Session Six
Postharvest quality, outturn

New Zealand and Australia Avocado Grower’s Conference’05
20-22 September 2005
Tauranga, New Zealand
RESOLVING LONG DISTANCE SHIPPING DISORDERS IN ‘HASS’ AVOCADOS

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Long distance shipping implies

- Long periods at low temperatures
- High potential for defects
Defects to be avoided

- Fungal
Defects to be avoided

• Physiological
Defects to be avoided

- Premature softening
- Uneven ripening
- External chilling injury
Defects from two sources

- Preharvest
- Postharvest
Preharvest causes

• Fungal infections
  – Need adequate spray programme
  – Postharvest fungicides

• Physiological disorders
Orchard history important

- Mineral nutrition (especially N)
- Stress levels
Postharvest

- Fruit removed from the tree creates
  - Water stress
  - Carbohydrate stress
Results in

- Oxidative stress leading to membrane damage
- Enhances ethylene production and ripening
- Results in external and internal defects
Focus of our work

- Reduce water loss and respiration rate to:
  - Reduce stress
  - Enhance shelf life

- Is based on experience with other cultivars
Methodologies

- Used fruit from:
  - Limpopo province (North)
  - KwaZulu-Natal (KZN) (South)

- Results over 2 seasons
Season 1 treatments

- Control – no treatment
- Wax 1
- Wax 2
- Polybag – micro-perforated polypropylene
- Polyscrub bag – polyethylene with ethylene absorber
Storage and evaluations

- 30 days at 2°C; 5.5°C; 8°C
- Fruit mass change
- CO₂ evolution
- Ripening
- Defects
Season 2 treatments

- Control
- Wax
- Polybag
- Storage 30 days at 2°C; 5°C
- Evaluations at 10, 20 and 30 days
Fruit mass loss season 1
Mass loss at 2°C season 2 - Limpopo
Mass loss at 2°C season 2 KZN
Effect of temperature on CO$_2$ evolution
Effect of treatment on CO$_2$ evolution
It is clear that

• It is possible to decrease water loss

• Micro-perforated polypropylene bags seem best

• Considerable water loss during pre-cooling period

• Seems to be interaction between temperature and water loss
EFFECT OF MASS LOSS ON CHILLING INJURY
Low temperature

- Decreases CO$_2$ evolution (respiration)
- Decreases potential for disorders
Therefore suggest that

- Consider preharvest factors
- Decrease postharvest stress
- Minimise water stress with appropriate packaging
- Consider pre-cooling techniques
Minimise respiration

- Ship at low temperature
- $2^\circ C$ or lower is possible
Provide perfect fruit at destination