THIRTY-NINTH ANNUAL

CITRUS

PACKINGHOUSE

DAY

August 17, 2000

CITRUS RESEARCH & EDUCATION CENTER

700 Experiment Station Road

Lake Alfred, FL 33850

STATE OF FLORIDA--DEPARTMENT OF CITRUS

Lakeland, Florida

IN COOPERATION WITH

FLORIDA CITRUS PACKERS

COOPERATIVE EXTENSION SERVICE

INSTITUTE OF FOOD & AGRICULTURAL SCIENCES

UNIVERSITY OF FLORIDA, GAINESVILLE

REGISTRATION – 8:30 AM

PROGRAM – 9:30 AM

EXHIBITS – AFTERNOON

FORWARD

PROGRAM

Underlined Titles are Linked to their Respective Slide Presentations.

9:30 AM WELCOME (10 min.)

Dr. Harold W. Browning, Center Director, Citrus Research and Education Center, Lake Alfred

INTRODUCTORY REMARKS (10 min.)

Dr. Mohamed A. Ismail, Scientific Research Director, Fresh Fruit, Florida Department of Citrus, Lake Alfred

PRESIDING (10 min.)

Bobby Sexton, Oslo Citrus Growers Association, President, Florida Citrus Packers, President, Indian River Citrus League

10:00 AM CITRUS PACKINGHOUSE WASHWATER RECYCLING USING ELECTRO-PULSE TECHNOLOGY - David Lester, General Manager, Waverly Regulatory Associates (WRA), Waverly, FL

10:15 AM STATUS OF CITRUS CANKER IN FLORIDA AND STATEWIDE REQUIREMENTS FOR HARVESTING, HAULING, PACKING AND SHIPPING FRESH CITRUS - Leon Hebb, Chief , Bureau of Pest Eradication and Control (Winter Haven), and Ken Bailey, Program Director, Dade-Broward-Palm Beach County - Citrus Canker Program (Miami and Plantation)

10:45 AM "GREEN RING" -- OCCURRENCE AND CONTROL - Mark A. Ritenour, University of Florida, Indian River Research and Education Center, Fort Pierce, FL and Huating Dou, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

10:55 AM SANITATION AND HACCP - Steven Pao, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

11:10 AM **VOLUME FILLED PACKAGING** - Steve Maxwell, Vice President/Fresh Fruit Division, Ben Hill Griffin, Inc., Frostproof, FL

11:25 AM **FACTORS TO MINIMIZE CHILLING INJURY** - Huating Dou, Florida Department of Citrus, Citrus REC, Lake Alfred, FL and Mark A. Ritenour, University of Florida, Indian River Research and Education Center, Fort Pierce, FL

11:35 AM **REFRIGERATION CONDITIONS IN STORING FLORIDA CITRUS** - William M. Miller, University of Florida, Citrus Research and Education Center, Lake Alfred, FL and Huating Dou, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

11:45 AM **INTERNATIONAL MOVEMENT OF FRESH FLORIDA CITRUS** - Suzanne Thornsbury, University of Florida, Indian River Research and Education Center, Fort Pierce, FL

LOBBY EXHIBITS

FOREWORD

"The Old and The New" is the theme for the Thirty-ninth Annual Citrus Packinghouse Day. While things change and new issues and techniques are always arising, we also continue to encounter many of the previous issues and techniques that need to be revisited. The start of the new millennium has brought with it many potential opportunities for new business, but as we know, there are both continuing and new obstacles that we must overcome. We will touch on some of these key issues facing the citrus packinghouse industry during this day's proceedings.

Among the continuing but expanding threats is the spread of citrus canker. A group of people from the Florida Department of Agriculture, Animal Health Inspection Services (Pest Eradication and Control) will be here to present the latest information concerning the spread and eradication efforts for citrus canker. They will also be available in the lobby to answer individual questions and concerns.

Industry and academic presenters will address a number of continuing and new issues for packinghouse procedures. First of all, the performance of a new water recycling system used in a commercial packinghouse will be discussed. In addition, an argument will be made for the implementation of mechanized volume filling of citrus and a successful example presented. Fruit quality, storage life and disorder development (e.g. pitting) are profoundly affected by temperature. Research results will be presented showing the relative effectiveness of forced air and room cooling. Current information regarding a new peel disorder (green ring) will be presented and an increase in the incidence of an old peel disorder (chilling injury) brings an update on its cause and prevention. Because many packinghouses are taking a proactive approach to implementing and documenting their sanitation programs, the latest methods to reduce microorganism populations on citrus fruit will also be presented.

New business opportunities for the citrus industry include expanding domestic and export sales. Dr. Suzanne Thornsbury will present on opportunities and challenges that exist through trade with countries such as China. As has been observed in the rapidly expanding fresh-cut produce sector, the delivery of ready-to-eat citrus also holds promise for expanding citrus sales. To meet these market opportunities, the Department of Citrus has developed and will demonstrate a prepeeler for citrus fruit. Lastly, over 30 commercial exhibitors will provide valuable information for your business. Check out what they have to offer after lunch. An exhibitor list is provided including the names, addresses, telephone numbers and products sold.

One of the notable differences this year at Packinghouse Day will be the absence of Dr. Will Wardowski following his retirement June 30th. After 31 years of excellence in coordinating Packinghouse Day (including a major role in preparing for this year), Dr. Wardowski has made a positive impact on Florida's citrus packinghouses. As the new program coordinator, I am excited about the contributions I can make promoting the citrus industry through Packinghouse Day. To give due credit, however, Packinghouse Day is the result of a team of dedicated people: Dr. Bill Miller coordinates the exhibits, Dr. Renée Goodrich oversees the local arrangements, Jane Wilson handles the abstracts and lunch arrangements and a host of other people contribute in various capacities. As a team, we will continually evaluate our efforts and look for ways to improve the effectiveness of Packinghouse Day. BUT WE NEED YOUR HELP! Please take advantage of the evaluation forms to give us valuable feedback on how we can improve Packinghouse Day.

Mark A. Ritenour

Indian River Research & Education Center

Program Coordinator

PROGRAM

8:30 AM REGISTRATION

9:30 AM WELCOME (10 min.)

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Citrus Research and Education Center, Lake Alfred

INTRODUCTORY REMARKS (10 min.)

Dr. Mohamed A. Ismail

Scientific Research Director, Fresh Fruit

Florida Department of Citrus, Lake Alfred

PRESIDING (10 min.)

Bobby Sexton

Oslo Citrus Growers Association

President, Florida Citrus Packers

President, Indian River Citrus League

10:00 AM CITRUS PACKINGHOUSE WASHWATER RECYCLING USING ELECTRO-PULSE TECHNOLOGY - David Lester, General Manager, Waverly Regulatory Associates (WRA), Waverly, FL

Why should you be concerned about the cost of water, and what impact it has on packinghouse operations? Fifteen years ago regulatory agencies began issuing permits for the use of water and the discharge of wastewater. Consumptive use permits are issued by the Water Management District to packinghouses that pull water from wells. The Florida Department of Environmental Protection (FDEP) issues industrial wastewater permits for citrus packing washwater discharges. There are three methods used today to discharge citrus wastewater. Perc ponds, the standard for many years, spray fields which in most cases are land limited, and sewer discharges, the preferred method where available. Packinghouses are faced with a wastewater discharge plan that is significant in terms of cost. The migration from perc ponds to a spray field is quite expensive and is an option that is not available to everyone. First it takes dedicated land and an elaborate (maintenance free) spray system. Daily reports and monitoring of water discharges are also required. Sewer on the other hand requires connection fees and monthly sewer bills. Annual sewer costs can run as high as $40,000 and are increasing. There are increasing regulatory pressures to limit or restrict the use of well water and at the same time, reduce and/or eliminate discharges to the ground, all to protect the groundwater aquifer.

One of the obvious solutions to water conservation is water recycling. Washwater recycling will dramatically reduce the amount of fresh water usage and at the same time, limit the discharge. Due to the fresh water rinse requirement, there will always be some management of excess water, however, to reduce consumption and discharge by 80% to 90% is a significant cost savings. The history of recycling attempts have also generated large investments and in most cases less than satisfactory results. First generation systems were strictly mechanical filtration. They were expensive to install and resulted in high maintenance. Second generation systems were typically chemical injection systems.

These systems were expensive to purchase and expensive to manage. It is not uncommon for a first or second generation system to require dedicated staff to operate the system. Chemicals were also an ongoing cost factor. Finally, there were installations that after some period of time, were discontinued.

The third generation of recycling technology was installed last year at a packinghouse in Vero Beach. The packinghouse faced many of the water cost factors discussed earlier and elected to prototype an electrical water recycling technology. While this technology was successful in many other application areas, it was never applied to citrus wastewater. There were anticipated start-up obstacles as the system is 100% automated and the programming of the system requires a knowledge of citrus wastewater components and profile of water usage. The system was reprogrammed a number of times to accommodate for packinghouse chemicals and flow rate requirements. After a few months of experimental adjustments, the system was finally "trained" and declared a success. As a result, the system processed nearly 1,000,000 gallons of water in the six months it was operational.

10:15 AM STATUS OF CITRUS CANKER IN FLORIDA AND STATEWIDE REQUIREMENTS FOR HARVESTING, HAULING, PACKING AND SHIPPING FRESH CITRUS - Leon Hebb, Chief , Bureau of Pest Eradication and Control (Winter Haven), and Ken Bailey, Program Director, Dade-Broward-Palm Beach County - Citrus Canker Program (Miami and Plantation)

The continued presence of Asian strain citrus canker in Dade, Broward, Palm Beach, Collier, Hendry, Manatee and Hillsborough has necessitated increased quarantine actions, further tree losses and new statewide requirements for decontamination of all personnel and equipment between commercial citrus properties and regulation of fruit movement for packing and processing.

Major portions of urban Dade and Broward counties are affected with residential properties having been found infected in 348 legal sections. In Collier County, 77 square miles in the Sunniland area containing 16,000 acres of commercial grove are quarantined. In Hendry County 18 sections in the Big Cypress Indian Reservation containing 1,700 acres of commercial grove, and in the Devils Garden area, 30 sections containing 2,559 acres are quarantined. The Hendry County Starglo 25 square mile quarantine area has

1,725 acres of commercial groves within the 25 square mile quarantine area. New detection of citrus canker disease in two properties southwest of the Siboney quarantine area has resulted in a quarantine extension from 30 square miles to 84 square miles. In 60 square miles of Northern Manatee County, where 1,358 acres of commercial and abandoned citrus have been destroyed 2,050 acres of commercial citrus remain under quarantine. In Eastern Manatee County, in the 41 square mile Duette quarantine area with 2,050 acres of commercial citrus, 104 acres of commercial citrus has been removed.

In the regulated areas, all citrus plants and plant parts, including fruit, are restricted from movement unless the plants have been inspected and found free of citrus canker disease within 30 days prior to harvesting. The harvesters, haulers, and receiving packinghouses or processing plants must be compliance agreement to receive and handle the fruit from quarantined areas in accordance with FDACS Citrus Canker Rule 5B-58. This rule requires the decontamination of personnel, trucks and equipment upon leaving groves in established quarantined areas, covering of loads to prevent leaves and debris from being disbursed during transportation, washing and surface decontamination of the fruit, using SOPP or hypochlorite solutions, and the decontamination of trucks, bins and truck covers, with approved chemicals, prior to leaving packing or processing facilities. All culls and eliminations must move to processors, feed mills or approved dump sites.

Certificates of harvesting and limited permits for movement from quarantined areas to processing facilities are required. Federal limited permits are required on all packed fresh fruit cartons restricting movement. “LIMITED PERMIT - USDA-APHIS-PPQ, Federal Domestic Quarantine, NOT FOR DISTRIBUTION IN: American Samoa, Arizona, Arizona, California, Florida, Guam, Hawaii, Louisiana, N. Mariana Islands, Puerto Rico, Texas, and U.S. Islands.”

Outside of quarantine areas all handlers, harvesters, groves caretakers are required to be under compliance. Sanitation to prevent the spread of citrus canker is now required statewide.

Latest information and requirements for harvesting, handling, packing fresh citrus will be discussed.

10:45 AM **“GREEN RING” -- OCCURRENCE AND CONTROL** - Mark A.

Ritenour, University of Florida, Indian River Research and Education Center, Fort Pierce, FL and Huating Dou, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

In previous years, there have been sporadic reports of peel damage (e.g. green or brown circles or streaks) developing after drenching the fruit. However, causal agents or factors have never been identified. However, in both 1998 and 1999, the disorder was observed with much greater frequency in loads of early-season, drenched fruit and caused significant loss of product for the fresh market. The term GR was first coined because the affected areas (ring patterns) did not degreen properly. Symptoms now include fruit with green or necrotic (brown) peel tissue that forms rings or streaking patterns and is usually visible after degreening but before packing. We currently do not know if the different symptoms are all caused by the same factor(s). Injured areas are generally associated with contact points with other fruit or the bin where drench solution remains longest before evaporating and where drench chemicals and dissolved solutes concentrate. Smaller fruit tend to develop more GR than larger fruit.

During the 1998-1999 and 1999-2000 harvest seasons, GR was reported in drenched ‘Fallglo’ tangerines, ‘Navel’ oranges and red and white grapefruit. Even on the east cost, most citrus that was drenched did not develop GR and those loads that did develop GR came from a variety of drenchers (both truck and bin drenchers), suggesting that the problem is not associated with a particular drench. However, product loss was significant when GR did occur. Furthermore, during both seasons, incidence of GR declined as the season progressed into November, with no known reports of GR by December. Thus, preharvest/ developmental factors play a critical role in the development of GR.

Preharvest factors giving rise to the disorder have been difficult to correlate and could include any of a number of chemicals and/or weather-related events. Possible factors giving rise to GR susceptible fruit could include excessive rain and/or poor drainage in the grove, a large proportion of “off-bloom” fruit, preharvest chemical applications, and local weather conditions. After harvest and when fruit are susceptible to GR, discontinuing drenching has been reported to virtually eliminate the disorder. However, unless other precautions have been taken (e.g. preharvest benomyl applications), postharvest decay could become a problem. There have been reports that drying fruit after drenching can reduce the development of GR and some of our preliminary data supports this. However, depending on the relative humidity, drying fruit in the center of the bins without dehydrating outer fruit can be very difficult.

To investigate postharvest factors on GR development, harvested grapefruit were treated with combinations of different drench chemicals. Using susceptible fruit (from groves where GR had been reported), we were able to reproduce the disorder (necrotic/ brown tissue) using different drench chemicals. GR did not develop on fruit treated with water or with water containing 125 ppm chlorine. However, significant GR did develop when drench solutions contained different combinations of surfactant, TBZ, chlorine and/ or motor oil. Although the disorder is usually visible before packing, preliminary data suggest that waxing may reduce GR severity after storage.

10:55 AM **SANITATION AND HACCP** - Steven Pao, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

Microbial contamination of fresh fruit and juice products is influenced by fruit surface microbial loads after final washing and sanitizing. Thus, an effective fruit surface sanitizing treatment should be incorporated in fruit handling procedures to achieve desired decontamination. Currently, sanitizing treatments are being utilized by citrus packinghouse and fresh juice processors to minimize microbial populations on the surfaces of fruit. It is known that packinghouse procedures generally reduce surface microorganisms on citrus fruit. Alkaline washing applied with an adequate spray volume effectively reduces the surface contamination of fruit and decreases the microbial loads of fresh juice as well. Furthermore, mildly heated, high pH waxes may be utilized in the packinghouse to complement the overall sanitizing procedures. For fresh juice processor, rapid thermal treatments can be utilized to reduce fruit-surface and initial juice microbial loads without altering the original sensory quality of fresh juice. These sanitizing treatments may be integrated into existing good manufacturing practices and/or hazard analysis critical control point (HACCP) program to protect the integrity of fresh citrus products.

11:10 AM **VOLUME FILLED PACKAGING** - Steve Maxwell, Vice President/ Fresh Fruit Division, Ben Hill Griffin, Inc., Frostproof, FL

In the summer of 1999 Ben Hill Griffin, Inc. installed a fully automated Tangerine Packaging System. The decision was made to go with this system after careful

consideration of the history of our industry and also taking a hard look into the future.

In the late 1960's and early 1970's volume filled packaging was attempted on a small scale and in short did not succeed. The concept was correct but, in our opinion, the timing was not.

Since those days many dynamics have changed in our industry both on the shipper side and the buyer side. These changes have given ample reasons to revisit the volume filled concept.

Things have changed over the past 30 years:

For the Buyer:

1. Our customer base has shifted from predominately wholesale (who request place packed cartons) to retailers who demand quality and PLU's but do not demand place packed.

2. The computer has made drastic changes in operations and management of grocery chains. Produce departments are managed by information generated by computer. This creates a demand for profit, which manifests itself in a push for lower FOB's by the buyer and smaller, controlled inventories.

3. Worldwide sourcing of fruit is now a reality. On any given day you can purchase any kind of fruit from any region of the World and any retail chain or wholesaler. (Try buying a watermelon in December – 30 years ago!) This creates competition for shelf space, which again puts pressure on the Grower/Shipper.

For the Grower/Shipper changes have also occurred, that have eroded our profit margins.

1. Specialized packaging and labeling.

2. Labor needed to place pack has become scarce and expensive.

3. Workers Compensation cost have skyrocketed.

4. Worker Liability issues have taken center stage.

5. Our customers are asking for better quality for less money, squeezing profits from the products we produce.

These changes are to name just a few and the bottom line is in order to survive long range, we must continue to eliminate cost from our packaging systems.

What can be done?

It's a given that volume filling is not the answer to all of our challenges, but we believe it has its place in today's market. We as packers must trim cost to survive. The system you are about to see will reduce cost.

After volume filling our tangerines for 17 seasons by hand we decided to automate our tangerine operations. This decision has resulted in substantial savings and created more "run time" so that we can comfortably increase our volume while maintaining a quality of life our employees deserve, all the while reducing our packaging cost primarily due to labor savings and operational efficiencies.

11:25 AM **FACTORS TO MINIMIZE CHILLING INJURY** - Huating Dou, Florida Department of Citrus, Citrus REC, Lake Alfred, FL and Mark A. Ritenour, University of Florida, Indian River Research and Education Center, Fort Pierce, FL

Chilling injury of citrus is characterized by peel tissue collapse and requires approximately 4-6 weeks to develop during cold storage. In contrast, postharvest pitting is caused by wax application and high temperature (e.g. >50 F) storage, where oil glands are the preliminary site of collapse. This season, CI was frequently reported in 38 F shipments of exported and domestic grapefruit. Storage/shipment temperatures lower than 45 F can cause severe CI with the highest incidence occurring at 38 to 40 F. Postharvest pitting occurs in storage temperatures higher than 50 F. Our studies indicate that both CI and pitting can be controlled at 45 F storage and shipping temperature.

Wax application reduces CI incidence with shellac wax providing better control of CI than carnauba wax. Fungicides such as TBZ, IMZ, and Benomyl reduces the incidence of

CI. Intermittent warming and relatively high storage humidity also minimize CI development. An earlier recommendation of pre-treatment at 60 F for 7 or more days reduces the CI, but increases the risk of postharvest pitting in waxed fruit. Storage in low O2 and high CO2 reduce the incidence of CI in citrus fruit. Dipping fruit in methyl jasmonate and vegetable oils or sealing fruit in polyethylene film decreases fruit CI.

In Florida's climate, citrus are susceptible to CI in early (October-December) and late (March-May) seasons, but more resistant during midseason (January-March). However, the specific time of year when fruit become resistant to CI fluctuates from season to season. Exterior canopy fruit are reportedly more susceptible to CI than interior fruit and the sun-exposed side of a fruit is more susceptible to CI than the shaded side of the same fruit.

Optimal storage and shipping temperature in combination with waxes is the best means to minimize fruit CI. The current Department of Citrus recommended holding temperature for grapefruit is between 45-50 F, which controls both CI and pitting.

11:35 AM **REFRIGERATION CONDITIONS IN STORING FLORIDA CITRUS** - William M. Miller, University of Florida, Citrus Research and Education Center, Lake Alfred, FL and Huating Dou, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

The use of refrigeration in post-packing operations of citrus has become prevalent in Florida. However, current systems vary widely with respect to temperature, relative humidity and air circulation. A review of commercial operations was undertaken to determine a representative range of operating conditions. In monitoring cold rooms, pre-coolers and refrigerated trailers, temperatures were found to range from 12.5 deg C (54.5 deg F) to 3.7 deg C (38.7 deg F). Relative humidity levels from 80.0 to 91.7% were measured. A pilot-scale pre-cooling chamber was fabricated to evaluate cooling rates under forced air conditions. To reduce the fruit's center temperatures by ½, the time for single layer cartons (forced air, 0.38 m/s or ~75 fpm face velocity) was approximately 60 min. while fruit in a 2-layer carton depth required approximately 130 min. By contrast, a single carton in quiescent room refrigeration conditions required 435 min. for ½ cooling. Venting patterns were important for forced-air cooling but did not alter cooling times significantly in refrigerated storage rooms. Total vent areas of various carton designs

were measured and ranged from 90 to 200 cm^2 (14 to 31 in^2). In limited testing of wax-refrigeration interactions, no pitting was observed with any wax treatments when fruit was stored immediately at 7 deg C (45 deg F). However, at 21 deg C (70 deg F), minor pitting on fruit treated with shellac wax treatments was observed.

11:45 AM **INTERNATIONAL MOVEMENT OF FRESH FLORIDA CITRUS** - Suzanne Thornsbury, University of Florida, Indian River Research and Education Center, Fort Pierce, FL

Through June 4 in the 1999/00 season, 55,753,000 cartons of certified fresh Florida citrus were shipped, a decrease of 13 percent from 1998/99. Approximately 68 percent (22,532,000 cartons) of Florida grapefruit, 9 percent (1,157,000 cartons) of Florida oranges, and 6 percent (572,000 cartons) of Florida specialty fruit were exported. Total citrus volume exported decreased less than 2 percent from the 1998/99 season. International shipments of both grapefruit and specialty fruit increased but there was a decrease in the volume of orange exports compared to 1998/99.

Fresh citrus was also imported into the U.S. including a record high level of imports in 1998/99, partially due to freeze conditions in California. Between 1994/95 and 1998/99, approximately 641,200 cartons of grapefruit, 2,034,200 cartons of oranges, and 1,575,780 cartons of specialty citrus were imported on average each year.

Not only is a majority of Florida fresh grapefruit exported, but the U.S. remains a dominant force in world grapefruit markets accounting for 43-54 percent of total world exports each year between 1994 and 1998. Other countries with significant volume in grapefruit export markets include Israel with approximately 7 percent of world production and 9-12 percent of world exports; South Africa with approximately 3 percent of world production and 4-7 percent of world exports; and Cuba with approximately 6 percent of world production and less than 1 percent of world exports.

The European Union (EU) is the largest importer of grapefruit in the world, accounting for approximately one-half of the total volume. Other significant importers are Japan (13-18 percent), Canada (5-7 percent), Poland (2-3 percent) and Argentina, the Russian Federation, and Switzerland (1.5 percent each). Given Florida's dominance in world grapefruit markets, it is not surprising that state trade patterns closely follow world

patterns. In the 1999/00 season, 32 percent of all Florida grapefruit were exported to Japan, 20 percent to the EU, 7 percent to Canada, and 2.4 percent to other Pacific Rim countries.

Fresh citrus exports account for a smaller, although not unimportant, part of the market for Florida oranges and specialty fruit. In 1999/00, 6.1 percent of fresh Florida oranges were exported to Canada and 3 percent were exported to the Pacific Rim. Over the same period, 7 percent of Florida honeybells, 4.5 percent of temples, 4 percent of tangerines, and 2 percent of tangelos were exported to Canada.

There were several important events in the international markets for Florida citrus in the past two seasons. The bilateral Agricultural Cooperation Agreement was signed in April 1999, formally lifting the ban on U.S. citrus exports to China. Continued negotiations over removal of phytosanitary restrictions resulted in several direct shipments of citrus during the 1999/00 season. A March 1999 agreement opened citrus markets in India for mandarins, clementines, lemons, and grapefruit. In addition a protocol over phytosanitary concerns was negotiated in 1999 with the Philippines to allow imports of Florida grapefruit, oranges, and tangerines. In June 2000, an agreement was signed that would allow restricted imports of citrus from Argentina to the U.S. Lifting the ban on the import of Argentinean citrus has raised the expectations that the ban on Florida citrus exports to Argentina may also be lifted. A comparison of relative prices suggests that Argentinean lemons are the product most likely to be exported to the U.S. and that U.S. grapefruits are the product most likely to be exported to Argentina. Due to differences in growing seasons, shipments are expected to complement, rather than compete, with each other.

Despite the progress, some concerns remain over the international movement of fresh Florida citrus. Tariffs remain high in China, limiting unrestricted market access. Once China accedes to the WTO, tariffs for priority U.S. agricultural products are scheduled to fall from a current average of 31 percent to 14 percent by January 2004. Although Switzerland currently imports approximately 1.4 percent of world grapefruit traded, no product enters directly from the U.S. Phytosanitary regulations continue to restrict Florida citrus from markets in Mexico and Australia and, while the entry of citrus products to Argentina is anticipated, it has not yet been achieved.

Continuing economic research in three broad areas can assist in identifying opportunities for further expansion of Florida product into international markets. The first

is demand analysis; what products, and product characteristics, are consumers willing to purchase and able to afford? Continued research into trade flow patterns is also important; where do Florida products have a competitive advantage, are there adjustments that can be made to shift the competitive advantage of Florida citrus? Finally continued research into phytosanitary issues will be vital, not only to assess opportunities in additional markets but to maintain existing markets for Florida products.

LOBBY EXHIBITS, BEN HILL GRIFFIN HALL

CITRUS CANKER STATUS IN FLORIDA AND REQUIREMENTS FOR MOVING AND MARKETING FRUIT FROM REGULATED AREAS - Leon Hebb, Chief, Bureau of Pest Eradication and Control and Kenneth Bailey, CCEP Program Director, Miami, FL, both with the Division of Plant Industry, Florida Department of Agriculture and Consumer Services.

Citrus Canker Project personnel are located in the main lobby of the Ben Hill Griffin Auditorium with displays and handouts. These project representatives have experience in citrus canker regulations and will be available to address regulatory questions or discuss special concerns.

Samples of certificates of harvesting and limited permits for movement from quarantined and non quarantined areas to packinghouses, for fruit originating in quarantine areas to processing facilities will be available.

Maps of current areas will be on display. Note that the quarantine areas may change between going to press and Citrus Packinghouse Day.

DEVELOPING AN AUTOMATED PEELING SYSTEM FOR CITRUS FRUIT - Mohamed Ismail and Mark Thomas, Florida Department of Citrus, Citrus Research and Education Center, Lake Alfred, FL

Convenience is a driving force for the increased consumption of fresh fruits and vegetables. To promote consumption of fresh citrus, a peeling system has been developed and patented by the Florida Department of Citrus, Scientific Research staff. The prototype

peeling machine is capable of peeling 40-60 fruit per minute, following enzyme infusion to soften the rind. It features a washing line, peel perforation line, vacuum infusion tank and a 2-head peeling machine. In cooperation with Heinzen Manufacturing International of Gilroy, California, the FDOC has developed and constructed a larger peeling system equipped with four peeling heads and can accommodate four additional heads.

An ongoing research and development program is underway aimed at developing citrus peeling equipment for water infused fruit and for non-infused fruit.

A NEW FLORIDA DEPARTMENT OF CITRUS WEBSITE FOR POSTHARVEST CITRUS INFORMATION - Mohamed A. Ismail, Florida Department of Citrus, Lake Alfred, FL

In April 2000, Fresh Fruit, Scientific Research Staff, launched the first Scientific Website dedicated to Postharvest problems of citrus. The website can be accessed on the Florida Department of Citrus domain www.floridajuice.com or www.fdocitrus.com. The site, titled "Postharvest Florida Citrus Information Guide," presents information on:

Citrus Diseases & Decay Control

Peel Disorders

Cold Treatment

Storage Temperatures

Fruit Sanitation

Peeling Technology

A section on Mechanical Harvesting is also featured discussing various harvesting systems under development by the Florida Department of Citrus and private machinery enterprises.

The site will be updated approximately every quarter with new research information

and answers to frequently asked questions.

INTERNATIONAL SOCIETY OF CITRICULTURE, NINTH CONGRESS

December 3-7, 2000 Walt Disney World's Coronado Springs Resort, Orlando, Florida

ISC Website: http://www.lal.ufl.edu/ISC_Citrus_homepage.htm

See display at Citrus Packinghouse Day, in the lobby of Ben Hill Griffin Hall.

For complete information on the IX ISC 2000 Congress visit our website or contact International Society of Citriculture, Citrus Research and Education Center, 700 Experiment Station Road, Lake Alfred, Florida 33850-2299, USA

Local Arrangements

The IXth Congress of the International Society of Citriculture will be at the Coronado Springs Resort, Walt Disney World, Orlando, Florida, USA, December 3-7, 2000.

Scientific Program

The Program Committee has planned poster and oral presentations on all aspects of citrus, from production to consumption. There will be daily oral sessions, workshops and major Symposia on Monday, Tuesday and Thursday with tours on Wednesday. Late afternoon poster sessions will be emphasized (15:30-17:00 hr). Oral sessions on Monday and Tuesday will highlight topics of interest to growers, packers, processors, and marketers. Invited speakers will share their experiences and expertise from citrus industries in other countries.

Tours

A four-day tour to three regions of the Florida citrus industry will begin on

November 28th and conclude on December 1st, 2000. Participants will see the East Coast area, a major fresh grapefruit production region characterized by interesting soils, water management systems, and modern fresh fruit packinghouses; the Gulf region typified by many large citrus operations where oranges and other citrus types are grown for processed juice and fresh fruit markets; and, the well-known Ridge area of central Florida where orange, grapefruit, and mandarin trees are grown on deep, sandy soils. Abbreviated two-day tours will also be offered to the East Coast and the Ridge areas November 30th through December 1st.

On Wednesday, December 6th, visits to a variety of local scientific and citrus industry sites will be conducted for Congress participants. These tours will conclude at the University of Florida Citrus Research and Education Center, Lake Alfred, with a tour of this facility followed by a casual dinner and return to the Congress hotel in the evening.

A California delegation has organized a post-congress tour of their industry. More details and registration packets are available in the lobby display.