Critical success factors in transporting mango fruit

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one harvest
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Critical considerations

Quality attributes at risk

- Over-ripe / under-ripe fruit
- Variable ripening between and within pallets
- Poor skin colour
- Chilling damage
- Skin marks

Key issues

- Temperature of fruit at loading
- Pallet configuration in the container
- Refrigeration capacity/air circulation/insulation
- Gas accumulation (mainly carbon dioxide)

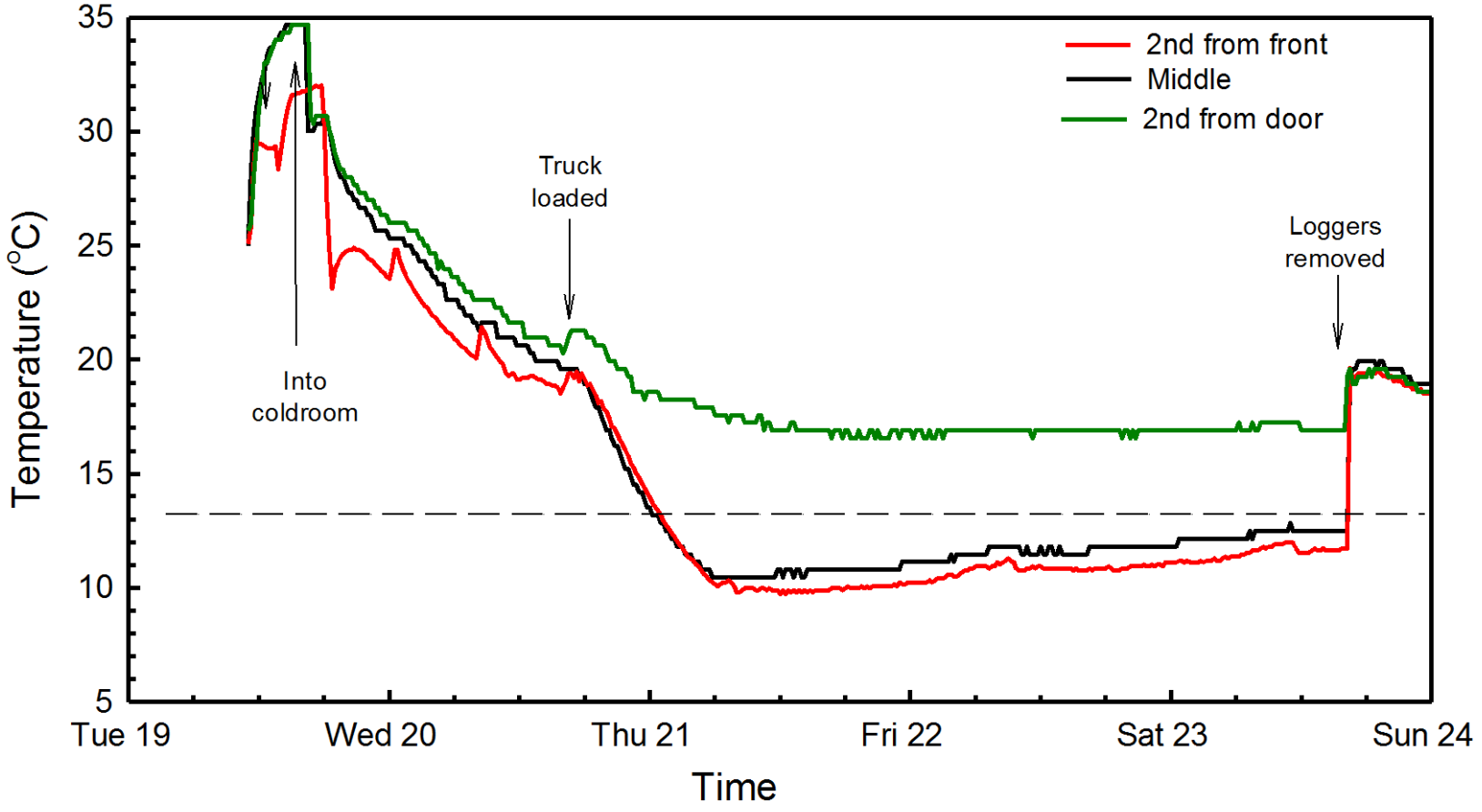
High fruit temperatures at loading

- Pre-cooling room temperature too high (>12ºC)
- Pre-cooling time too short
- Forced-air cooler not used or loaded incorrectly
- Cool room not functioning properly

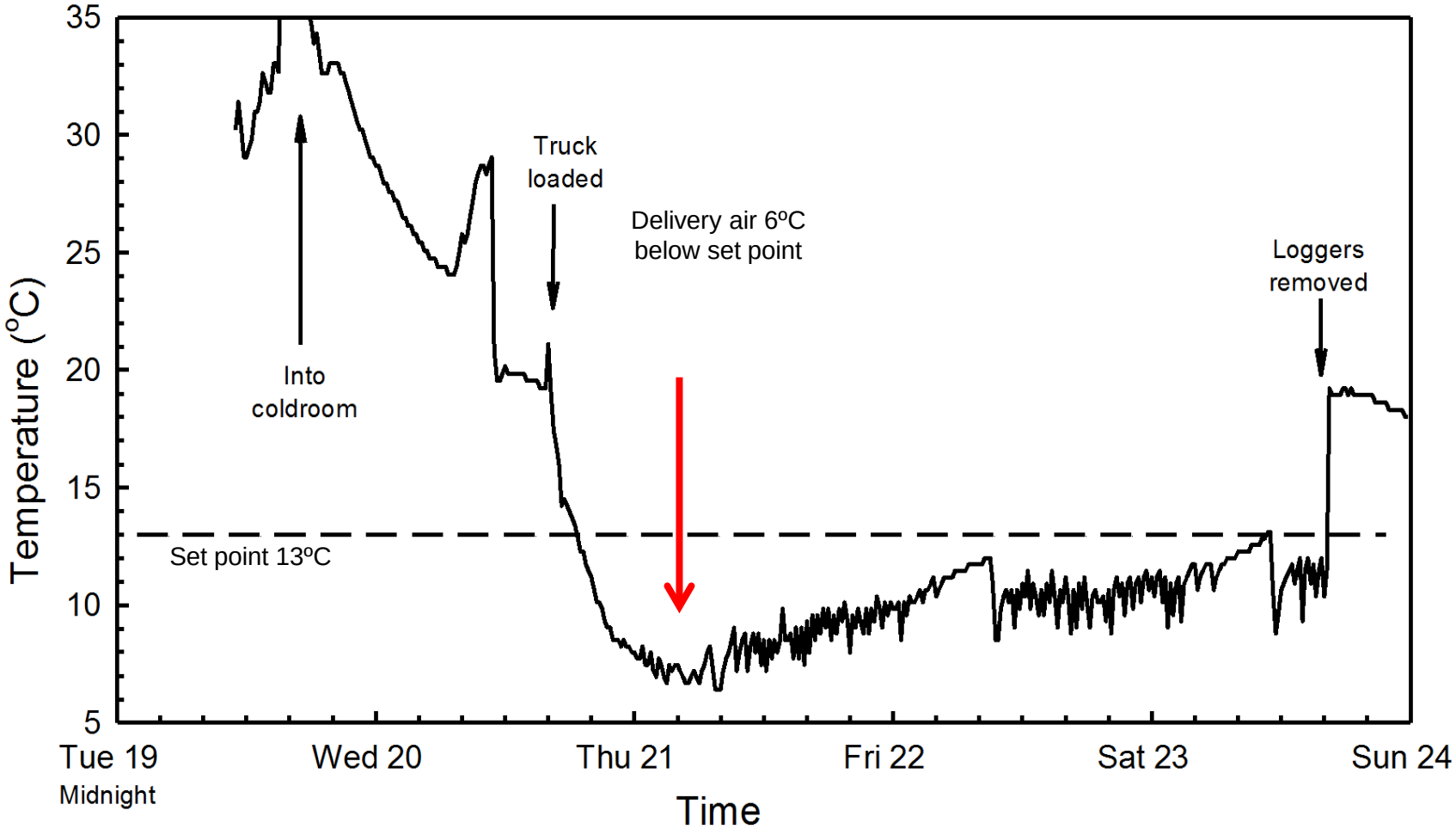
Quality risks; too ripe, uneven ripe, chilling

Loading warm fruit causes uneven ripening

Truck temperature 13ºC Average fruit temperature at loading 21ºC



Loading warm fruit causes chilling injury



Chilling injury

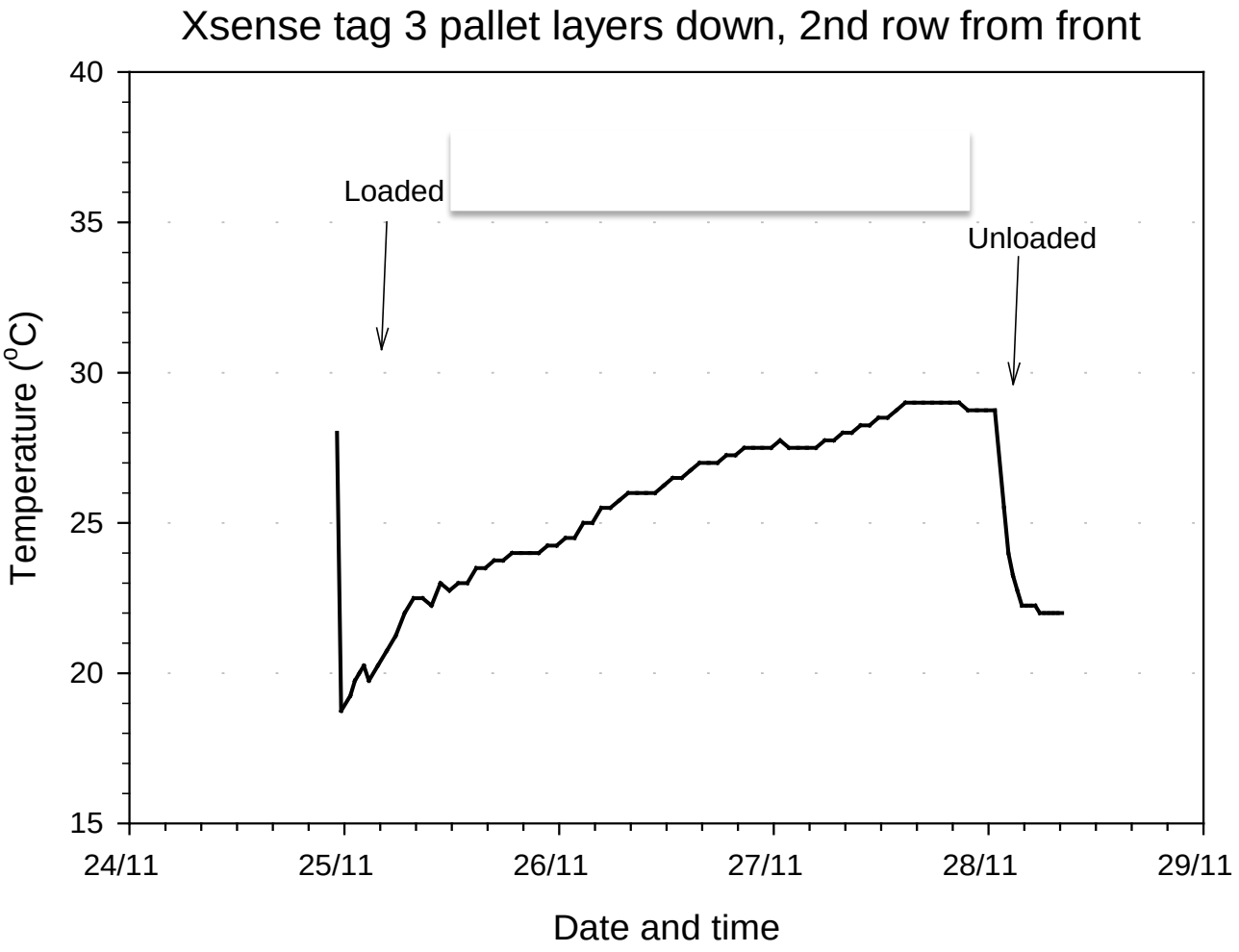
Poor pre-cooling and container loading/performance

Temperature setting too low - <10°C

- Poor container loading
- Poor container insulation (tautliners)
- Fruit exposed on top of pallets near delivery air
- Faulty equipment operation

Poor cooling performance

Set temperature 18°C; fruit temperature at loading 19°C

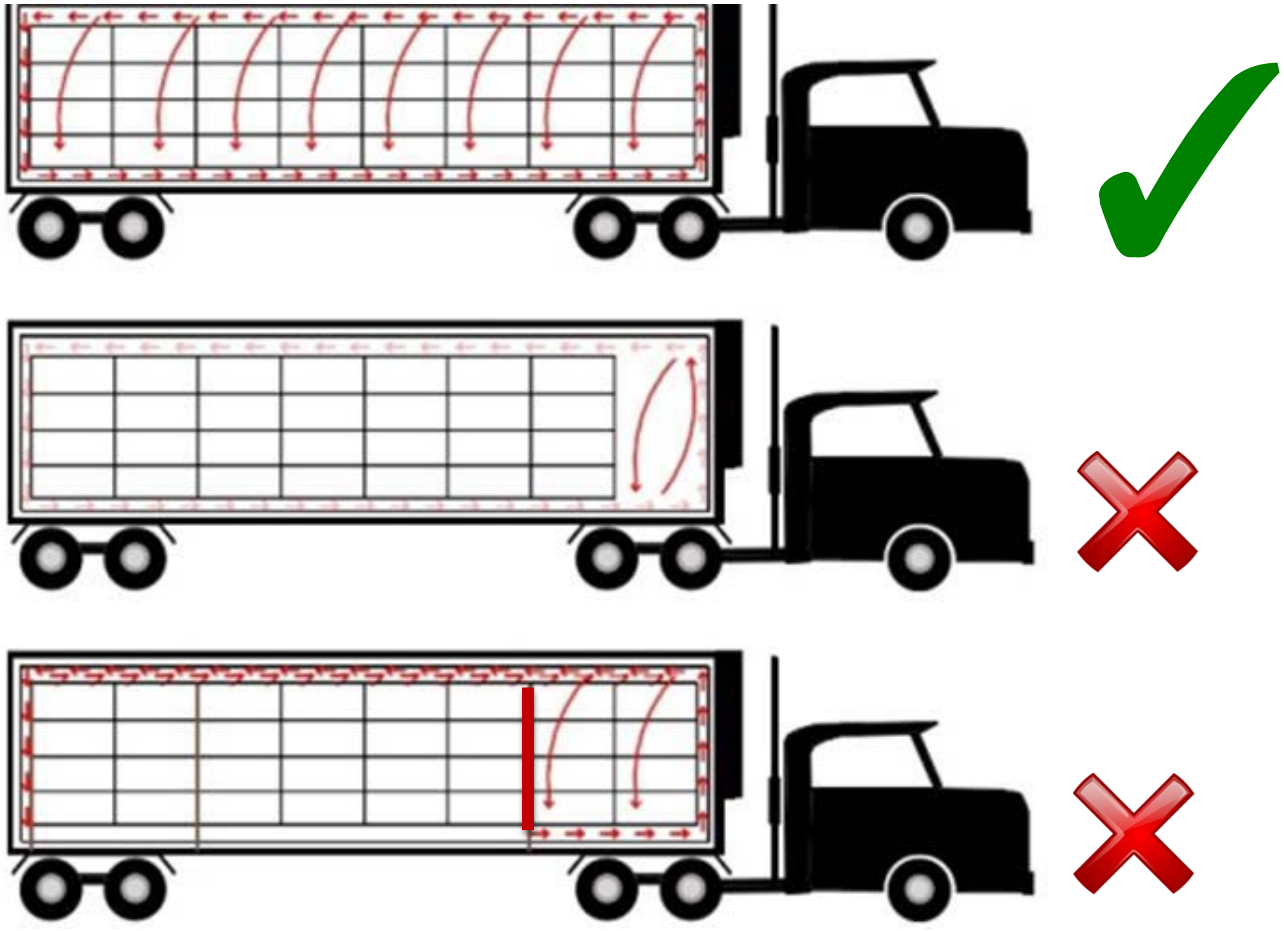


Poor cooling performance

- Fruit temperature too high at loading
- Faulty refrigeration
- Poor insulation, e.g. tautliners
- Poor pallet loading
- Air flow obstructed

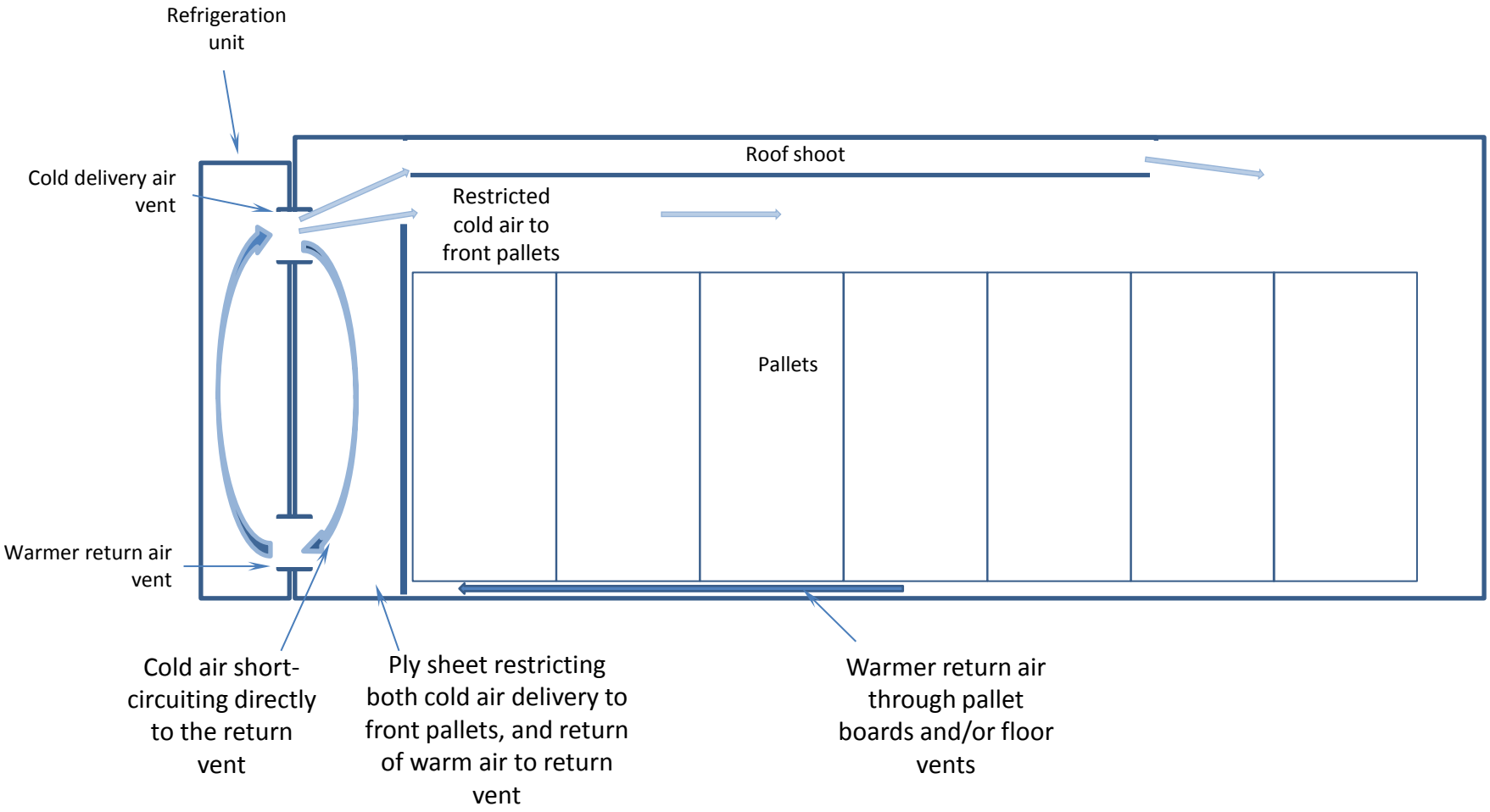
Quality risk; too ripe, uneven ripe

Good, even airflow is critical



From Ledger 2012

Good, even airflow is critical



Transport do's and don'ts

✓ Pallet placed tight against bulkhead

✧ Gap left between bulkhead and 1st row of pallets – air short circuits

Transport do's and don'ts

✓ Stabilizing boards crossed to avoid blocking air flow under pallets

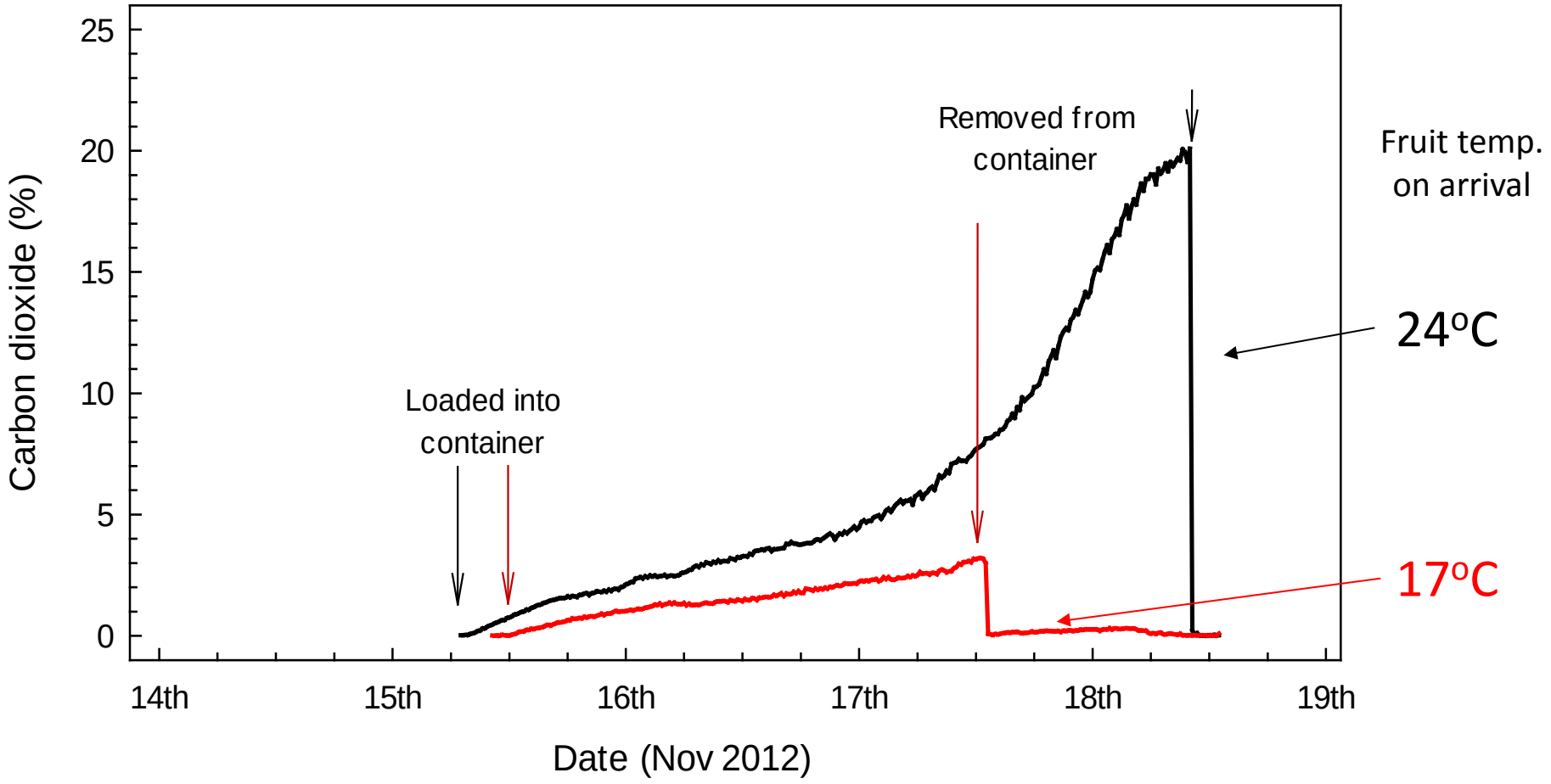
✧ Stabilizing boards and pads block air flow under pallets

Gas accumulation

- Carbon dioxide and other volatiles
- High fruit temperatures causing high respiration
- Poor ventilation

Risks; Skin spotting, poor colour, off flavours, WHS

Temperature and carbon dioxide



Packing and roads/driving

- Loose packing and over-packing
- Hard inserts
- Incorrect stacking, pallet strapping
- Pallets not secured effectively in vehicle
- Rough roads and driving too fast

Quality risk; Transport rub, pallet collapse

Critical success factors

- Fruit temperatures before loading
  - Cool to within 2^{o}C of transport temperature
- Correct pallet configuration
  - No gaps between first pallet and bulkhead, or
  - Ply from top of first pallet to bulkhead
- Don’t block return air flow
  - Use angled or fluted ply sheets
- Adequate refrigeration and insulation
  - Don’t use tautliners on long journeys
- Tight pack, soft inserts - drive to road conditions
- Minimise carbon dioxide hazards
  - Low fruit temperatures
  - Venting
  - Lime