



# PISTACHIO INFORMATION AND TECHNOLOGY GROUPS

SPRING SESSION 2021

## TOPICS

- Introduction
- Research update
- Pistachio shoot dieback- overview
- Research plan

**Dr. Maha Mahadevan**

**Researcher  
PGAI**





## PROJECTS & ACTIVITIES

- ✓ Chill mitigation : Polymer - oil application - Waikerie (Richard Issacson's orchard)
- ✓ Bud opening & nut set study : Simpfendorfer's Orchard
- ✓ Survey on bud break : Assess location – action – response
- ✓ Benchmarking & grower details : Map & model – for forecast & future research
- ✓ Shoot die back : Systematic approach - Action taken



## Enhancing pistachio yield and quality through polymer application in chill deprived Riverland, SA (2021/2022)

- *Inadequate dynamic chill units (Waikerie)*

*As of 15<sup>th</sup> August 2021 : 50 chill units or 590 hours less than 7°C*

*As of 31<sup>st</sup> August 2021 : 56 chill units or 678 hours less than 7°C as against 59 chill units*

- *Opportunity to capture the effects of polymer & / oil application*



## ***MATERIALS & METHOD***

- ***Location*** : ***Richard Issacson's Orchard, Waikerie (34.18OS, 139.96OE)***
- ***Variety & age*** : ***Eight-year-old Sirora on PG1 rootstock; 7 x 5m***
- ***Polymer*** : ***0.5% (5L/1000L water)***
- ***Oil*** : ***6% (60L/1000L water)***





**Polymer trial 2021/2022**  
Location : Richard Issacson's orchard / Waikerie, SA

N ←	Row no. →	1	2	3	4	5	6
	Tree No. ↓	Border					Border
	29	F	F	M	F	F	F
Block 3	28	F	F	F	M	F	M
	27	F	F	F	F	F	F
	26	M	F	F	F	F	F
	25	F	F	M	F	F	F
	24	F	F	F	F	F	F
	23	F	F	F	M	F	F
	22	F	F	M	F	F	F
	21	F	F	F	F	F	M
	20	F	F	F	No tree	F	F
Block 2	19	F	M	F	F	F	F
	18	F	F	F	F	F	F
	17	F	F	F	F	F	F
	16	F	F	F	F	F	F
	15	F	F	F	F	F	F
	14	F	F	F	F	F	F
	13	M	F	F	F	F	M
	12	F	F	F	F	F	F
Block 1	11	F	F	F	F	F	F
	10	F	F	F	F	F	F
	9	F	F	F	F	F	F
	8	F	F	F	F	F	F
	7	M	F	F	F	F	M
	6	F	F	F	F	F	F
	5	F	F	F	No tree	F	F
	4	F	F	F	F	F	F
	3	F	F	F	F	F	F
	2	F	F	F	F	F	F
	1	F	F	F	F	F	M

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		31/08/2021	7/09/2021
T5	Control (NO polymer NO oil)	3	1	4	4	NON	NON
<b>Total</b>		<b>15</b>	<b>5</b>	<b>20</b>	<b>8</b>		

Treatment details	Female	Male	Total
No of trees / treatments	3	1	4
No of shoots/ treatment	24	4	28
No. of buds / treatment	72	12	84
No. of shoots in the trial	120	20	140
No. of buds in the trial	360	60	420

#### Abbreviations

Direction				Position	
N	North	S	South	S1	Lower Layer
W	West	E	East	S2	Upper Layer

Bud #					
B1	Basal	B2	Middle	B3	Distal



## OBSERVATIONS

### **Shoots tagged in four direction, two canopy levels in each tree in all treatments**

- ✓ Temperature : daily temperature from met station(BOM)
- ✓ Bud & shoot temperature : Recorded using laser thermometer
- ✓ Phenology : Bud burst (%), uniformity in flowering (days from start of flowering to 50% flowering)
- ✓ Nut set & nut retention (%) : no. of nuts set & no. of nuts retained at harvest
- ✓ Blank nuts (%): No. of blanks in tagged shoots & count no. of blanks/ shoot
- ✓ Yield & quality : Marketable yield & quality estimates based on industry standards



# Treatment implementation



**Polymer spray (4 trees)**



**Tree covered by tarpaulin**



**Trees covered by tarpaulin (8 trees)**



## Oil Spray







## Colour coded

Female trees for observation

Shoots tagged

Two levels

Four directions





Colour coded

Male trees for observation

Shoots tagged

One level

Four directions

Observed ONLY for flower  
proliferation



First sign of movement : 19<sup>th</sup> Sep 2021

Control & Polymer only : Delayed by 22 days

### Observations so far

- Polymer -
- Oil -
- Polymer + Oil & Oil + Polymer -
- Control -

### Directions

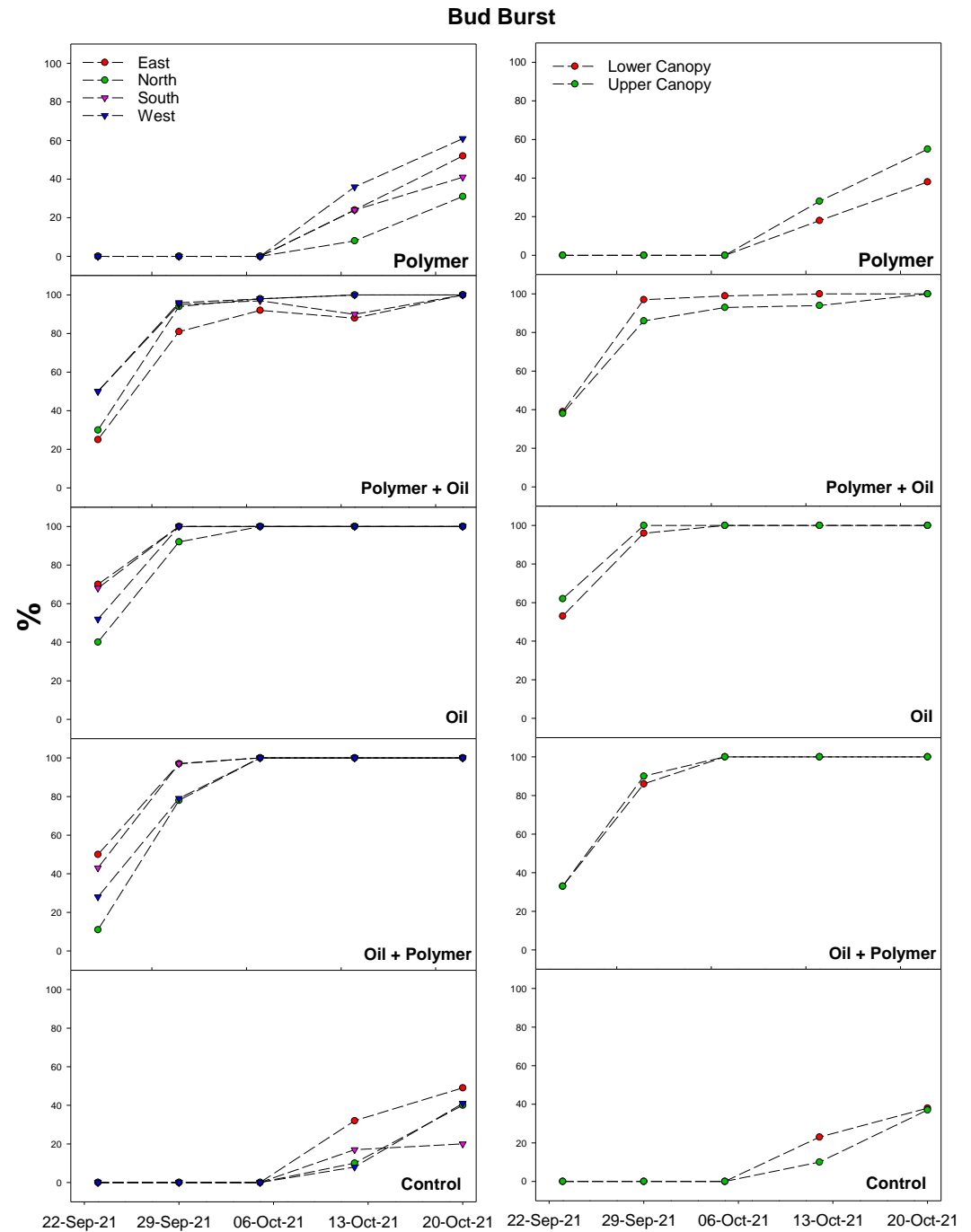
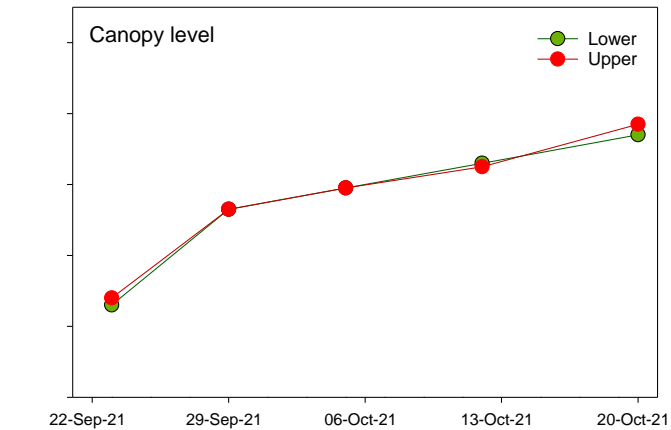
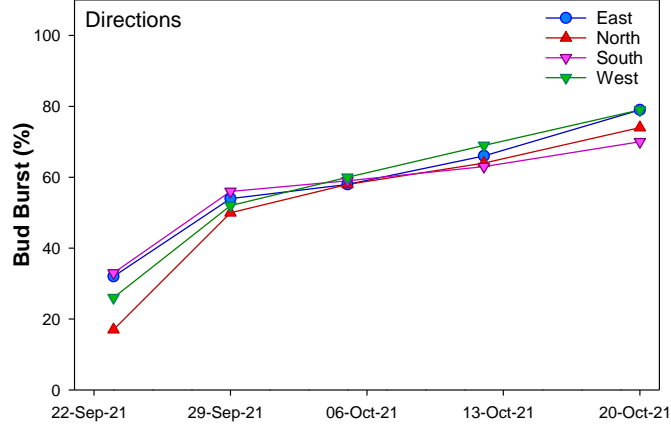
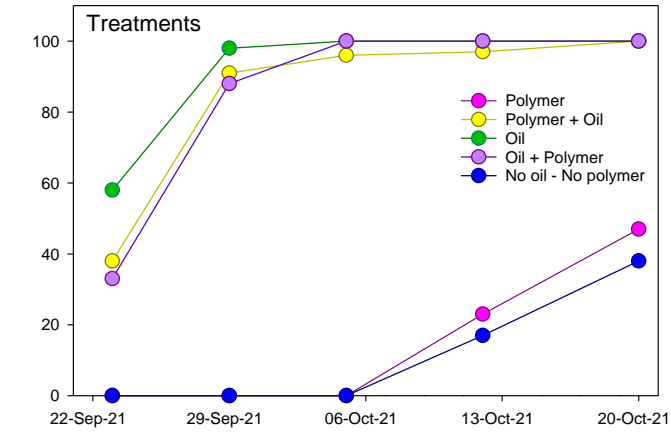
N - W - S - E

### Canopy level

Lower - Upper

Slow to respond

- North
- Lower canopy



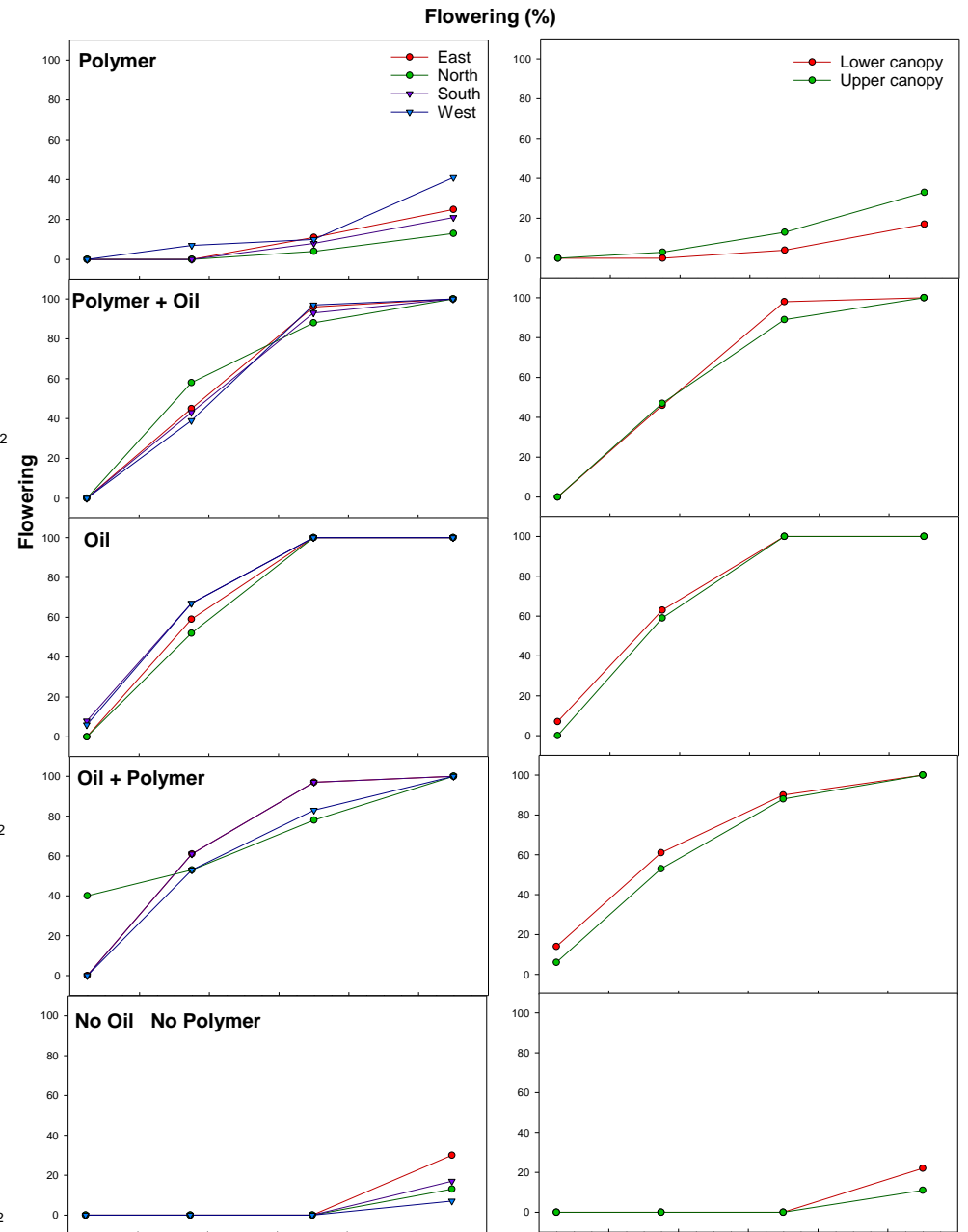
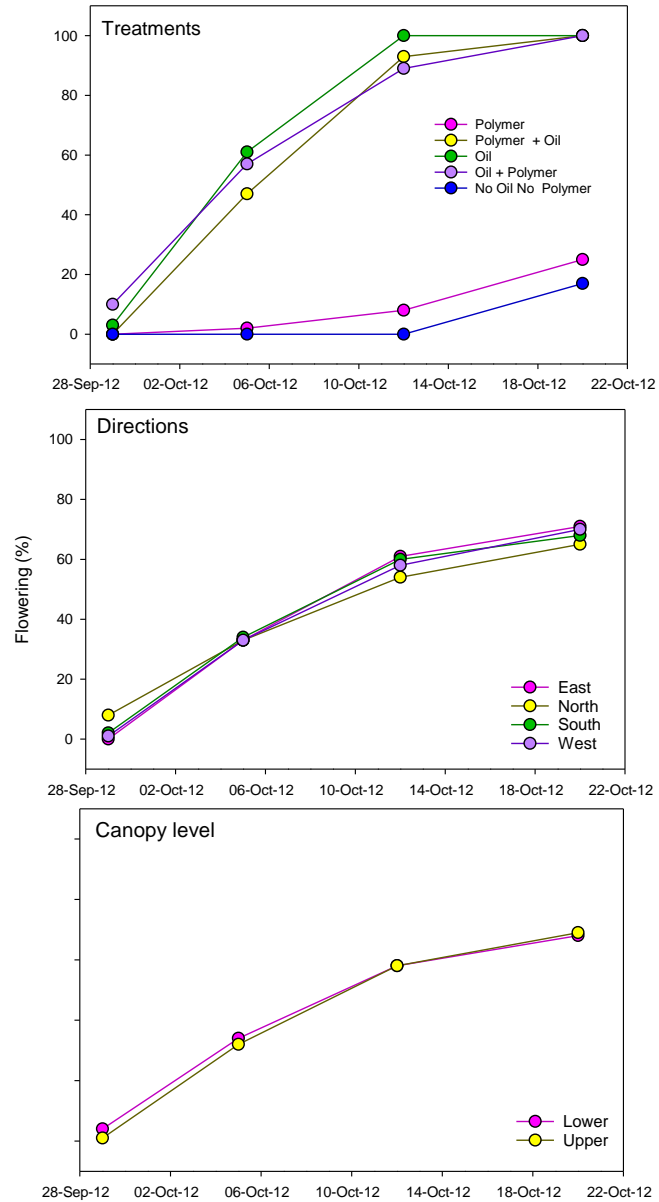


## Flowering

Days to 100% flowering : 10

Lower canopy level : higher & earlier flowering

Control & Polymer treated : delayed by more than 20 days



As of 20<sup>th</sup> October 2021



Oil sprayed female



Control female



Control male



Polymer only female



Polymer only male



Oil sprayed male



## Bud opening & nut set study Simpfendorfer's orchard

Observations so far

### 40 YO

- Early & short period
- Uniform bud burst & Flowering

Southern side – Respond early

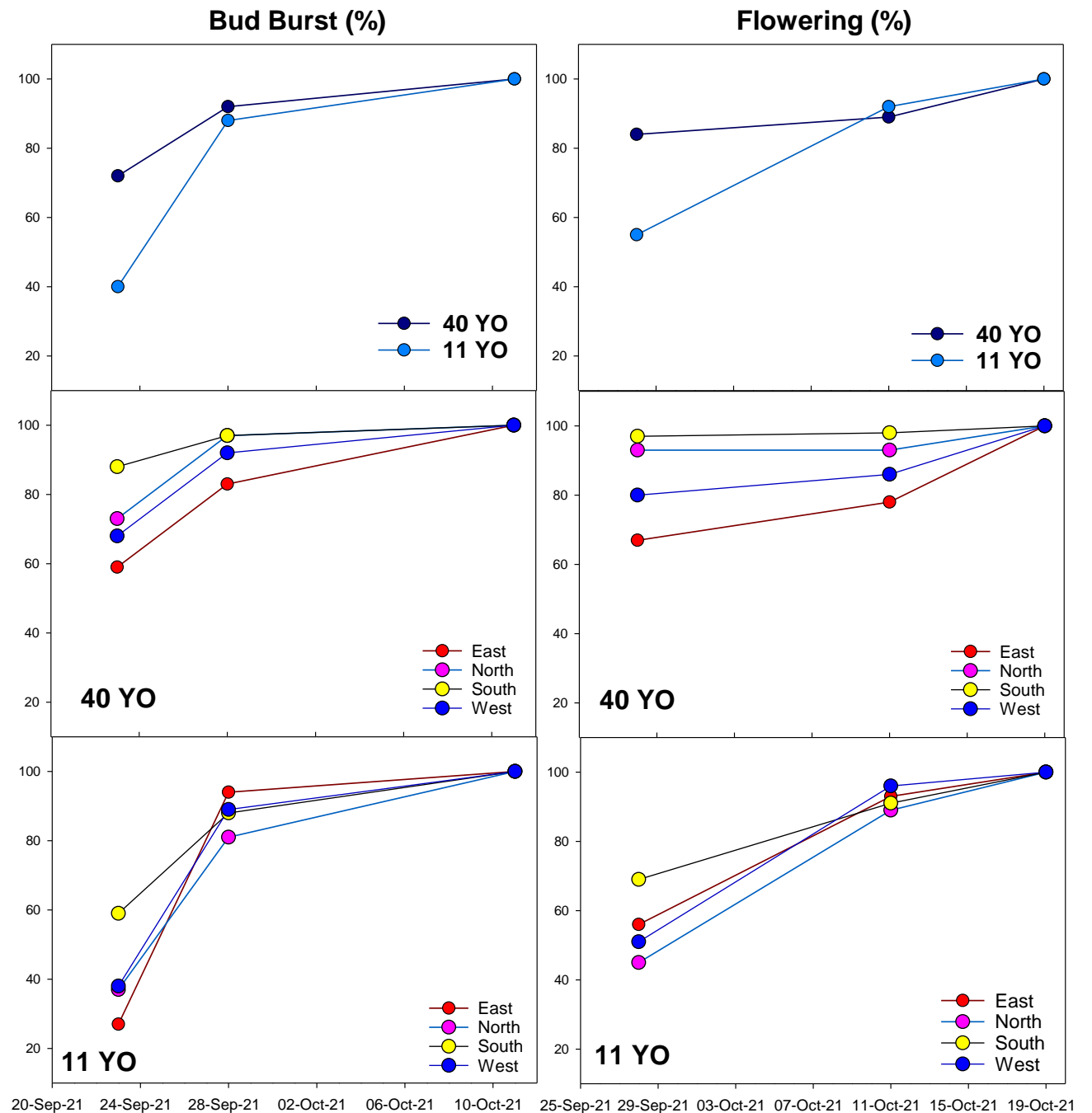
East – Slowest Response

### 11 YO

- Late & spreaded

Mixed trend

Southern side – Respond early



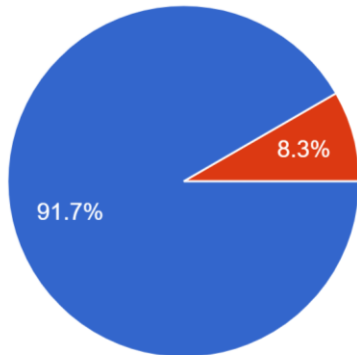


# Chill mitigation survey 2021

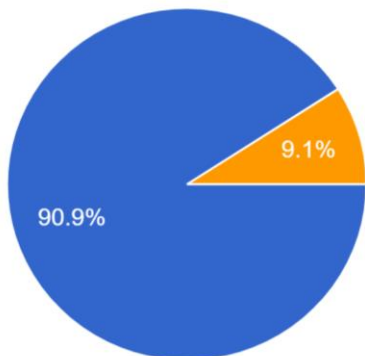
Number of responders : 12

Was any mitigation action taken

12 responses



● Yes  
● No



● Oil  
● Polymer  
● Both  
● Non

Time of application: 3<sup>rd</sup> to 4<sup>th</sup> week of August

Age: 2 to 30 YO

Concentration : 4 to 6 %

Rate of application : 1000 to 3500 L /ha

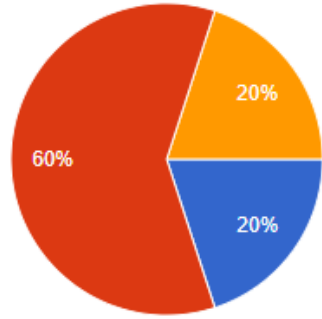
Speed : 2 to 4 kmph

Polymer spray : Taken by Richard & CMV farms – research purpose

Bud break in oil treated trees: Mid Sep

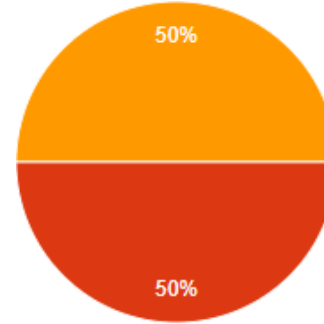
Bud break in untreated trees : First week of Oct

## Bud break



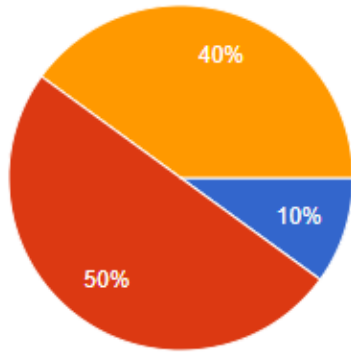
- Earlier than usual
- About the same
- Later than usual

## Flowering



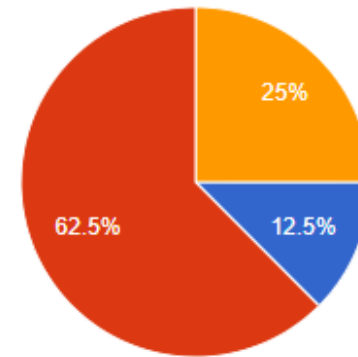
- More even than usual
- About as even as usual
- More uneven than usual

## Bud break



- More even than usual
- About as even as usual
- More uneven than usual

## Flowering



- Earlier than usual
- About the same as usual
- Later than usual