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Citrus Leaves

November 1999

Citrus Research and Education Center - News and Information

Volume 17, No. 11

CREC News Release

Grapefruit Juice Flavor, Food Safety and More At CREC's 50th Annual Citrus Processors' Day

LAKE ALFRED - Grapefruit juice and food safety were key topics at the 50th Annual Citrus Processors' Day and Subtropical Technology Conference at the University of Florida (UF) Citrus Research and Education Center (CREC) on October 21.

This year's meeting was a milestone, acknowledged Dr. Harold Browning, CREC Center Director. This was the fiftieth annual meeting where scientists and engineers from the UF Institute of Food and Agricultural Sciences (IFAS), FDOC, U.S. Department of Agriculture (USDA) and other laboratories have come to share their latest research news

see page 4

Processing History on display in BHG Citrus Hall. Come view old photos and posters on CREC's Processing Program - past and present. Contributions and suggestions for additions and corrections are welcome for this work-in-progress -- see Monica Lewandowski.

Juice Processing History-Makers

Drs. Ed Moore (left) and Bob Carter, at the 50th Annual Citrus Processors' Day on October 21. Dr. Moore was part of the original team of FDOC researchers that developed frozen concentrate in the 1940's. Dr. Carter was a FDOC scientist at CREC from 1969-1992. For more photos, see page 4.

FDOC-Fresh Fruit Division Receives FDA Grant

• Pao and Davis Study Food Safety

Dr. Steven Pao and Craig Davis of the Florida Department of Citrus (FDOC) Fresh Fruit Division were awarded a $22,760 grant by the U.S. Food and Drug Administration (FDA) for food safety research, announced Dr. Mohamed Ismail, Scientific Research Director.

The study pertains to new FDA regulations for fresh-squeezed orange juice and other unpasteurized or unprocessed fruit and vegetable juices. Fresh juices are under scrutiny because of some recent food-borne outbreaks that were traced to these products.

Read the latest news from FDOC's Fresh Fruit Division, p. 3

For the study, Pao and Davis identified non-pathogenic organisms that are similar to the human pathogens, *Salmonella* spp. and *Escherichia coli* O157:H7. The non-pathogenic organisms, called "surrogate

see page 2

FDOC, Bestfoods Launch New Citrus Salad Dressings

Peggy Troelson serves a salad made with a new Hellmann's citrus-based salad dressing at the Florida Citrus Commission meeting on October 27. For story and more photos, see page 5.

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52 YEARS - FDOC RESEARCH AT LAKE ALFRED

The Florida Department of Citrus (FDOC) and the University of Florida have been partners in citrus research at CREC for over fifty years. Below, Dr. Mohamed Ismail, FDOC Scientific Research Director for Fresh Fruit, shares with us the history of the FDOC's scientific research program at CREC. Dr. Ismail has been conducting research on fresh and processed citrus in the areas of flavor chemistry, abscission, postharvest quarantine treatments and quality control at Lake Alfred since December 1966.

by Dr. Mohamed Ismail

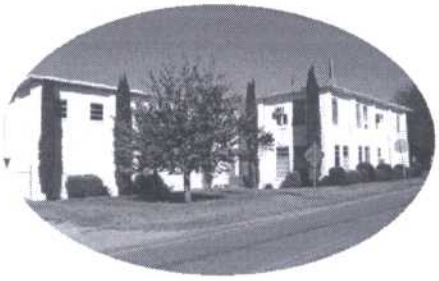
In July 1947, Florida Citrus Commission (now FDOC) scientists Dr. Ed Moore, Mr. C.D. Atkins and Mr. Richard Huggart packed up their equipment, glassware and books and moved from the USDA Citrus Products Station in Winter Haven to a new processing research building at CREC (then called the Citrus Experiment Station) in Lake Alfred.

They joined Dr. E.F. Hopkins and Mr. K.W. Loucks, who had already set up working labs and a packinghouse line at CREC to study postharvest fruit decay problems.

Their move completed the implementation of a 1941 amendment to the Florida Citrus Code, authorizing the creation of a Research Department of the Florida Citrus Commission for studies on citrus fruit and juice quality, nutrition, new citrus products and other related areas.

The Legislature also stipulated that the new department be provided with "suitable and sufficient laboratory facilities and equipment, making use of the laboratory facilities and equipment of the University of Florida insofar as it is practicable for the purpose of conducting thorough and comprehensive study and research . . . . ".

Thus the road for a partnership between the two organizations was



paved, and for 50 years, University and FDOC scientists have worked together to serve the technical needs and solve problems of the Florida citrus industry - each group contributing in its own way to the welfare of Florida citrus growers, packers and processors.

The first Director of Scientific Research was the late Dr. L.G. MacDowell, who headed a team composed of Dr. E.L. Moore and Mr. C.D. Atkins in developing and patenting the process of manufacture of frozen concentrated orange juice. After Dr. MacDowell's retirement in 1968, he was succeeded by Dr. John A. Attaway, who headed the FDOC's scientific research program until January 1995.

Today the department has two directors: Dr. Bill Stinson heads the Processed Products research unit, while Dr. Mohamed Ismail leads the Fresh Fruit research unit. The Harvesting program is directed by Dr. Galen Brown. Both the Processed Products and Fresh Fruit units are committed to serving the technical needs of the Florida citrus industry and increasing public consumption of fresh and processed citrus.

FDOC scientists are specialists in engineering, food technology, biochemistry, plant physiology, plant pathology, food microbiology and postharvest technology. Their work complements that of University faculty, thus providing effective and efficient utilization of taxpayers' money. The FDOC also supports medical research through direct grants awarded to prominent scientists that study the importance of citrus in nutrition, maintaining good health and combatting disease.

As the FDOC Scientific Research Department at Lake Alfred enters its second 50 years, greater emphasis is placed on enhancing the relevancy of research activities to the needs of the Florida citrus industry. More cooperation has been initiated with the Fresh, Processed Products, Food Service and International Marketing business units as well as the advertising and public relations agencies at the FDOC Lakeland headquarters. This ensures greater utilization of the research results of a newly focused and committed research program.

FDA Food Safety Grant

From page 1

organisms," must have similar characteristics as the disease-causing organisms, yet be safe for use in fruit disinfection studies.

Pao and Davis conducted part of their experiments at the Florida Department of Agriculture Laboratories in Tallahassee. They compared attachment strength, thermal tolerance and chemical resistance of several different surrogate organisms to human pathogenic strains of *Salmonella* and *E. coli* O157:H7.

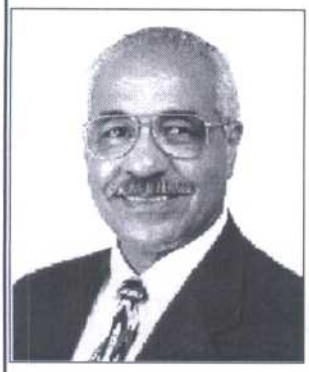
Surrogate organisms can be used by juice manufacturers to demonstrate whether their practices or treatments are effective in "reducing, or eliminating harmful bacteria by 100,000-fold." The 100,000-fold reduction in bacteria is referred to as a "5-log reduction." If manufacturers cannot or do not demonstrate the sanitary capabilities of their juice-making process, the juices must carry a label that states: "WARNING: This product has not been pasteurized and, therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems."

Pao and Davis are also conducting research on heat and chemical treatments for citrus fruit to eliminate surface bacteria.■

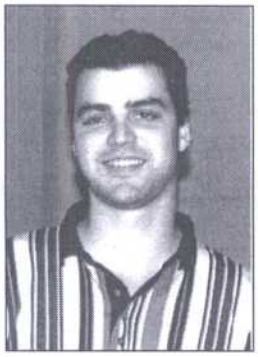
The Florida Department of Citrus - Scientific Research - Fresh Fruit

By Dr. Mohamed Ismail. Learn what's going in the FDOC's Scientific Research - Fresh Fruit and the Harvesting Programs, and look for news from the FDOC's Processing team in a future issue.

FRESH-CUT CITRUS

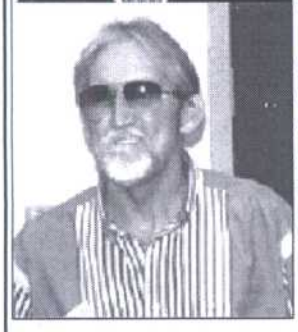


Dr. Mohamed Ismail, Scientific Research Director for Fresh Fruit, is also the team leader for the development of automated citrus peeling equipment. The FDOC has an ongoing agreement with a Fresh-cut fruit and vegetable manufacturer to develop, manufacture and market citrus infusion and peeling equipment. In April 1999, the FDOC and CREC completed construction of a 500 ft.^{2} Clean Room facility in the Packinghouse Building. The room is the first of its type at CREC. It houses FDOC prototype citrus peeling and packaging equipment.



Mark Thomas, FDOC Food Engineer, is in charge of the citrus peeling, sectionizing and packaging equipment development and operation. Among his responsibilities are optimizing the citrus peeling process and integrating the operation of the citrus peeling line. Mark is a talented engineer with excellent experience in cutting, welding polishing and fabrication of stainless steel equipment.

POSTHARVEST FRUIT QUALITY



Dr. Huating Dou (left), Research Scientist and postharvest physiologist, has identified 45° F as the optimum temperature for reducing postharvest pitting during storage and shipping grapefruit.

Postharvest peel pitting is a peel disorder of most citrus fruit, particularly white grapefruit and Fallglo tangerine. It is associated with waxed fruit held at 50°F or greater.

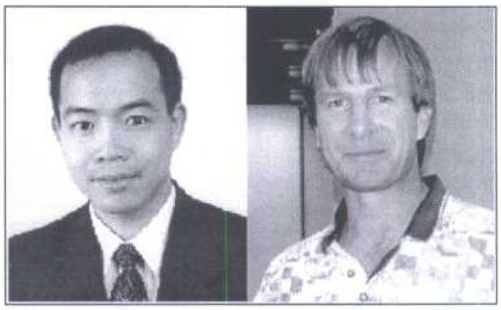
Dr. Dou continues to evaluate the effect of temperatures and various wax coatings on peel pitting and keeping quality of grapefruit. He is also evaluating a nondestructive method for predicting pitting prior to its appearance. Dr. Dou is assisted by **Mel Chambers** (left).

HARVESTING and ABSCISSION

Dr. Galen Brown is the Harvesting Program Administrator in charge of a multimillion dollar Mechanical Harvesting Program, funded exclusively by the Florida Department of Citrus. The program's mission is to develop viable, efficient and economical mechanical harvesting systems for Florida's processed orange crop. During the past four years, several systems were tested including trunk shake-catch system, continuous canopy shake-catch system and the Canopy Penetrator.

In addition, a team of CREC scientists is engaged in a comprehensive research program aimed at better understanding the physiology, genetics and biochemistry of citrus abscission. The Harvesting program is closely monitored by the Florida Citrus Harvesting Council, which meets monthly at the FDOC Headquarters in Lakeland.

FOOD SAFETY AND MICROBIOLOGY



Dr. Steven Pao (above left) FDOC Research Scientist and Food Microbiologist, received a $22,760 Food and Drug Administration grant to identify surrogate organisms to be used in sanitation verification studies in fresh citrus juice operations (see article on p. 1).

For the last three years, Dr. Pao, along with **Craig Davis** (above right), have conducted an intensive research program aimed at sanitizing citrus fruit and eliminating surface microflora prior to juice extraction. He holds a patent on water injection in citrus to facilitate fruit peeling.

The FDOC Fresh Fruit Research staff also includes **Tommy Long** (left), **Merritt Daugherty, Virgil Stewart, Ellen Wheeler, Cindy Livingston, Lura Ruxman and Beverly Jakelsky**. Tommy is in charge of the Pilot Plant Operations.

Citrus Processors' Day

Dr. Jim Kesterson, right, UF faculty scientist from 1947-1980, made tremendous contributions to the area of juice and by-products processing.

Dr. Kevin Goodner, left, a former CREC post-doc who worked with Dr. Russell Rouseff, is now a Research Chemist at the USDA Citrus and Subtropical Products Laboratory in Winter Haven. Dr. Goodner was a speaker at the USDA Subtropical Technology Conference during the afternoon session.

Kees Wisse, who worked with Dr. Mickey Parish at CREC, came all the way from The Netherlands, where he works on new food products for Reidel.

Citrus Processors' Day Highlights

From Page 1

with the citrus industry. The event was originated in 1950, just after the development of frozen orange juice concentrate by a team of FDOC researchers. The development made it possible to ship orange juice to new markets worldwide, leading to the rapid growth of the citrus industry.

The conference came at the heels of medical reports that consumption of citrus fruits and juices can reduce the chance of stroke, noted Dr. William Stinson, Florida Department of Citrus (FDOC) Scientific Research Director, Processed Products. The FDOC continues to pursue studies on the health benefits of citrus, juice quality and new citrus products.

Dr. William Stinson, FDOC Scientific Research Director, Processed Products.

While technology and the world marketplace have changed dramatically in the past fifty years, issues such as juice quality and food safety continue to receive attention today.

Aroma, Color and Grapefruit Juice Quality

Scientists point to aroma as the key to flavor, as it is our sense of smell, not taste, that plays the primary role in our perception of flavor.

"Aroma volatiles are the major component of flavor quality," said Dr. Russell Rouseff, UF/CREC Professor of Food Chemistry. Aroma differentiates the "best" from "average" grapefruit juice quality and flavor, according to Rouseff.

Rouseff, Dr. Steven Nagy (FDOC), Dr. Philip Shaw (USDA) and other scientists are using gas chromatography, electronic nose sensors, human sniffers and other methods to identify aroma compounds in grapefruit juice that contribute to both pleasant and unpleasant flavor. Nagy noted that some compounds are so potent that minute levels can give juice unpleasant, even rotten flavors.

Dr. Elizabeth Baldwin, a researcher from the USDA Agricultural Research Service's Citrus and Subtropical Products Laboratory in Winter Haven, reiterated the importance of aroma. "Your tongue can detect compounds in [concentrations of] parts per hundred, but the nose can detect [concentrations of] parts per *trillion*," Baldwin explained. Baldwin's research is aimed towards developing better-tasting tomatoes with good shipping qualities.

In concert with flavor research, Dr. Hyoung Lee, FDOC, discussed the importance of color in judging grapefruit quality and maturity, as well as a factor in consumer preference. Lee is developing objective methods for evaluating grapefruit juice color, which can vary widely from pink to deep red, depending on the variety.

In related research, Dr. Wilbur Widmer, FDOC, discussed the evaluation of techniques to clarify juice so that bitter compounds in grapefruit juice can be removed during processing.

Food Safety

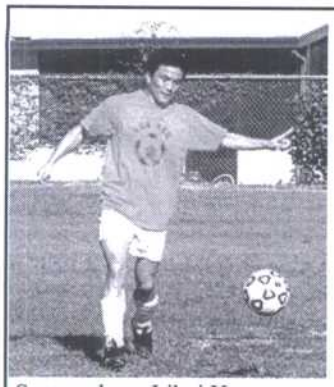
In the area of food safety, Drs. Renee Goodrich, Jan Narciso and Mickey Parish are working on improved methods for monitoring fungi levels in juice and juice packaging materials. Goodrich pointed out that current tests are labor-intensive and improvements are needed.

Parish, who spent a year in Washington, D.C. on a Congressional Science Fellowship working with lawmakers on food safety issues, shared some of his insight into how science influences the legislative process. Parish discussed the importance of communicating with lawmakers and providing scientific information to Congressional members and their staffs on food safety and related issues.

Nutrition and More

Researchers also reported on the development of new citrus products, improved procedures for measuring ascorbic acid content in citrus juices, studies on the processing of citrus by-products in feed mills, and the novel use of enzymes to generate flavor compounds in fruit.

The chairmen for this year's conference were Sean Frielich of Pasco Acquisitions in Dade City and John Neiswanger of Minute Maid in Plymouth, Florida. Goodrich served as organizer for the event.



Soccer player Likui Yang.

Soccer Team Heads into Final Stretch Of Season

The CREC Soccer team is 2-2-2 (as of 10/30) as they continue to dominate Polk City Ace Hardware (2 lop-sided victories), play evenly with the Landsharks (2 ties), and struggle against United (2 losses) in the Auburndale Co-Ed Fall Soccer League. Remaining games at Caldwell Elementary School, 141 Dairy Rd., Auburndale:

Nov. 7: CREC vs. Landsharks, 3:15 pm
Nov. 14: CREC vs. United, 1:30 pm
Nov. 21: Year End Tournament, time TBD

New Citrus Salad Dressings

Sandy Barros (left) serves up some salad at the Florida Citrus Commission meeting on October 27, along with (right photo, L to R): Melissa Neff, Peggy Troelson, Kitty Sheung, and Eileen Hoobin. They prepared a chicken dish and salads made with new citrus-based salad dressings. The dressings will be in supermarkets next spring.

Dr. William Stinson, FDOC Scientific Research Director - Processed Products, announced that a new line of citrus-based salad dressings will soon be on the market. The new salad dressings, given the product name *Citrus Splash*, were developed in a partnership between the FDOC and Bestfoods. The salad dressings will carry the Florida Sunshine Tree logo.

The official announcement came at the October 27 Florida Citrus Commission (FCC) meeting at the FDOC headquarters in Lakeland. The development of new citrus products is a part of the FDOC's Solids Strategy, looking for new uses for citrus in food products. The FDOC is working with other food manufacturers to develop citrus-based jams, dressings, marinades, barbecue sauces and desserts.

Attendees at the FCC meeting were treated to a lunch, prepared and served by Sandy Barros and a team that included Kitty Sheung, Eileen Hoobin, Peggy Troelson and Melissa Neff. Sandy Barros leads the Solids Strategy research at CREC.

UF Newsletter Cites Study That Shows No Link Between Pesticides and Cancer

From the October 1999 UF/IFAS Extension Newsletter, *Chemically Speaking*, an excerpt from the article, "Worrying About Pesticides in Food." *Chemically Speaking* is published by the UF Pesticide Information Office, and is posted on the web: **fshn.ifas.ufl.edu/pest/news.htm**

Worrying About Pesticides in Food

According to a study conducted by the American Institute for Cancer Research (AICR), "77 percent of people believe that eating foods treated with pesticides increases cancer risk." However, the Institute also reviewed more than 4,500 published peer-reviewed studies and "found no convincing evidence that eating foods containing trace amounts of chemicals including pesticides and fertilizers changes cancer risk." In contrast, the Institute said that eating five or more servings of fruits and vegetables "was found to significantly lower the risk for many cancers."

The Institute was not able to find any evidence to support a link between pesticide residues on produce and cancer. The authors of the report said that "maybe 1% of cancers are derived from . . . ingesting the wrong substances, whereas 30 to 40% of cancers can be avoided or the risk of them can be reduced by eating the right foods." The right foods included at least five servings daily of a plant-based diet (lots of salad, vegetables and fruit) to reduce the risk of cancer.

- See entire article in the October 1999 issue - plus more information:

fshn.ifas.ufl.edu/pest/news.htm

• Medical Study Says Crucifers, Citrus Reduce Chance of Stroke

Broccoli and citrus got some positive PR in the news as a recent medical study reported that consumption of cruciferous vegetables (broccoli, cabbage and cauliflower, e.g.), leafy green vegetables and citrus fruits and juices may reduce the chance of ischemic stroke.

Ischemic strokes are caused by an artery blockage in the brain. Published in the October 6 issue of the Journal of the American Medical Association (JAMA), the research was funded by grants from the National Institute of Health and a smaller grant from the Florida Department of Citrus.

The multi-year study was based on observations of more than 114,000 women and men in the Nurses' Health Study and the Health Professionals' Follow-up Study.

For the complete article, see the Oct. 6 JAMA issue on **www.jama.com**.

- NEWS AROUND CREC -

Fond Farewell To Dr. Moshe Bar-Joseph

Dr. Moshe-Bar Joseph returned to his home country of Israel after a one-year sabbatical at CREC, where he conducted citrus tristeza virus (CTV) research in Dr. Bill Dawson's laboratory. Dr. Bar-Joseph is a scientist at the Volcani Center in Bet Dagan, Israel, and one of the world's leading authorities in citrus plant pathology. To Dr. Bar-Joseph, it was a privilege to work with you and learn from you, and we will miss you.

Awards

★ **Dr. Covadonga Arias**, a postdoctoral scientist working with Dr. Jackie Burns, received special recognition, "Premio Extraordinario de Doctorado", from the University of Valencia in Spain. The honor was given to Dr. Arias for outstanding work on her doctoral thesis, "Detection and Typing of *Vibrio vulnificus* With Molecular Techniques."

Dr. Arias was also awarded a one-year grant from the NATO Science Fellowship Program of Spain to work with Dr. Burns on the project, "Molecular Characterization of the Thermostable Pectinesterase Associated With Loss of Quality in Pasteurized Orange Juice."

★ **Dr. Mickey Parish** was received the 1999 Research and Development Award from the Institute of Food Technologists (IFT) Citrus Products Division.

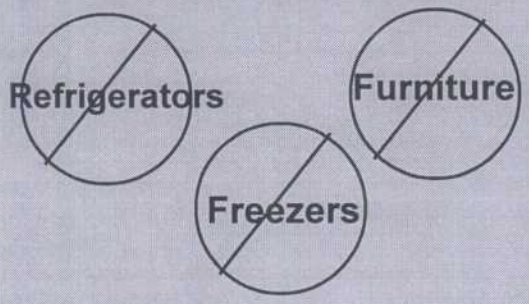
The IFT is an international society with 28,000 members from food science, food technology and related professions.

Dr. Parish was recognized for his achievements and work in the microbiology of citrus products. His program has provided leadership in the citrus industry in the areas of pathogen survival in citrus products, high pressure processing (non-thermal method of reducing microbial growth in juice), and the spoilage of citrus products.

P-CARD REMINDER

Remember, furniture, freezers and refrigerators are among the list of items that *CANNOT* be purchased with the P-card!

P-CARD "DON'TS" !!!!!



Announcement

Craig Davis, FDOC, has been promoted to Associate Research Scientist, effective November 1, announced Dr. Mohamed Ismail, FDOC Scientific Research Director - Fresh Fruit. Craig previously operated the facilities in the Electron Microscopy Laboratory with DiAnn Achor. He will continue to work with Dr. Steven Pao on food safety and microbiology, and also provide expert assistance to our staff of pathologists and physiologists.

November 15 Deadline For UF Superior Accomplishment Awards

Show an employee how much you appreciate his or her work and commintment - nominate an employee for the UF Superior Accomplishment Awards (SAA) Program.

The SAA Program recognizes faculty, A & P and USPS employees that have contributed outstanding services during the 1998-99 academic year. Awards include monetary gifts and certificates. Details and forms are available at: **www.ups.ufl.edu/awards/superior.htm**, or call Employee Relations and Development at (352) 392-1072.

From The Mail Room

Recycle Day - Friday, November 19

Please have all recyclable material to the Maintenance Shop by 9:30 am - paper, glossy and aluminum. Help recycle!

We Will Mail Out Reprint Requests

We will send out reprint requests that you receive - just attach an address to the reprint and bring it to the Mailroom.

Remove Labels From Styrofoam Boxes

When returning recyclable styrofoam boxes to the manufacturer, please remove all other labels. The Post Office will not accept boxes with UPS and other carrier labels.

From Personnel

Holidays
Nov. 11 - Veterans Day
Nov. 25-26 - Thanksgiving

Time Cards Due
Friday, Nov. 5
Thursday, Nov. 18

Training and Development Courses from University Personnel Services

November 2, 1999
The Supervisor's Role: Everything You Always Wanted to Know About Being a Supervisor
10:00 am - 1:00 pm, BHG Room 4

Conflict Management
2:00 - 5:00 pm, BHG Room 4

Welcome to . . . . .

Phillip Allende (OPS, Nielsen)
David Castrilli (OPS, Nielsen)
Julia Beretta (OPS, Derrick)
Arthur Swan (OPS, Albrigo)
Jianming Lin (Postdoc, Rouseff)

Farewell to . . . . . .

Michelle Thompson (OPS, Childers)
David Hires (OPS, Albrigo)
Richard Maness (OPS, Albrigo)
Noel Vasquez (OPS, Alva)
Daqing Sun (Res. Sci., Cancalon)
David Shapiro (Assistant In, McCoy)
JingJing Yang (OPS, Rouseff)
Dr. Moshe Bar-Joseph (Visiting Scientist)

Citrus Leaves

Would you like to be in *Citrus Leaves?* We welcome your contributions and suggestions. Editor: Public Relations, Monica Lewandowski; Production and Distribution: Word Processing, Barbara Thompson, Supervisor; Customer Service, Kathy Witherington, Supervisor, Nancy Burke & Connie Noxel.

New Grandparents

Grandparents Dave and Connie Noxel, birth of grandson Drew Michael Johnson on Oct. 25; parents are daughter Tara and husband Mike Johnson.

Grandfather Rommel Rubio, birth of gradson on 10/19/99; father is Rommel Rubio, Jr.

Manuscripts Submitted to the Publications Committee In October

W. J. Kender, U. Hartmond, J. K. Burns, and R. Yuan. Citrus Fruit Abscission Induced by Methyl Jasmonate. *Journal of the American Society for Horticultural Sciences.*

L. R. Parsons and John Jackson. The Florida Automated Weather Network and Minimum Temperature Estimation for Frost Protection. *Citrus Industry.*

W. M. Miller and G. P. Drouillard. Multiple Feature Analysis for Machine Vision Grading of Florida Citrus. *Applied Engineering in Agriculture.*

L. W. Timmer, H. M. Darhower, S.E. Zitko, T.L. Peever, A. M. Ibáñez and P. M. Bushong. Environmental Factors Affecting the Severity of Alternaria Brown Spot of Citrus and Their Use in Timing Fungicide Applications. *Applied Engineering in Agriculture.*

S. H. Futch and D. P. H. Tucker. Identification of Nutritional Deficiencies of Citrus. *Citrus Industry.*

M. Salyani, L. W. Timmer, C. W. McCoy and R. C. Littell. Petroleum Spray Oils in Florida Citrus Application. *Proc. of the Int. Conf. on "Spray Oils Beyond 2000.*

J. P. Michaud. Development and Reproduction of Ladybeetles on the Citrus Aphids *Aphis spiraecola* Patch and *Toxoptera citricida* (Kirkaldy). *Biological Control.*

D. I. Shapiro, C. W. McCoy, A. Fares, T. Obreza, and H. Dou. Effects of Soil Type on Virulence and Persistence of Entomopathogenic Nematodes in Relation to Control of Diaprepes abbreviatus. *Environmental Entomology.*

David I. Shapiro, Edwin E. Lewis, Sivapatham Paramasivam, and Clayton W. McCoy. Nitrogen Partitioning in *Heterorhabditis bacteriophora* Infected Hosts, and the Effects of Nitrogen on Attraction/Repulsion. *Journal of Invertebrate Pathology.*

C. C. Childers and D. S. Achor. The Eriophyoid Mite Complex on Florida Citrus (Acari: Eriophyidae). *Proceedings of the Florida State Horticultural Society.*

C. C. Childers. Flower Thrips: *Frankliniella bispinosa* (Morgan), *F. kelliae* Sakimura (Thysanoptera: Thripidae) and Postbloom Fruit Drop Disease Are Economic Pests on Florida Citrus. *Proceedings of the Florida State Horticultural Society.*

Kenneth Marsh, Pedro Gonzalez and Ed Echeverria. PP*i* Formation by Reversal of the Tonoplast Bound V-PP*iase* from 'Valencia' Orange Juice Sac Cells. *Journal of the American Society for Horticultural Science.*

Megh Singh and Shiv D. Sharma. Bio-efficacy Enhancement of Pesticides with Adjuvants. *Proceedings of International Symposium on Citriculture, Nagpur, India.*

S. H. Futch and M. Singh. Economical Approach to Analysis of Weed Control Data. *Proceedings of the Florida State Horticultural Society.*

November 1999

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 Training Courses: Supervisor Role-10am Conflict -1 pm	3	4	5 **Seminar:** Defensive Driving 11 am	6
7	8	9 **Seminar,** Dr. Ed Stover, IRREC 10:45 am	10 Supervisor's Mtng 8:30 am	11 **Veteran's Day Holiday**	12	13
14	15	16 **Seminar:** Dr. J Manthey, 10:45 - FDOC Commission Mtng 1 pm	17	18 Faculty Mtng, 8:30 am	19	20
21	22	23 **Seminar**, Dr. Mickey Parish, 10:45	24	25 **Thanksgiving Holiday**	26 **Thanksgiving Holiday**	27
28	29	30 **Seminar**, Dr. Richard Lee, 10:45	**December:** Seminar: Mike Armstrong "Computing at CREC - 105" BHG Rm 1, 11:00 am - Noon			

November 1999

2 – In-Service Training–Fac. & Sup'v, Rm 4,
10 am - 1 pm –"The Supervisor's Role: Everything You Always Wanted to Know"
2 pm - 5 pm–"Conflict Management"

5 – Seminar: Defensive Driving–Carol Lehtola. BHG Rm 1, 11:00 am - Noon.

9 – Seminar: Dr. Ed Stover "Preharvest Factor Affecting Quality of Citrus." BHG Rm 1, 10:45 am - Noon.

10 – Supervisors' Meeting–Dr. Browning. BHG Conf. Rm, 8:30 am - 10:00 am.

11 – **HOLIDAY - VETERANS DAY**

16 – Seminar: Dr. John Manthey "Anti Inflammatory Properties of Citrus Flavonoids." BHG Rm 1, 10:45 am - Noon.

16 - Florida DOC–Citrus Comm. Public Mtg.–Dr. Ismail. BHG Rm 1, 1 pm - 5 pm.

18 – Faculty Mtg.–Dr. Browning, BHG Rm 4, 8:30 am - 10:30 am.

23 – Seminar: Dr. Mickey Parish "Development of Federal Science Policy Related to the Citrus Industry." BHG Rm 1, 10:45 am - Noon.

25&26 **THANKSGIVING HOLIDAYS**

30 – Seminar: Dr. Richard Lee "EcPort: A New UF Internet Service." BHG Rm 1, 10:45 am - Noon.

December

3 – Seminar: Mike Armstrong "Computing at CREC - 105. BHG Rm 1, 11:00 am - Noon.