

Postharvest Handling Can Improve Fresh Market Success

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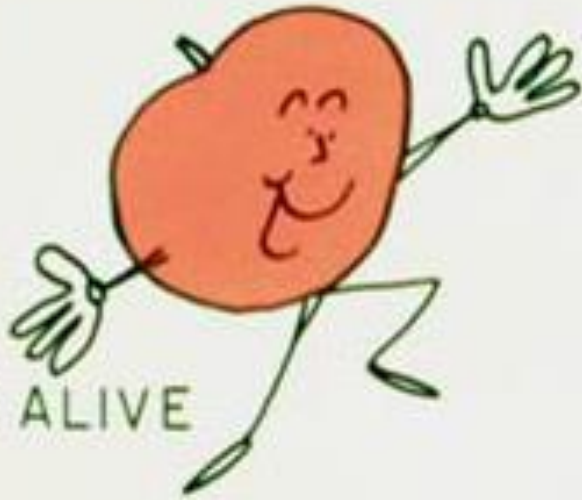
SARE R&E Project
#LNE16-347

go.uvm.edu/precoolcure

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FRESH PRODUCE



IS ALIVE



BREATHES



RELEASES
HEAT



LOSES
MOISTURE



CAN GET SICK



CAN EVEN DIE

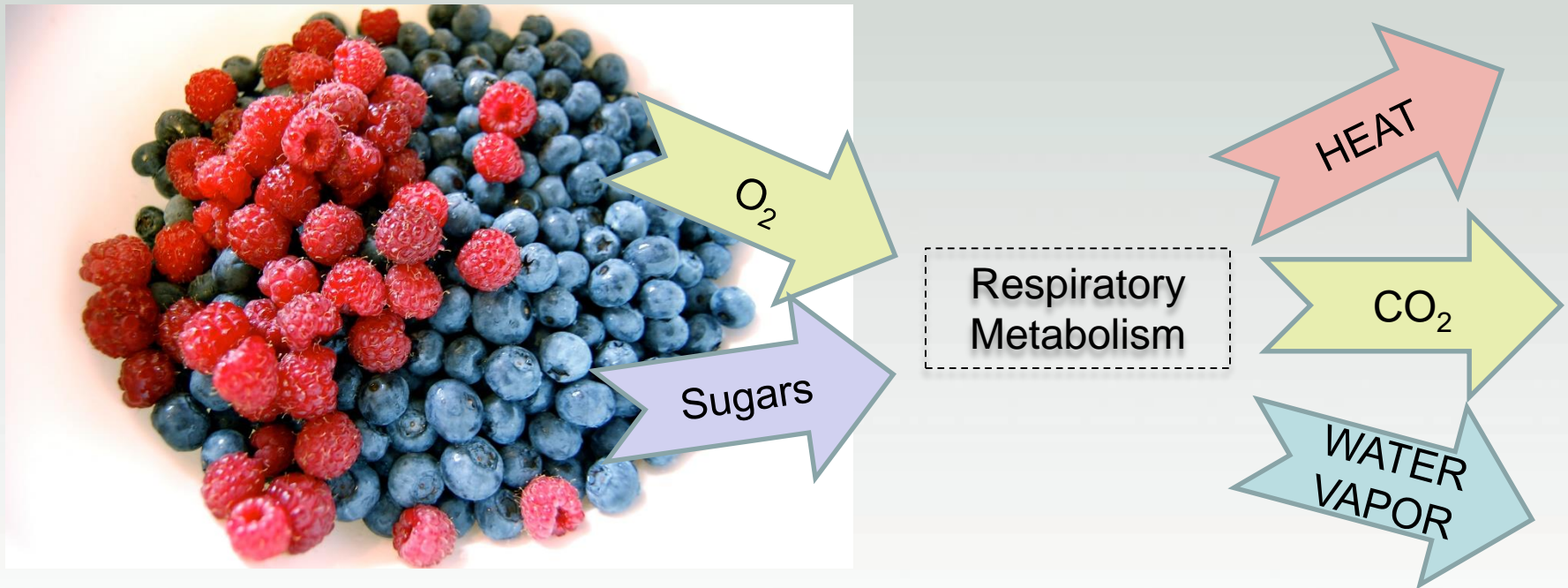


Postharvest is a hotel.



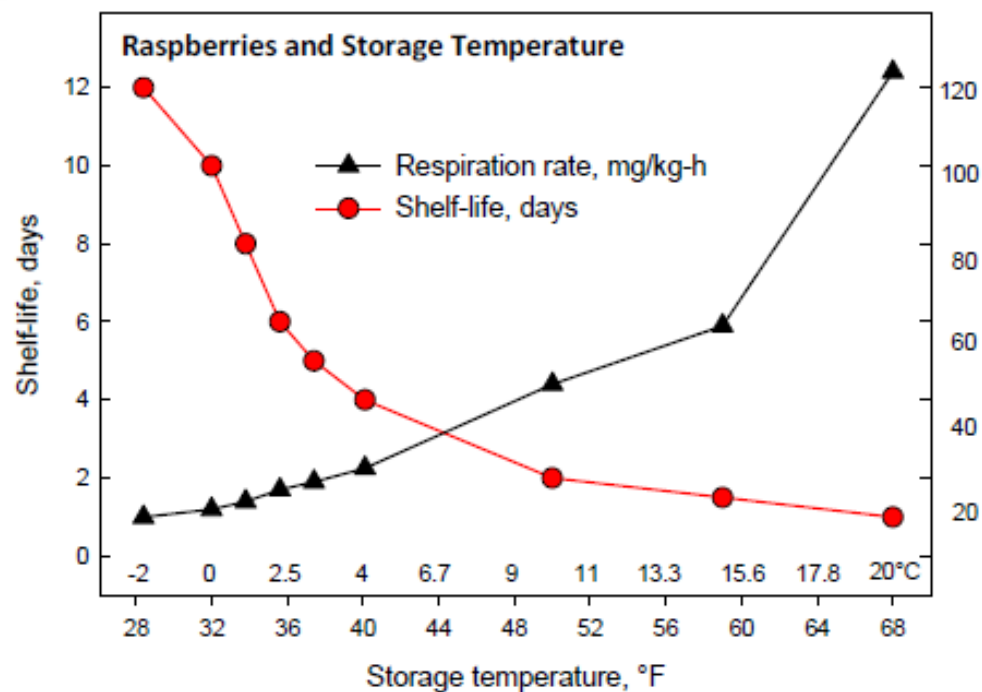
Not a hospital.

Respiration



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

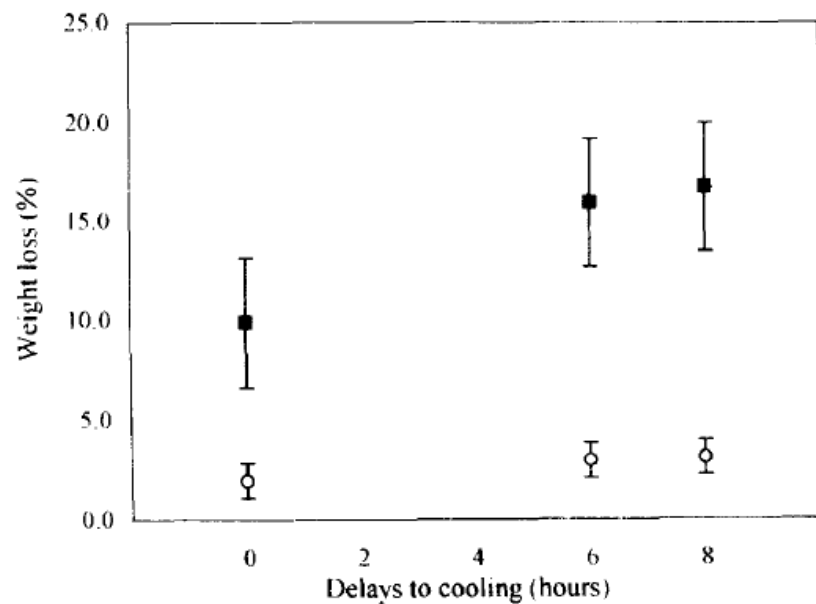


Figure 1 Effects of delays to cooling and wrapping on the weight loss of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

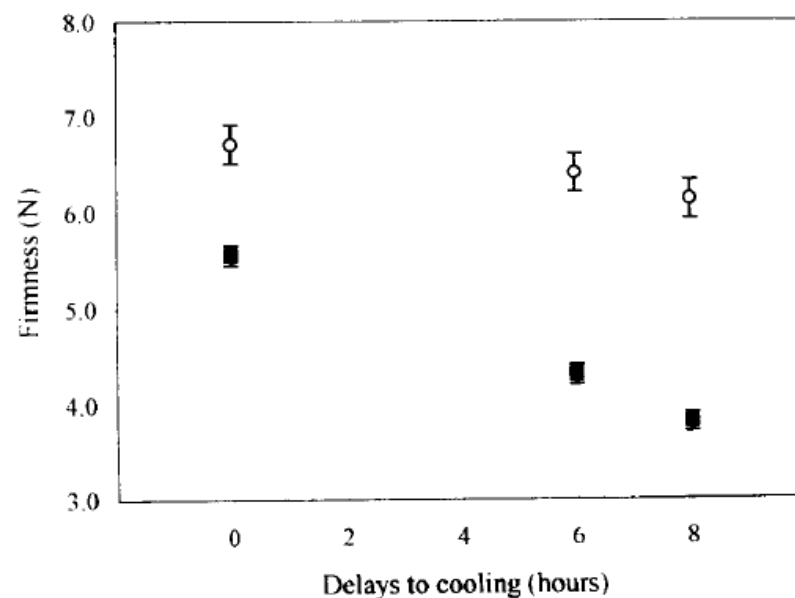


Figure 3 Effects of delays to cooling and wrapping on firmness of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

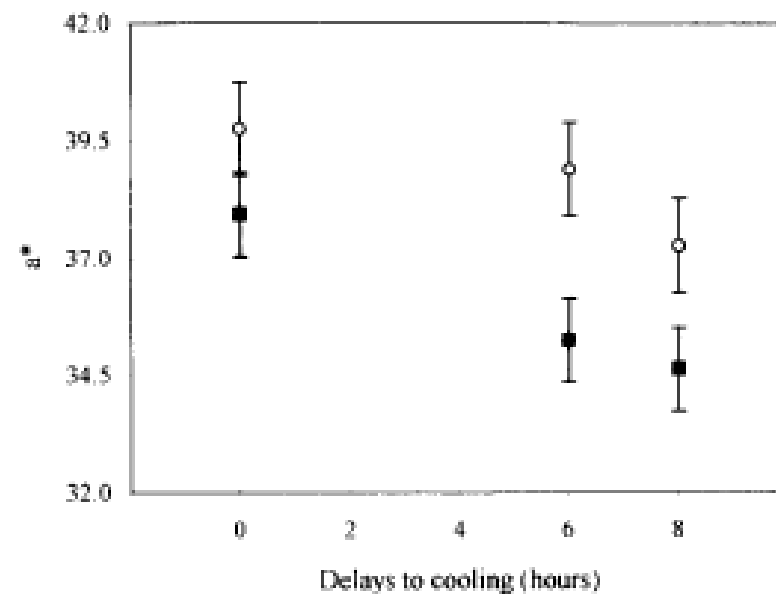
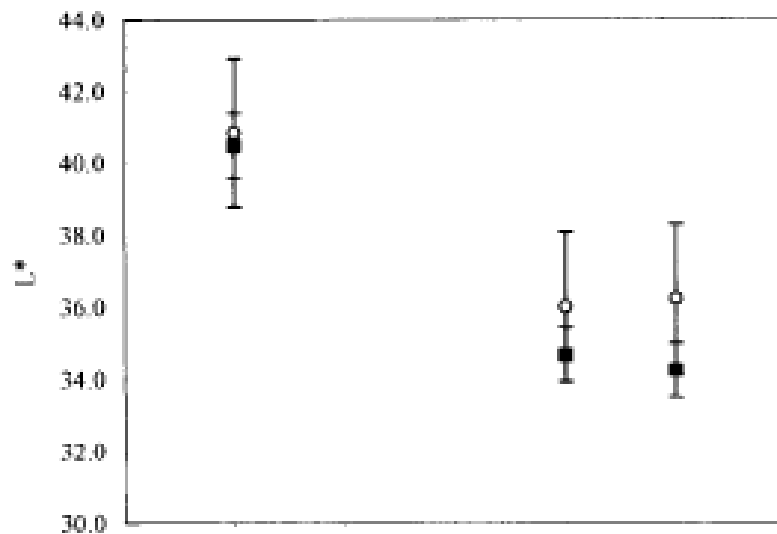


Figure 2 Effects of delays to cooling and wrapping of the colour of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

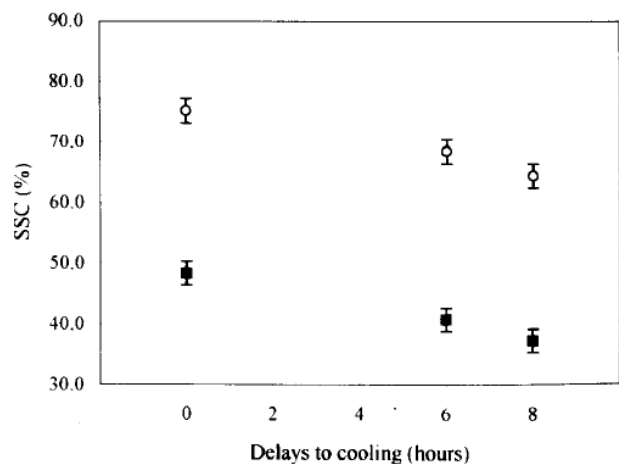


Figure 4 Effects of delays to cooling and wrapping on the soluble solids content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

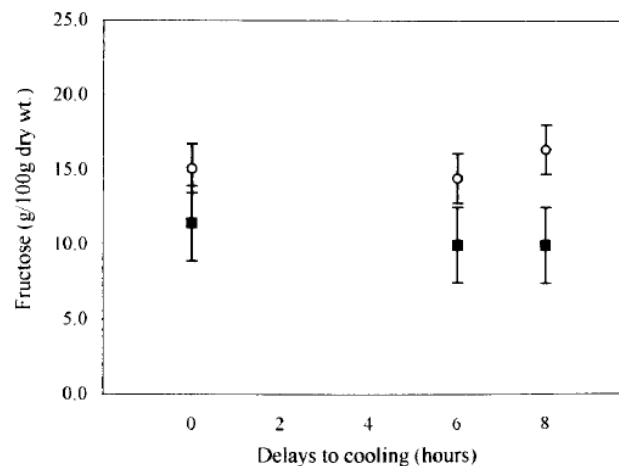


Figure 5 Effects of delays to cooling and wrapping on the fructose content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

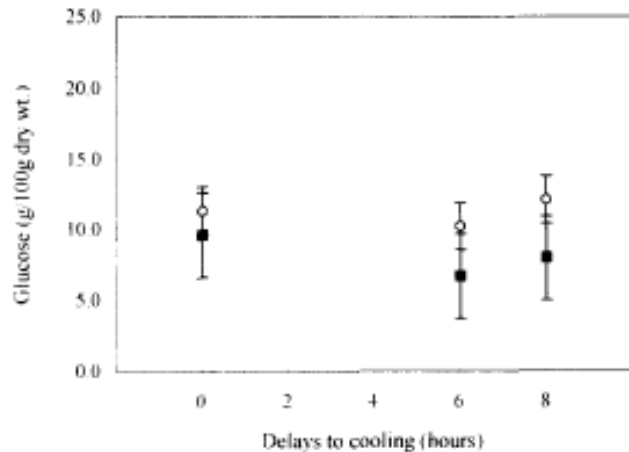


Figure 6 Effects of delays to cooling and wrapping on the glucose content of strawberry (cv. Sweet Charlie). ○, wrapped; ■, non-wrapped.

Precooling Methods

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

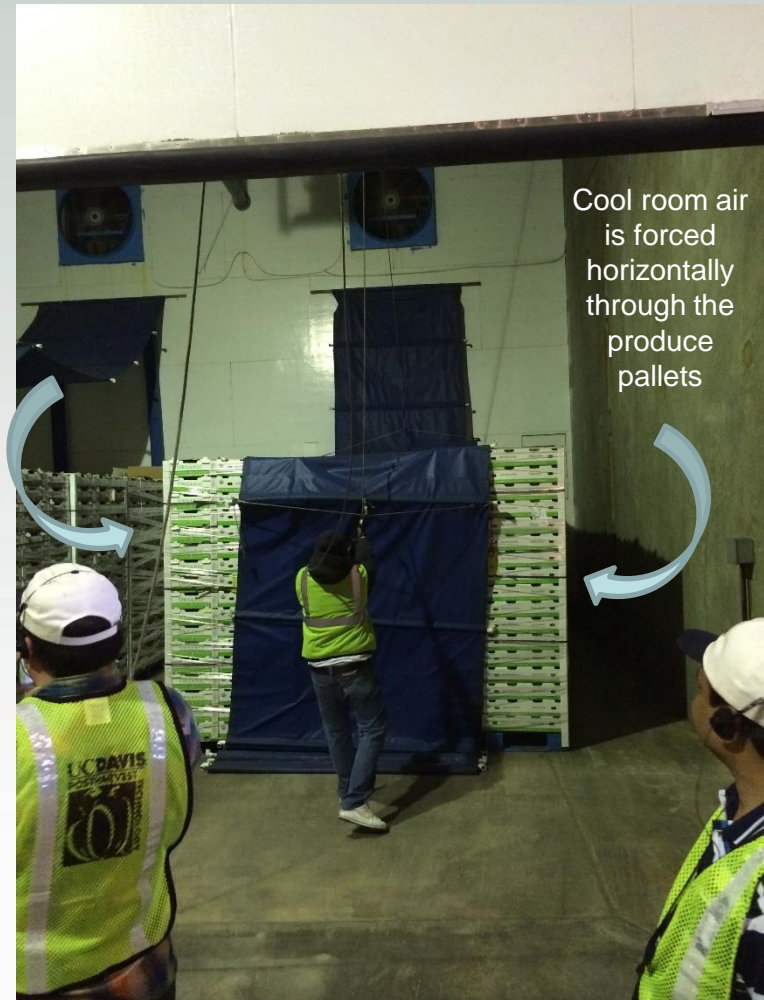
- NE Veg Mgt Guide
- nevegetable.org/

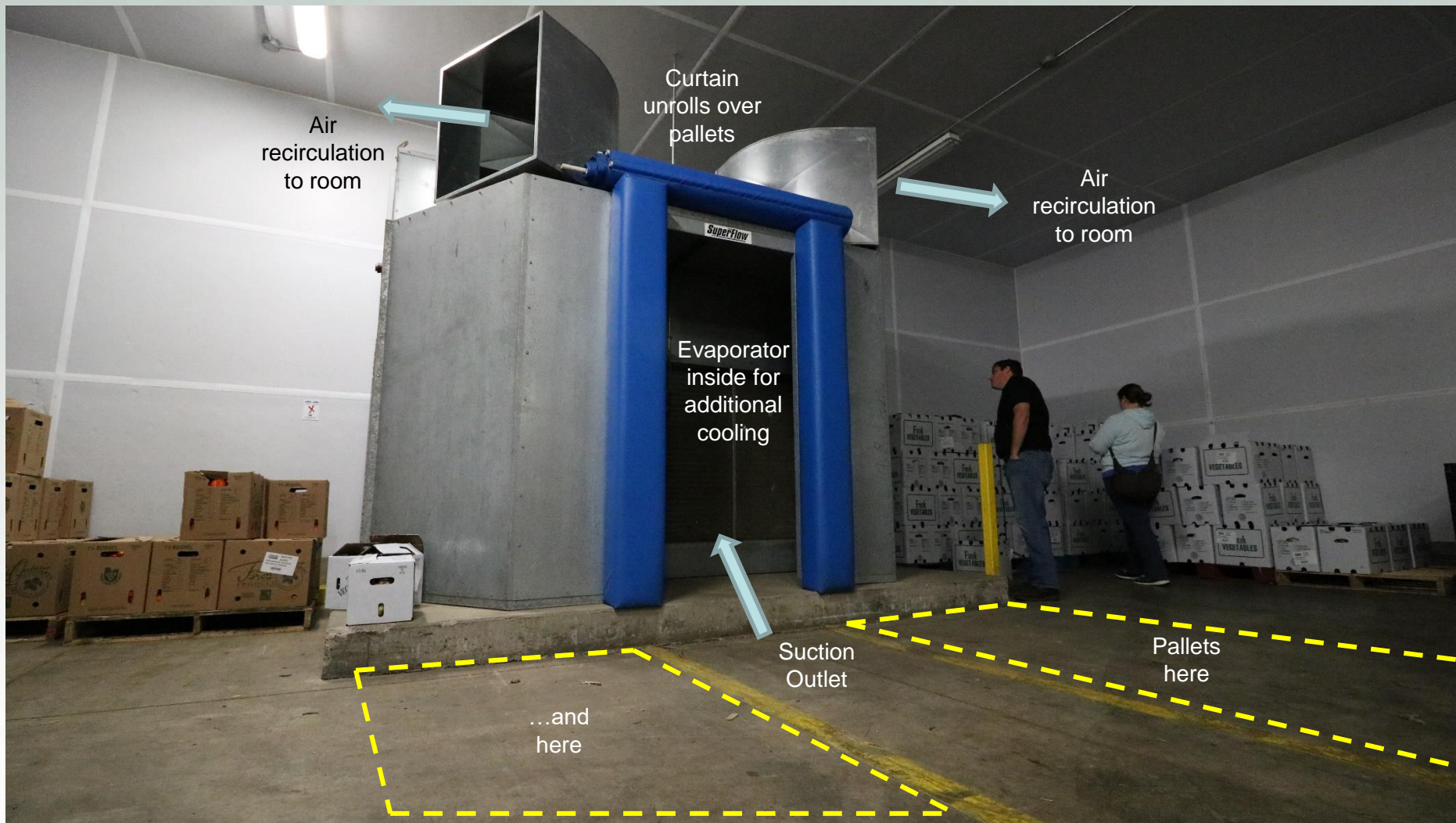
Table 16: Handling Produce for Higher Quality and Longer Market Life

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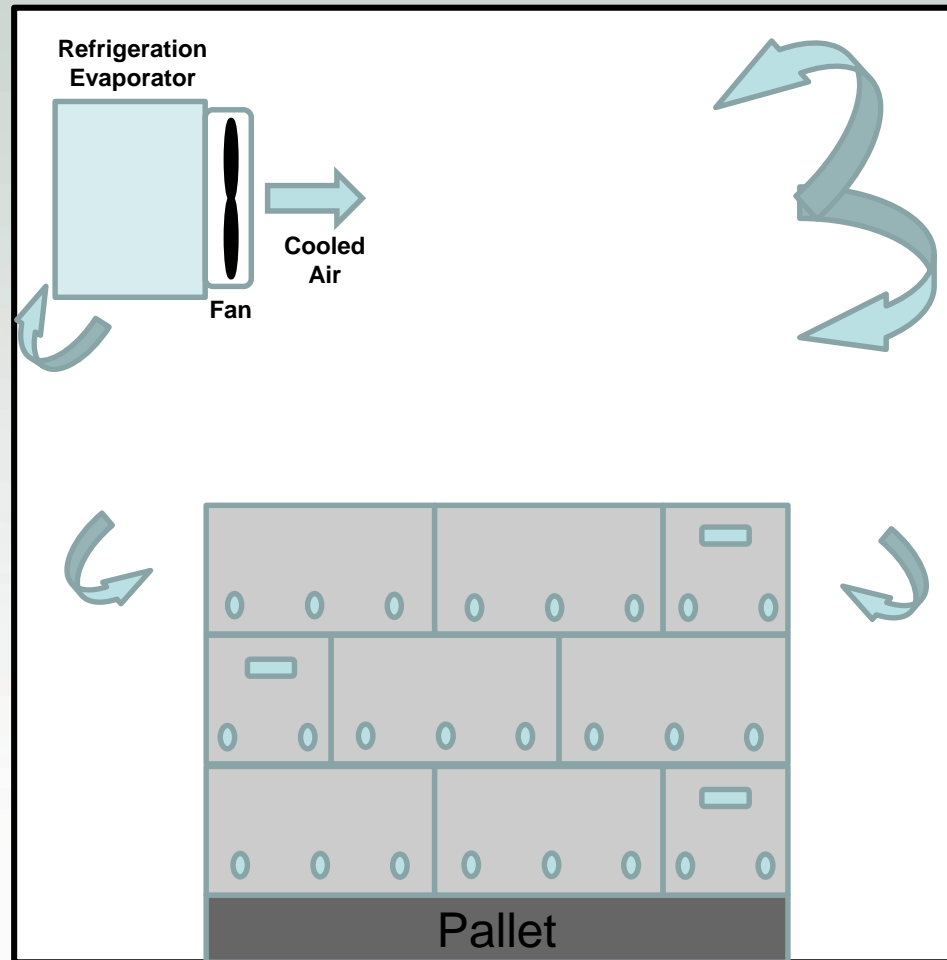
Vegetable Crop	Recommended Cooling Methods ²					Important Handling Factors			
	Forced Air or Room Cooling	Hydro-Cooling	Package Ice or Liquid Icing	Vacuum Cooling	Transit Icing ³	Recommended Transit & Storage Temp. Degrees F 4	Recommended Transit & Storage Rel. Humidity, %	Expected Marketable Life Under Best Conditions	Sensitivity to Chilling Injury 5
Asparagus		+		+	N	32-36	95	1-2 weeks	L
Basil	+				N	46-50	90-95	4-7 days	H
Beans, lima in pod	+	+			N	38-42	90-95	7-10 days	M
snap	+	+			N	40-45	90-95	7-10 days	M
Beets, bunched		+			R	32		1-2 weeks	I
Broccoli			+		E	32	90-95	1-2 weeks	I
Brussels sprouts	+	+	+	+	R	32	90-95	3-5 weeks	I
Cabbage	+				N	32	90-95	3-6 weeks	I
Cabbage, Chinese	+		+	+	R	32	90-95	4-8 weeks	I
Carrots, Topped	+		+		N	32	90-95	6-7 months	L

Forced Air Precooling Tunnels

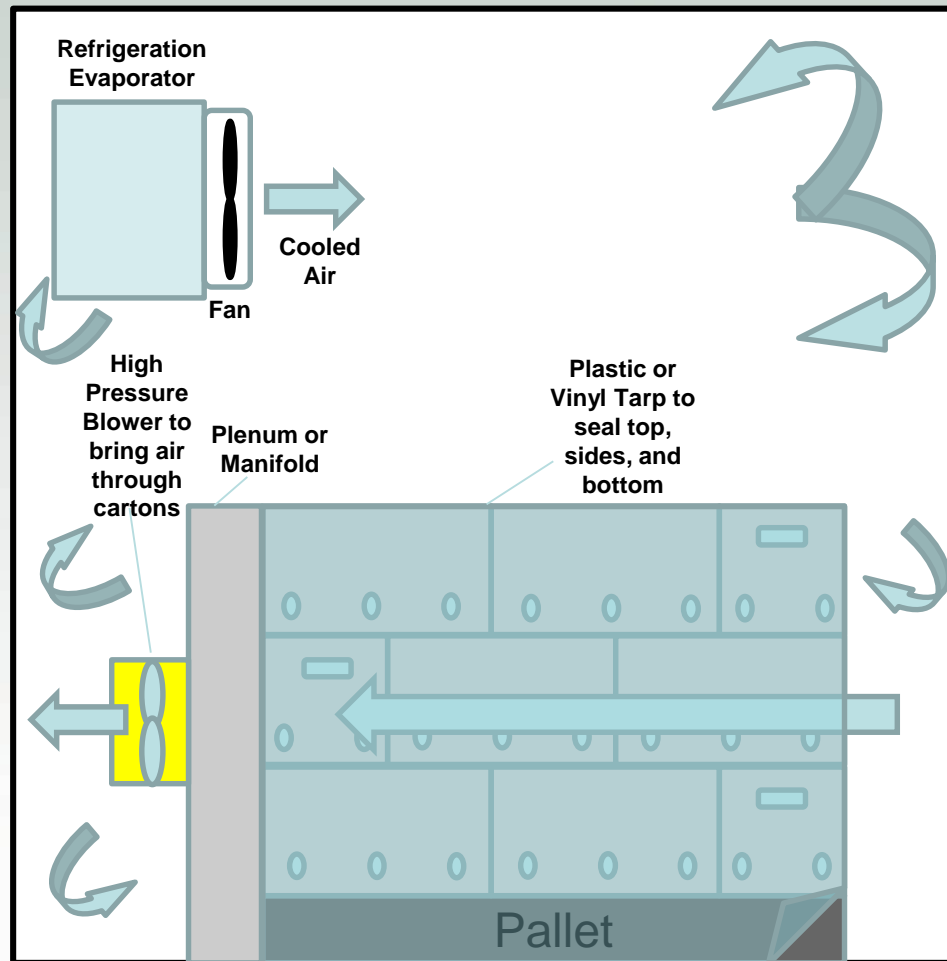




Typical “Room Cooling”



“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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