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AUSTRALASIA

SESSION SIX

Session Six
Postharvest quality, outturn

New Zealand and Australia Avocado Grower's Conference'05
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Is Ripening and Post Harvest Quality Affected by Fruit Water Status?

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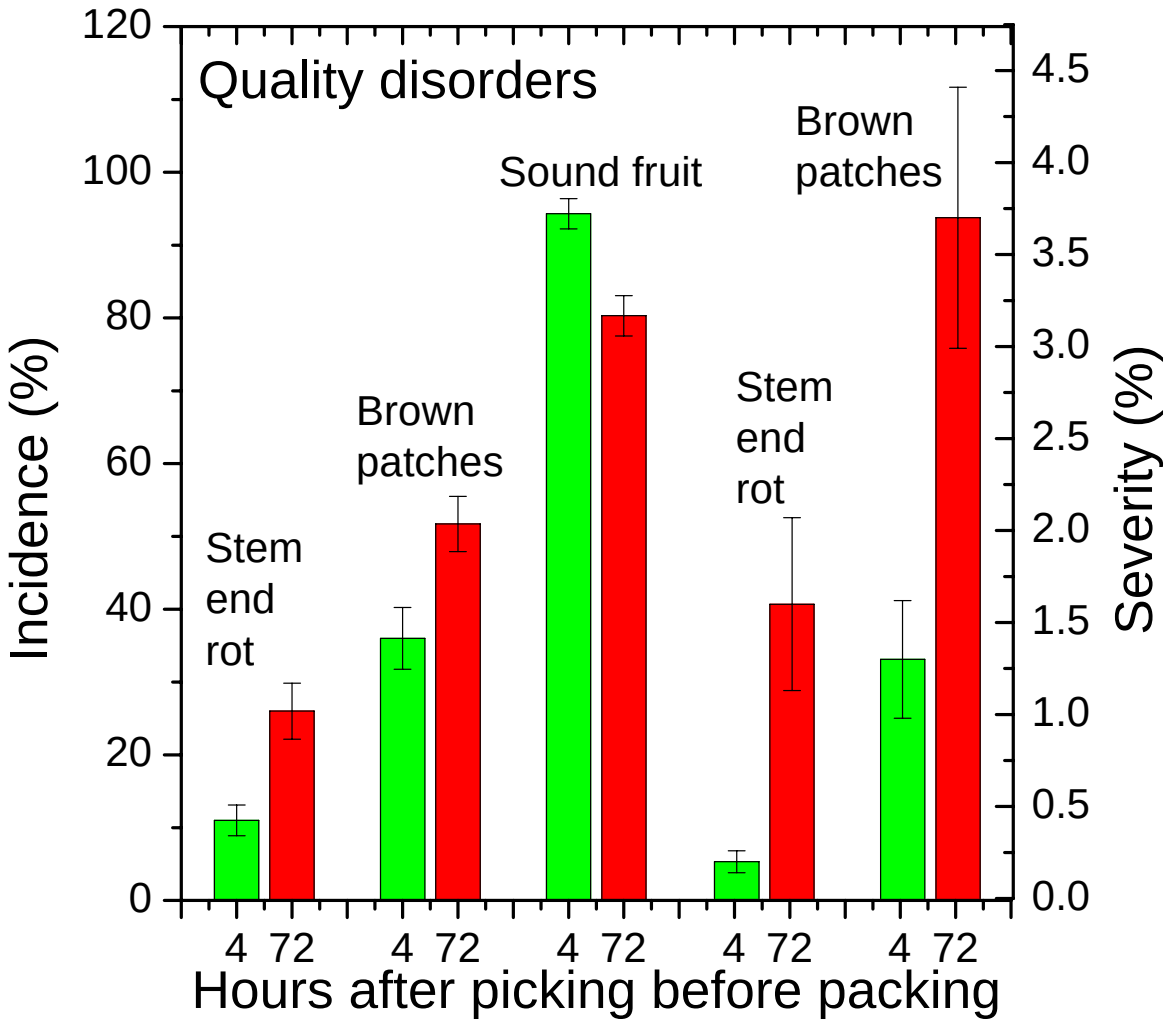
Avocado Industry Council Ltd
FRST contract no. AVIX0201

Introduction

- The incidence and severity of disorders increases when pick to pack times exceed 48 hours
- Observed in library trays
- Stem end rot and body rot (brown patches) are the main disorders affected

Quality and Delays Before Storage

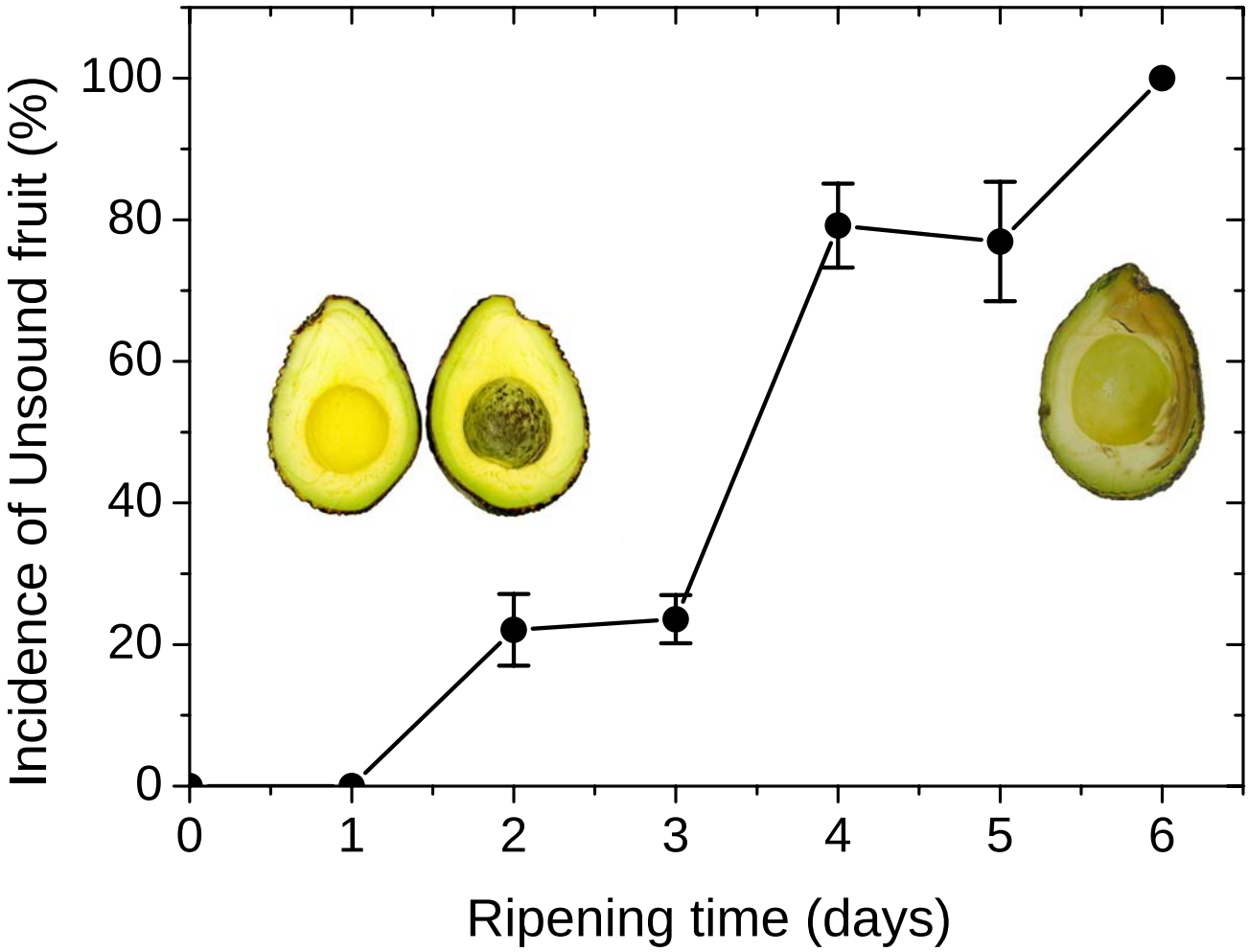


Introduction

The amount of water loss after harvest may be inducing earlier ripening because:

- High water loss rates - faster ripening (Bower and Cutting, 1988; Lallu et al, 2002, 2003, 2004)
- Low water loss rates – slower ripening (Dixon et al, 2003, 2004)

Ripening time and rots



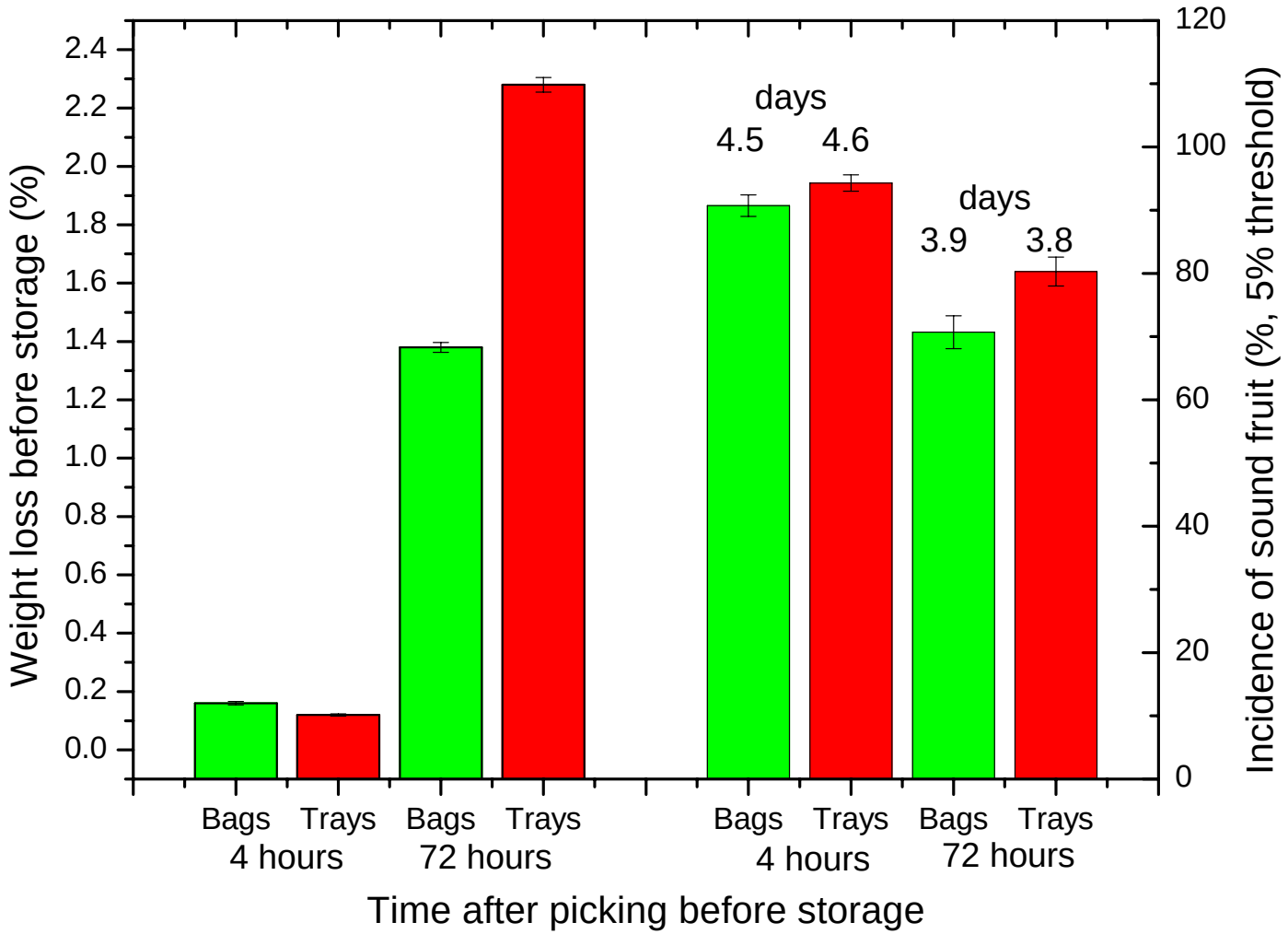
Introduction

Conducted a series of experiments looking at quality in relation to ripening and water loss

We manipulated ripening by:

- Increasing water loss after harvest
- Decreasing water loss after harvest
- Adding water to the fruit (imbibing) at different physiological stages

Water loss after harvest



Weight loss

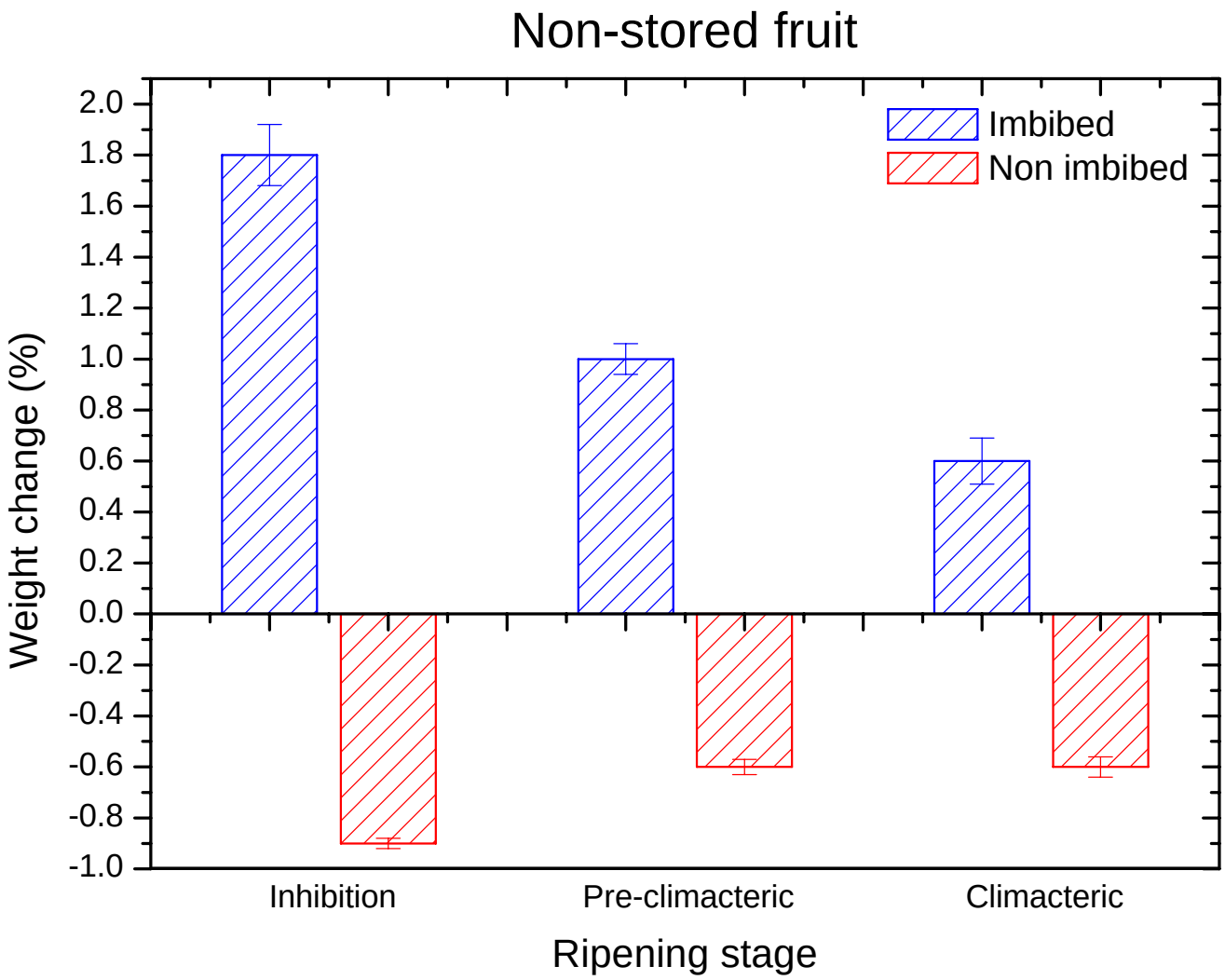
Instead of removing water what happens if we add water to the fruit?

Do we get the opposite results to water loss?

Experimental

To see if we could slow down ripening water was imbibed into freshly harvested fruit

Ripeness stages



Ripeness stages

	Ripening time (days)		
Stage	Inhibition	Pre-climacteric	Climacteric
Imbibed	10.6a	9.7a	11.7a
Non-imbibed	9.4b	10.3b	10.2b
	Sound fruit (%, 5% threshold)		
Stage	Inhibition	Pre-climacteric	Climacteric
Imbibed	79.3	93.3	90.0
Non-imbibed	91.7	87.3	96.2

Imbibing

What else does the amount of water imbibed tell us?

Amount of water imbibed may measure fruit water potential

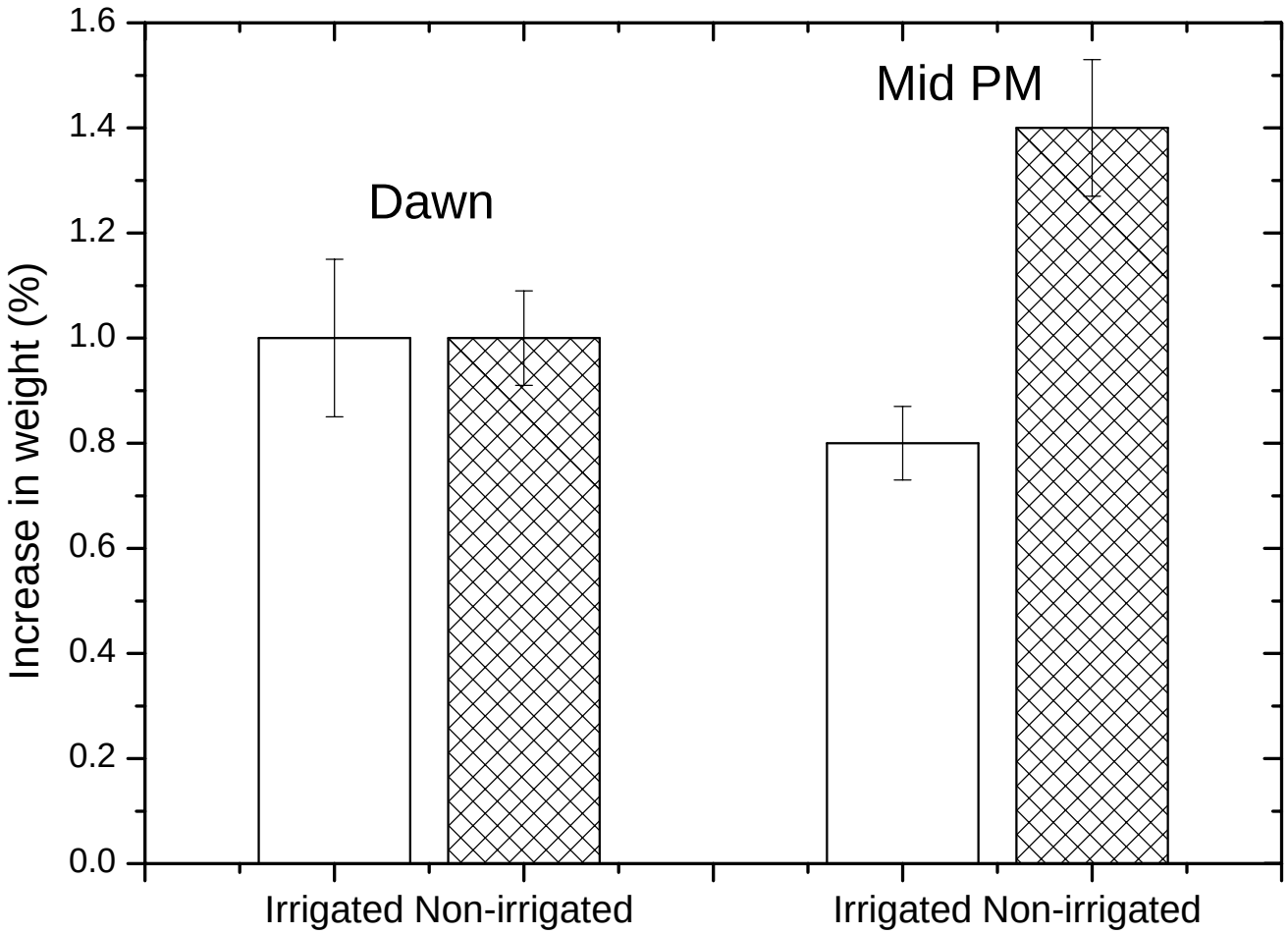
- how readily water moves into the fruit
- indicate fruit water status
- may explain some of the variation in quality disorders

Experimental

Factors that affect fruit water status may be:

- Irrigation
- Rainfall

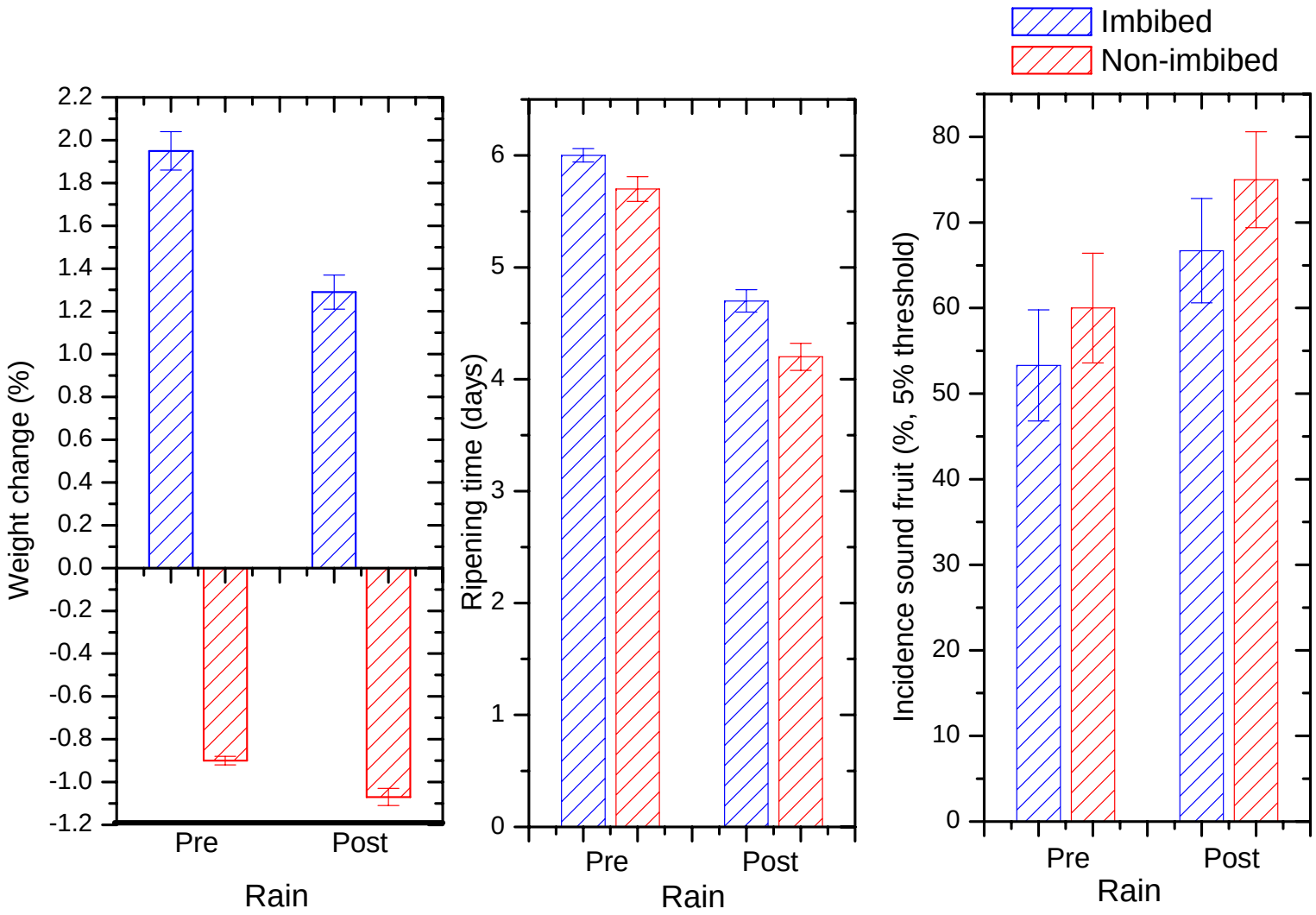
Irrigated vs Non Irrigated fruit



Irrigated vs Non-Irrigated Fruit

Time of Day	Imbibed		Non-imbibed	
	Irrigated	Non-irrigated	Irrigated	Non-irrigated
Ripening time (days)				
Mid PM	4.4	4.1	4.7	3.6
Incidence of sound fruit (%, 5% threshold)				
Mid PM	55.9	71.7	75	95

Effect of rain



Conclusions

- The loss in quality with delays before packing is more because the fruit increase in ripeness rather than due to weight loss
- The fruit water status at harvest affects ripening which influences the amount of ripe rots
- This means what happens to the fruit before harvest and how the fruit are handled after harvest and by the packer affects final fruit quality

Acknowledgements

Thanks to the following avocado growers for fruit for the various trials:

Hugh Moore
Graham Body
Dan & Rose Cook
Kevin Holley
Drew Skowrup
Kim Crocker
Debbie Fleming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Library Trays
– a powerful tool in fruit quality management

Dr Henry Pak

Dr Jonathan Dixon

Dr Jonathan Cutting

Avocado Industry Council

Introduction

- Cornerstone of quality improvement programme – export focus
- Feedback on fruit quality
  → Improve quality on-orchard
- Runs in parallel with out-turn monitoring
- Initially best practice, now compulsory
- Over several seasons has successfully identified quality issues and contributing factors

Methods

- ~ 20 fruit sample after grading
- Each PPIN, every 2nd picking round
- Coolstored 28 days 5 °C
- 1st assessment = external quality
  - on removal from coolstorage
- Ripened at 20 °C
- 2nd assessment = internal quality
  - at eating ripe
- Entered into central database

Number of fruit sampled

2001/2	30,023
2002/3	22,192
2003/4	23,882
2004/5	25,873
	101,970

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Main quality disorders

Brown patches

Fuzzy patches

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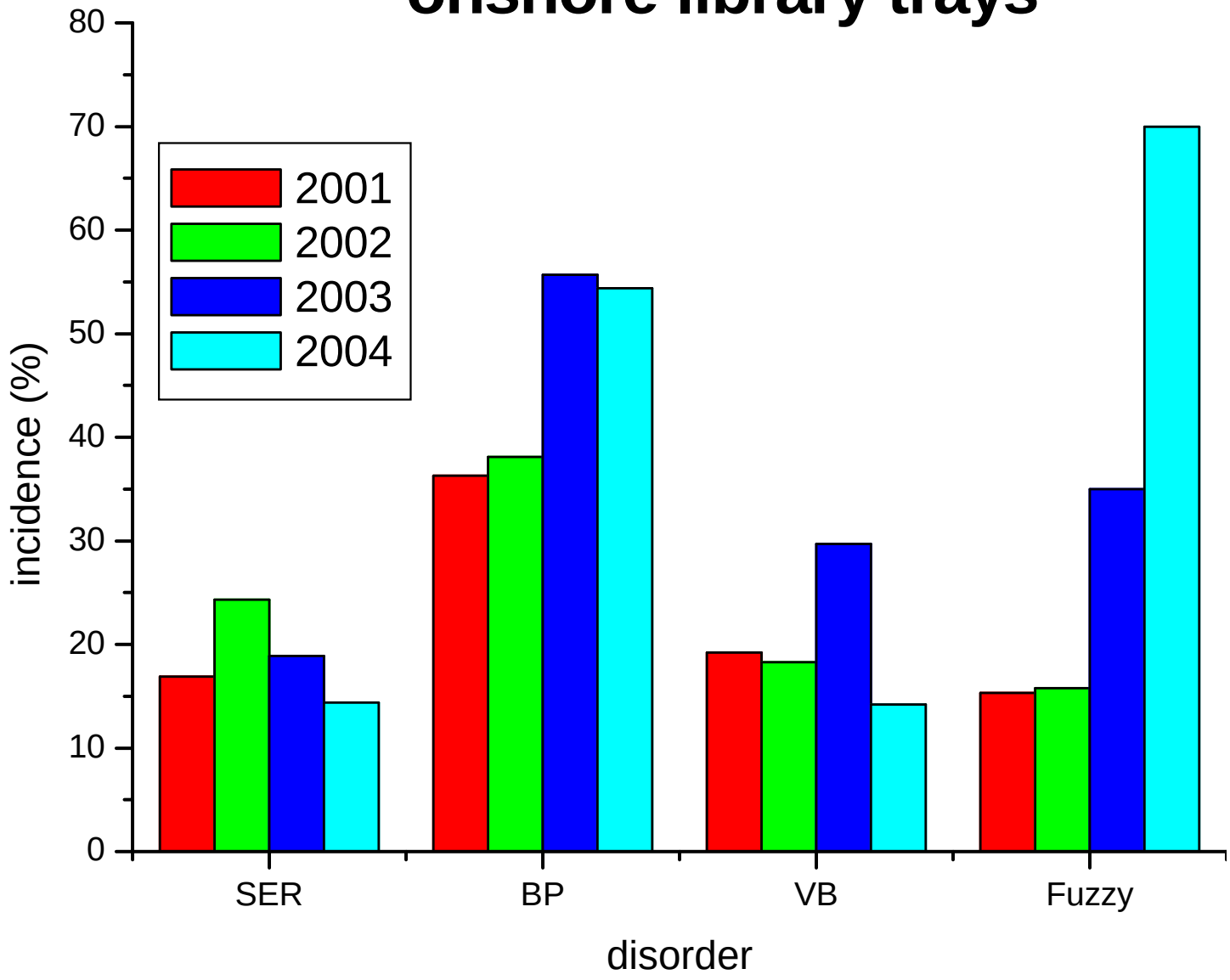
onshore library trays



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Seasonal trends

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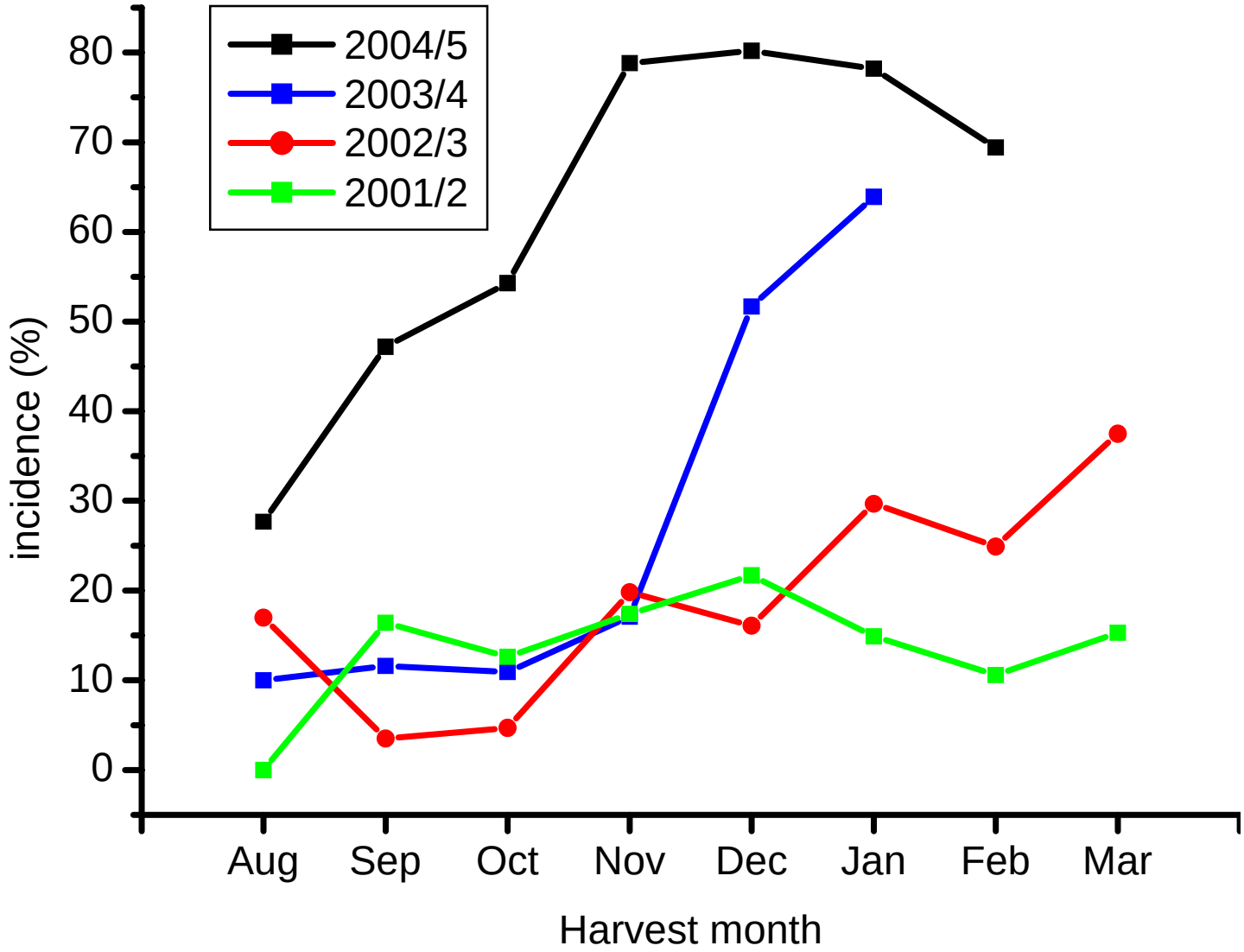
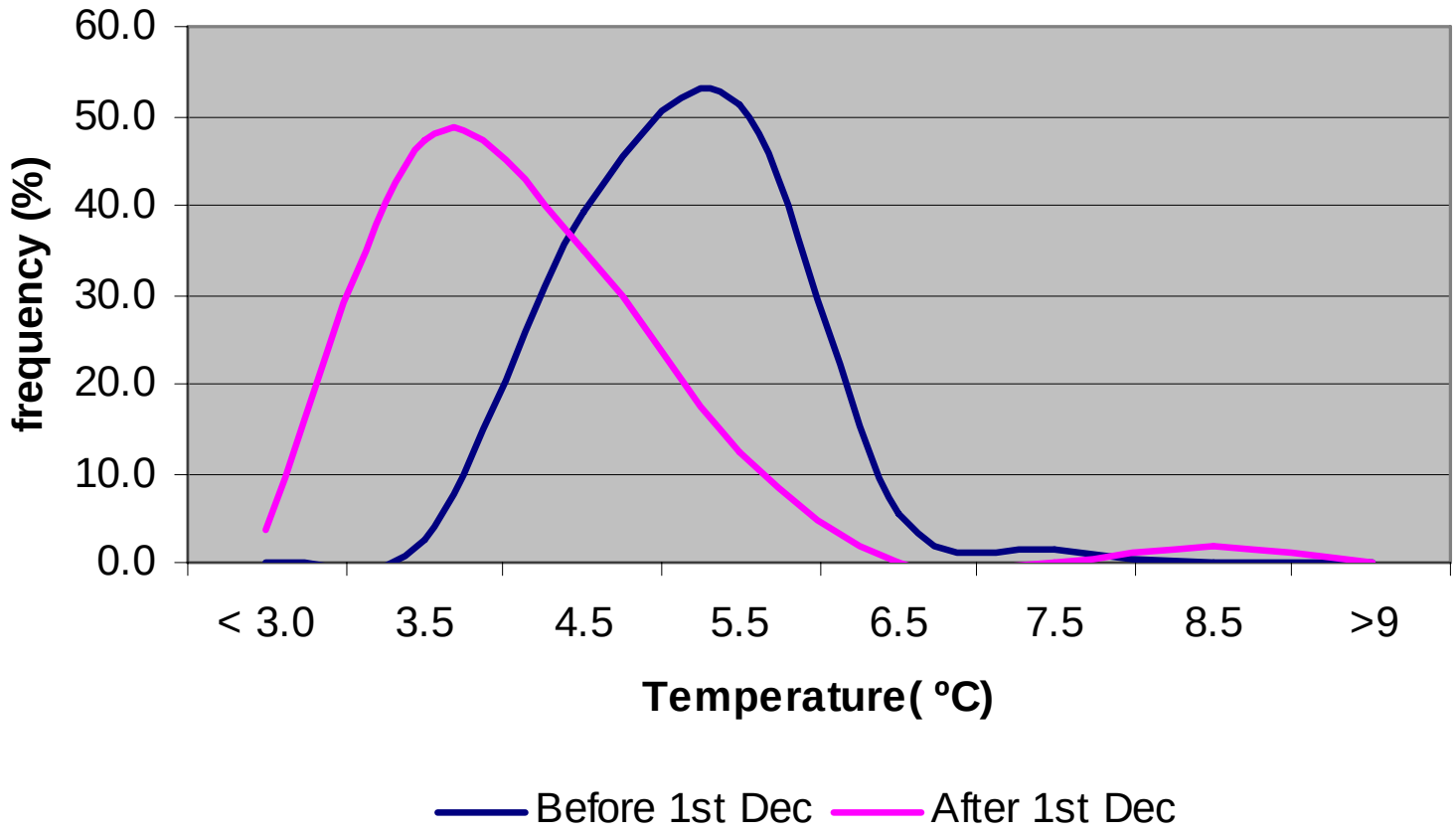
Fuzzy patches



Flesh temperature audits



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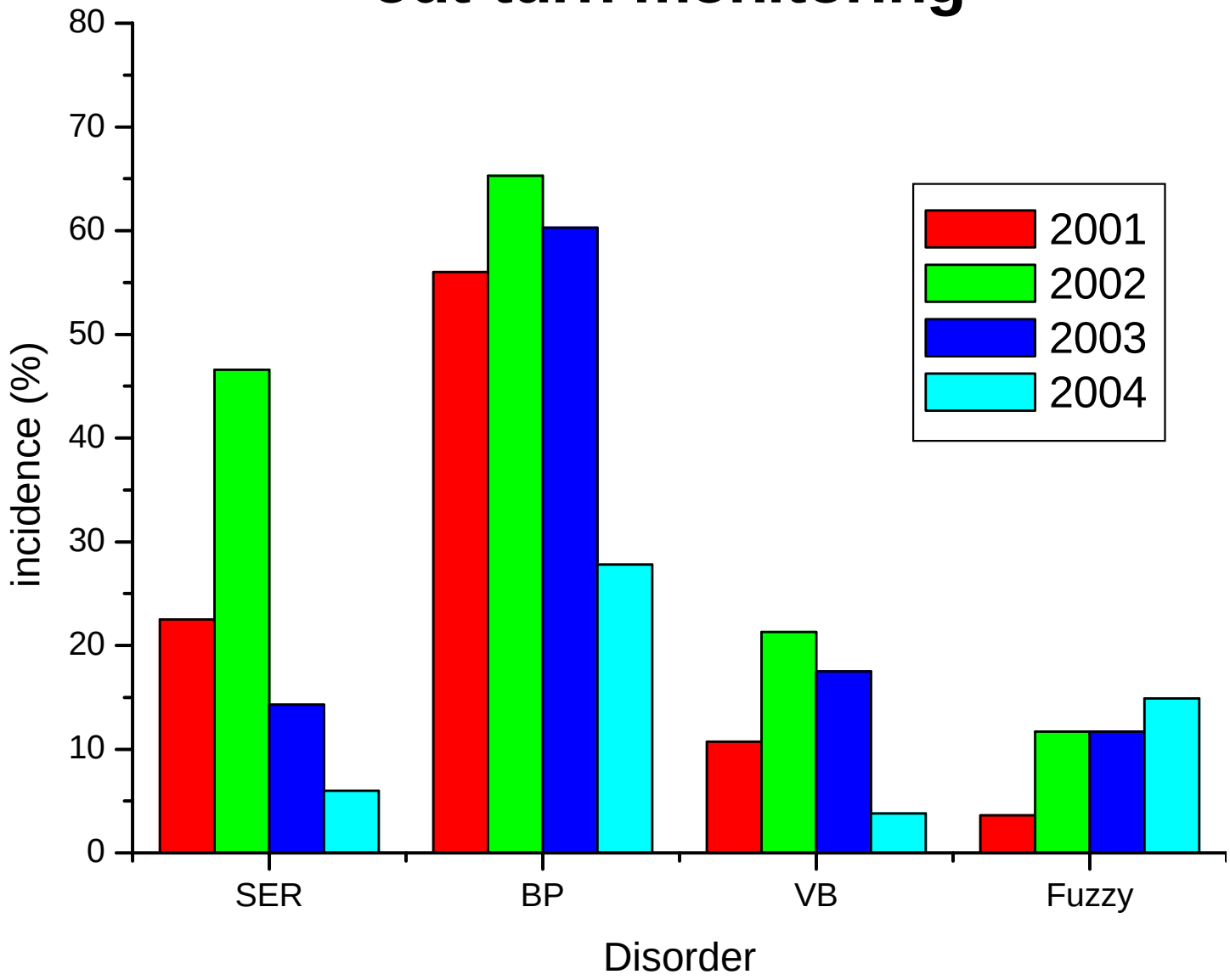
out-turn monitoring



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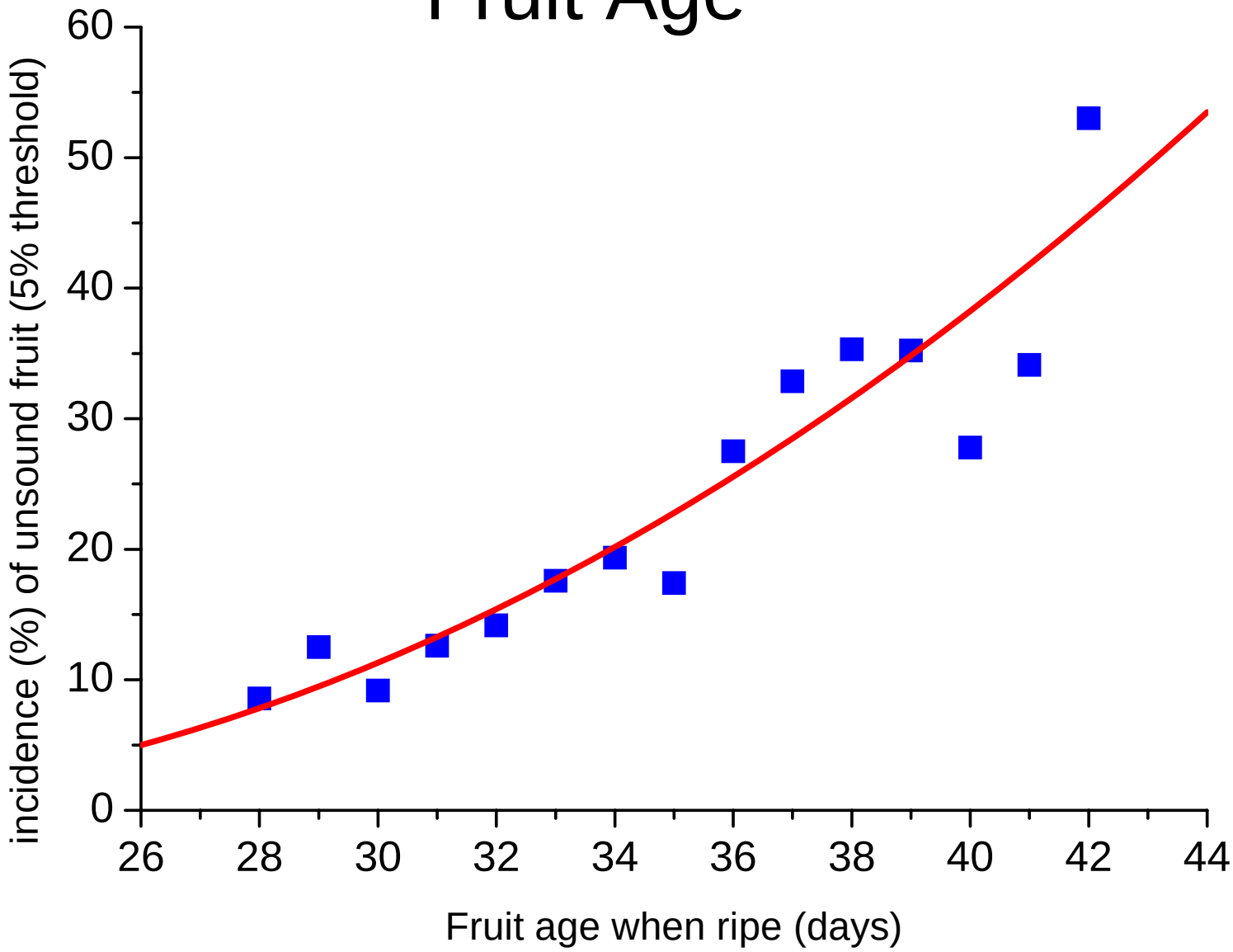
Fruit Age

Fruit Age


incidence (%) of unsound fruit (5% threshold)
0
10
20
30
40
50
60
26
28
30
32
34
36
38
40
42
44
Fruit age when ripe (days)

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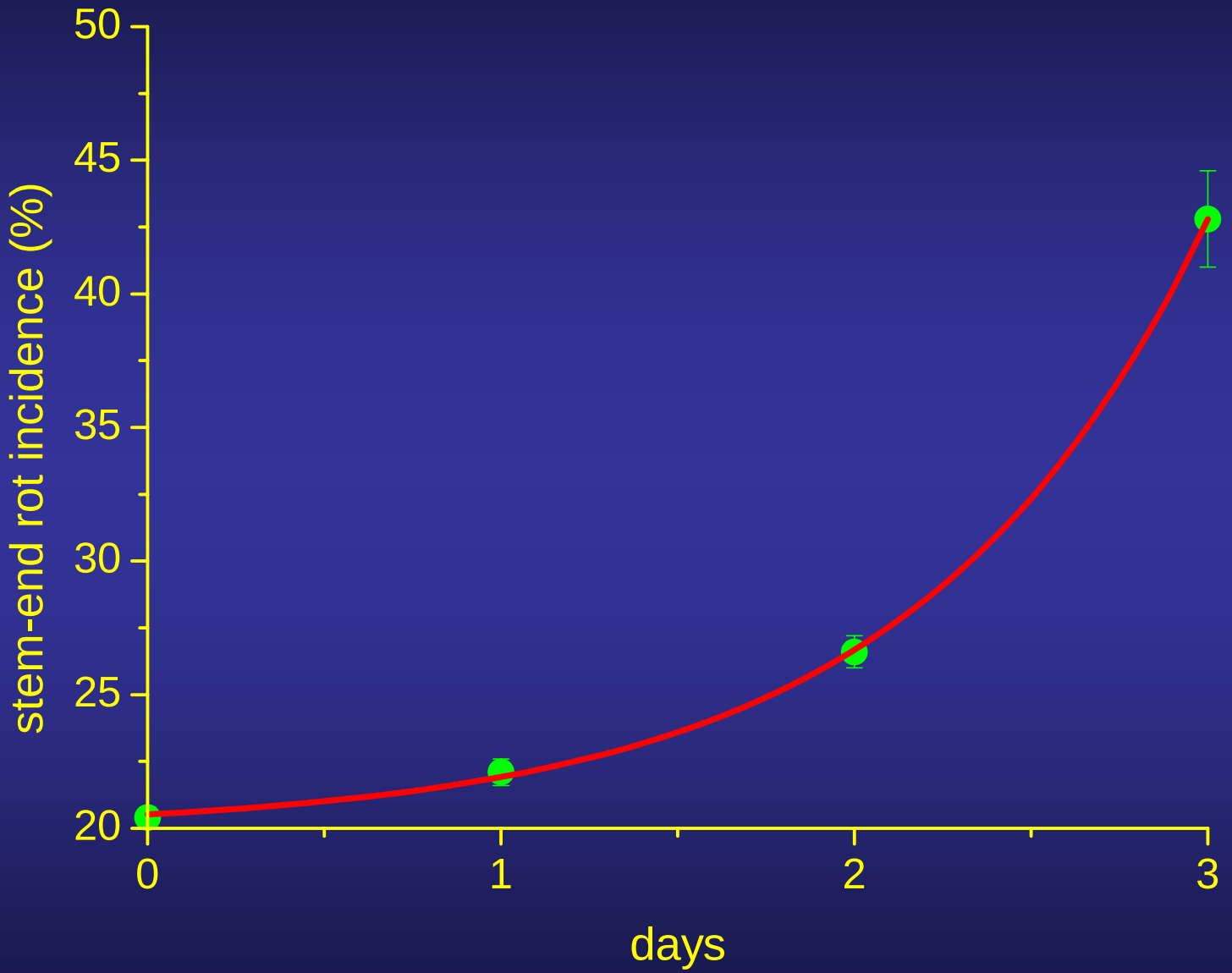
Pick to Pack Time

Pick to Pack Time



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Wet Fruit

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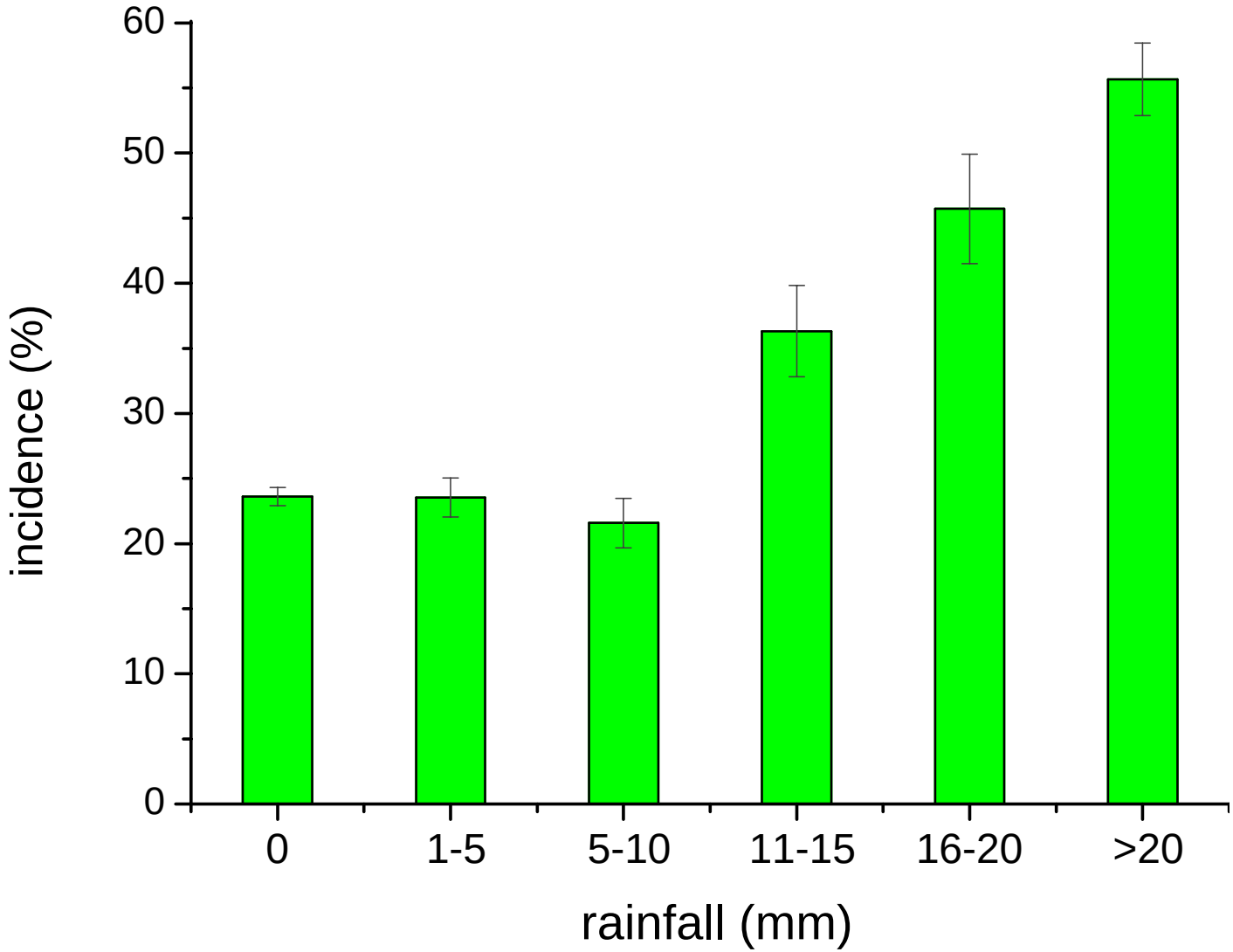
influence of rain on stem-end rots



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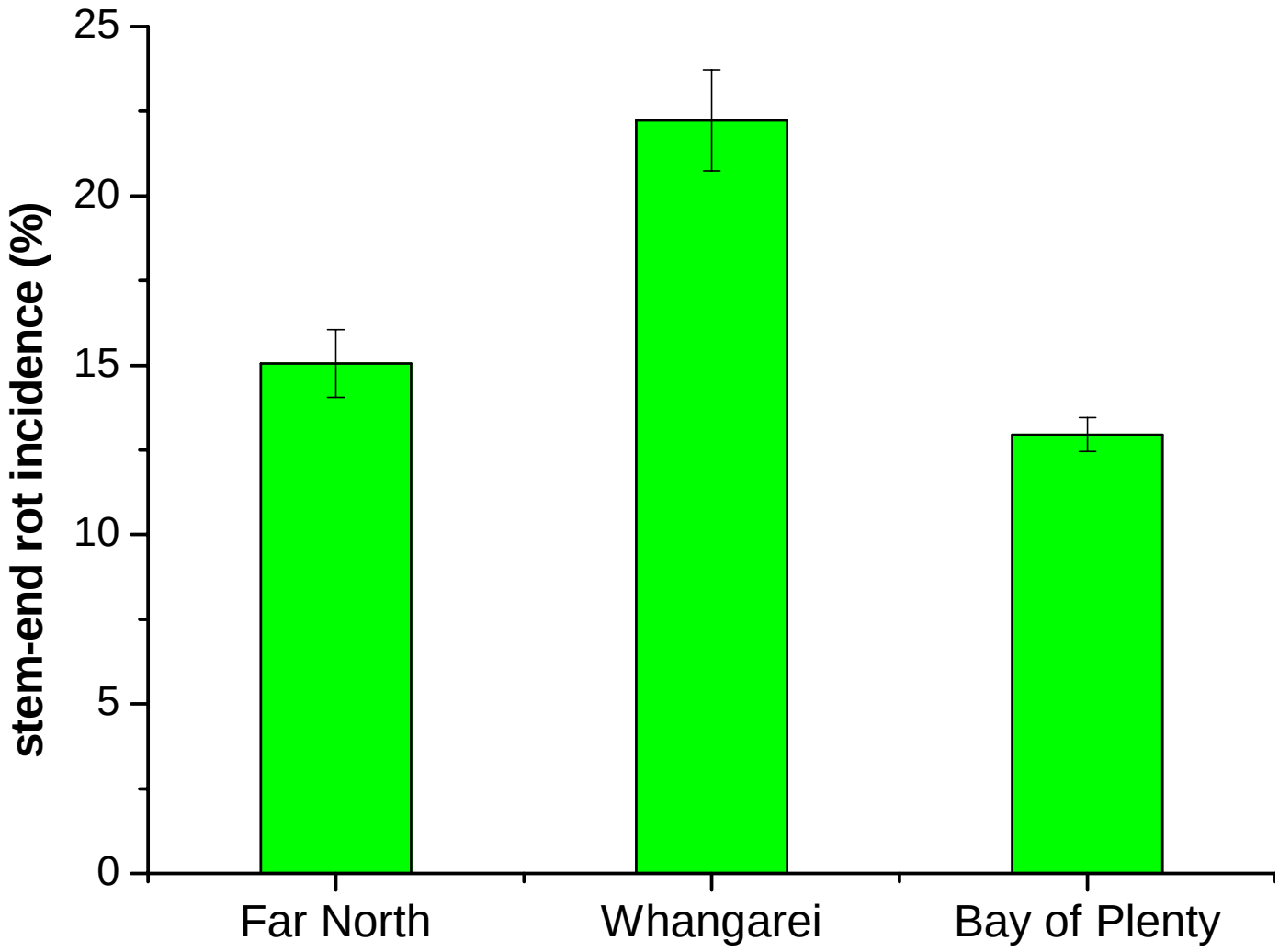
Regional comparisons

Regional differences



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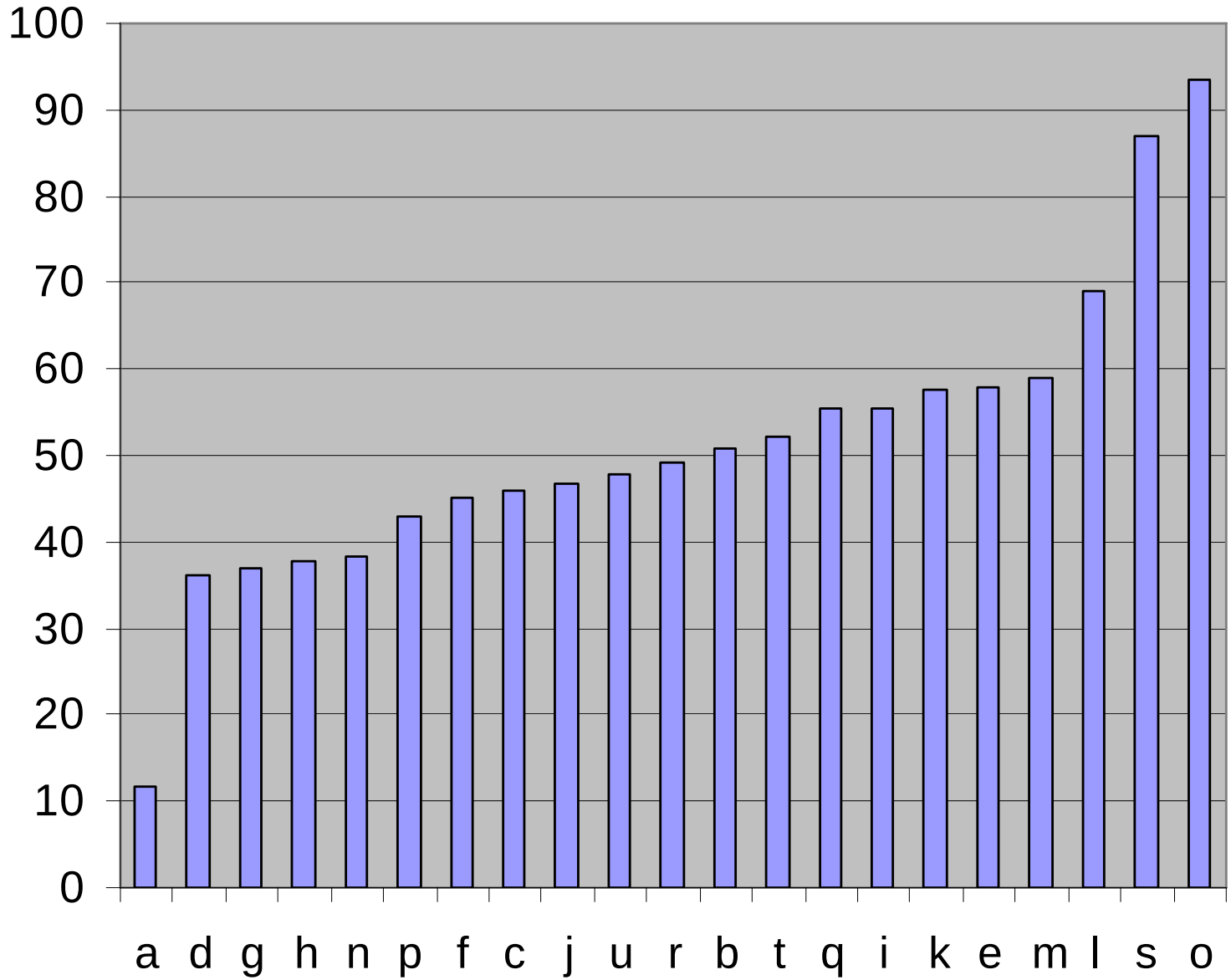
Packer Reports

Shed averages – incidence brown patches



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Grower comparisons

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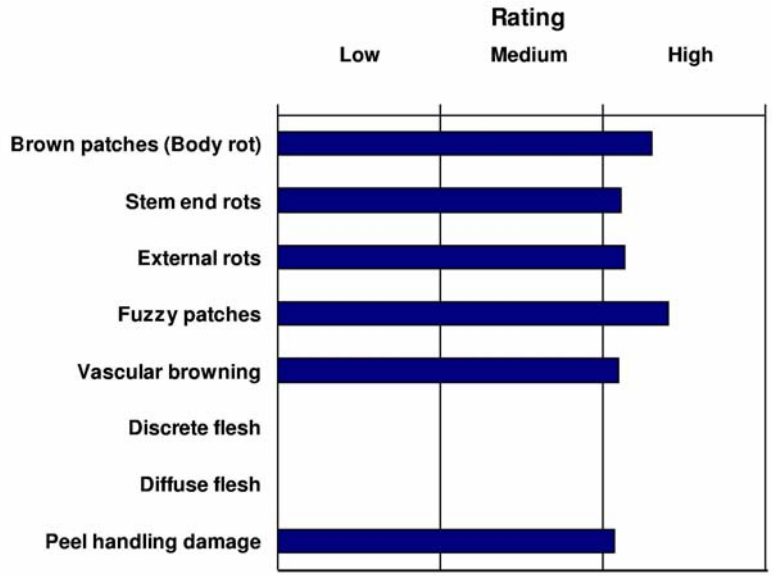
Library Tray Grower Report

Packhouse [redacted]
Pick date 16/01/05

Grower [redacted]
Season 2004

25/02/05



Comparisons based on Unsound Fruit

For assistance with interpretation of this report please refer to the Avocado Industry Council website (www.nzavocado.co.nz)

Conclusions

- Provides framework for quality improvement - feedback
- Successfully identified quality issues and causal factors over several seasons
- Allows remedial action within season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