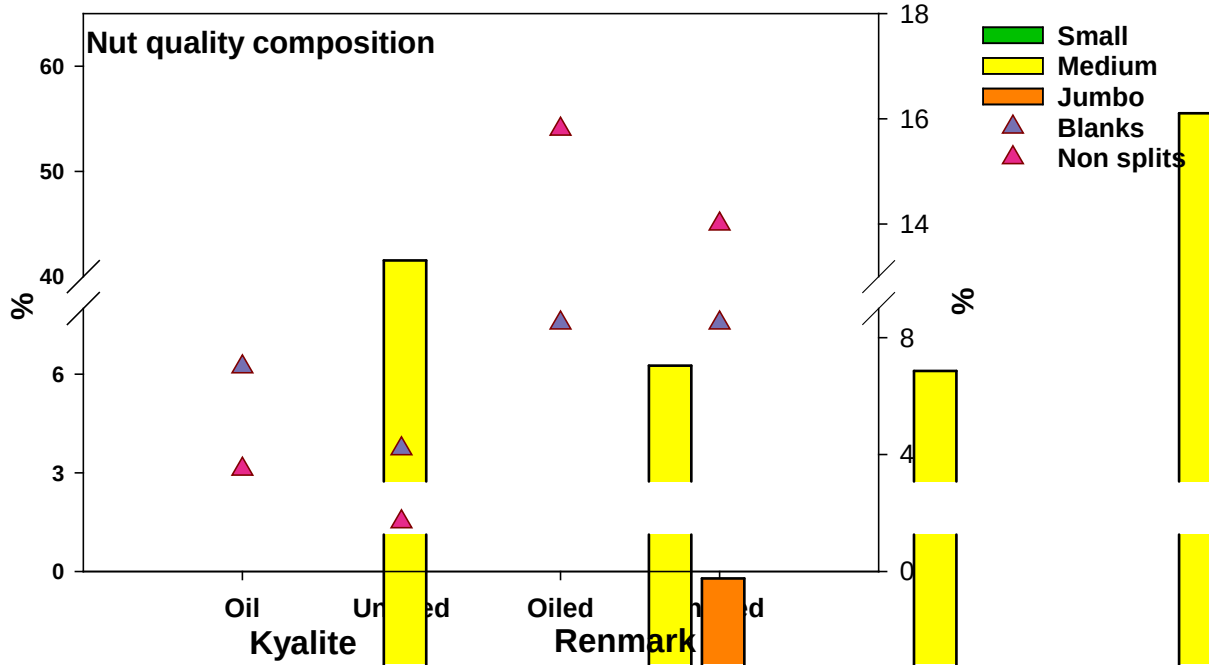
Un-Oiled trees

Kyalite Pistachio

Oil vs Unoiled : Comparison

Details	Kyalite	Renmark
Tree age (years)	6	7
Root stock	PG1	UCB
Date of spray	22/08/2022	27/08/2021
Rate of application (L/ha)	1500	1200
Concentration (%)	5%	6%
Speed of application (km/hr)	3.2	3





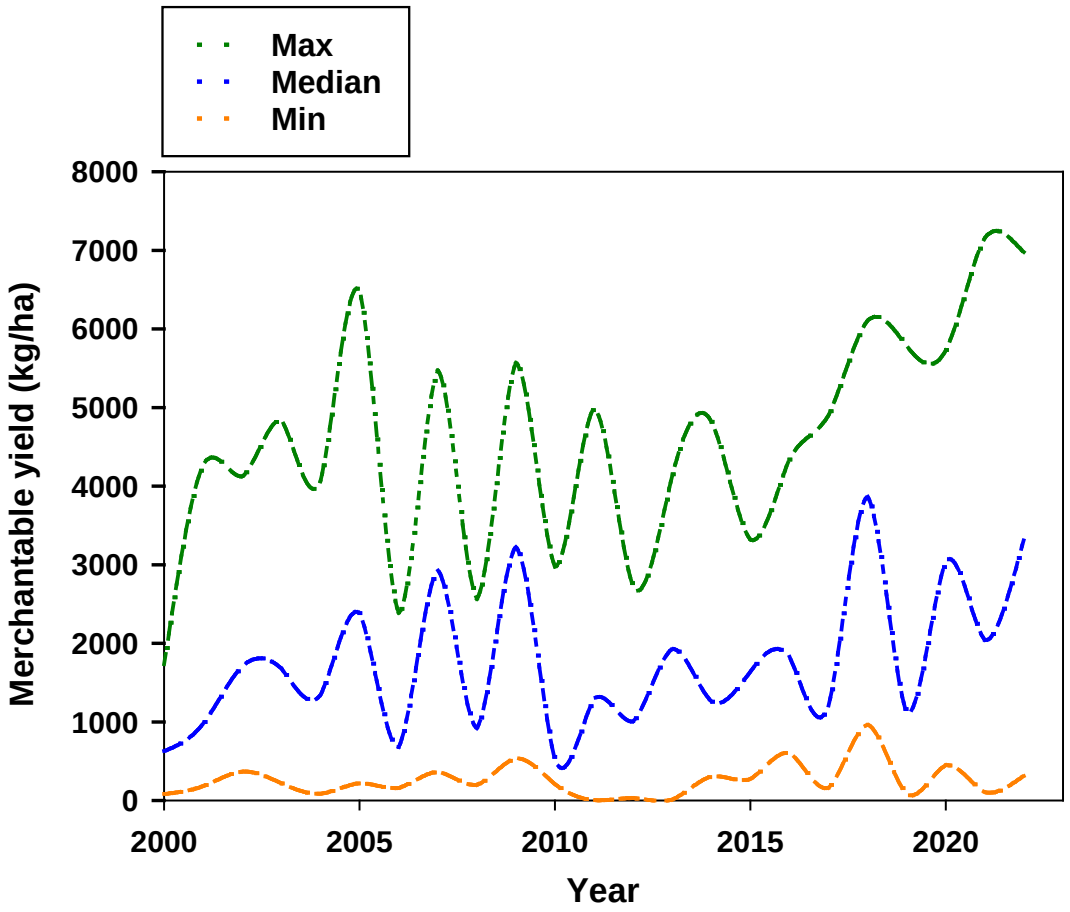
Benchmarking…

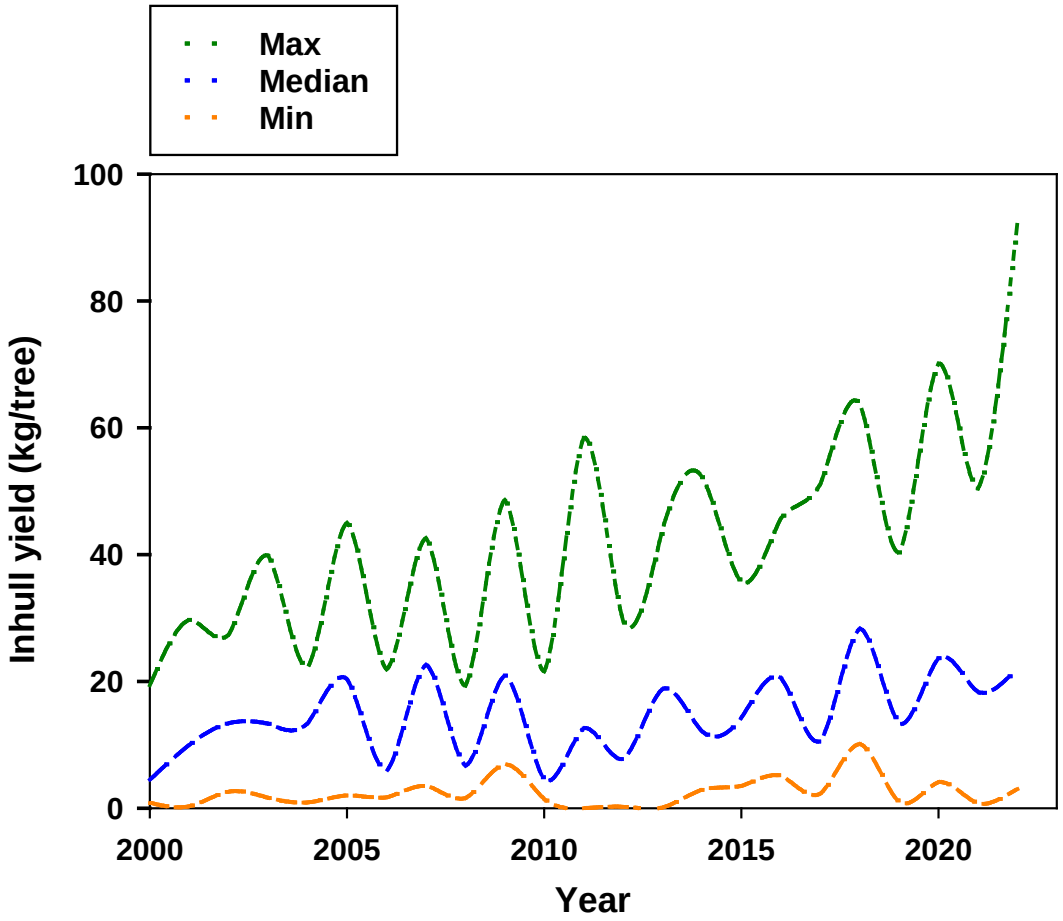
Project (PS17003)
Pistachio Productivity Improvement Program

- Why?
  - Australian pistachio industry's
    - **22 years of data**
    - **performance & trend**
  - Objective
    - **Improve yield & nut size – 3000kg/ha**
    - **Reduce dark skin & closed shell**
- Meaning?
  - Individual orchard's vs the industry

Understanding the chart……

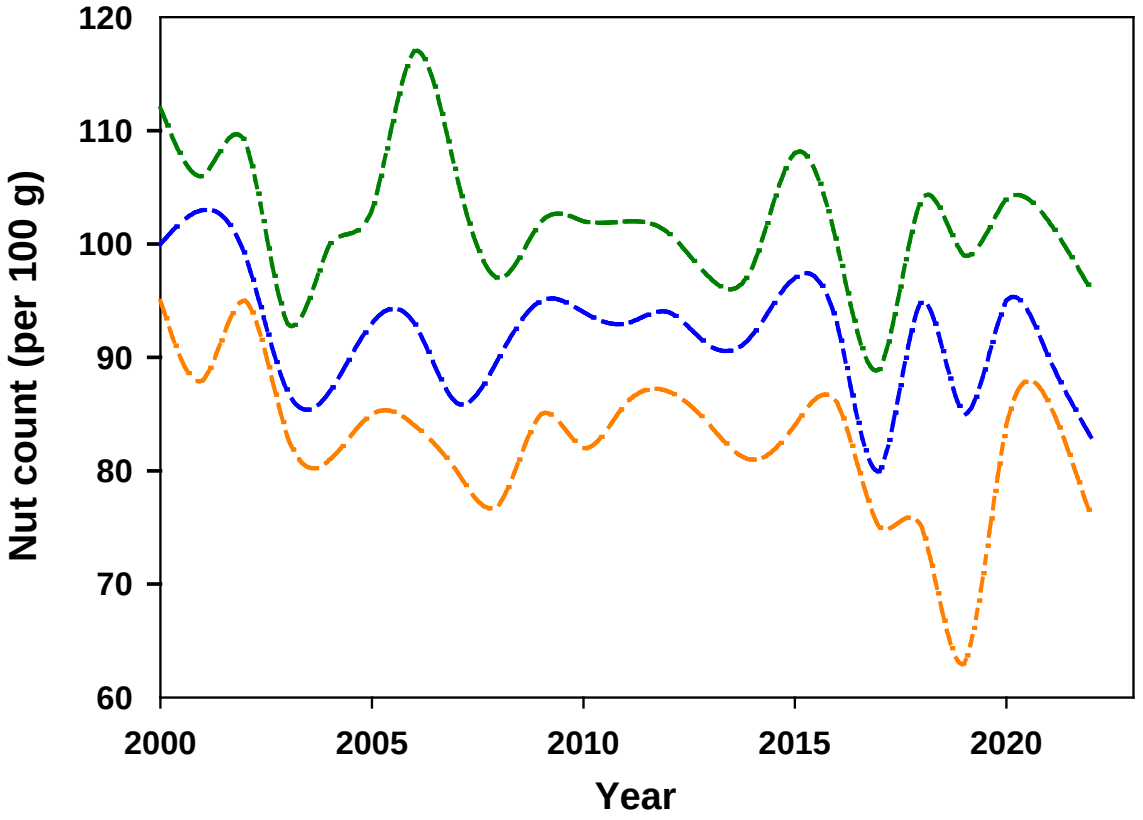
1. Yield traits





Understanding the chart……

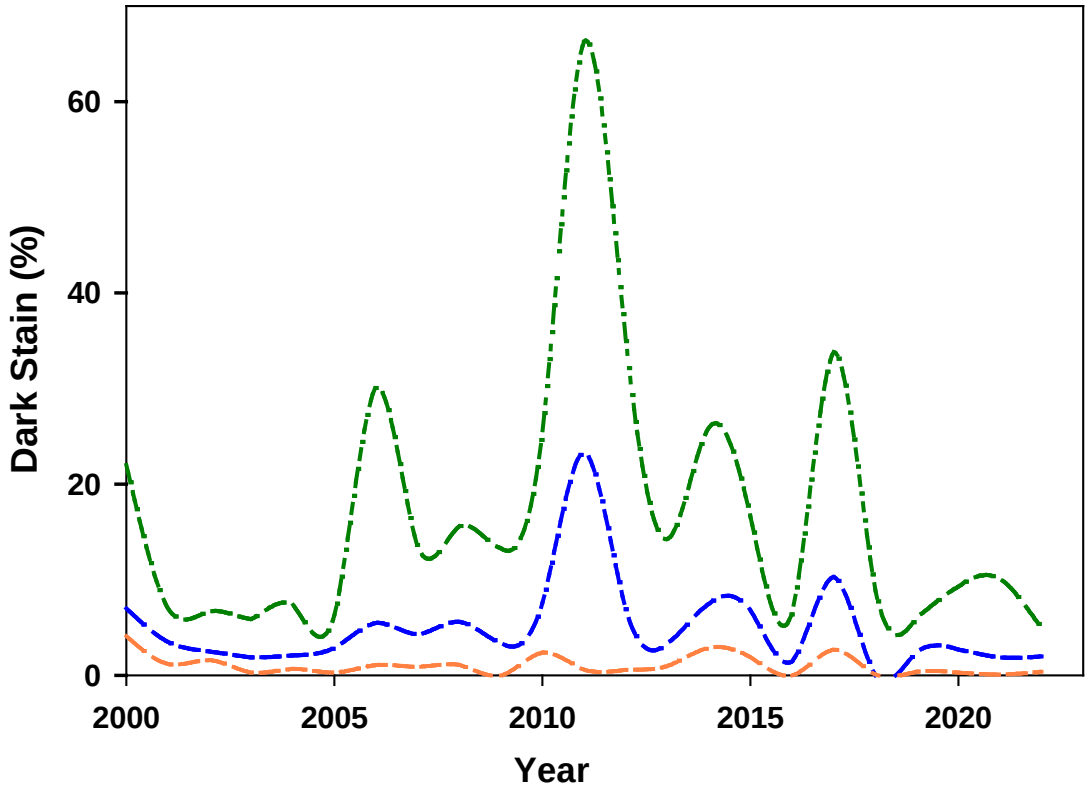
2. Nut size

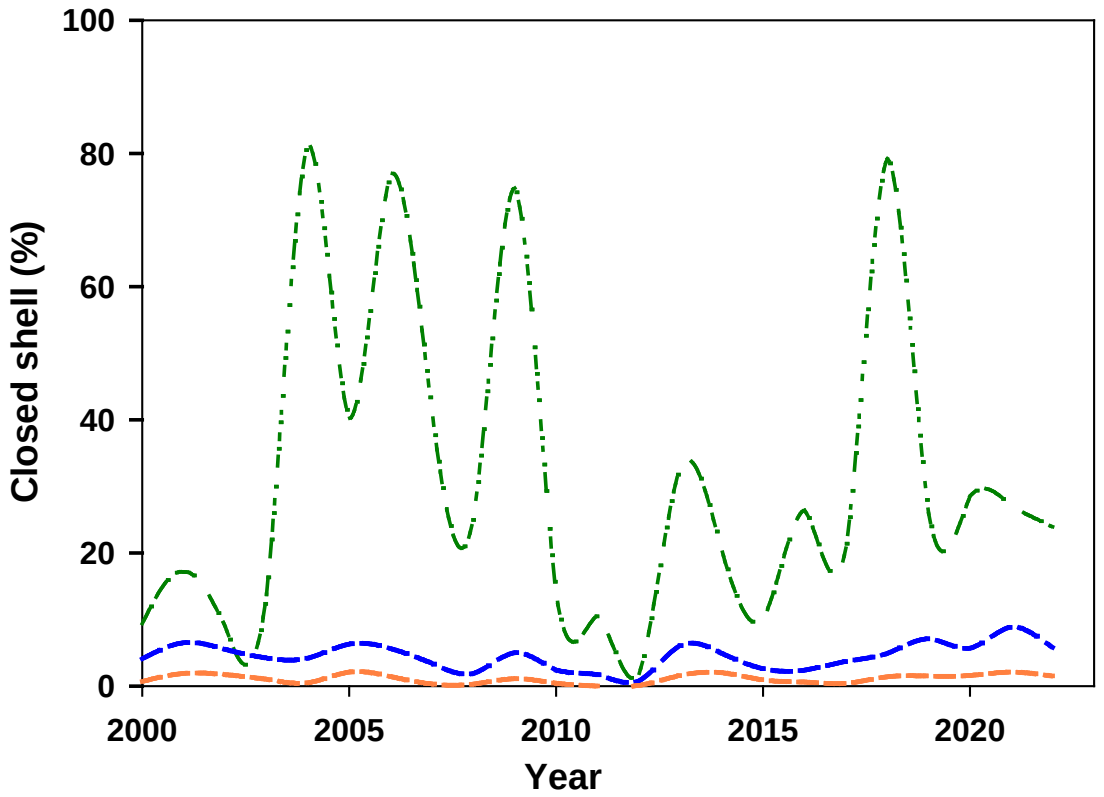


Lower number of nuts /100g

Bigger are the nuts

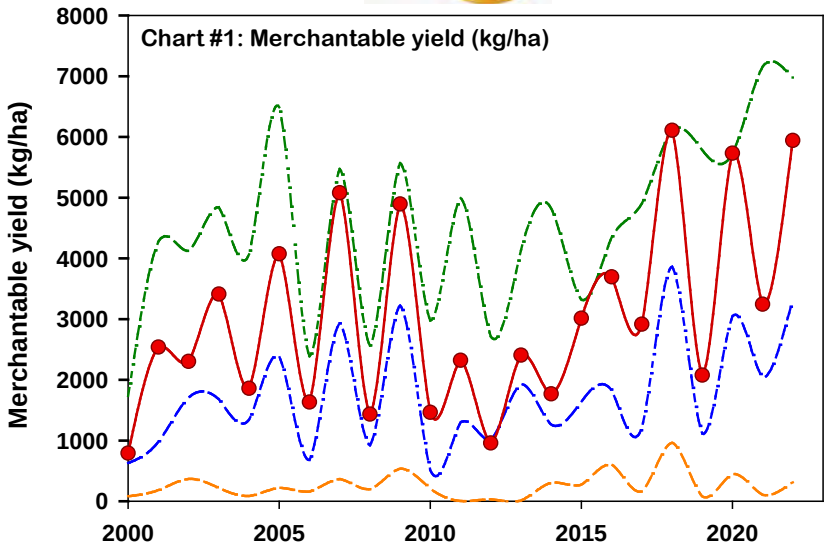
Understanding the chart.... 3. Quality trait

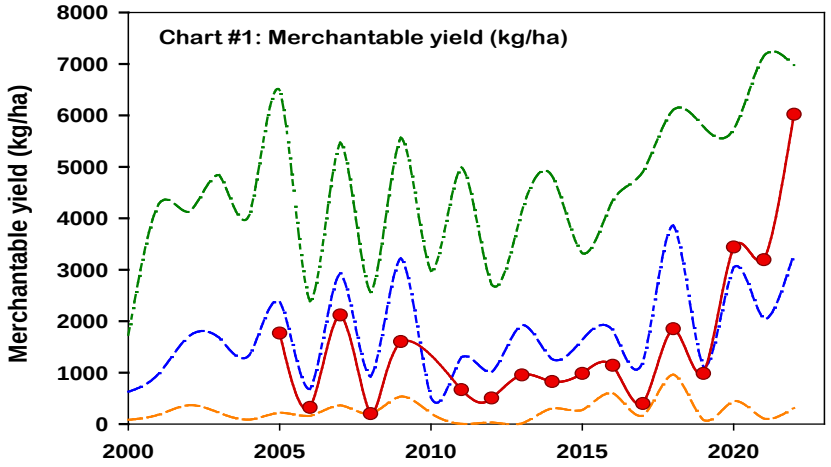




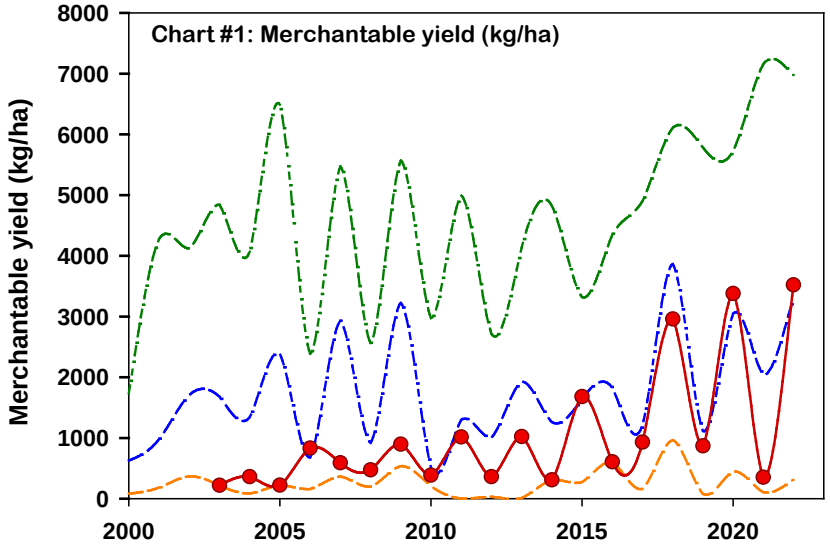
Understanding orchard data…

Merchantable yield (kg/ha)

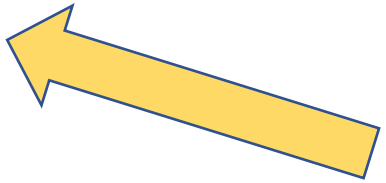


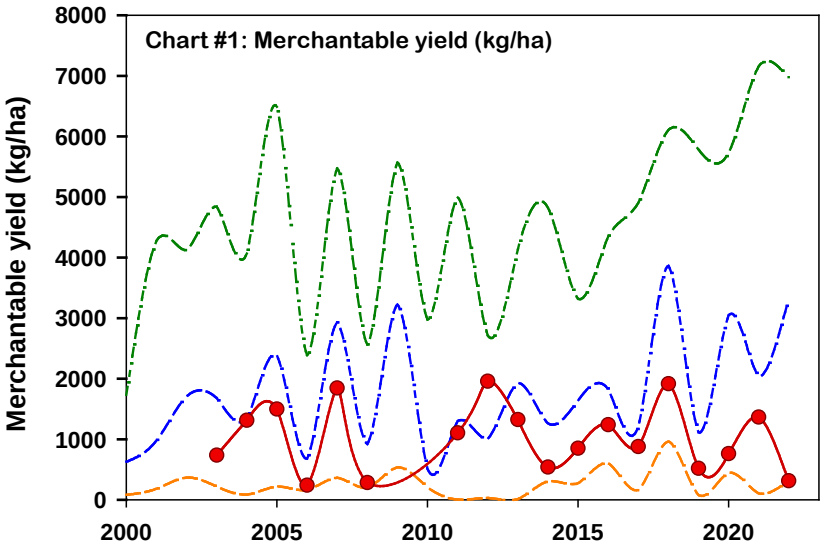


Orchard inline with industry's maximum



Orchard inline with industry's medium

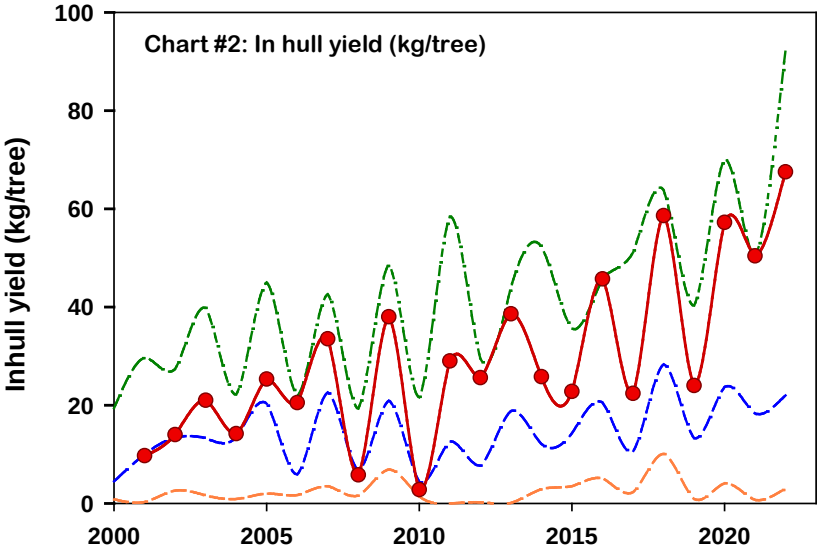




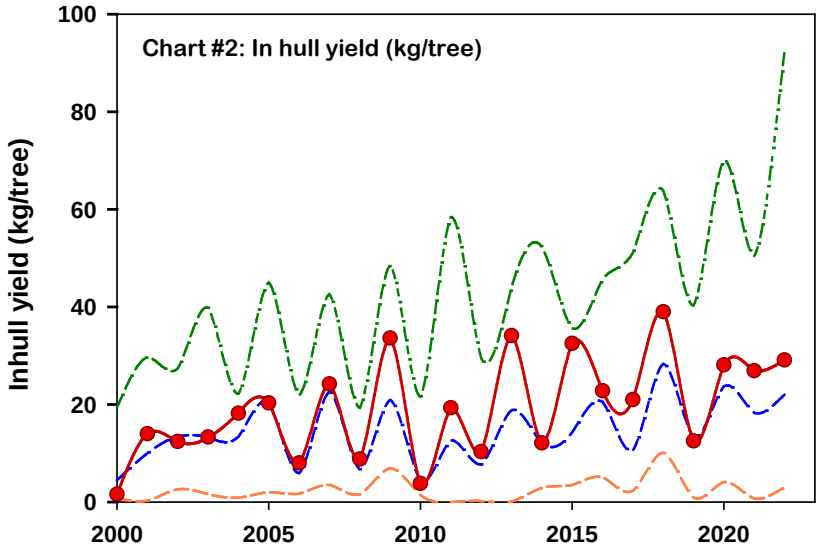
Orchard inline with industry's minimum

Understanding orchard data…

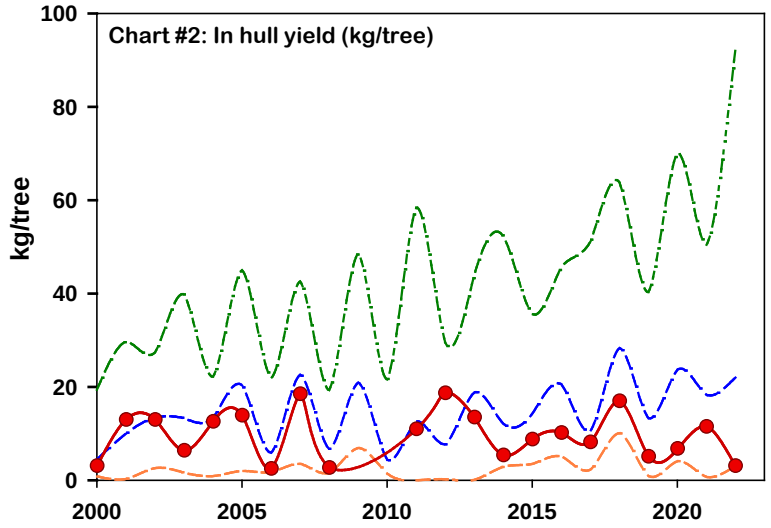
In hull yield (kg/tree)



Orchard inline with industry's maximum



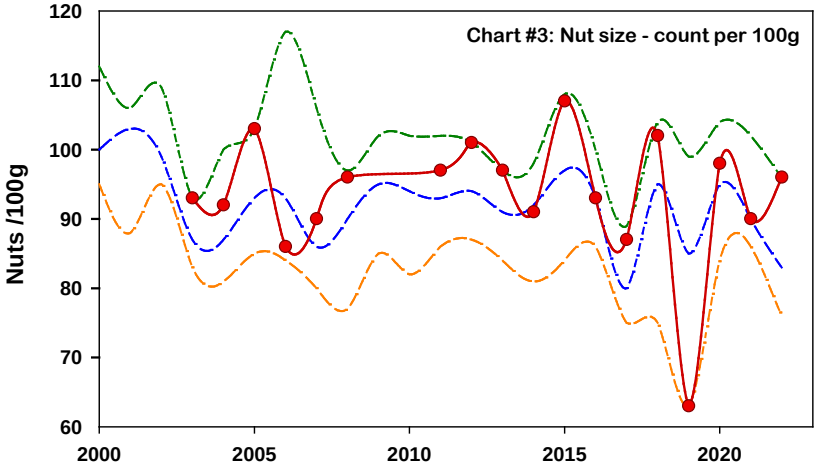
Orchard inline with industry's medium



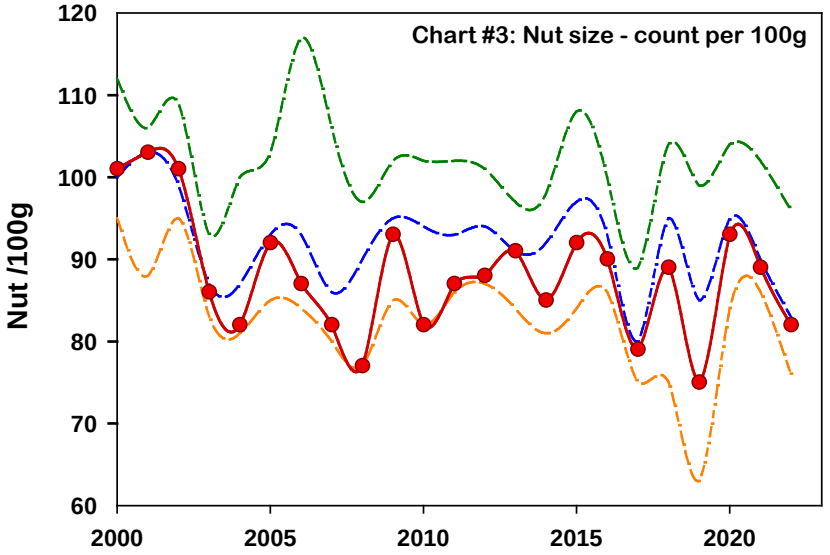
Orchard inline with industry's minimum

Understanding orchard data…

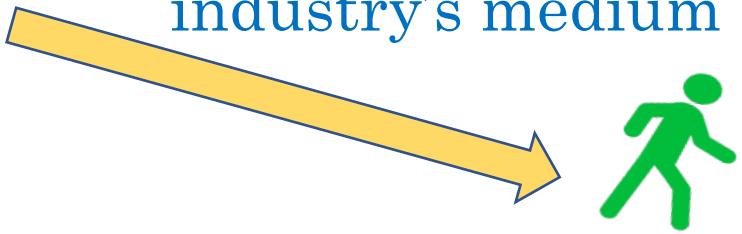
Nut size (no. of nuts/100g)

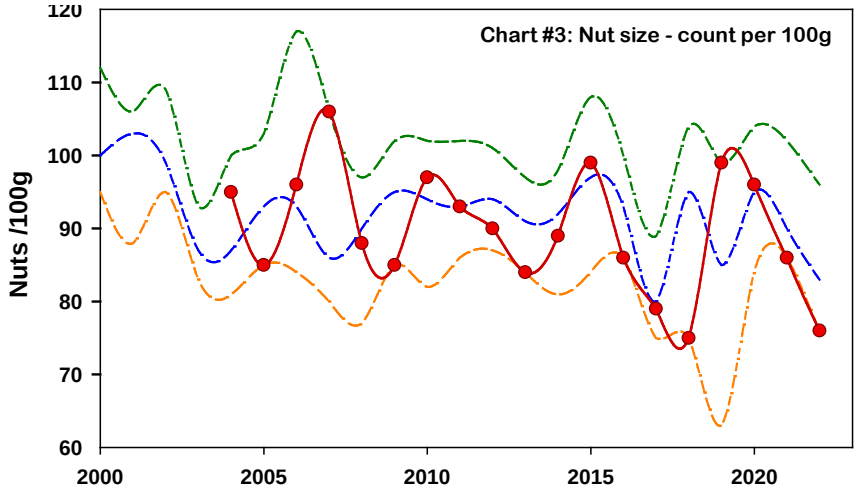


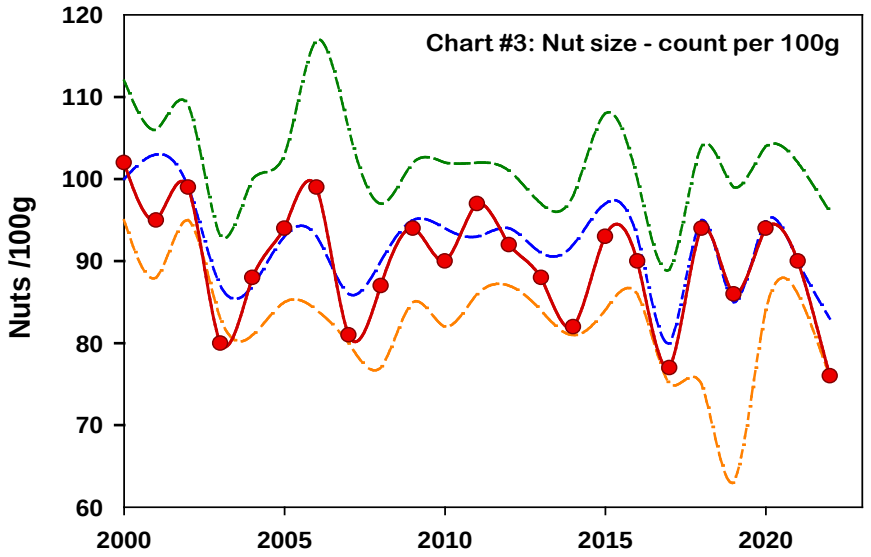
Orchard inline with industry's Maximum



Orchard inline with industry's medium



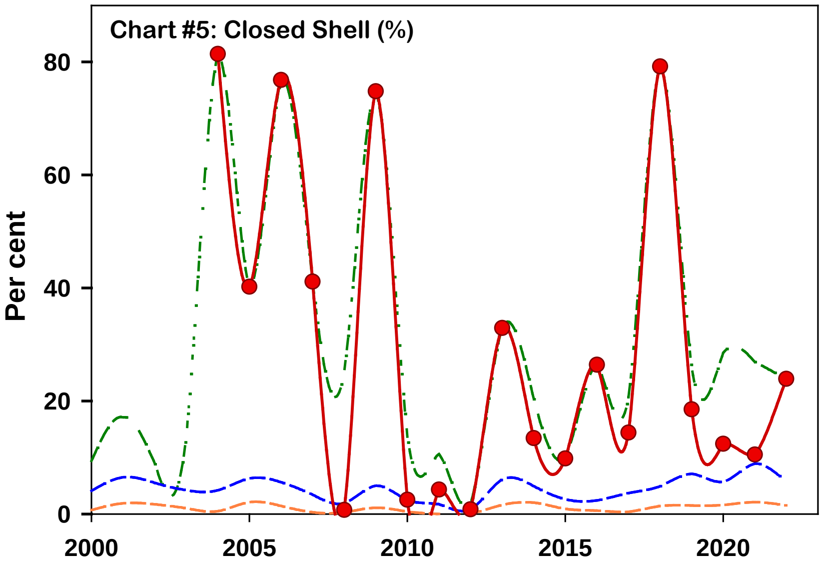


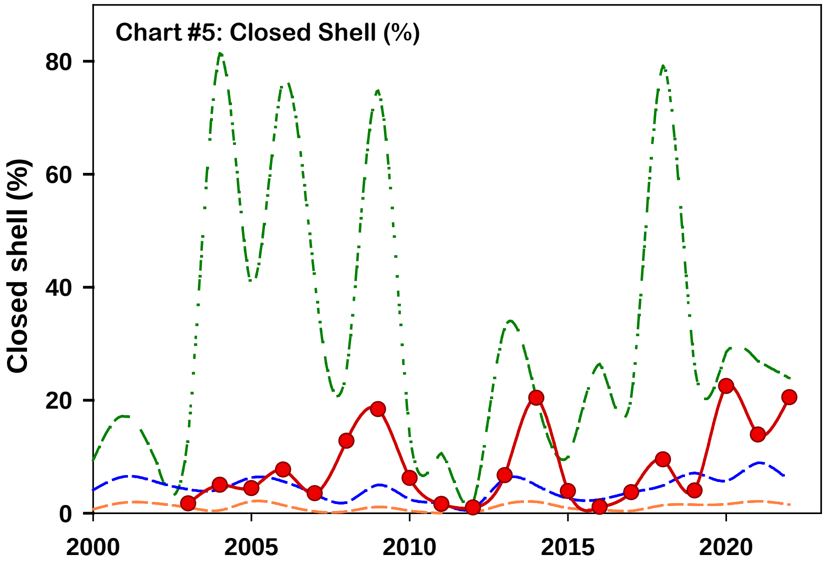


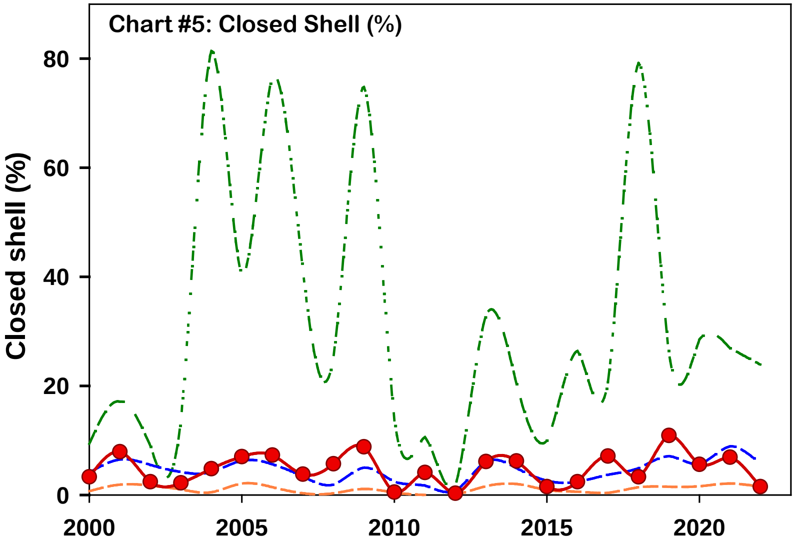
Orchard inline with industry's minimum

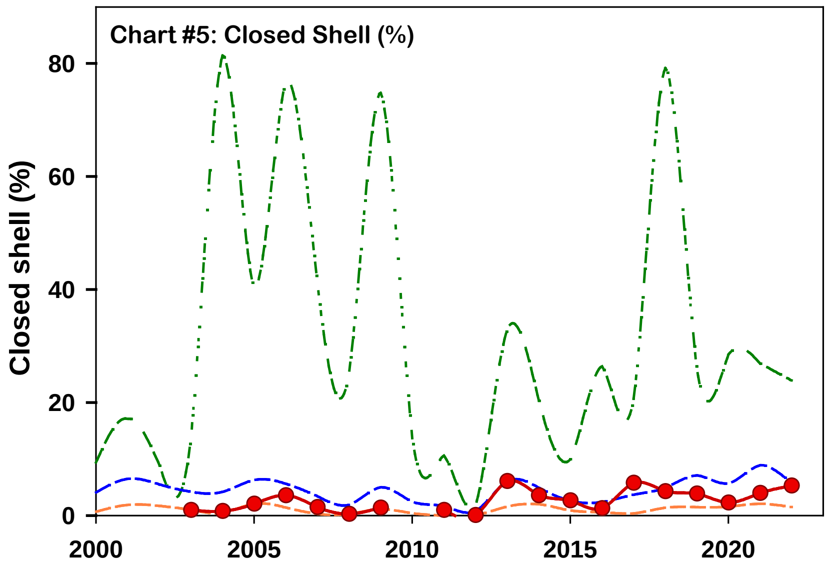
Understanding orchard data…

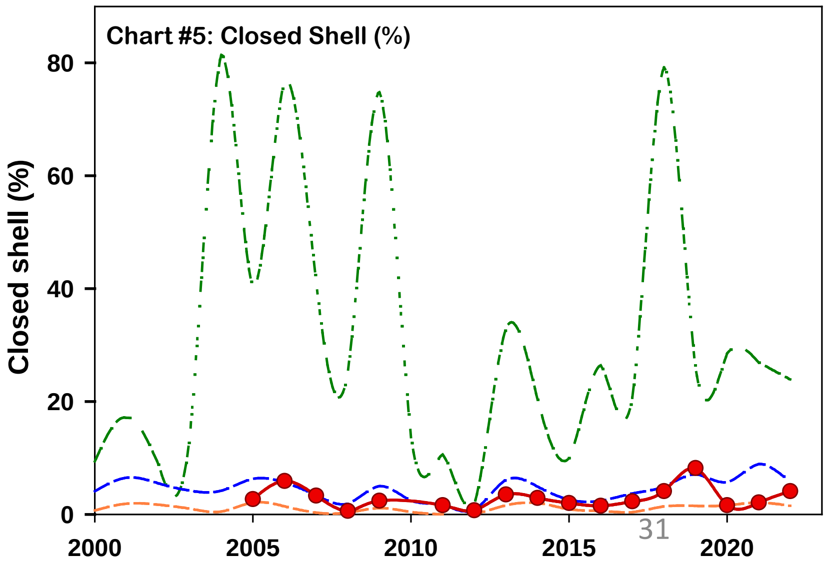
Closed shell (%)





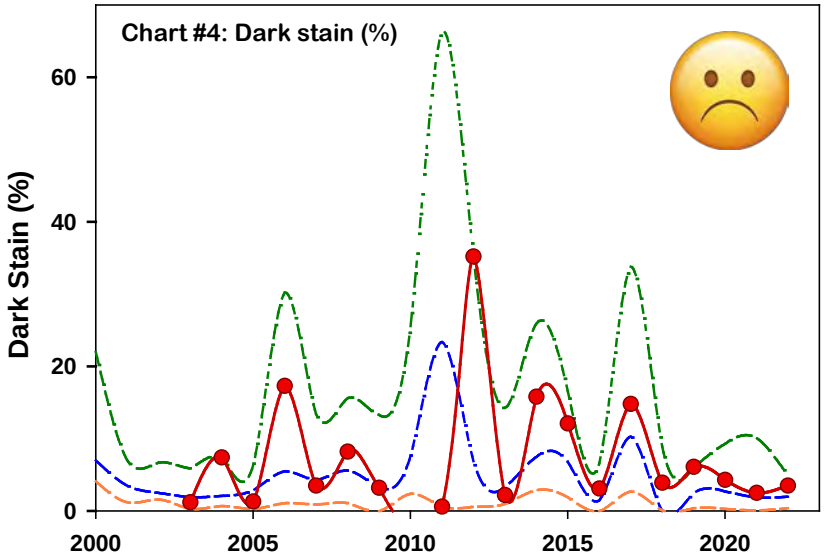




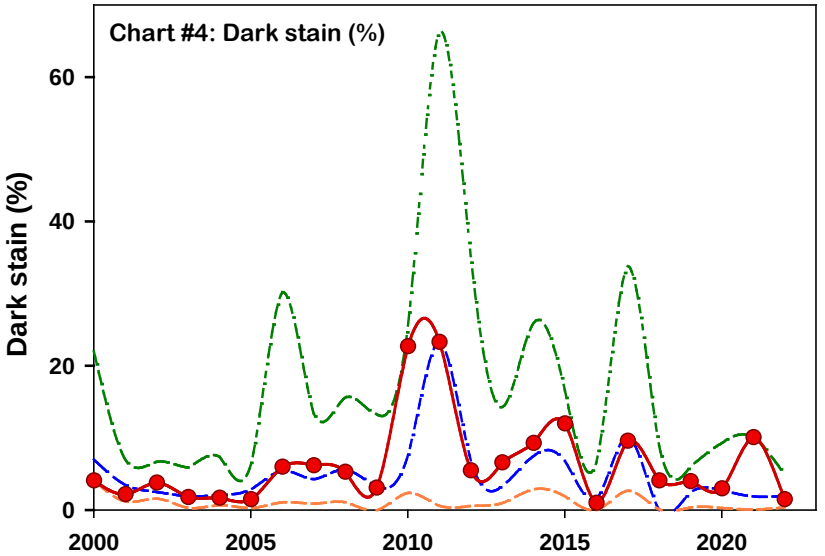


Understanding orchard data…

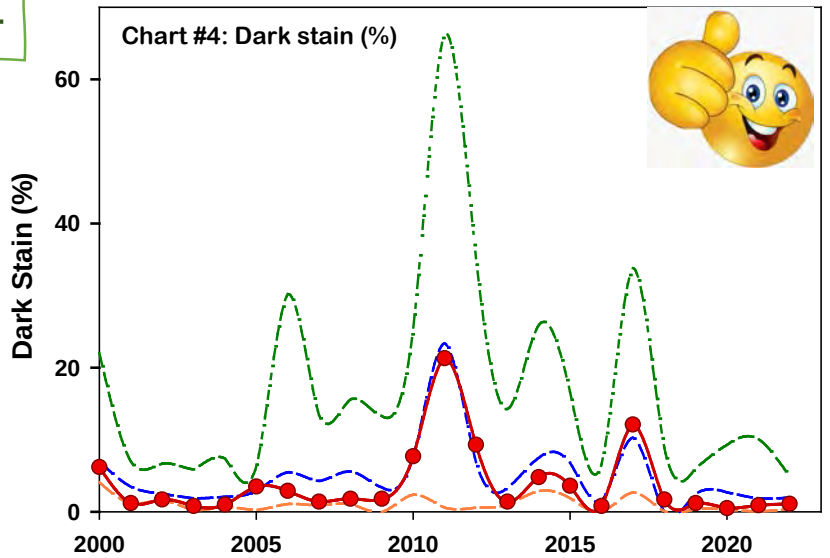
Dark stain (%)

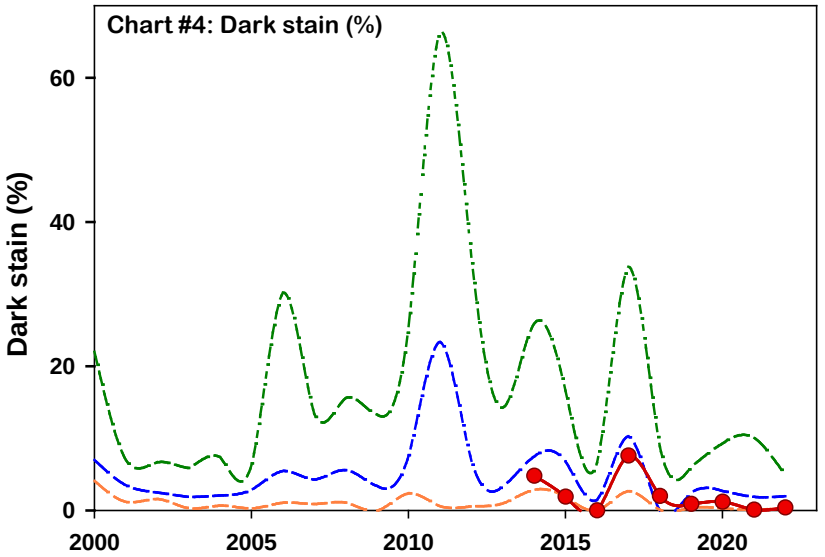


Orchard inline with industry's Maximum



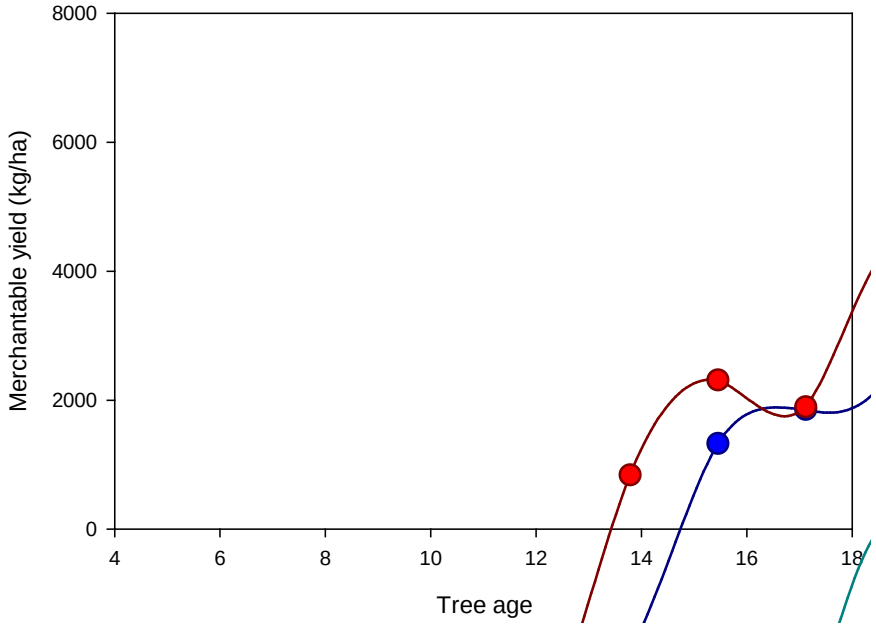
Orchard inline with industry's medium

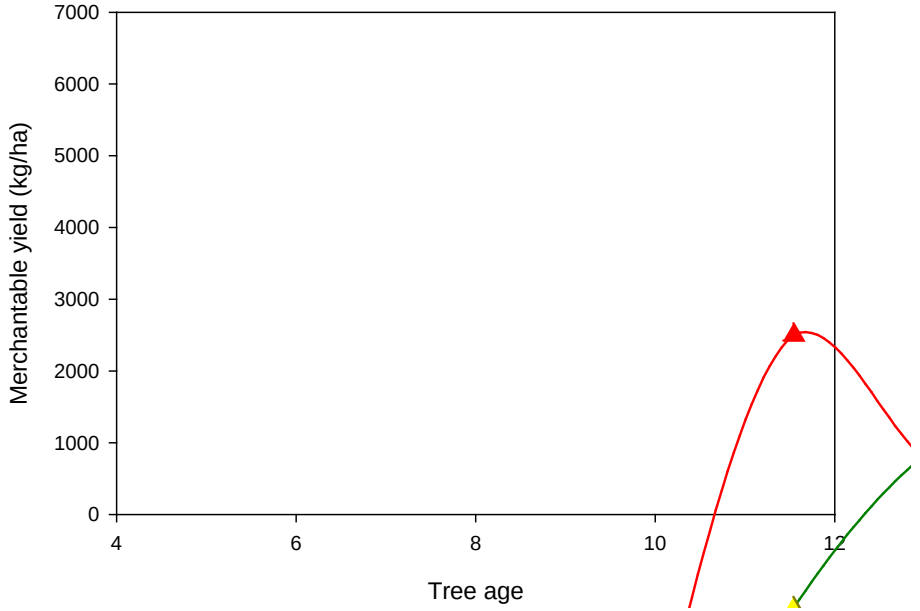


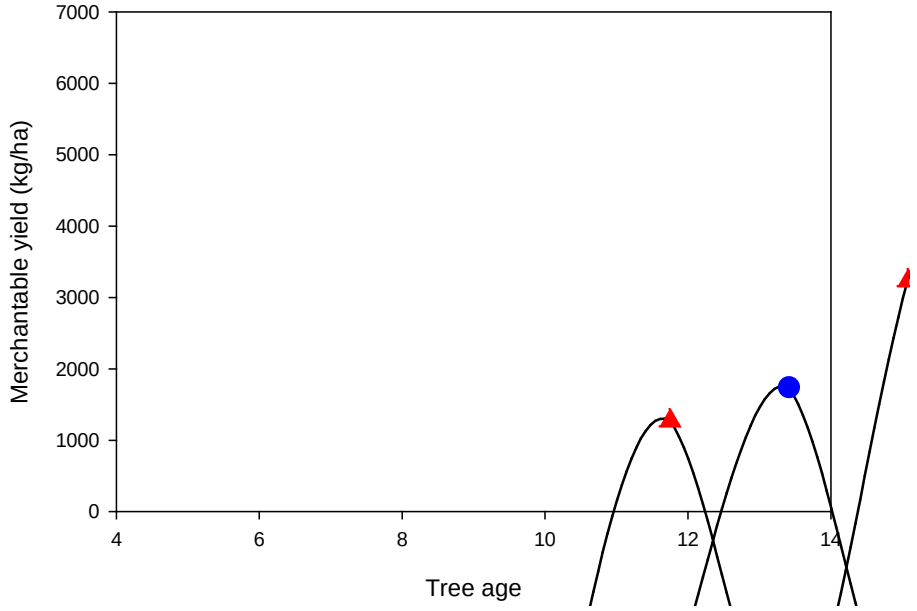


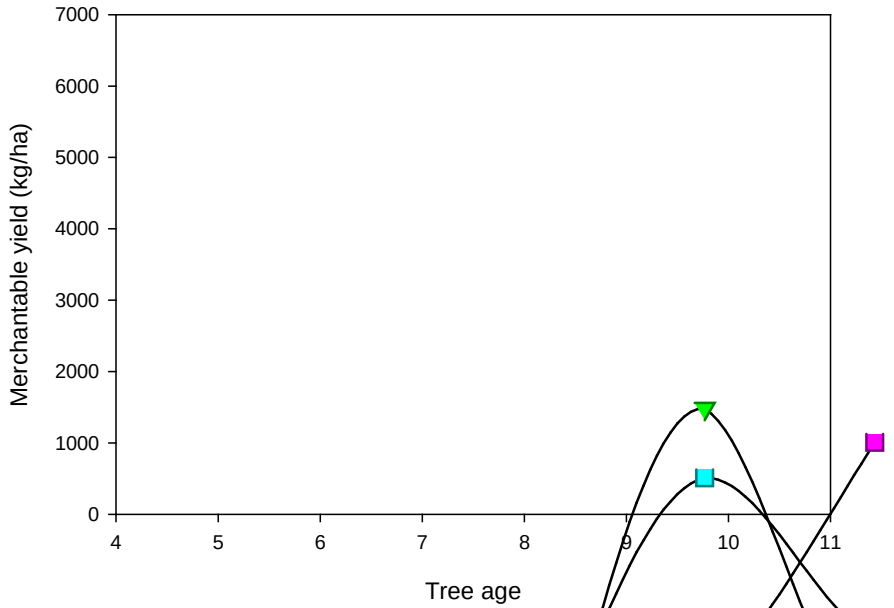
Orchard inline with industry's minimum

Yield of young trees

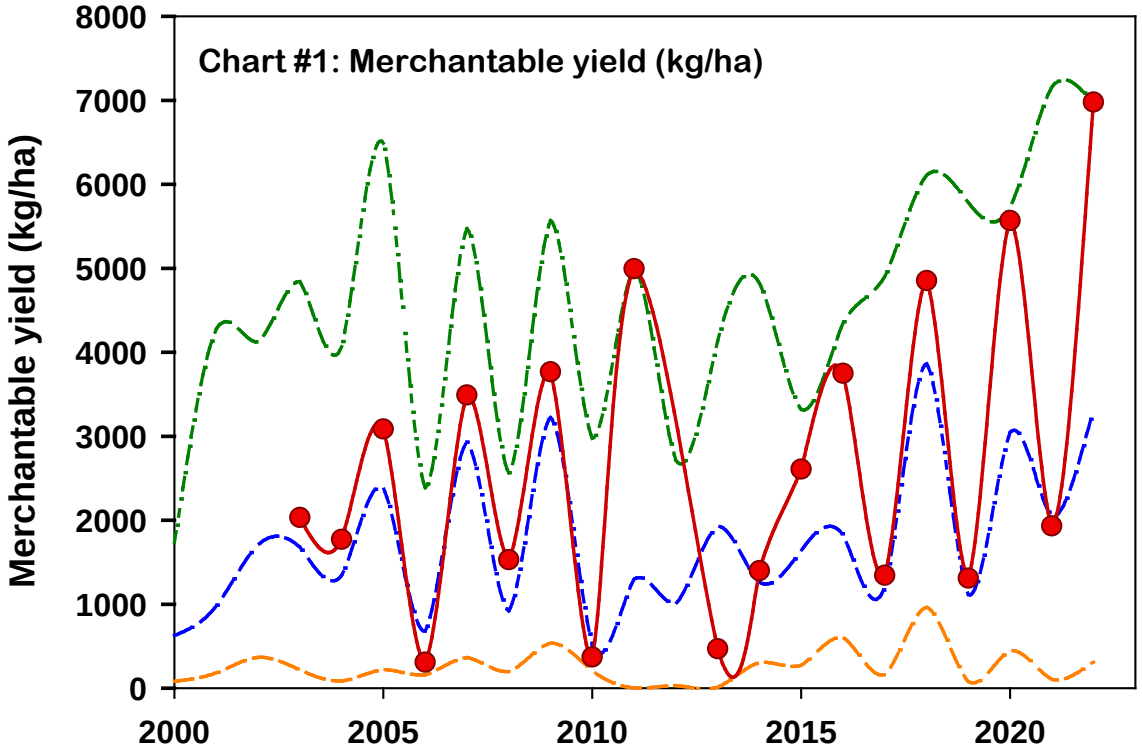


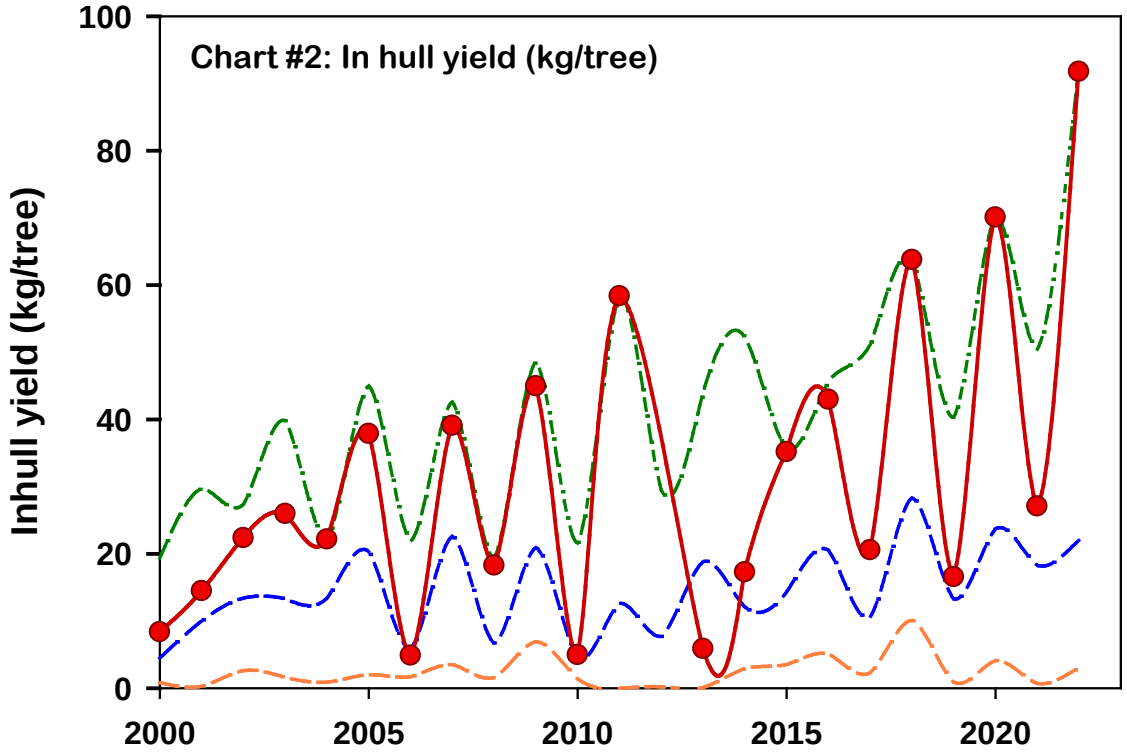






Misleading and inaccurate information





Grower details ….. Update request

Name
Location & address

Details	Block 1 (or) Age group 1	Block 2 (or) Age group 2	Block 3 (or) Age group 3	Block 4 (or) Age group 4	Block 5 (or) Age group 5	Block 6 (or) Age group 6
Area of planting						
Root stock						
Year of planting rootstock						
Year of budding						
Spacing						
Total number of trees						
No. of female trees						
No. of Male trees or % male						

Tinytag : temperature / RH / dew point

Two levels
- Lower
- Upper


Simpfendorfer's, SA


Issacson's , SA


Mallee Orchard pistachios, SA


Kyalite Pistachios, NSW


Kaniva Pistachios, VIC


CMV Farms, VIC

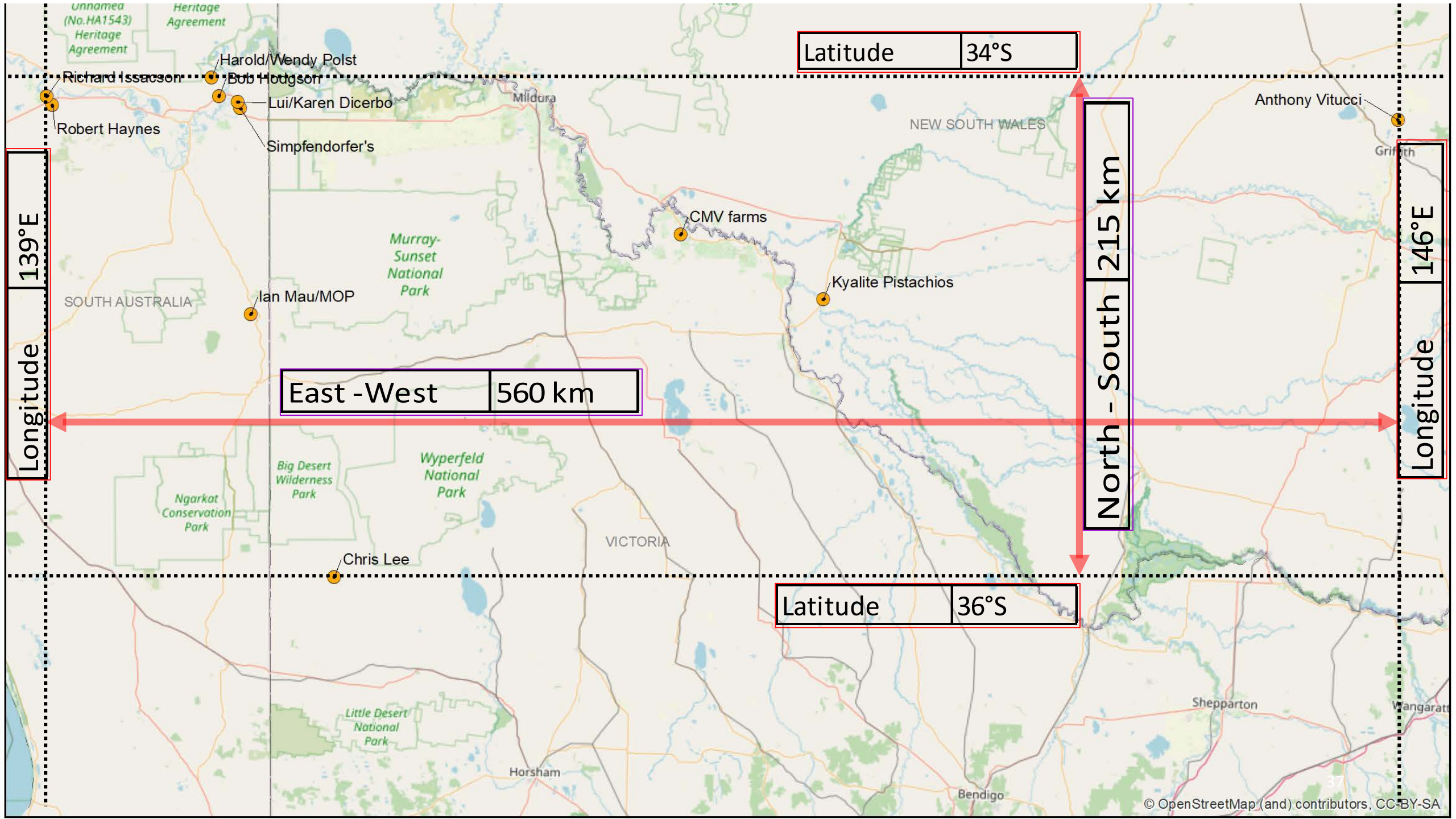

Bob Hodgson, SA


Rob Haynes, SA


Anthony Vittuci, NSW


Lui Dicerbo, SA


Harold Polst, SA


Latitude 34°S
Harold/Wendy Polst
Richard Issacson
Bob Hodgson
Lui/Karen Dicerbo
Robert Haynes
Simpfendorfer's
Mildura
NEW SOUTH WALES
Anthony Vitucci
Griffith
CMV farms
Murray-Sunset National Park
Kyalite Pistachios
139°E
Longitude
SOUTH AUSTRALIA
Ian Mau/MOP
East -West 560 km
North - South 215 km
146°E
Longitude
Big Desert Wilderness Park
Wyperfeld National Park
Ngarkat Conservation Park
VICTORIA
Chris Lee
Latitude 36°S
Little Desert National Park
Horsham
Shepparton
Bendigo
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Work plan 2022 -23

Estimation & reporting

- Benchmarking – updating grower information
- Chill New letter – Dynamic unit estimation & reporting

Research Trials

- Polymer application studies to improve yield and quality of pistachios
- Study on Juvenile Shoot Dieback of young pistachio trees in response to oil application

Others

- PIT – Research updates at meetings
- Abstract submission - VIII Symposium on almonds & pistachios (07-12 May2023),CA
- Temperature & RH data – Tinytag data collection, compilation and interpretation of data

Acknowledgements

- Growers
- Orchards, managers & staff
- APPC
- Research Committee
- Hort Innovation

Hort Innovation Strategic levy investment | PISTACHIO FUND

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Thank you

Maha

Researcher

PGA