Postharvest Handling Can Improve Fresh Market Success

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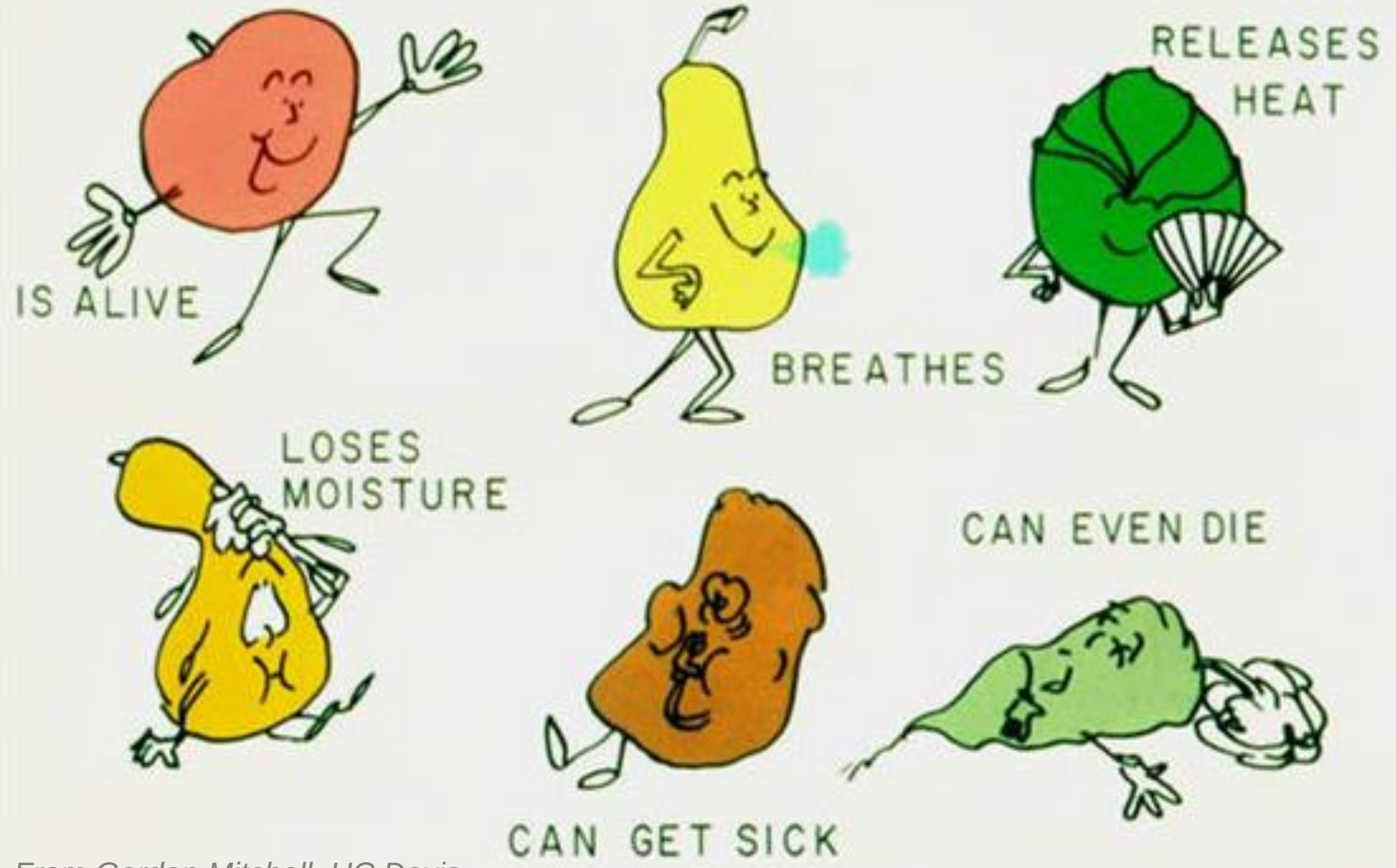
NORTHEAST SARE Sustainable Agriculture Research & Education

SARE R&E Project #LNE16-347

go.uvm.edu/**precoolcure**

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

FRESH PRODUCE

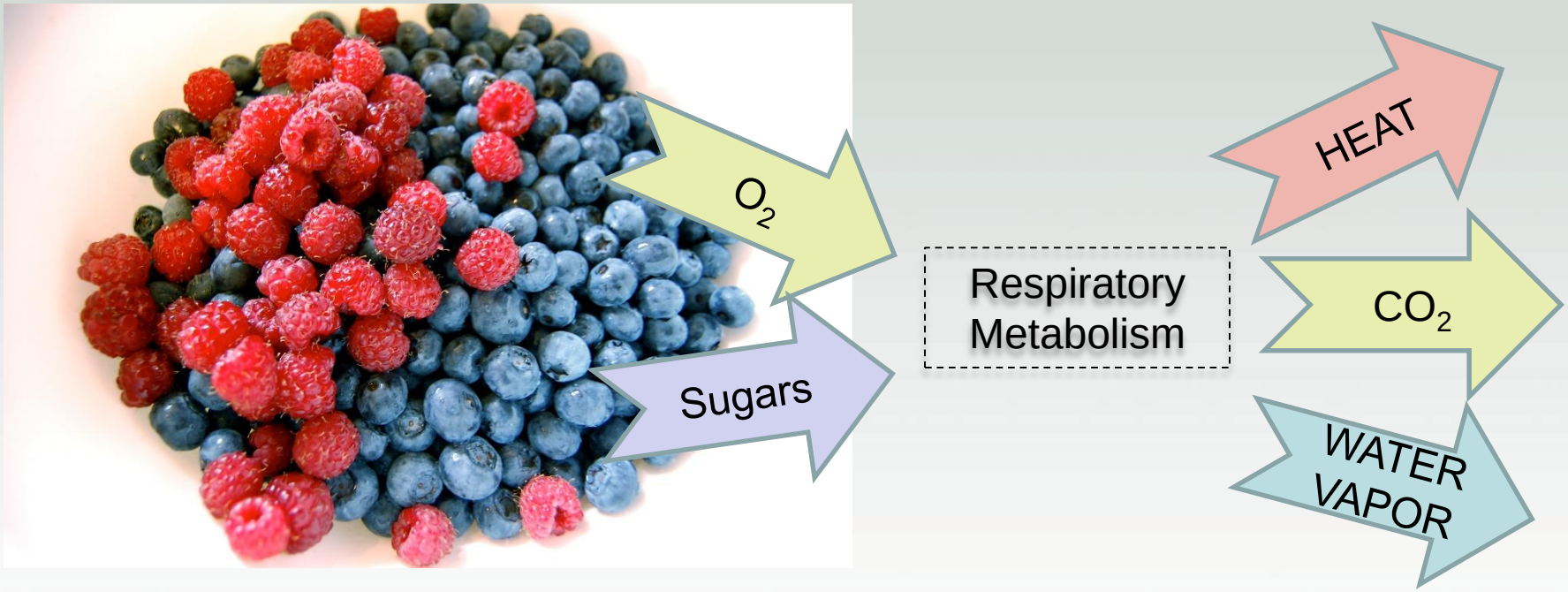


From Gordon Mitchell, UC Davis

Postharvest is a hotel.


Not a hospital.

Respiration

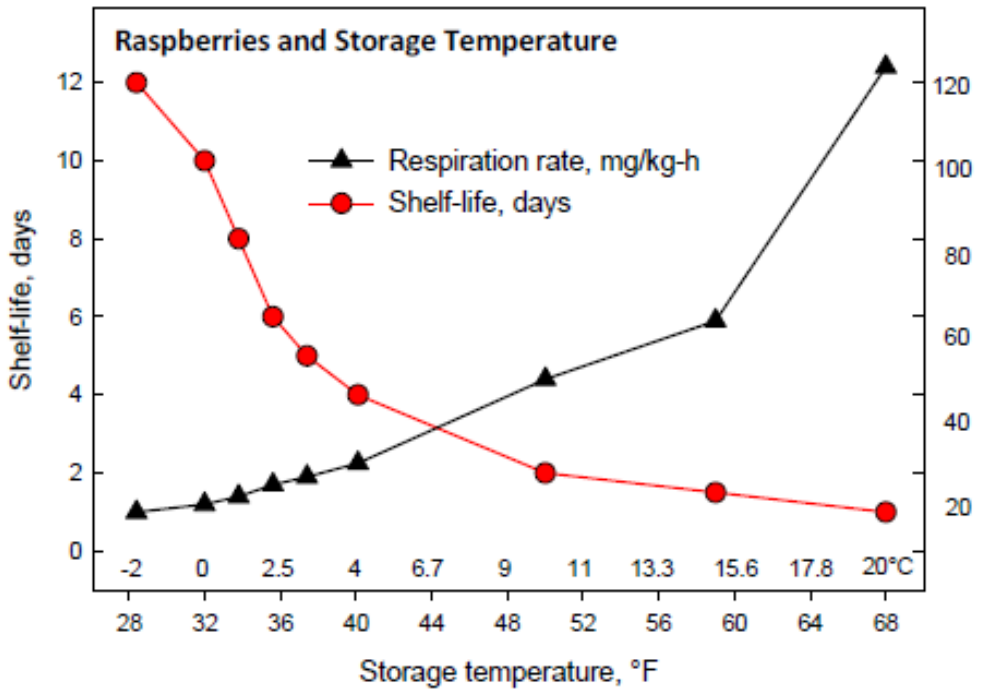


Based on USDA Handbook 66 - http://www.ba.ars.usda.gov/hb66/respiratoryMetab.pdf

Photo: Kim Piper Werker, https://flic.kr/p/5eUqT7

Benefit of Reducing Temperature

- Respiration & Metabolism are highly dependent on temperature.
- Lower temp = lower respiration = higher quality
- Watch for chilling injury
- Careful about infiltration due to ΔT



Cantwell, UC Davis

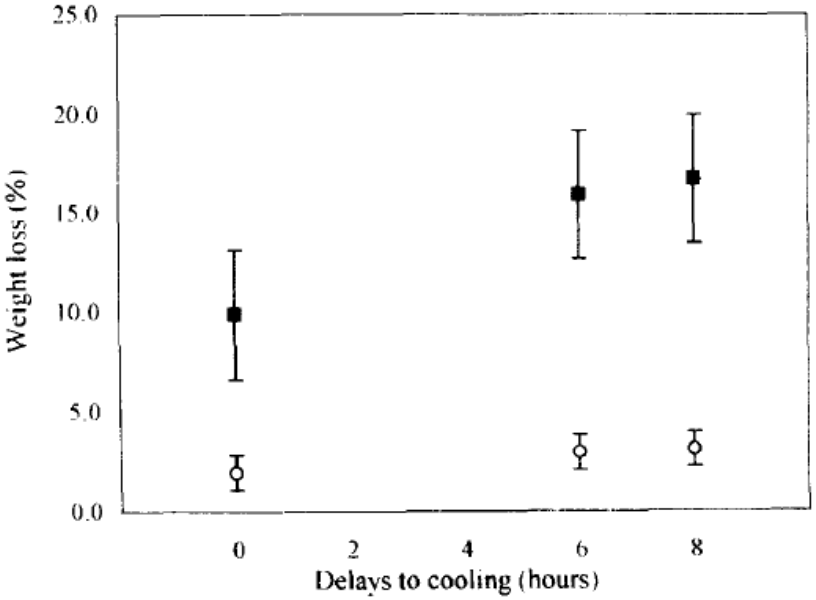


Figure 1 Effects of delays to cooling and wrapping on the weight loss of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

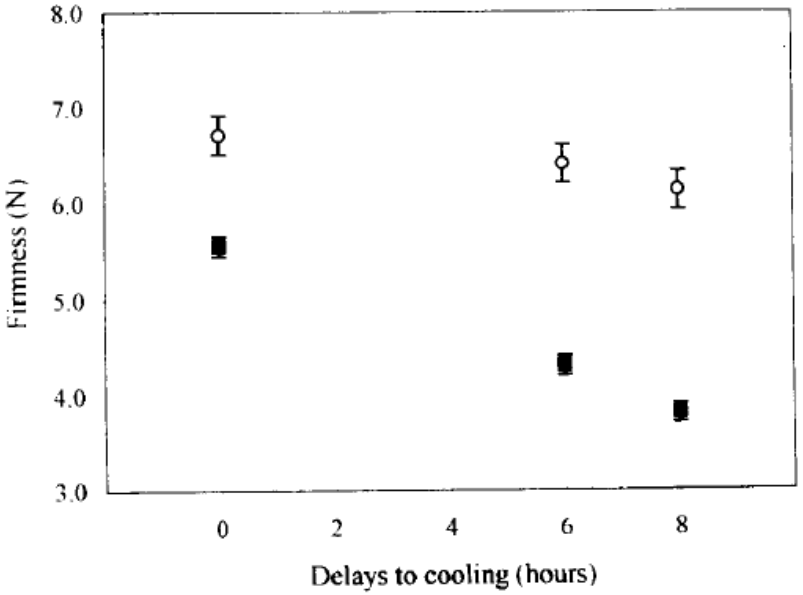
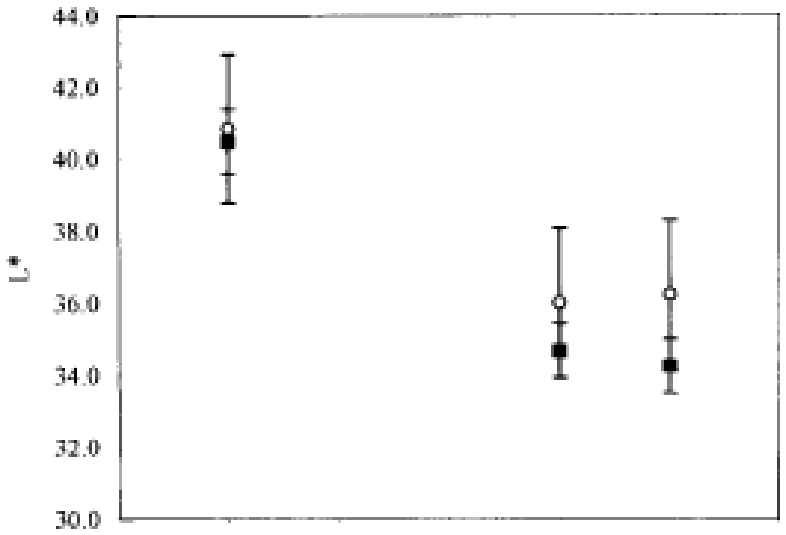


Figure 3 Effects of delays to cooling and wrapping on firmness of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

M.C.N. Nunes et al. 1995. *Effects of delays to cooling and wrapping on strawberry quality.* Food Control. Volume 6, Number 6.



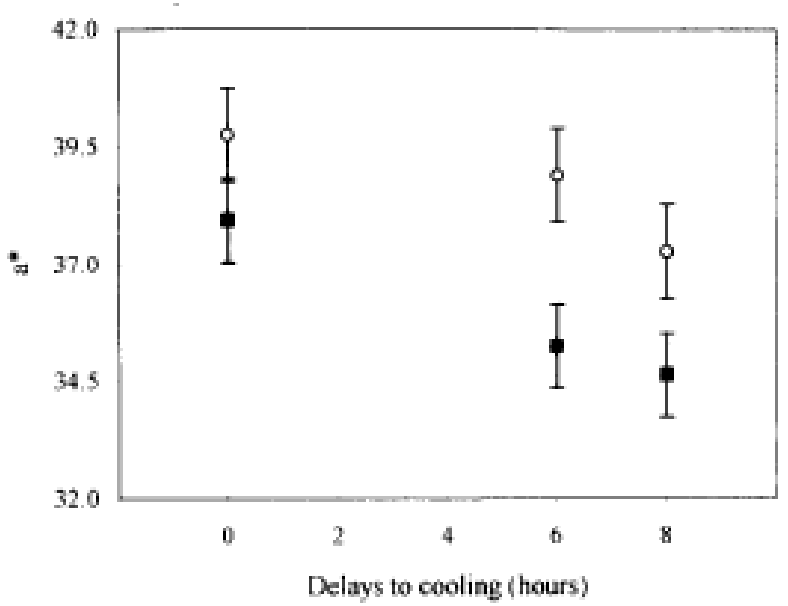


Figure 2 Effects of delays to cooling and wrapping of the colour of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

M.C.N. Nunes et al. 1995. *Effects of delays to cooling and wrapping on strawberry quality.* Food Control. Volume 6, Number 6.

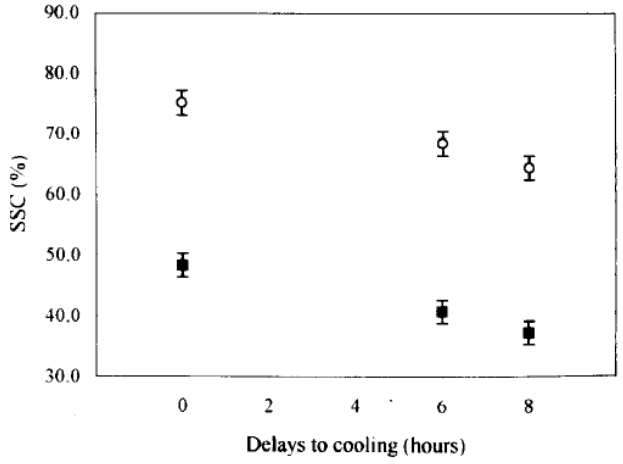


Figure 4 Effects of delays to cooling and wrapping on the soluble solids content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

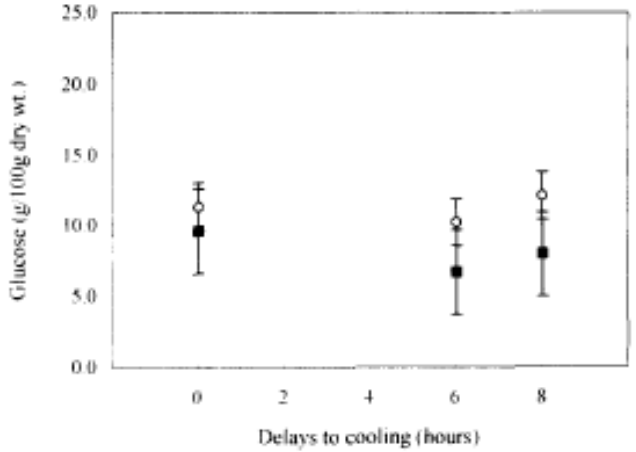


Figure 6 Effects of delays to cooling and wrapping on the glucose content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

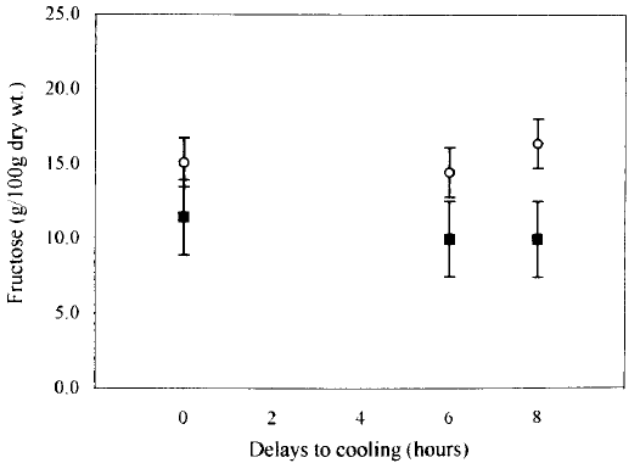


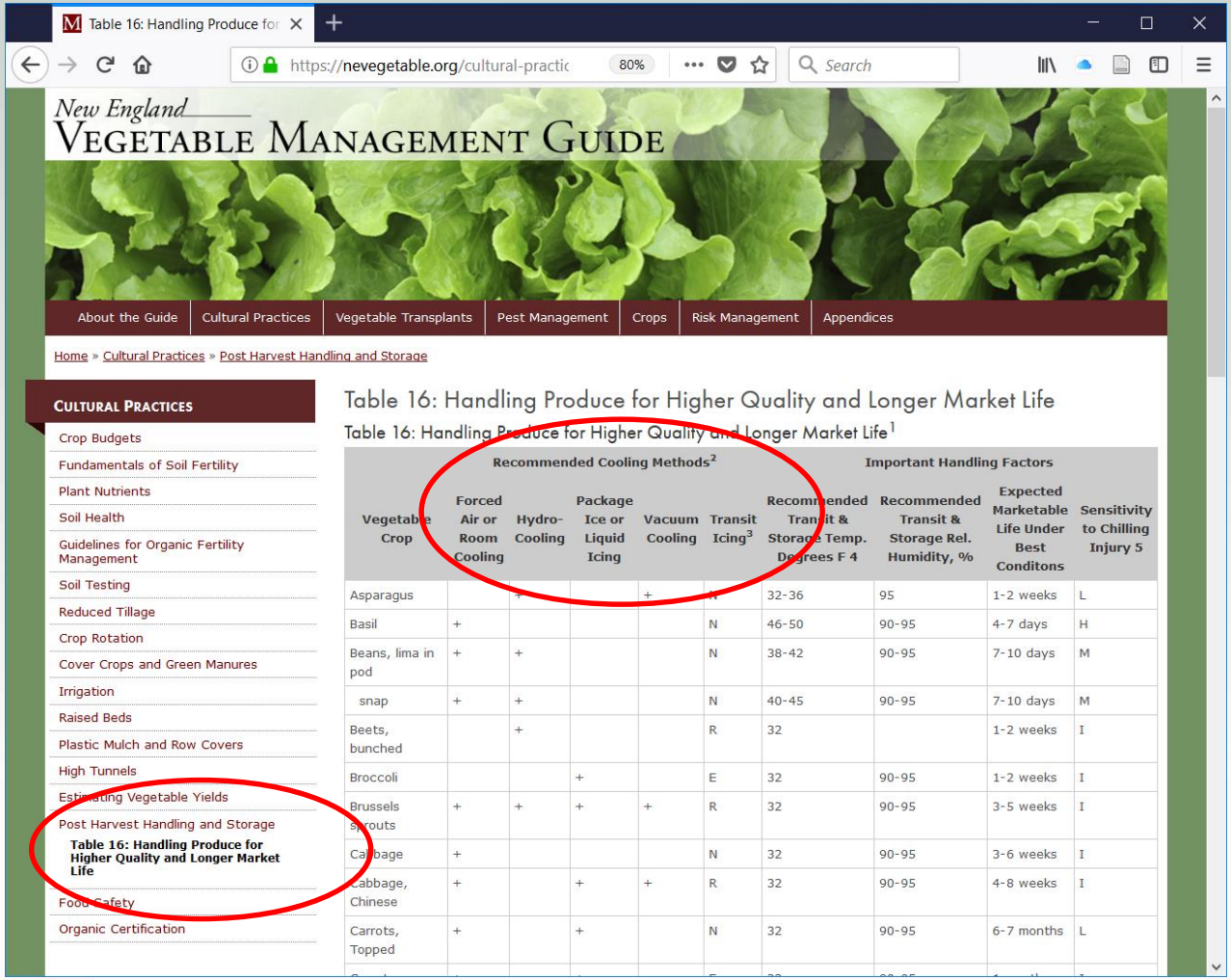
Figure 5 Effects of delays to cooling and wrapping on the fructose content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

M.C.N. Nunes et al. 1995. *Effects of delays to cooling and wrapping on strawberry quality.* Food Control. Volume 6, Number 6.

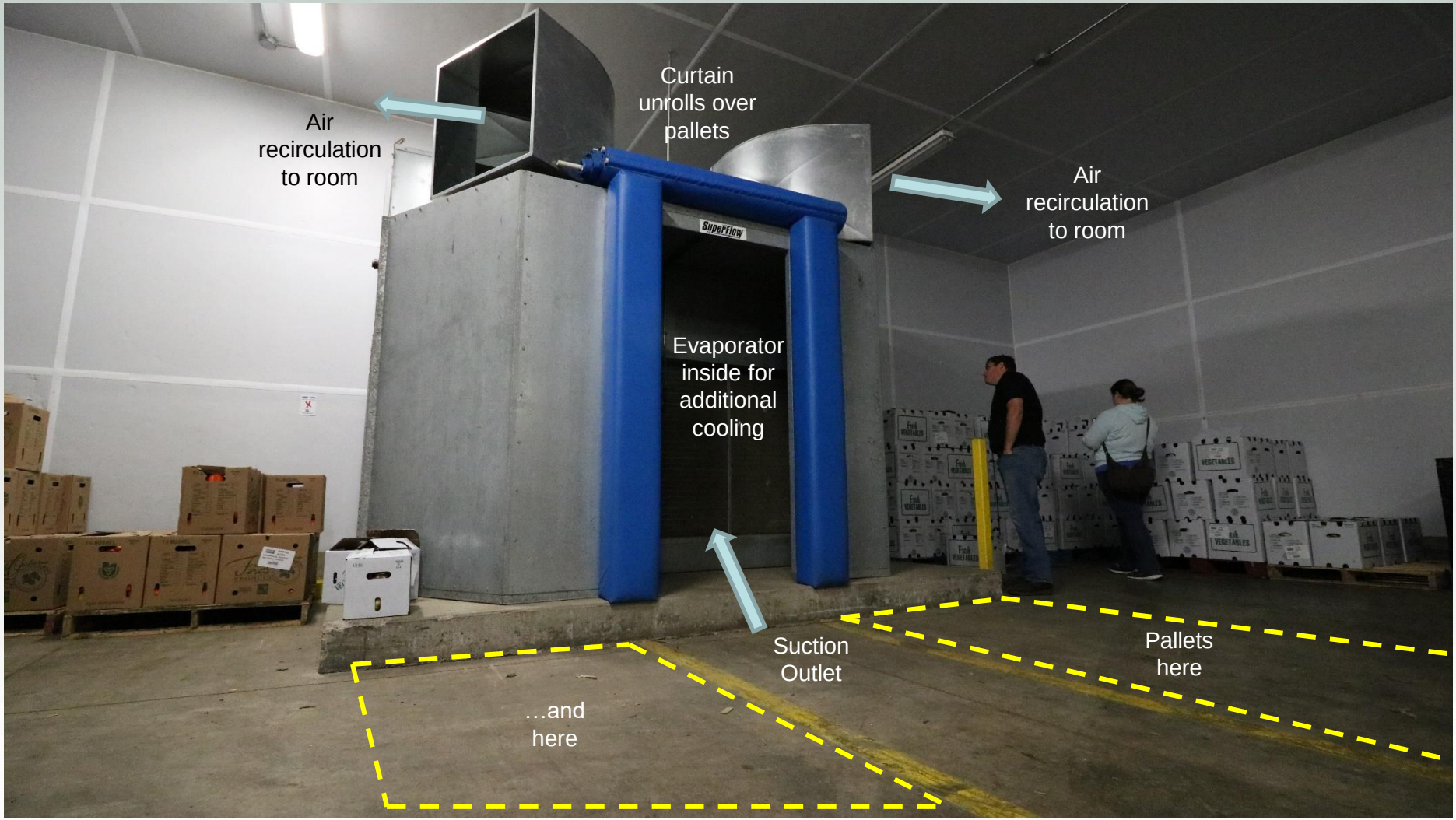
Precooling Methods

- Room Cooling
- **Forced Air Cooling**
- Hydrocooling
- Top Icing
- Vacuum Cooling

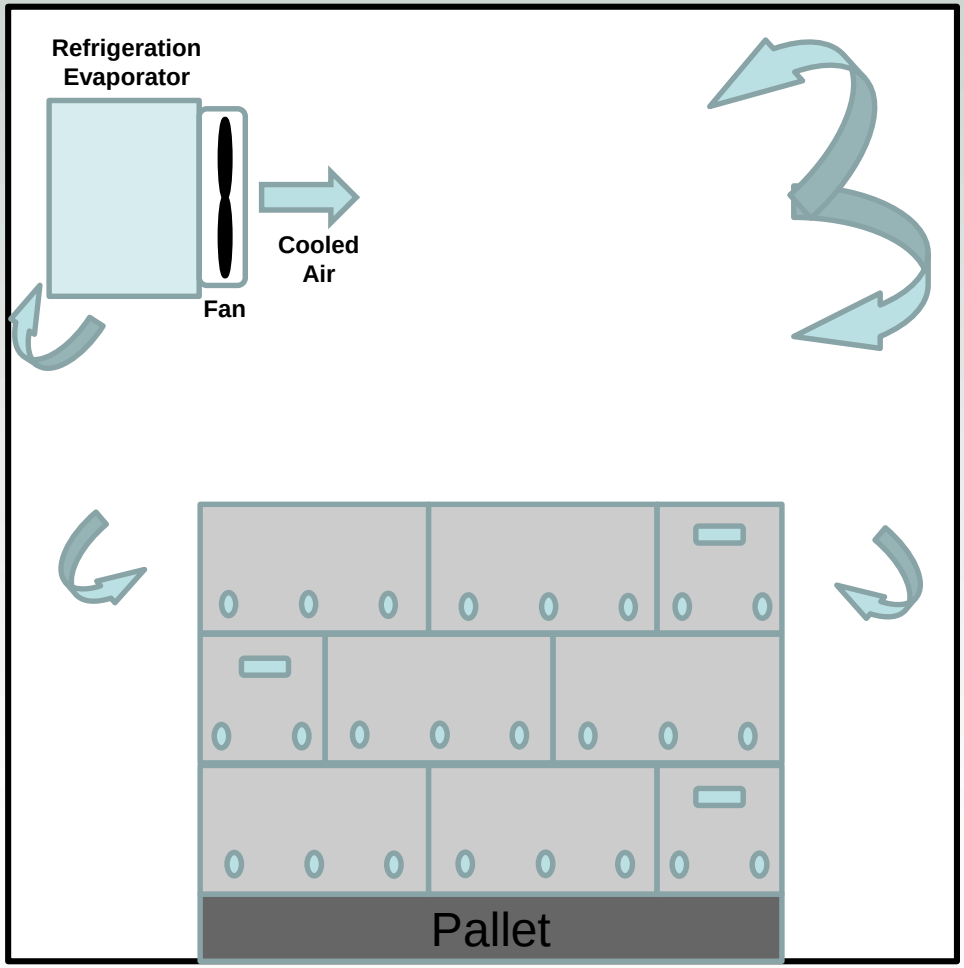
- NE Veg Mgt Guide
- nevegetable.org/



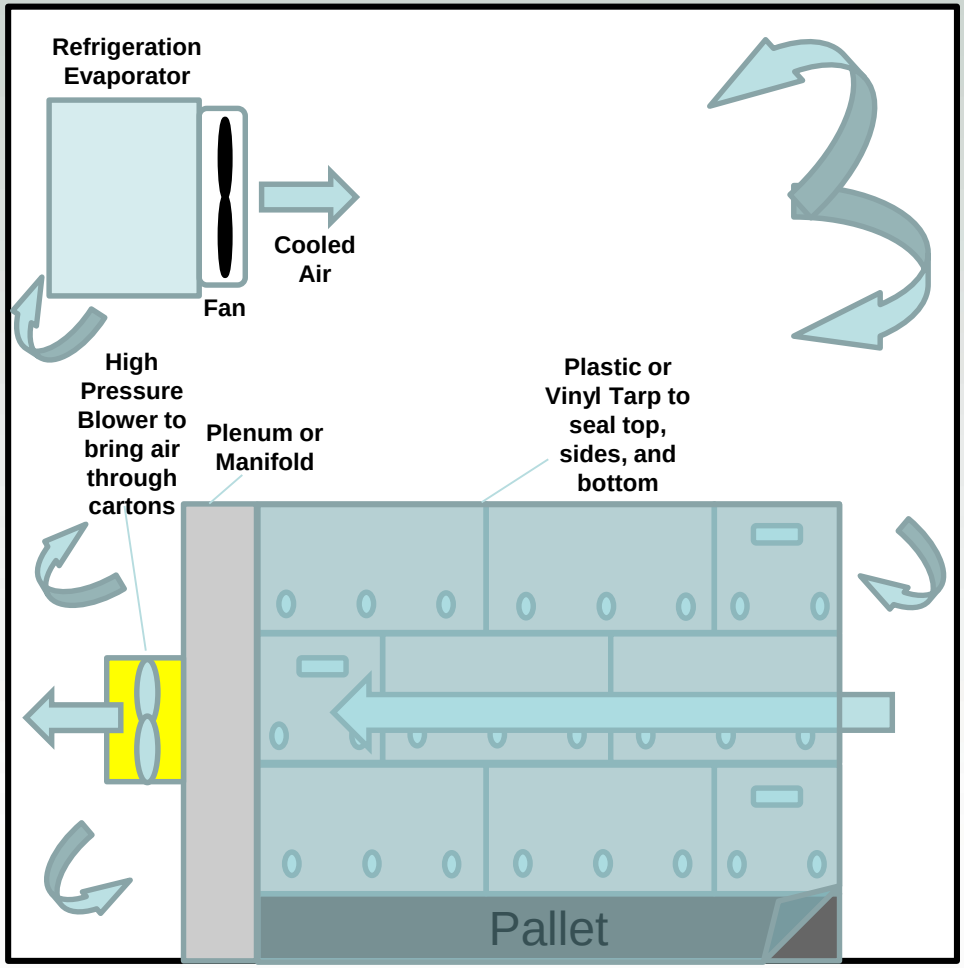
Forced Air Precooling Tunnels


Air recirculation to room
Curtain unrolls over pallets
Air recirculation to room
SuperFlow
Evaporator inside for additional cooling
Suction Outlet
Pallets here
…and here

Typical "Room Cooling"



"Forced Air Cooling"



Pallet Cooler

- Made to sit inside walk-in cooler
- Sized for 40”x48” pallet
- 5 x “10 block’s”
- 2”x12” suction plenum
- Suction blower
  - 2500 CFM at 2.1 IWC (Global Industrial, Model #T9F246343, $130)
- 6 mil greenhouse poly for sealing sides
- $300

Carton Cooler

Front door not yet installed in this picture

- Made to function independently
- Sized for 4 1-1/9 wax boxes or 3 bulb crates
- Built-in suction plenum
- Suction blower
  - Bathroom exhaust fan shown needs to be upgraded for more pressure diff.
- Exploring sealing options
- $1000 including CoolBot and AC

Measure/Monitor

- "The measured variable improves."
- Temperature – **easy**
- Relative Humidity – **not so much** easy.
- Don't assume you have the conditions you want. **Measure them**.
- **Low tech** – wall sensors, daily checks, log book
- **High tech** – remote monitoring, email alerts, USB's
- Calibration and certification

Certified hygrometer, $250

DeltaTrak 11063 Calibrated needle thermometer, $30

Clipboards, priceless

Sling psychrometer, www.benmeadows.com $80

USB logger. www.dataq.com

Improved electronic psychrometer. www.vecs.org

Want to Partner?

- Looking for on-farm piloting / demonstrations.
- Precooling and Curing improvements.
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