

Factors under your control

Educate yourself about the potential differences between varying sources of fruit - there are differences

- Pre-ripening inspection
- Ripening management
- *Postripening management*

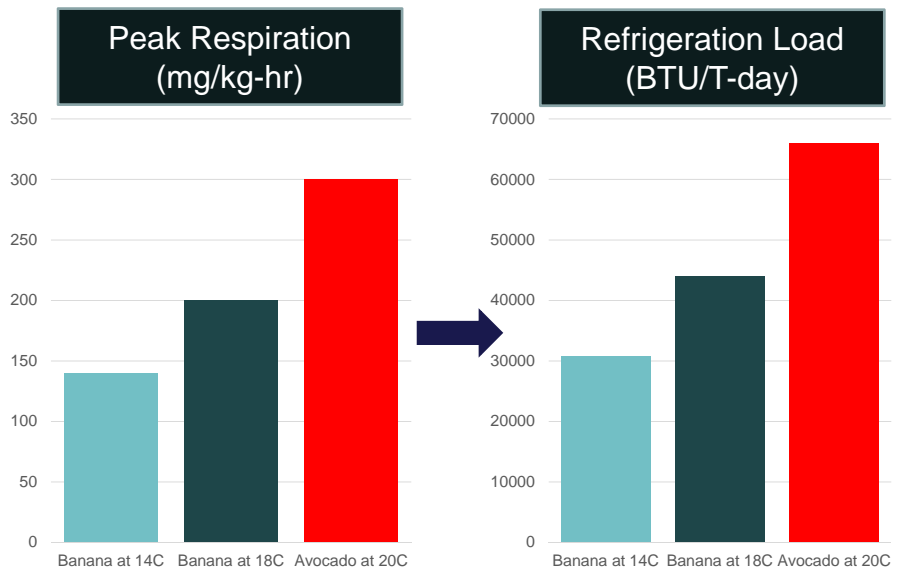
Ripening Management

- Uniform heating and cooling is **ABSOLUTELY ESSENTIAL**
- Refrigeration needs to control the heat (6000 BTU per pallet)
- Forced air ripening is critical (1000 cfm/pallet)
- Venting (preferably flow through, keep CO₂ below 1%)
- Source of Ethylene - as low as possible; physiologically you only need ~10 ppm but practically use 100ppm
- Fruit needs to be easily accessible in ripening room for monitoring; especially if fruit is of varying arrival condition or multiple lots of fruit
- Keep good records

Can I use a banana ripening room for avocado ripening?



Some considerations

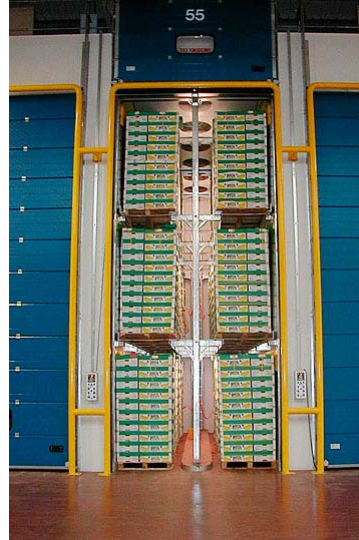


Can I use a banana room..... *With some practical modifications*

Refrigeration during ripening and cooling of fruit likely to be insufficient in a banana room

- Hot spots within pallet
- Uneven ripening

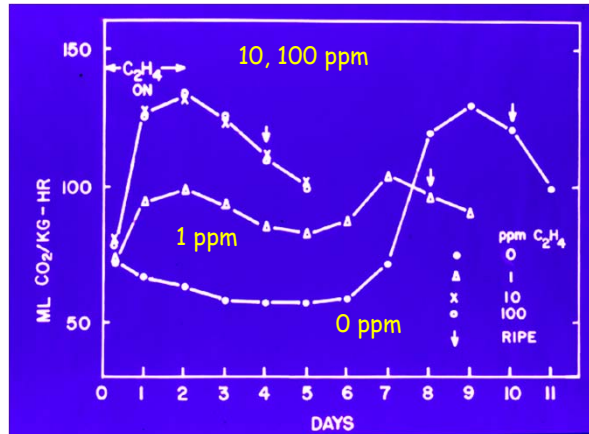
Do not to overload the room



Ethylene dose considerations

- Ethylene concentration
 - >20 ppm; no more than 100 ppm
- Fruit Maturity
 - Less mature; longer treatment
- Time after Harvest
 - With increasing time after harvest; shorter durations needed

How much to apply?



Short exposures to ethylene can trigger ripening; threshold is believed to be around 10 ppm

Commercial application of 20 - 100 ppm is recommended

Source: I. L. Eaks, UC, Riverside

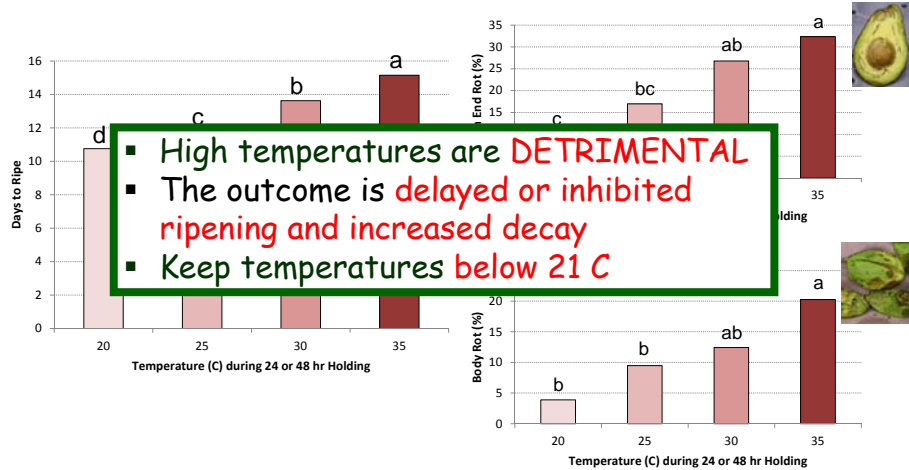
Temperature Management

- Avocados have a VERY high rate of respiration during ripening = HEAT
- Efficient warming/cooling of fruit essential
- Airflow essential to maintain proper pulp temperature (20C)

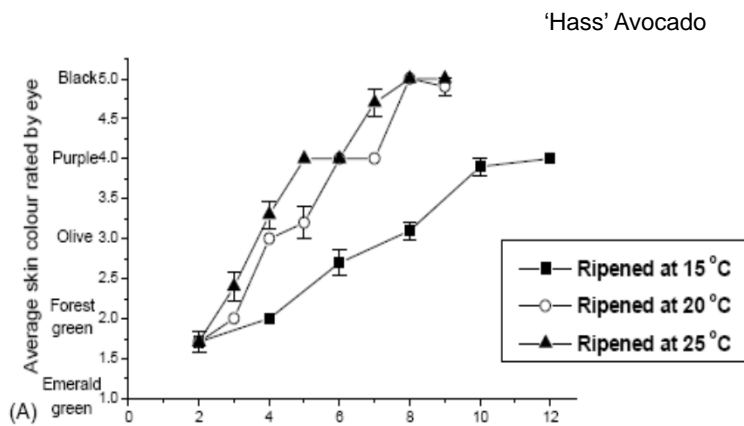
Impact of high temperatures

- Delayed/uneven ripening
- Increased decay

The impact of **Temperature** (24 or 48 hours) on ripening performance of 'Hass' avocado

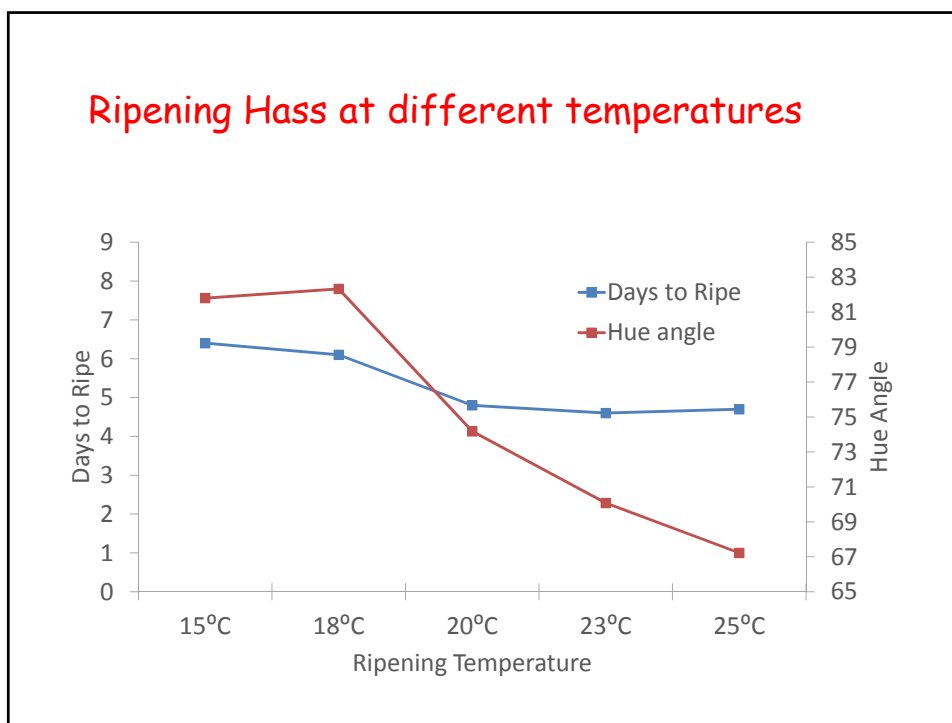


No significant difference due to duration



Ripening temperature influences final peel color

Cox et al, 2004, PH Biol. Tech.



Ripening Management When do you turn off the gas?

- You don't need the gas until ripe; a short duration treatment will "trigger" ripening
- Fruit may soften but may not color - maturity and other factors involved
- The best way to gauge the rate of softening is with a penetrometer...not your fingertips or buttons "popping"
- Fruit maturity is an important variable

The penetrometer is a tool to judge the relative stage of ripeness

Ripening Management

What should you do with ripe fruit?

- Cool immediately; ideally within ripening room
- How long can you hold the fruit? Depends on the stage of ripeness
- Ripe fruit (<2 lbf) can be held at lower temperature generally than unripe/partially ripe fruit; minimize peel damage
- Fruit will continue to soften in storage but has minimal impact on fruit flavor
- Risk of decay increases with longer holding periods

Managing Ripe Fruit

- Decay increases with increasing ripeness; accelerates in "overripe" fruit
- Don't hold fruit for long periods of time that are partially ripe - increased chilling injury
- Bruising increases with advancing ripeness - Protect fruit
- Peel color at "slicing" or "guacamole" ripe does not necessarily mean the fruit needs to be completely black!

These are issues wherever fruit are ripened

The outcome of "ripe" fruit

Ripe fruit at retail level
has greatly increased
consumption,

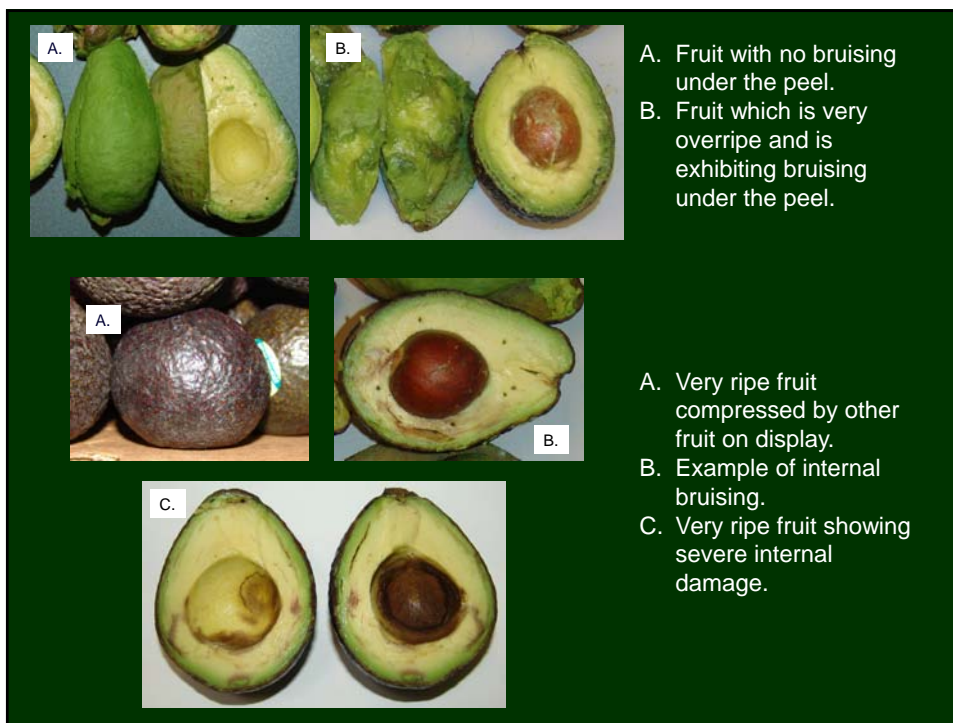
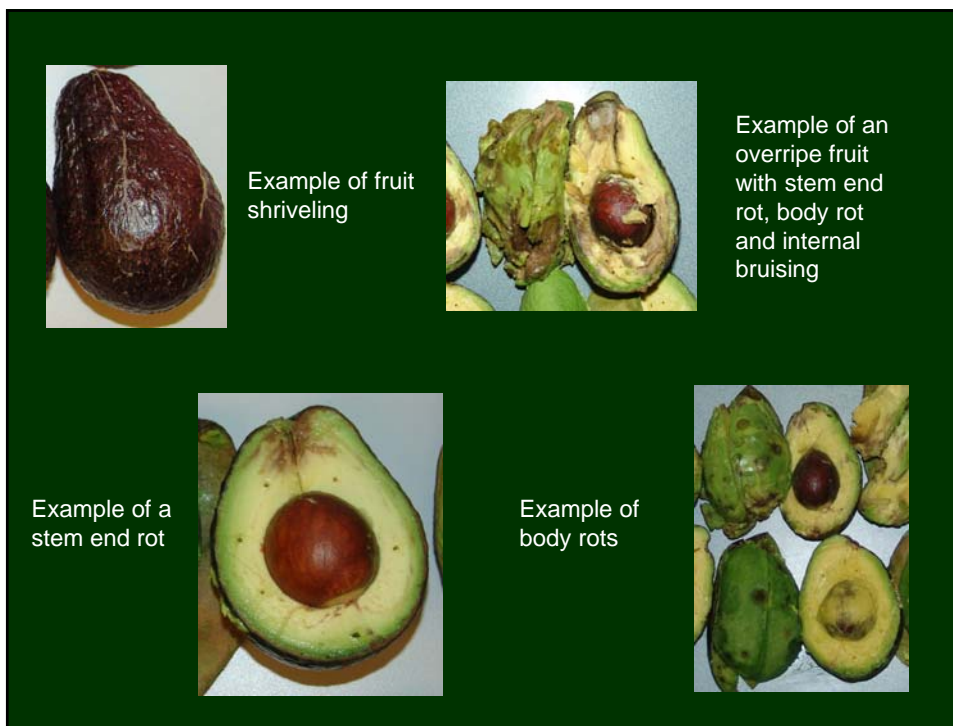
HOWEVER.....

- Greater challenge in temperature management
- Fruit sensitivity to damage greatly enhanced



Problems at retail





Considerations for successful avocado ripening

- **Temperature management is CRITICAL**
 - Too high; ripening inhibited and increased decay
 - Too low; ripening is slowed and lose benefit
- **Fruit Maturity**
 - More mature; less time
- **Time after Harvest**
 - After storage; less time
- **Avoids delays** in marketing
- **Minimize fruit handling**

Checklist

- Know the history of the fruit
- Quality; don't use stressed fruit
- Standardize fruit size and maturity
- Uniform warming and cooling
- Careful monitoring; don't overripen

CONSUMER/MARKET Education

Additional information

- **Contact me**
mlarpaia@ucanr.edu
- **UC Davis Postharvest Center website**
<http://postharvest.ucdavis.edu/>
- **California Avocado Commission website**
<http://www.californiaavocado.com/ripening-and-handling/>
- **General information on avocados**
www.avocadosource.com