

Post harvest mango quality study

Gingin 2018 Harvest
KP fruit

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Aim

- To better identify where fruit quality issues are caused:
 - On the farm
 - Along the supply chain as a result of poor post harvest handling



Approach

- Five Gingin growers each supplied two trays of Kensington Pride mangoes for an assessment of post-harvest quality during the 2018 harvest.
- On February 28, 2018 one tray from each grower was taken to Mercers at Canning Vale for ripening under controlled conditions (20° C, 85% relative humidity, CO₂ venting and standard ethylene injection).
- A temperature/humidity logger was inserted into the cool room.
- Before being placed into the cool room the fruit was rated for a range of quality parameters as outlined in the AMIA 'Mango Quality Assessment Manual'.
- Photographs of the fruit were also taken.

Approach

- A second tray from each grower, from the same consignment as the tray mentioned above, was sent by each grower to their ripening agent.
- A logger was inserted into this tray at the packing shed to monitor temperature management during transport and at the ripening/market agents facility.
- On March 7, 2018 the trays which went to be ripened by the different agents were collected and placed in the same cool room as their sister trays which had been ripened at Mercers. On this date both trays from each grower were again assessed for the range of quality parameters and photographs were taken.
- On March 15 a final assessment of the quality parameters was conducted on the 10 trays and photographs of each tray were taken.
- Samples of fruit which had developed disease were sent to DPIRD for identification of the pathogen.

Write report for each grower

- Specific grower information and photos at back.

Findings

Farm/packing aspects

- Fruit was graded correctly to Grade 1 and Grade 2 standards
- Big variation in the quality of grade 2 fruit
- Mixed ripeness of fruit with some fruit < 15 % DM.
- Showed up in uneven colour later in ripening
- Minor sap burn, no sun burn, one case under skin browning, lenticel spotting

What self life are we expecting?

- **Saleable life index**

- Shop keepers want seven days from Stage 4 (50 to 70% yellow) until 10% of the fruit show rots.

Day 7 assessment (after ripening)

- **Saleable life index**

- Seven days from Stage 4 (50 to 70% yellow) until rots start to occur.



Day 14 assessment

- Seven days from Stage 4 (50 to 70% yellow) until 10% fruit have rots.



Saleable life index

- For some trays 10% disease occurred < 7 days after 60% yellow.
- Similar results in other studies elsewhere (29% SLI).
- Does this explain why retailers (Chains) have lost confidence in mangoes?
- Mangoes were not green after ripening. KP is naturally green from the SW of WA. Myth?

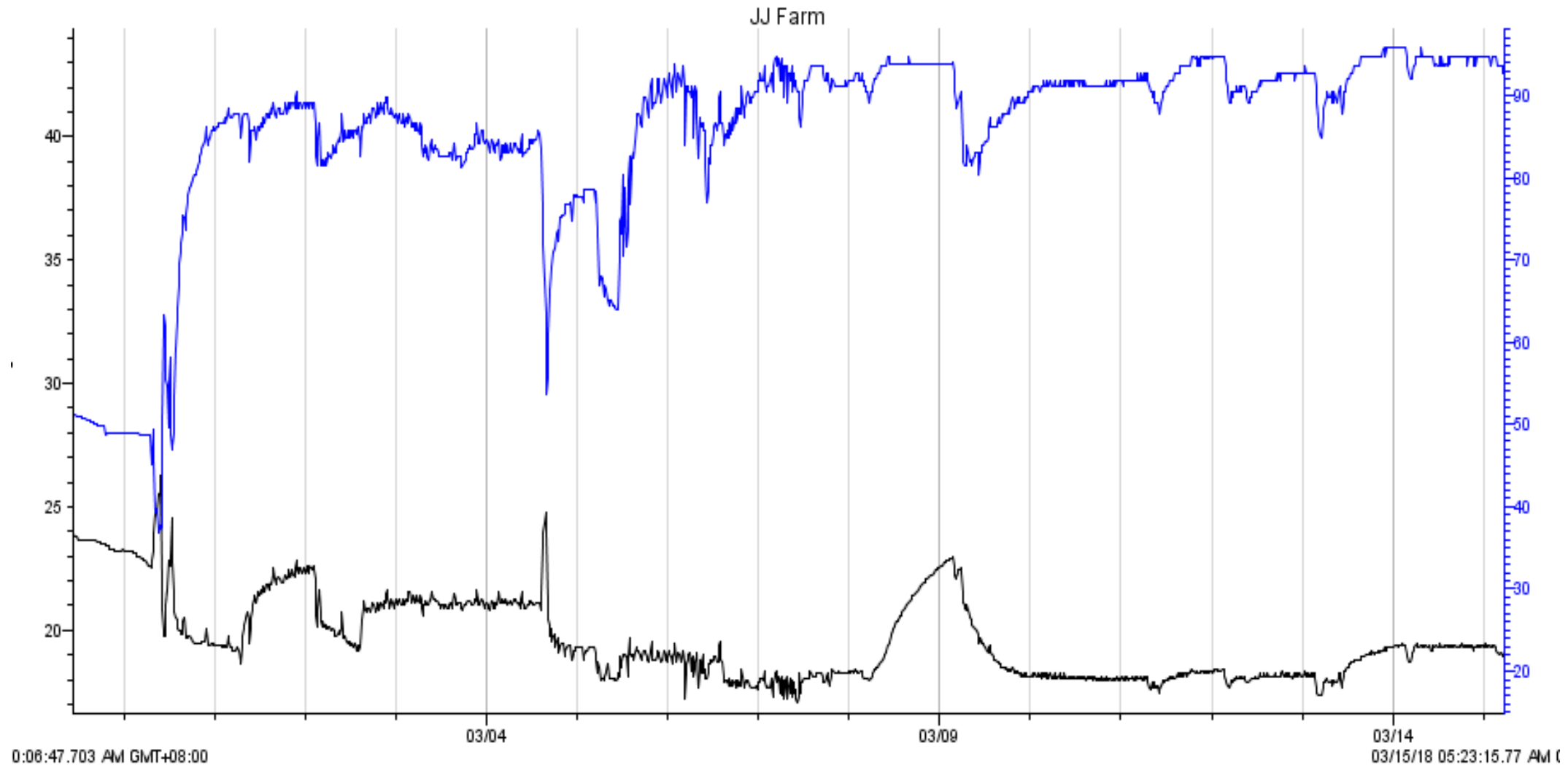
What affects saleable life?

- High temperatures during ripening
- Mixed ripening
- Poor disease control in the orchard
- Ineffective post harvest treatment
- Delays during handling

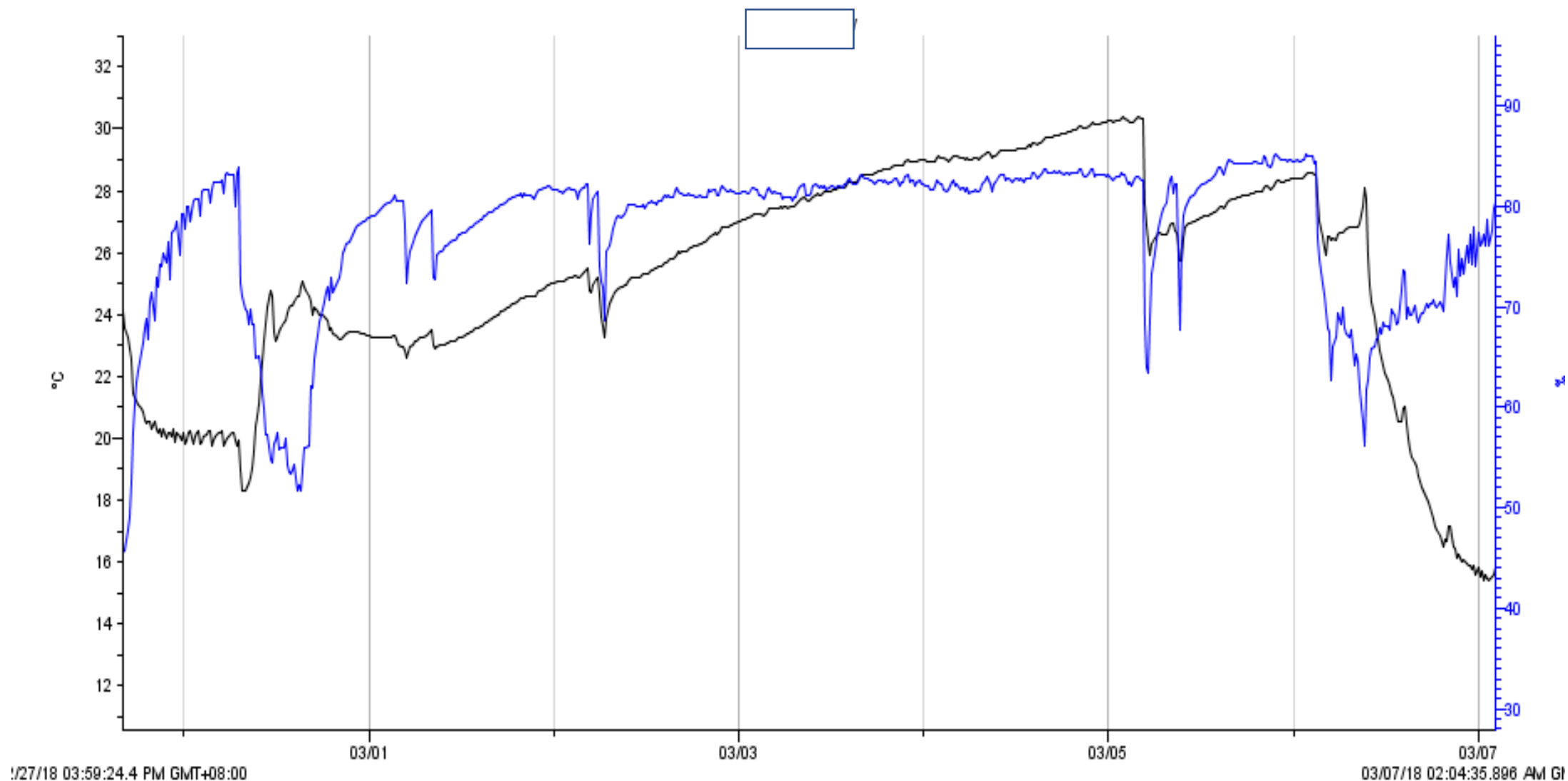
Temperature management by agents

- Was variable among the 4 participating agents
- Ask agent about his approach to ripening and what he is trying to achieve
- Give him AMIA Mango Ripening Manual
- Understand mango ripening options in the Manual

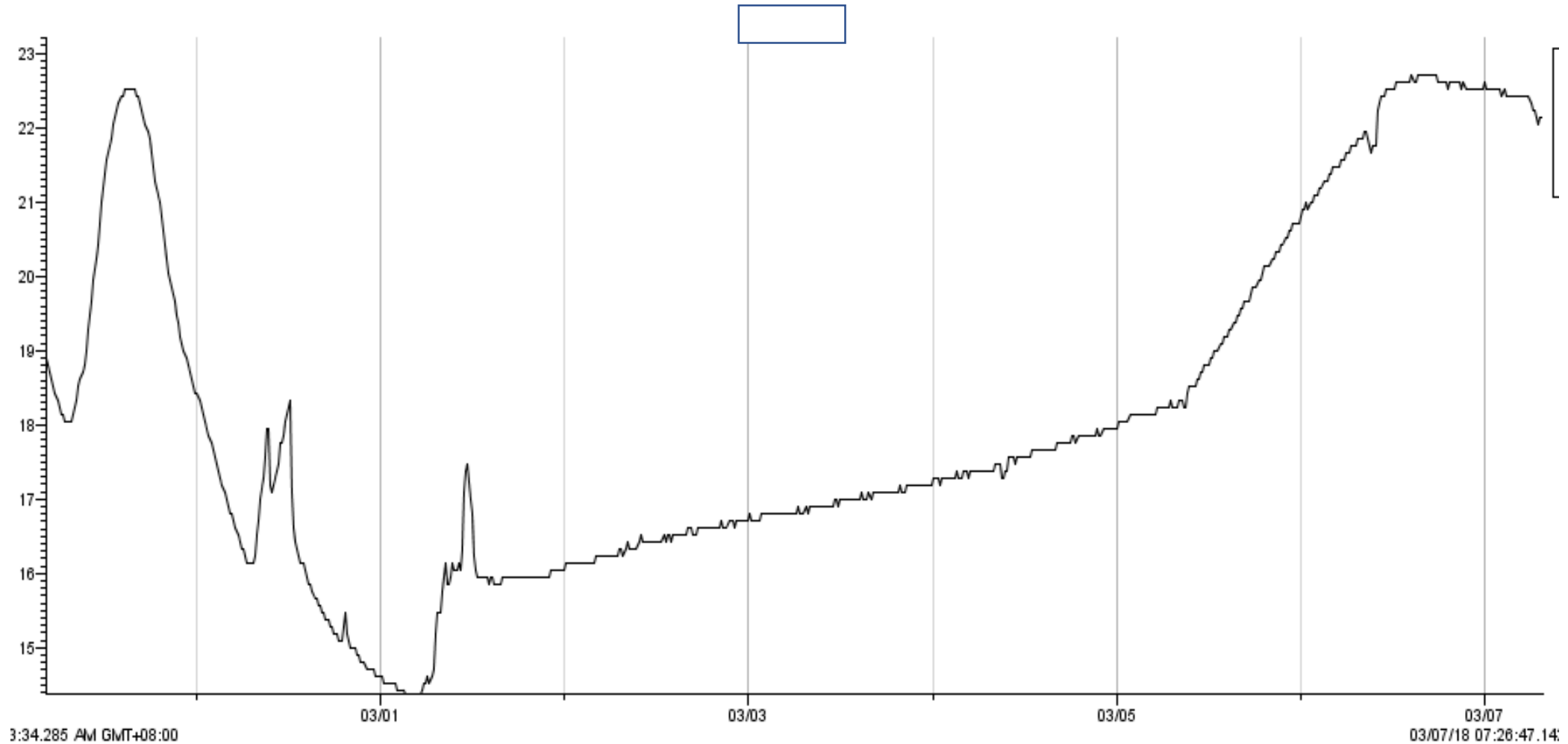
Mercers temperature and humidity (Control)



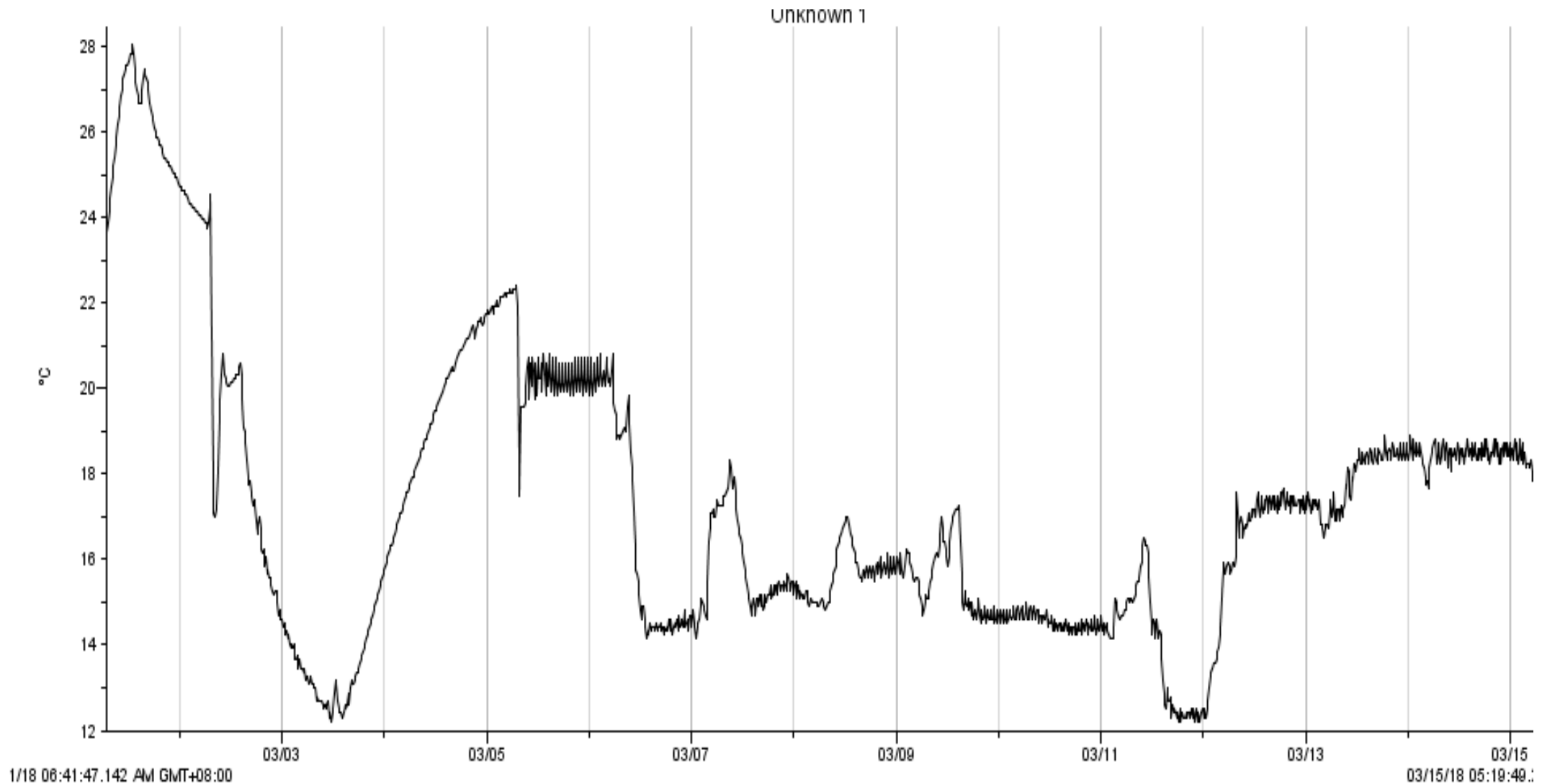
Temperature and humidity – Agent 2



Temperature - Agent 3

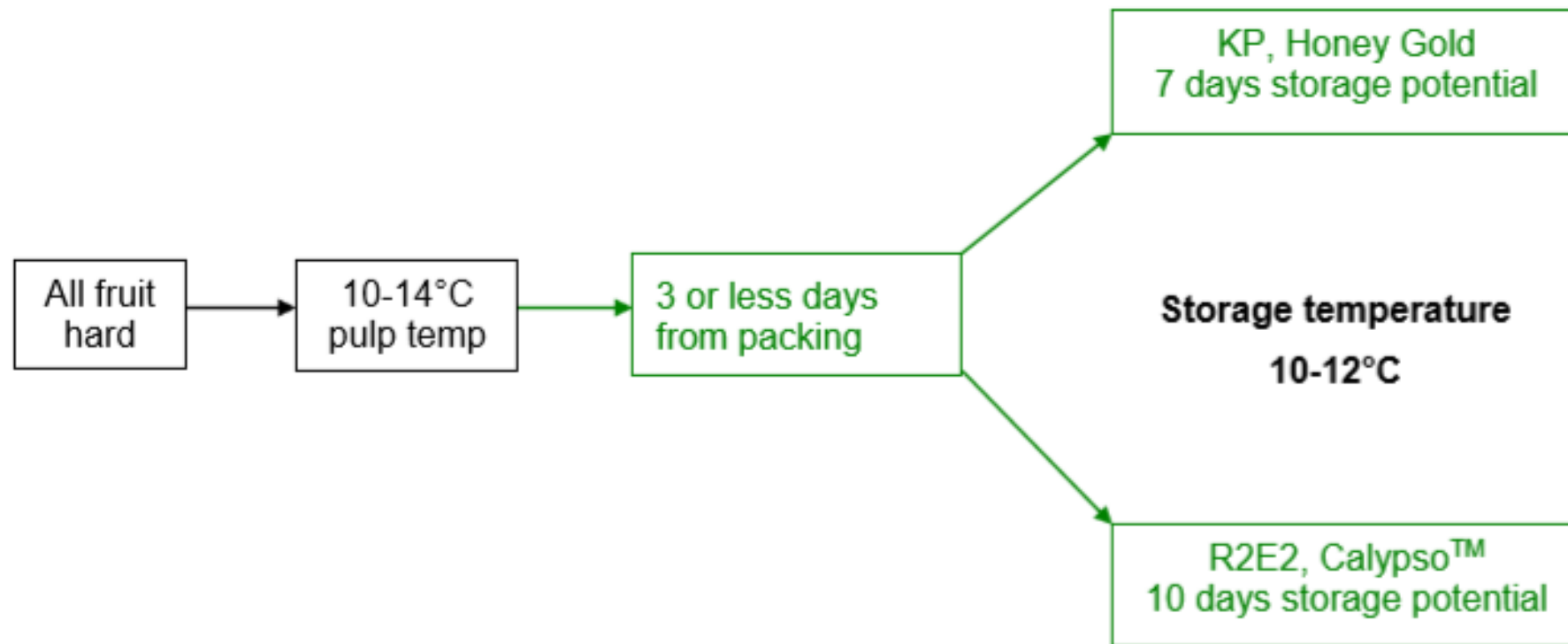


Temperature – Agent 5



Option 1. Storage before ripening: 7-10 days storage potential

Check fruit ripeness, pulp temperature and days from packing.







Caution:

- If fruit ripens during storage, the skin will turn a pale yellow colour, flesh acidity will remain high, have reduced flavour, and rots may develop.
- Fruit must be precooled effectively to 10-12°C within 36 hours of harvest and transported at 12°C.
- Place the fruit into the storage room within 4 hours of receipt at the ripening facility.
- Every day, check fruit condition and length of storage period. Remove fruit if there is a risk of fruit starting to ripen.
- Do not store late season fruit for more than 3-5 days.

Holding after ripening

To slow further ripening, hold fruit after ripening at 10-12°C for a maximum of 5 days depending on variety and ripeness.

Maximum holding period after ripening at 10-12°C

	Sprung	Firm soft		Sprung	Firm soft
Kensington Pride			R2E2		
	3 days	1 day		5 days	3 days
Honey Gold			Calypso™		
	3 days	1 day		5 days	3 days

Carbon dioxide and ethylene management

- Not measured
- Were the rooms vented properly? Automated venting.
- What was the rate and duration of ethylene?

Different ripening practices



Disease

- None apparent 7 days after packing
- Was evident on 4 of the 5 growers trays at the 14 day assessment

DDLS Results

Plant Pathology Results

No.	Spec ID	Spec Desc	Plant Part	Fungi	Bacteria
0001		Mango	Fruit	<i>Colletotrichum sp</i> <i>Botryosphaeria sp</i> <i>Phomopsis sp</i>	Not Detected

No bacterial pathogens were detected on the mango samples. However, *Pantoea agglomerans* was detected. This is a soft rot bacteria and is usually present when fruit has started to degrade due to other factors.

Three fungal pathogens were detected. These include *Colletotrichum sp* which causes anthracnose. The fungal pathogen *Botryosphaeria sp* causes stem end rot. *Phomopsis sp.* is also known to be a stem rot pathogen.

Stem end rot

- *Botryosphaeria* sp, *Phomopsis* sp



Collectotrichum sp



Anthracnose

- *Colletotrichum sp*



Bacterial black spot

- Not detected



Etch

Prolonged exposure to ooze sap and detergents, particularly where the fruit was left in the bin too long before picking.



Resin canal disorder



Jelly seed

- Too much nitrogen and too little calcium in plant, despite soil calcium being ok.
- Also associated with light crop load and trees flushing when fruit on trees.
- The calcium goes to the leaves and not the fruit.
- If it looks like this will occur then one management option is to pick earlier.



How successful was the trial?

- Logistical difficulties – collection of trays – one lost at markets
- Sample size was way too small
- Agents are busy.
- Use Grade 1 fruit only as the identification of any developing issues is much easier to see on fruit that is not marked.
- **Many thanks to Mercers for assisting**
- **Thanks to PRNRM and Northern Valleys**



Big Picture

- Post harvest management and shelf life have a big impact of your enterprise profitability.
- Chain stores do not stock Gingin mangoes as they have concerns about shelf life. Chains sell 70 % of the produce so not being able to get fruit in here greatly affects the wholesale price.
- Need to demonstrate to the supermarket chains that Gingin has a good product with a good SLI.
- Send fruit to the east coast. Plenty of opportunity.
- **Highest priority issue for SMANGO growers.**

Questions/ comments?

