



Summer Internship 2023 – 2024

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Massey University

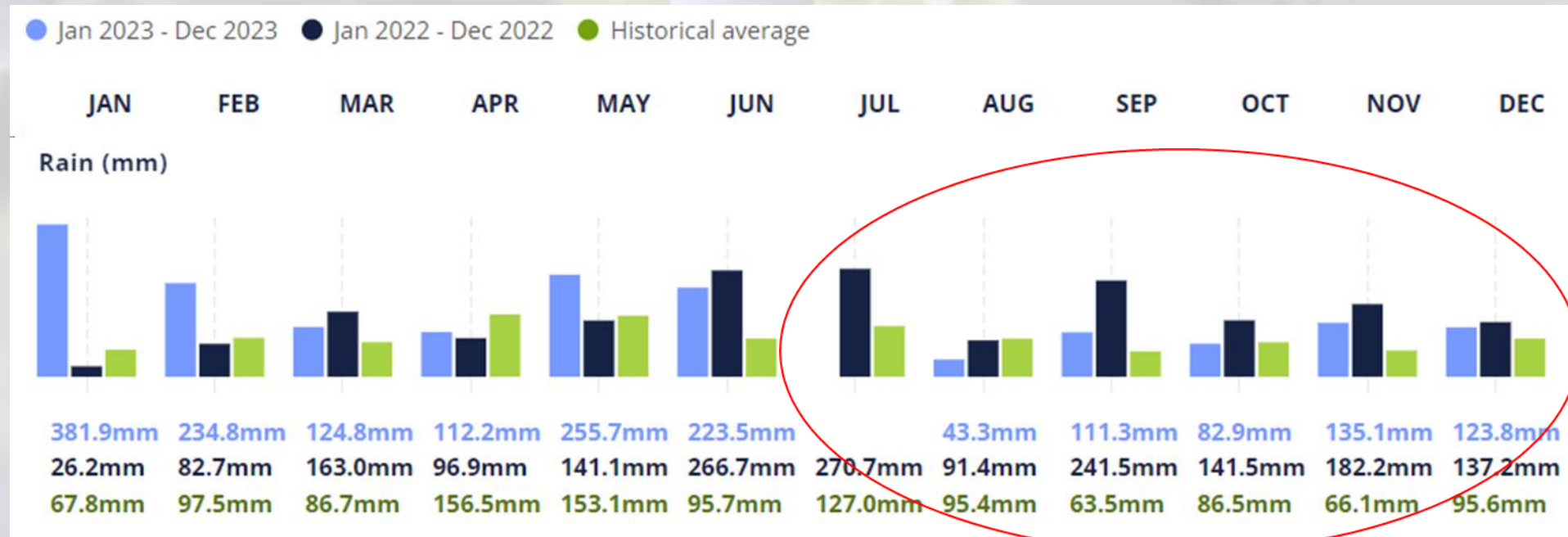


# Introduction

- Hello! My name is Annie
- I am in the final stages of completing my bachelor of Horticultural Science degree at Massey University, just this summer to go.
- Something fun about me is I LOVE CATS! And run a cat rescue in Palmy
- Thank you to BerryCo for allowing me to return this summer for a second internship.
  - This involved a wide range of work, such as:
    - Working at Plant & Food Research
    - Assisting with and analysing multiple trials
    - Analysing spray diaries and residue tests
    - Analysing fruit and leaf nutrient samples that had been sent to hills

# A different season to last year

- Botrytis expression post-harvest was substantially less compared to last year
- A big contributor to the decrease in disease pressure was the climate



Source: Tauranga Metservice

# Berry Collapse Trial Overview

**Aim: to understand if the postharvest berry collapse was biological (e.g. botrytis) or physiological/other nature.**



**Plant & Food<sup>TM</sup>  
Research**

Rangahau Ahumāra Kai

# Berry Collapse – Orchard Sample Collection



<b>Grower</b>	<b>Variety</b>	<b>Date Sampled</b>
1	Sunrise	11/11/2023
1	Eureka	11/11/2023 17/11/2023 23/11/2023
1	Masena	11/11/2023 17/11/2023 23/11/2023
2	Eureka	11/11/2023 17/11/2023 23/11/2023
2	Masena	11/11/2023 17/11/2023 23/11/2023

# Berry Collapse – Packhouse Sample Collection

Grower	Class	Variety	Arrived At Yeildia	Processed at Yeildia
2	General Reject	Masena	*	21/11/2023
1	Other Reject	Mixed	20/11/2023	22/11/2023
			23/11/2023	24/11/2023
			24/11/2023	27/11/2023
			4/12/2023	5/12/2023
1	Soft Reject	Mixed	20/11/2023	22/11/2023
			23/11/2023	24/11/2023
			24/11/2023	27/11/2023
			4/12/2023	5/12/2023
1	River Run	Mixed	20/11/2023	22/11/2023
			24/11/2023	27/11/2023
			4/12/2023	5/12/2023
1	Premium	Mixed	20/11/2023	22/11/2023
			24/11/2023	27/11/2023
			4/12/2023	5/12/2023

\* Date unknown



Other Reject

Soft Reject

# Berry Collapse – Sample Preparation



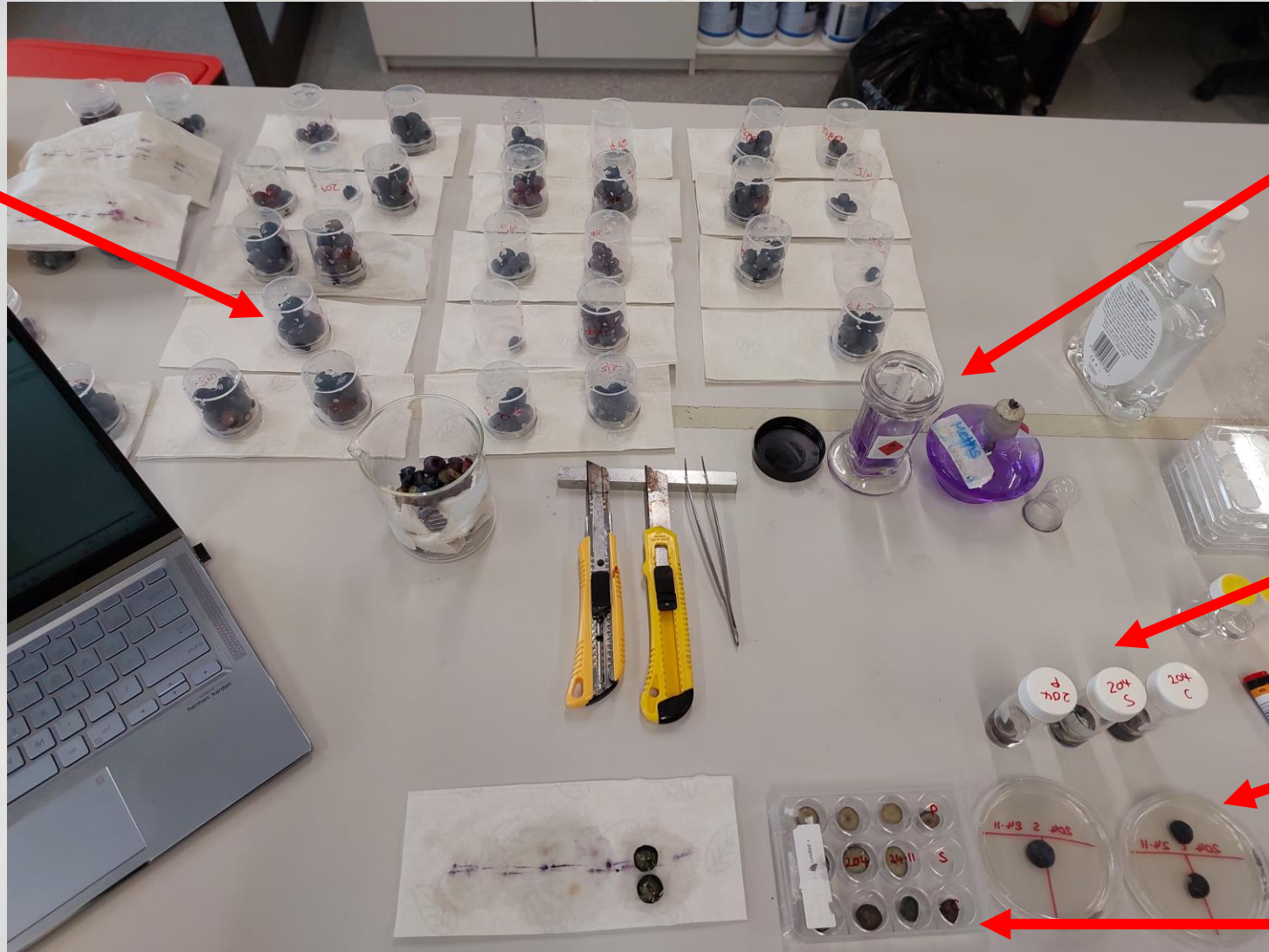
Humidity Chamber

Agar Dish

Titre Plate

# Berry Collapse – Sample Preparation

Surfaced Sterilised  
Berries



Sterilisation  
Between Each Cut

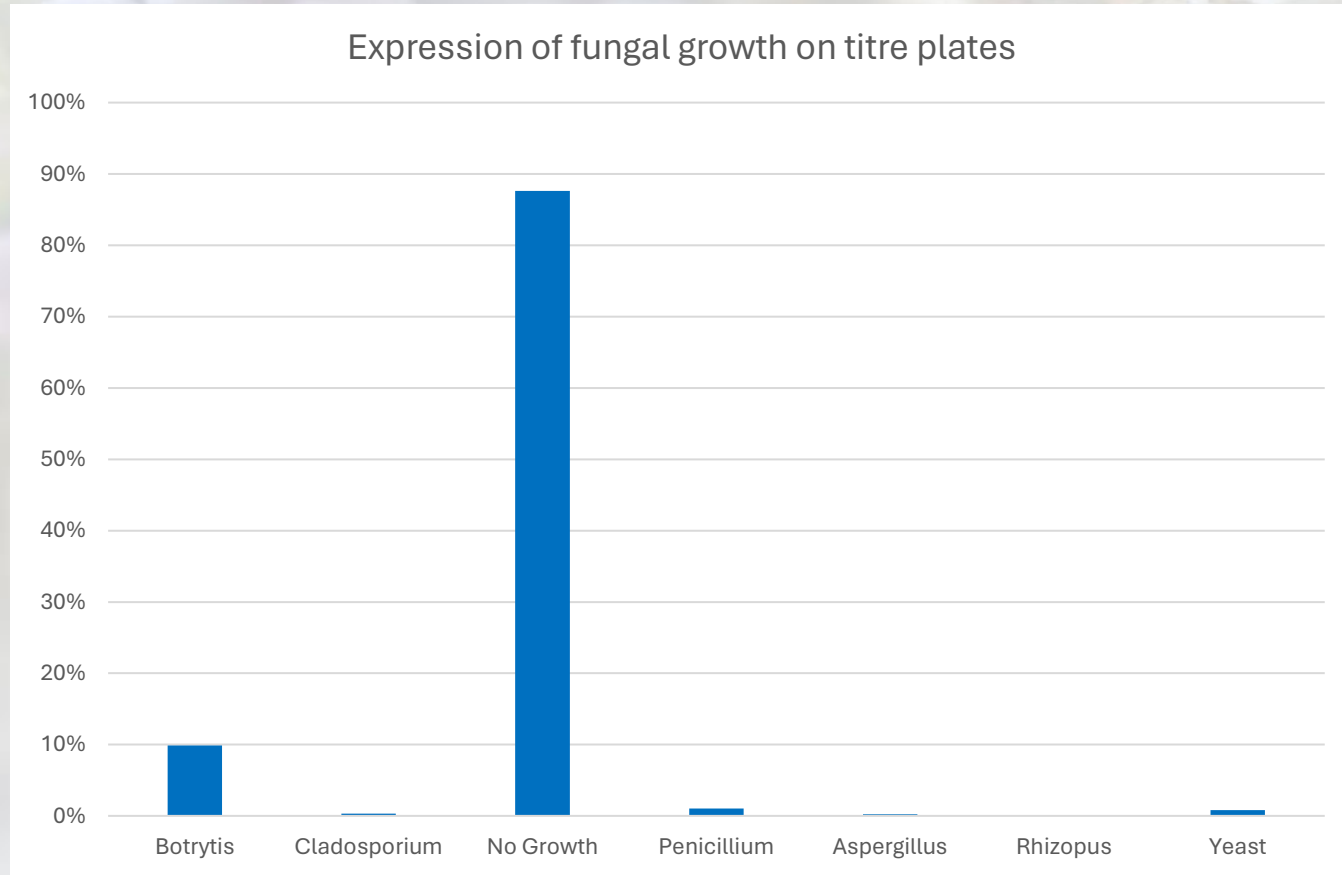
Fixative

Agar Dish

Titre Plate

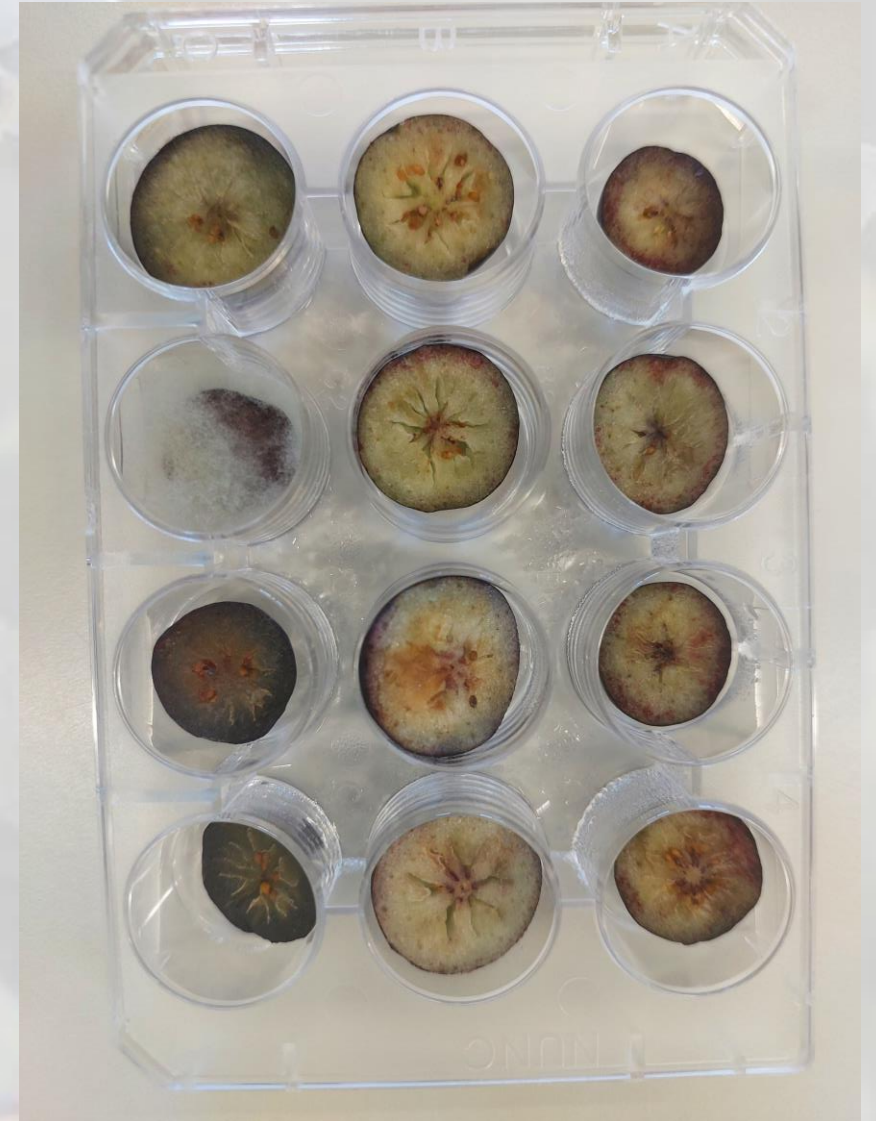


# Berry Collapse – Preliminary Results



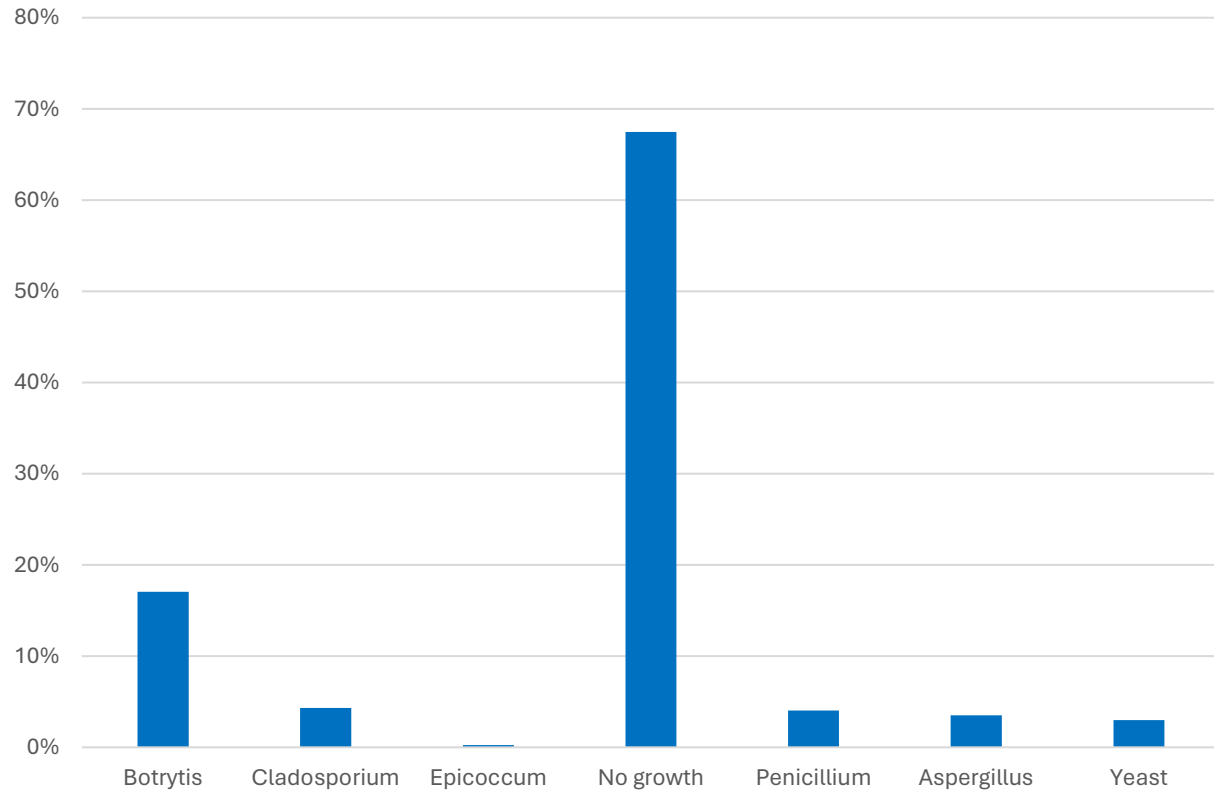
\*All berries were surfaced sterilised

Observational note: not all berries with internal browning (breakdown) expressed botrytis over the 7 day monitoring period.

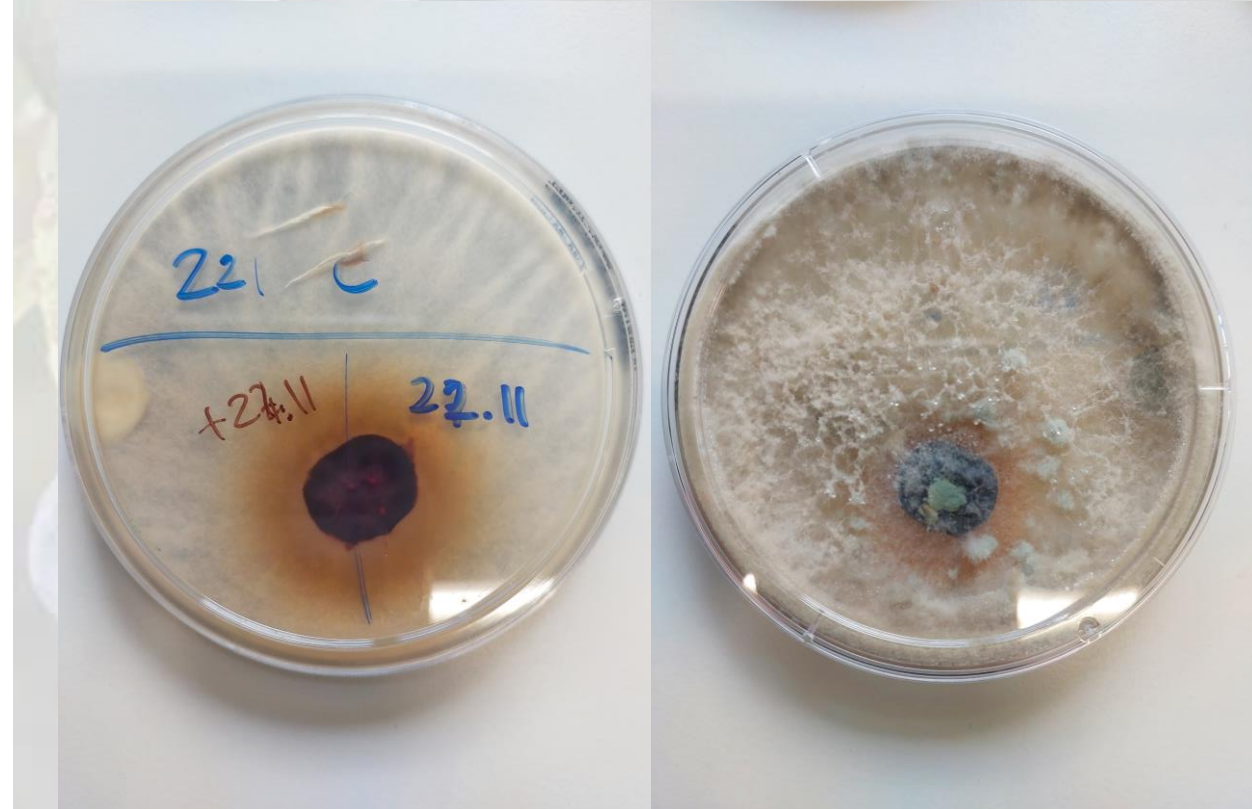


# Berry Collapse – Preliminary Results

Expression of fungal growth on agar plates

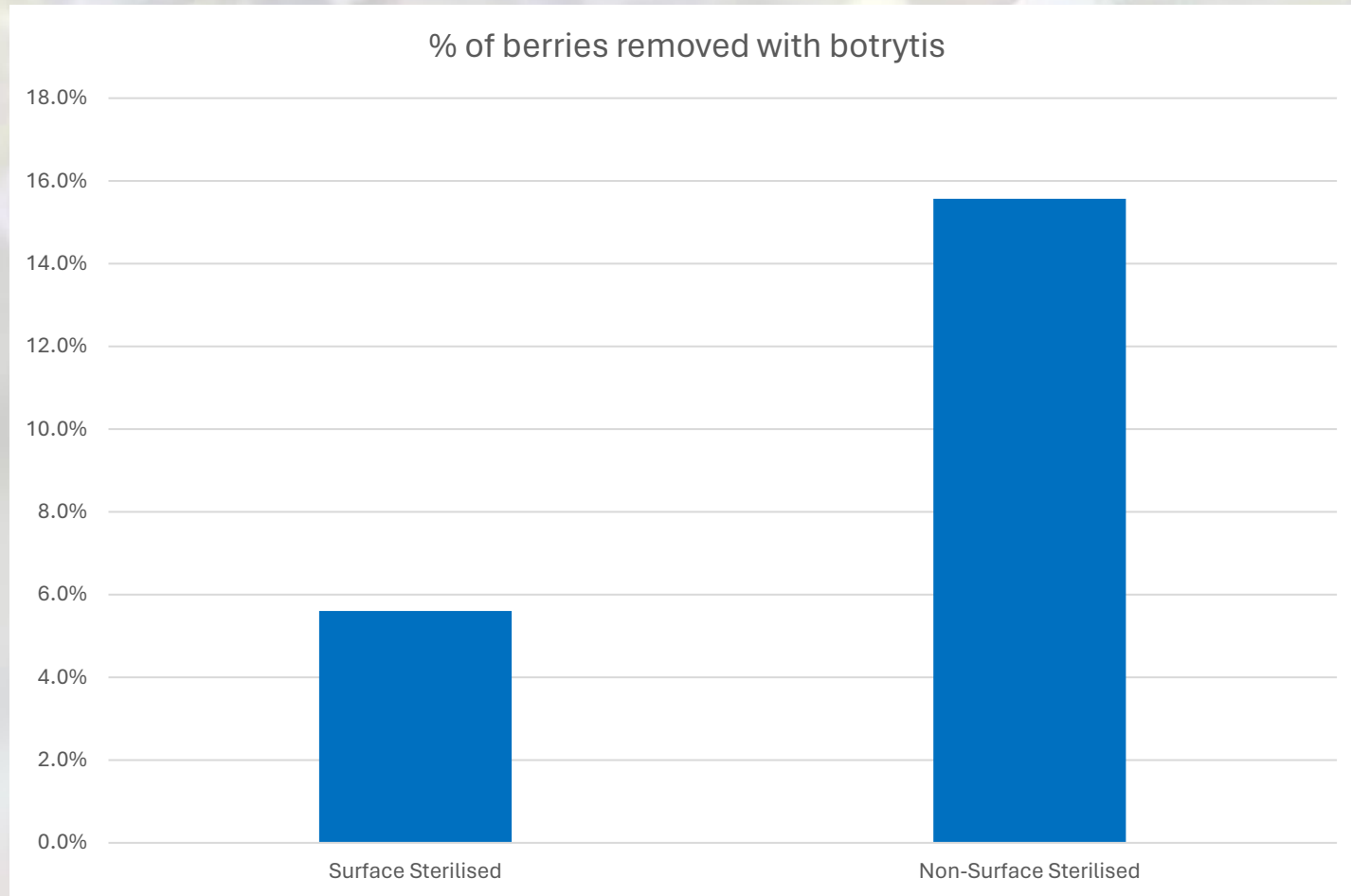


\*All berries were surfaced sterilised



Botrytis

# Berry Collapse – Preliminary Results



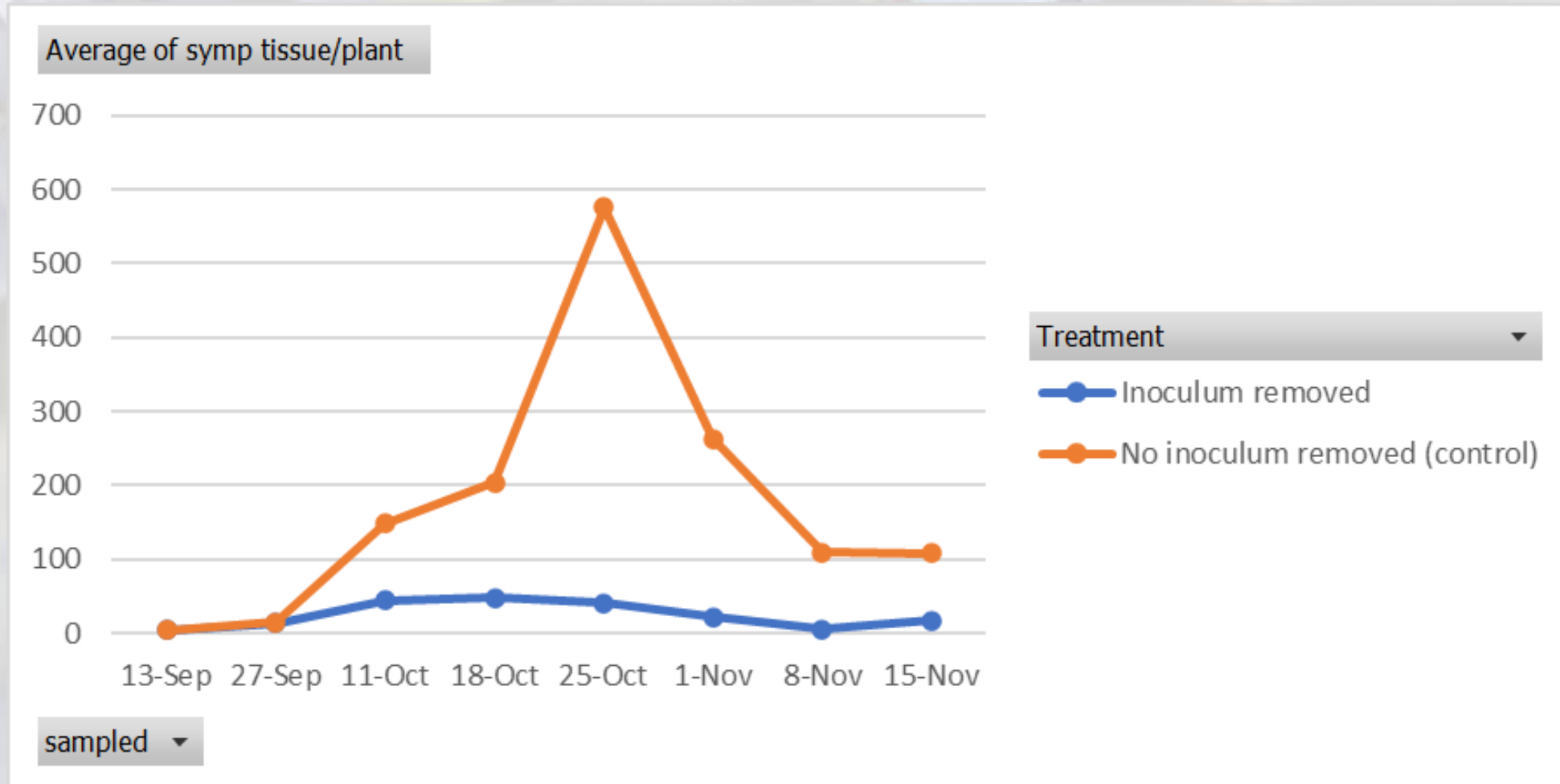
# Picking Scar Botrytis Expression (Stems vs No Stems)

Variety	% Botrytis		Storage temp
	Stems	No Stems	
Eureka	2.2	6.7	12 °C
Sunrise	16.7	56.7	Room Temp

Observational note: There was an approx. 3 fold increase of botrytis where berries had no stems.



# Inoculum Trial – A Glimpse at Preliminary Results (PFR)



Counts of symptomatic tissues (mainly aborted flowers) per plant in inoculum removed tunnel and control tunnel.

# Berry Collapse – Preliminary Discussion

- These preliminary conclusions are drawn from my observations and data interpretation; further analysis by Plant and Food Research is underway and will be presented to BerryCo in the coming months.
- Among agar and titre-monitored surface-sterilised blueberries, only a minimal percentage expressed botrytis.
- In humidity chambers, non-surface-sterilised blueberries displayed a higher botrytis expression compared to surface-sterilised ones.
- The expression of post harvest botrytis in fruit is more likely due to picking scar infection from spores at harvest than from 'latent' botrytis infection at flowering.



I will now move on to show some highlights  
from data analysis...

# Leaf Nutrient Content Summary – 2021-2023

	<b>MBO Range</b>	<b>Hills Range</b>	<b>Grower Range</b>	<b>Grower Mean</b>
<b>Macro</b>				
Nitrogen	1.8 - 2.2	1.8 - 2.1	0.9 - 2.4	1.7
Phosphorous	0.12 - 0.3	0.12 - 0.4	0.08 - 0.22	0.1
Potassium	0.6 - 1.2	0.3 - 0.60	0.5 - 1.5	0.8
Calcium	0.4 - 1	0.4 - 0.8	0.21 - 0.74	0.4
Magnesium	0.12 - 0.25	0.12 - 0.25	0.09 - 0.29	0.2
Sodium	0 - 0.25	0 - 0.05	0.002 - 0.094	0.0
Sulphur	0.12 - 0.25	0.13 - 0.2	0.11 - 0.62	0.2
<b>Micro</b>				
Iron	60 - 150	60 - 200	33 - 146	51.4
Manganese	50 - 500	50 - 350	20 - 350	105.0
Copper	2.0 - 10	5.0 - 20	2.0 - 36	6.0
Boron	30 - 100	30 - 70	14 - 118	40.3
Zinc	12.0 - 30	8.0 - 30	12 - 132	39.9

Units for macro are % and micro mg/kg (dry weight)



# Fruit Nutrient Content – 2023 Grower Summary

	<b>*Published Range</b>	<b>Grower Average</b>	<b>Grower Range</b>
<b>Macro</b>			
Nitrogen	74 - 103.1	94.3	30.7 - 163.5
Phosphorous	6.8 - 20	16.7	12.4 - 23.1
Potassium	66 - 98	85.1	70.6 - 104.7
Calcium	6.6 - 15.2	8.9	4.6 - 12.5
Magnesium	4.5 - 10	6.2	4.4 - 7.7
Sulphur	10.1 - 25.4	12.7	7.7 - 16.5
<b>Micro</b>			
Iron	0.15 - 0.57	0.19	0.11 - 0.71
Manganese	0.14 - 1.52	0.38	0.11 - 1.4
Copper	0.01 - 0.09	0.04	0.02 - 0.12
Boron	0.08 - 0.14	0.10	0.08 - 0.16
Zinc	0.06 - 0.13	0.09	0.06 - 0.12

\*Data for published range from Krishna et al., 2023

Units mg/100g (wet weight)

# Residue Analysis – Fail Summary

Product	Active	# Orchard fails	Fail Reason	Action
Pristine	Boscalid	1	3x label rate	50g/100L
Dithane, Manzate	Mancozeb	5	<120 days between application & residue test  250 g/100L applied	>120 days  200g g/100L
Folpan	Folpet	1	Long residue breakdown	Not recommended
Movento	Spirotetramat	3	3 consecutive sprays just before flowering	Alternate sprays
Mortar, Applaud, Ovation	Buprofezin	1	All export MRLs are non-detectable (0.010 mg/kg)	Post-harvest only
Weedmaster	Glyphosate	1	NZ MRL is non-detectable (0.010 mg/kg)	Not recommended in or around tunnels



**Thank you for listening...**

**Are there any questions?**