

## ***Problem Diagnosis in Produce Handling***

Marita Cantwell  
Dept Plant Sciences  
UC Davis  
[micantwell@ucdavis.edu](mailto:micantwell@ucdavis.edu)  
<http://postharvest.ucdavis.edu>

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**From:** Bill Gerlach [mailto:BillGerlach@melissas.com]

**Sent:** Thursday, August 12, 2004 3:21 PM

**To:** micantwell@ucdavis.edu; Cantwell, Marita

**Subject:** Fw: Melissa's Refusal Belgian Endive

Hello, Dr. Cantwell. We are continuing to experience problems on imported endive. I was wondering whether these photos might indicate temperature abuse?

Thanks!

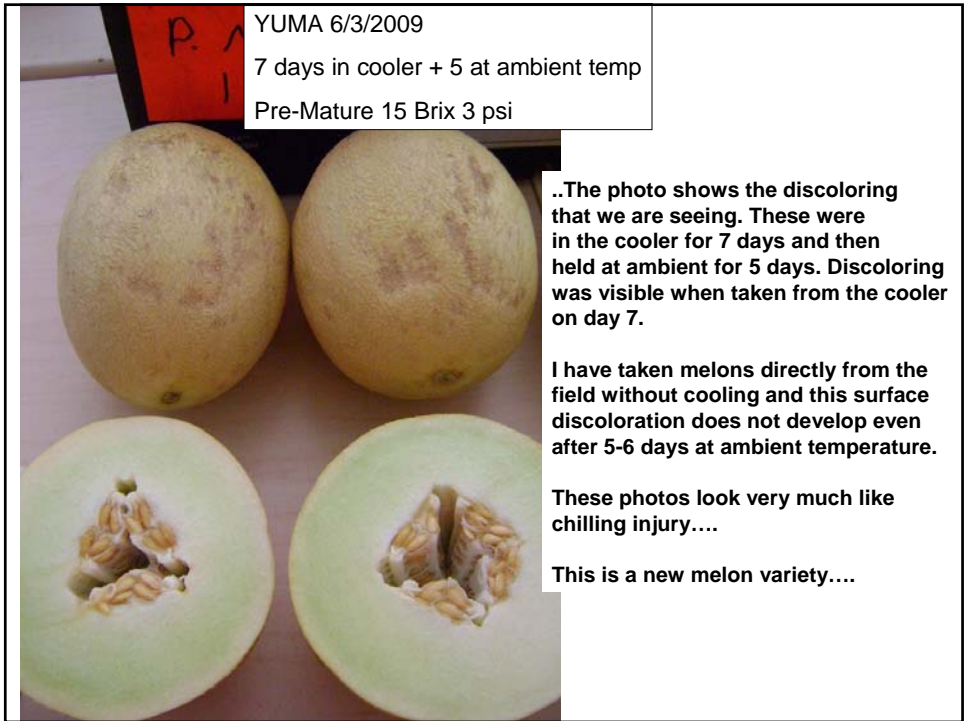
Temperature abuse  
Poor sanitation  
Time





Please send reasonable  
Photos that are in focus!

Better pictures, but  
Where is the needed information  
To facilitate diagnosis or an  
educated guess?



YUMA 6/3/2009  
7 days in cooler + 5 at ambient temp  
Pre-Mature 15 Brix 3 psi

..The photo shows the discoloring  
that we are seeing. These were  
in the cooler for 7 days and then  
held at ambient for 5 days. Discoloring  
was visible when taken from the cooler  
on day 7.

I have taken melons directly from the  
field without cooling and this surface  
discoloration does not develop even  
after 5-6 days at ambient temperature.

These photos look very much like  
chilling injury....

This is a new melon variety....

## Suggestions to help in problem diagnosis

- Document with good photos-when & where taken
- When and where harvested
- Summary of handling procedures--details
- Storage, shipping, distribution conditions
- Was it handled or shipped differently from usual procedures?
- How long have you had the product?



### **Possible Causes**

- Heat damage
- Chilling injury
- High carbon dioxide injury
- Low oxygen injury
- Physical injury
- Anthracnose

From Adel Kader, UC Davis

## **PRELIMINARY INVESTIGATION-1**

- **Bill of lading**
- **Invoice description of the load**
- **Dates of arrival and inspection**
- **Make and model of refrigeration unit**
- **Container identification**
- **Airflow delivery system (top or bottom)**
- **Obvious damage, if any, to the container on arrival.**
- **Documentation that the generator and refrigeration unit were operational**
- **Recorded temperature data**

From Adel Kader, UC Davis

## **PRELIMINARY INVESTIGATION-2**

- **Indication that the thermostat and CA equipment, if used, were set at the prescribed levels**
- **Detailed description of the box stowage pattern**
- **Severity of the damage or problem in various locations within the load**
- **Indications, if any, that the severity differs between lots in the load**
- **Measurements of produce temperature in various parts of the load during unloading**
- **Observations of the general outside appearance of the boxes and pallet units**

From Adel Kader, UC Davis

## Chilling Injury Symptoms on Mangoes



- Uneven ripening
- Poor color and flavor development
- Surface pitting
- Grayish scald-like skin discoloration
- Increased susceptibility to decay
- Flesh browning in severe cases

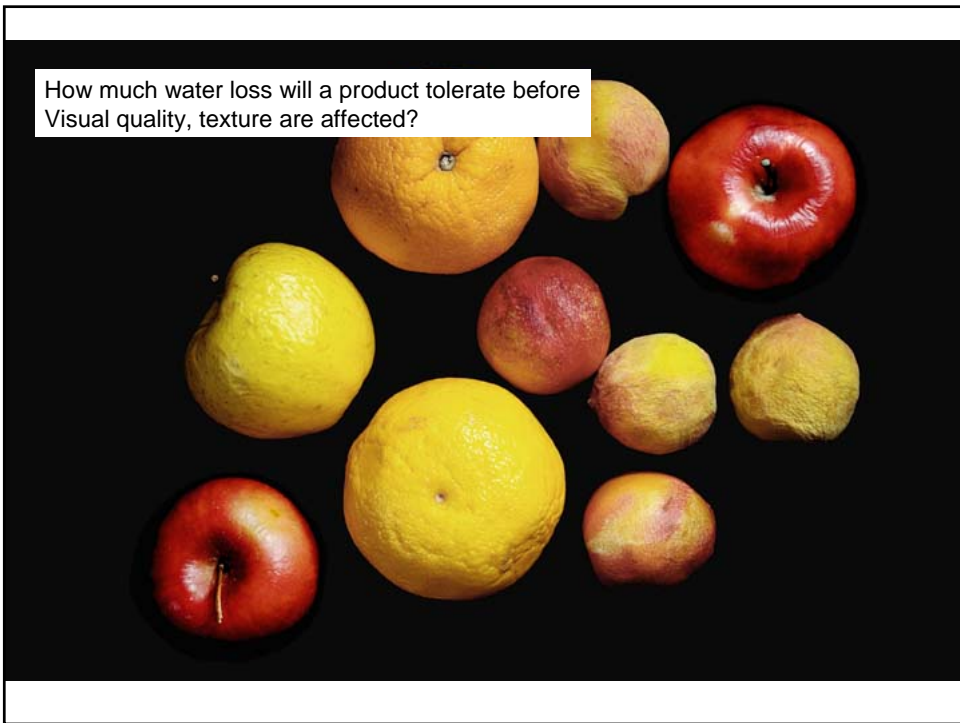
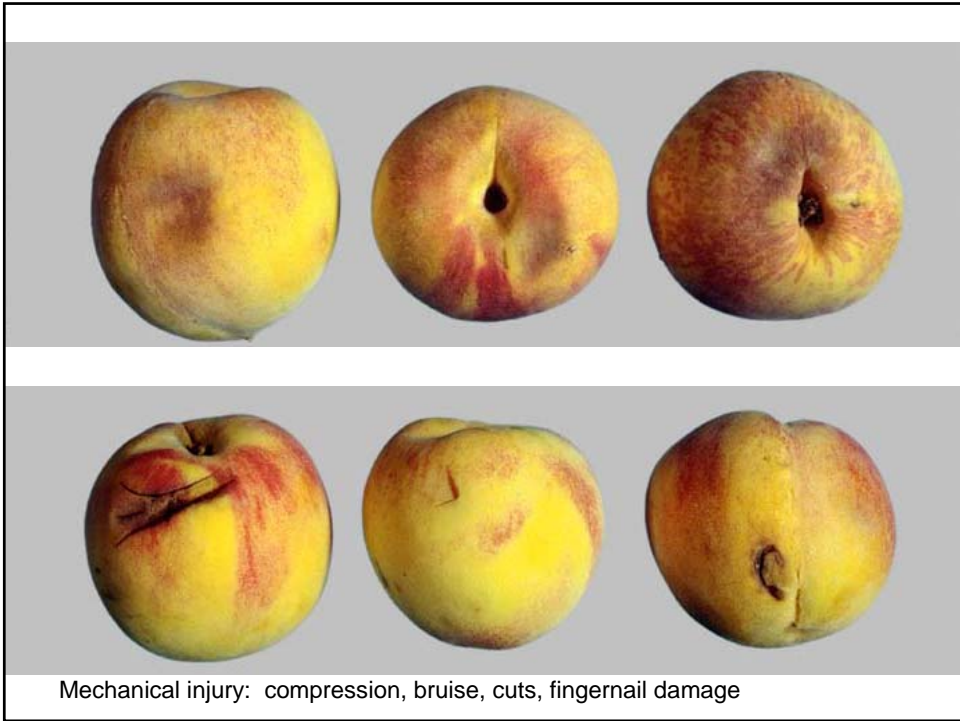
From Adel Kader, UC Davis

## Postharvest Problems

- Know the product
- What are common causes of quality loss
- Develop a photo library of problems of known origin

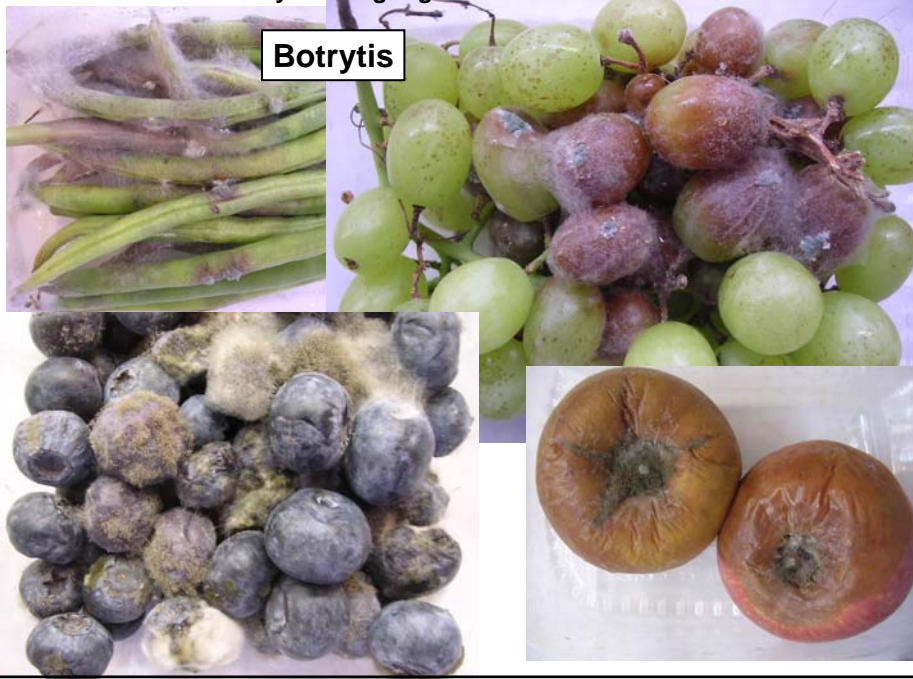


**Now a quiz for us all.....**



What is the decay-causing organism on these fruits & beans?

Botrytis



7 days storage —what were the storage temperatures?



0, 5, 10 and 15°C



Botrytis (Gray mold) and Aspergillus (Sooty mold) on stored onions



Bacteria  
Injury at harvest  
Temperature abuse  
Time



Anthrachnose developing on ripening fruit



Physiological problem: Bitter pit plus decay during storage



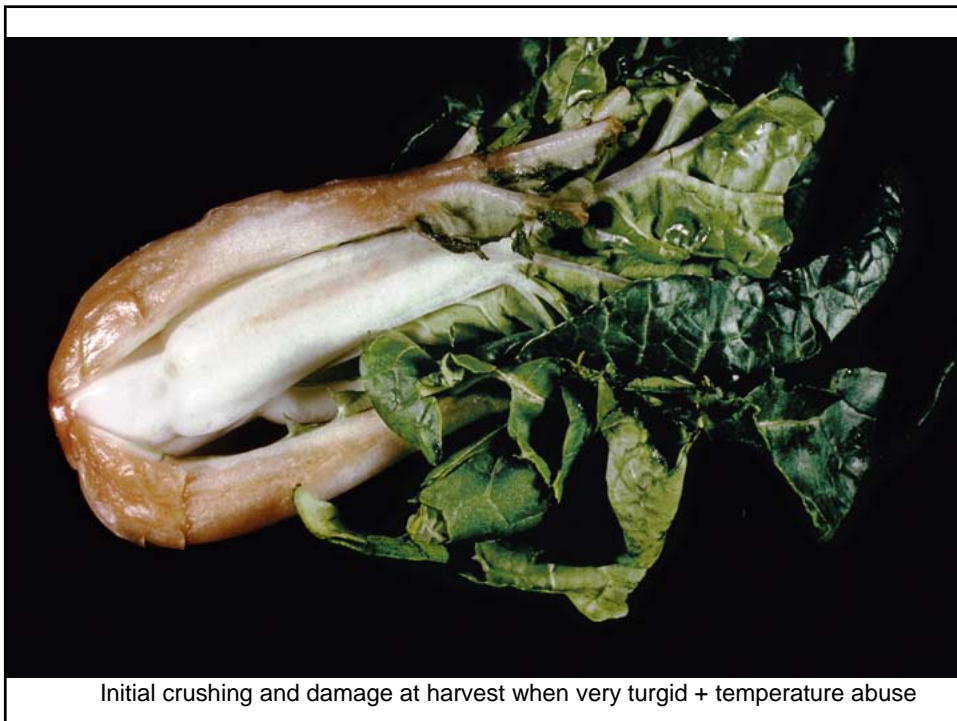
Low O<sub>2</sub>, high CO<sub>2</sub>, stored too long?



CO2 injury (brown stain)



"Roller" bruising of pears





Oleocellosis; damage at harvest when surface cells very turgid



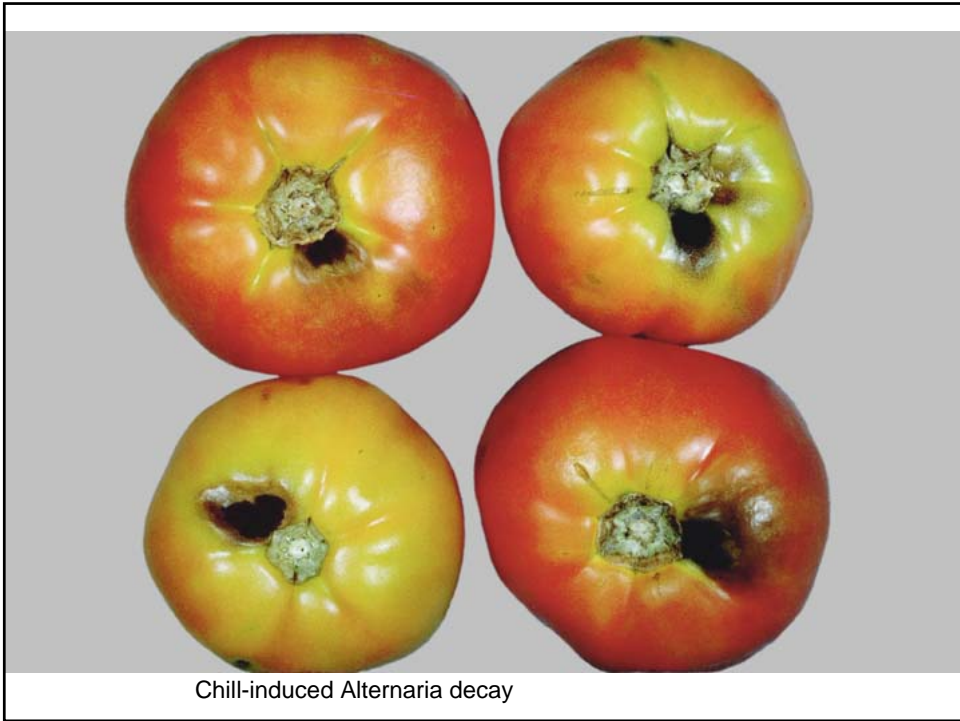
Drops leading to internal injury and bruises

Drops leading to Internal damage

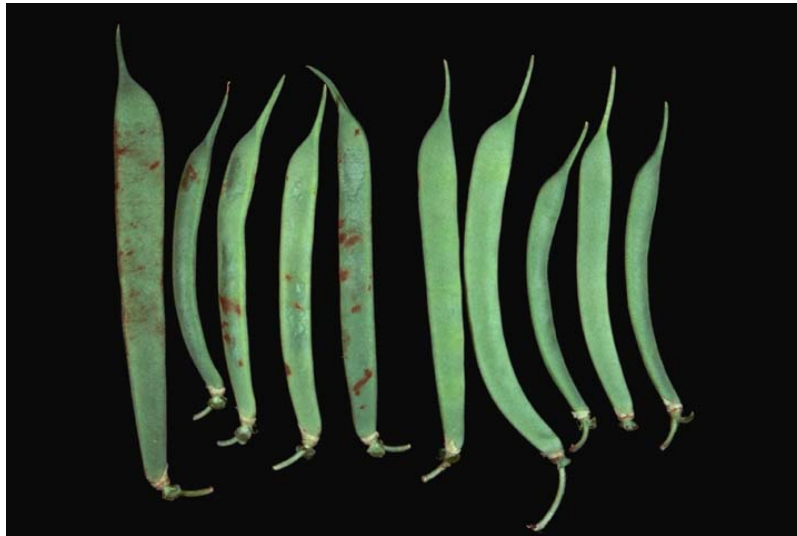


Chilling injury of banana





Chilling injury, but how long and at what temperature?



7 days

5°C (41°F)

7.5°C 45°F)

**Galia melon**  
**4 wk**



**10C (top) vs 7.5C (lower)**

Problem-what is this?

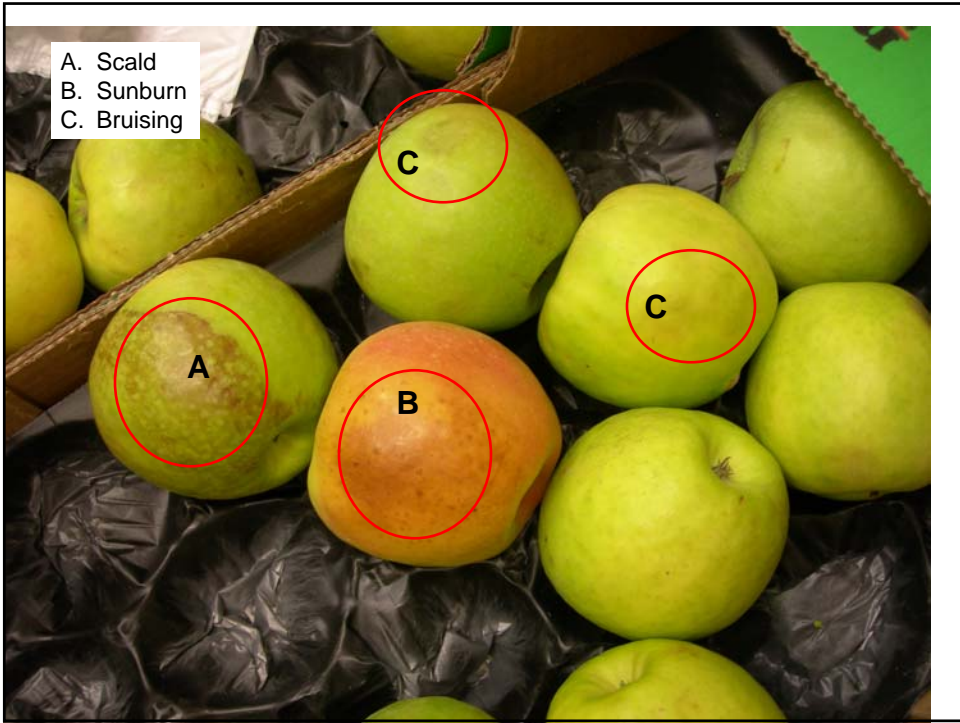


Injury from known conditions



Probably high temperature but virus can also lead to poor coloration in tomatoes (usually blotchy)





**Russet Spotting**  
**Ethylene-induced Disorder on Lettuces**





Cauliflower, leaf abscission due to ethylene exposure and/or abusive temperatures and TIME





Left = light exposure resulting in increase in chlorophyll and glycoalkaloids.  
Greened potatoes should be discarded because glycoalkaloids are toxic.

Temperature Abuse  
Arugula (Rocket) stored for 10 days



## Temperature Abuse



7 days at 5°C and 10°C

7 days

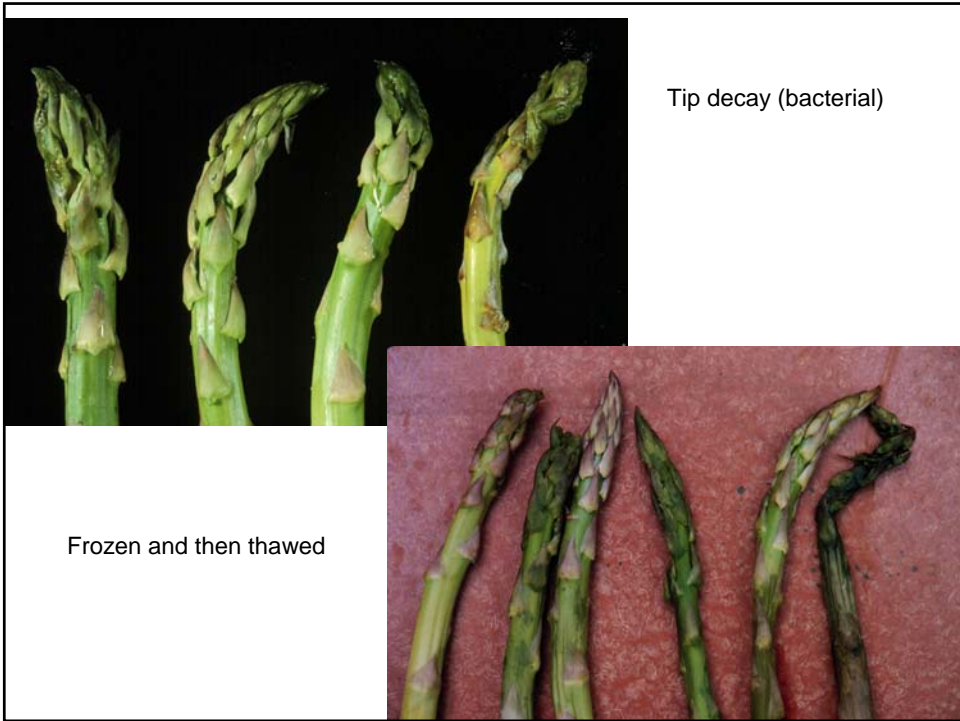


5°C

10°C

??

Ethylene at 10°C



Freeze damage



0°C

-6 to -7°C

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