

## **Stem-end Rind Breakdown (SERB) of citrus and its control**

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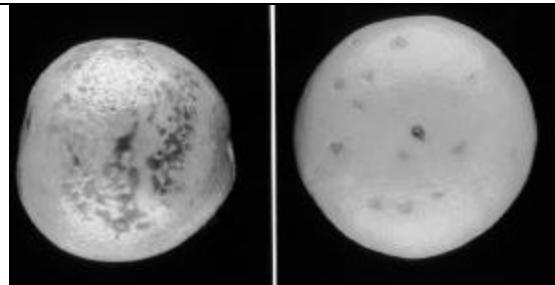
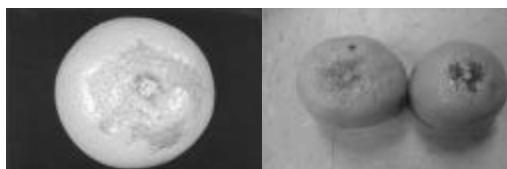


### **SERB-Why?**

- A peel disorder of citrus from humid, high rainfall areas such as in Florida
- Severe SERB reported in recent years
  - exported to southeast Asia
- Research was done only in the 1960's
- Adoption of new waxes & use of coolers
  - SERB is not well known
- SERB on grapefruit this year?

### **What is SERB?**

- Collapse of rind cells at the stem end
  - subsequent darkening and decay development
- Oranges: Valencia and Hamlin; Pineapple, etc.
- Worse in small and thin-skin fruit



**Chill injury**

Peel tissue collapse  
Develops in 4-6 weeks in cold storage

**Postharvest pitting**

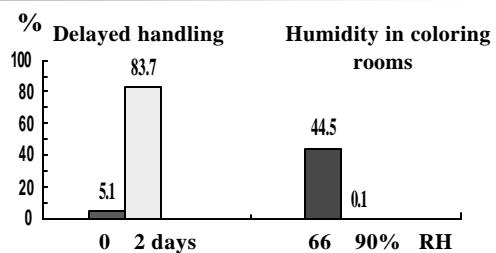
Oil gland targeted  
Develops in 2-4 days  
at high temperature in waxed fruit

### **SERB in grapefruit:**

- No reports previously
- Severe with delayed packing, high temperature & low relative humidity



### **Effect of delayed handling and humidity on SERB incidence of oranges (Grierson, Hopkins, McCornack, 1958-1960)**

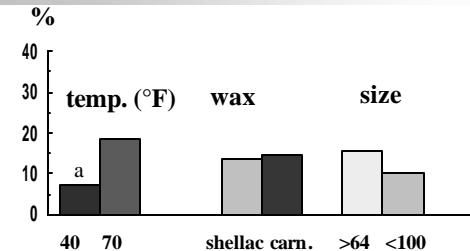


## Postharvest factors and SERB

- clipping vs. pulling
- fruit size
- wax formulation
- storage temperature



Study 1: Effect of fruit size, wax and temperature on SERB incidence of 'Valencia' oranges (day 40)



Study 2: Effect of wax, temperature, and clip/pull on SERB and weight loss of 'Valencia' oranges (day 18)

Treatment	SERB (%)	Wt loss(%/d)
40°F	1.3a	0.13a
70°F	61.2b	0.33b
Shellac	29.1ab	
Carnauba	40.9b	
Clip	31.2a	
Pull	31.3a	

Waxes vs. SERB of 'Valencia' oranges, day 110, 2000

Treatment	SERB (%)
Carnauba 1	31.27abc
Carnauba 2	21.35ab
Carnauba 3	34.22bc
Polyethyl. 1	34.05bc
Polyethyl. 2	12.72a
Shellac 1	31.31abc
Shellac 2	43.66c
Shellac 3	20.86ab

## Conclusions

- SERB is higher at 70°F than 40°F
- Waxes did not show a consistent effect on SERB
- Harvesting methods and fruit size did not influence SERB

## Preharvest factors affecting SERB

SERB is high at high N and low K plots. However, nutrition, irrigation and rootstocks did not significantly influence development of SERB at our recent studies.

Preharvest factors influence fruit susceptibility to SERB.

Postharvest conditions determine incidence and severity of fruit with SERB.

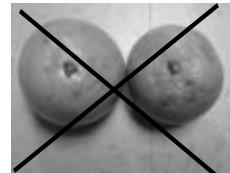
## Control of SERB

- Keep fruit in shade after harvesting
- Avoid delayed handling and drying
- Avoid unnecessary ventilation
- Keep high humidity after harvesting: 92%
  - picking, degreening(ethylene no effect on SERB), packing
  - avoid SERB is the best protection against decay
- avoid excessive brushing at packing
- Store fruit at low temperature and high humidity

## Recommended Temperatures

(Waxed Fruit)

**33-40°F for oranges/tangerines**  
**45-50°F for grapefruit**



**Thanks!**

