UNIVERSITY OF FLORIDA | Cooperative Extension Service
Institute of Food and Agricultural Sciences

PACKINGHOUSE NEWSLETTER

W. Wardowski
Citrus REC
700 Experiment Station Road
Lake Alfred, FL 33850
Phone: (941) 956-1151

Packinghouse Newsletter No. 179
May 16, 1997

Key Index Words: Citrus Packinghouse Day, Cold treatment, Grapefruit, Saprophytic fungi

THIRTY-SIXTH ANNUAL CITRUS PACKINGHOUSE DAY THURSDAY, AUGUST 21, 1997 CITRUS RESEARCH AND EDUCATION CENTER 700 EXPERIMENT STATION ROAD LAKE ALFRED, FL 33850

Will Wardowski
Citrus Research and Education Center
Lake Alfred

Citrus Packinghouse Day is early again this year: mark your calendar. Registration begins at 8:30 AM and the program begins at 9:30 AM. Tickets for lunch may be purchased at registration. There is no meeting registration fee and reservations are not required.

We have a full commercial exhibit area and continue to have a waiting list of exhibitors. The exhibit floor space continues to shrink as new equipment is installed in our packinghouse and processing plant.

The morning talks will center on water permitting and recycling, and on grade lowering defects at the time of packing or during marketing. We will look forward to seeing you on August 21st.

Saprophytic Fungi at the Stem-end of Citrus Fruit

G. E. Brown, Florida Department of Citrus, Lake Alfred
Adopted from FDOC Factsheet

The cotton-like material occasionally found on the stem-end of stored citrus fruit results from growth of a group of saprophytic (non-pathogenic) fungi on senescing buttons (calyx and disk). Typically, all or a portion of the button remains attached to a citrus fruit when it is separated from the stem of the tree at harvest. At harvest, healthy green buttons do contain some dead tissue on their surfaces. Some of this dead tissue is remnants of the petals and stamens that were attached to the disk during bloom at the initial stage of fruit formation. Additional dead tissue is formed on the button surface by various insects that are active in the protected environment between the calyx and developing fruit during the growing season. Numerous fungi colonize this dead tissue, and some are pathogens that cause postharvest disease, while others are saprophytes. The pathogens are often effectively controlled by postharvest treatments, but these treatments do not necessarily affect growth of the remaining saprophytic fungi. Healthy tissue of green vigorous buttons is not colonized. But as the button ages and dies with time after harvest, the fungi in the dead surface tissue will grow into the remainder of the button. Fungal growth on aged buttons is enhanced at temperatures nearing 70°F and relative humidities above 85%. Factors that enhance aging, such as ethylene degreening, will also favor more rapid colonization of the button. Saprophytic fungi consist mostly of species of *Mucor, Rhizopus, Trichoderma, Fusarium, Colletotrichum, Capnodium, Aspergillus* and *Cladosporium.* Species of *Fusarium* usually predominate. **Presence of these fungi has no effect on fruit quality and is not an indication of imminent decay, but rather an indication of handling and storage conditions.** High humidity conditions that favor growth of saprophytic fungi are actually very good conditions for maintaining fruit quality.

Symptoms

The aerial mycelium produced by saprophytic fungi can range in color from black to white, with various shades of gray between these two extremes. Mycelium can remain relatively appressed to the fruit surface, or in tufts nearing 3/8 inch in height. Growth may also occur in the absence of the button on small amounts of disk tissue still remaining attached to the fruit.

Control

1. Effective treatments that control growth of these fungi are not available. However, practices that retard senescence will delay fungal colonization.

2. Storage temperatures of 50°F or lower will retard fungal growth.

3. Storage relative humidities lower than 85% will delay fungal growth. <u>However, these conditions will accelerate fruit dehydration and softening!</u>

4. If degreening with ethylene is necessary, keep the degreening and storage time to a minimum.

Cold Treatment of Florida Grapefruit

M. A. Ismail and G. E. Brown, Florida Department of Citrus, Lake Alfred
Adopted from FDOC Factsheet

Cold treatment is an approved quarantine treatment for citrus grown in areas infested with a number of tropical fruit flies. In Florida, the Caribbean fruit fly (*Anastrepha suspensa*) may be found in citrus groves during late spring and summer months. Cold treatment, as approved by the U.S. Department of Agriculture involves storage of fruit below 36°F (2.2°C) for specified periods to ensure their freedom from fly infestation. However, because of the susceptibility of grapefruit to extended storage at low temperatures, fruit may be stored at 50-60°F (10-15°C) for approximately one week to increase their resistance to chilling injury. This process, commonly referred to as "pre-conditioning" or simply "conditioning", helps maintain fruit quality. However, it is not a requirement of cold treatment.

Cold Treatment Requirements:

Standard and short cold treatment schedules are approved for grapefruit by the U.S. Department of Agriculture. The short schedule is approved for use on grapefruit grown in areas of low fly infestation. The following tables list the various time/temperature combinations required to achieve quarantine security.

Standard Schedule		
Days	**Temp. °F**	**Temp. °C**
14	33.0	0.6
16	33.5	0.8
17	34.0	1.1
19	34.5	1.4
20	35.0	1.7
22	35.5	1.9
24	36.0	2.2

Short Schedule		
Days	**Temp. °F**	**Temp. °C**
10	33	0.6
12	34	1.1
14	35	1.7
17	36	2.2

To maximize the potential for successful completion of cold treatment and enhance better fruit arrivals, the following recommendations are offered:

1. Utilize quality fruit from groves maintained under adequate irrigation and cultural practices. Harvest carefully to minimize mechanical injury, peel pitting and decay.

2. Avoid prolonged degreening to minimize certain types of decay.

3. Ensure fruit cleanliness and freedom from surface insects to avoid fumigation with methyl bromide or hydrogen cyanide at ports of arrival.

4. Ensure proper application of fungicides, especially TBZ, which increases grapefruit resistance to chilling injury.

5. Apply water wax uniformly, but not excessively to insure good fruit appearance and minimal chalking.

6. Stack and position pallets of fruit to maximize air circulation and heat transfer for uniform cooling.

7. Promptly store fruit at 50°F after packing. Start seven-day conditioning period when pulp temperature reaches 60°F (15°C).

8. Ensure proper warming of cold treated fruit by placing pallets of cartons approximately one foot (30 cm) apart at 54°F (12°C).

9. Fumigation with hydrogen cyanide or methyl bromide should be avoided, if possible, but never conducted below 50°F (10°C).

10. Market cold treated fruit promptly.

AVAILABLE PUBLICATIONS

Available from Dr. W. F. Wardowski, Citrus REC, 700 Experiment Station Road, Lake Alfred, Florida 33850

Pallet Boxes for Florida Citrus, by W. F. Wardowski and W. Grierson. 1989. University of Florida, Cooperative Extension Service, Institute of Food and Agricultural Sciences, Cir. 443, 7 p.

Postharvest Decay Control Recommendations for Florida Citrus Fruit, by W. F. Wardowski and G. E. Brown. 1993. University of Florida, Cooperative Extension Service, Institute of Food and Agricultural Sciences, Cir. 359-A, 5 p.

Recommendations for Degreening Florida Fresh Citrus Fruits, by W. F. Wardowski. 1989. University of Florida, Cooperative Extension Service, Institute of Food and Agricultural Sciences, Cir. 389, 4 p.

THIRTY-SIXTH ANNUAL

CITRUS PACKINGHOUSE DAY

THURSDAY, AUGUST 21, 1997