BARC e-Update

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BARC is part of the USDA's Agricultural Research Service and encompasses programs at the Beltsville Agricultural Research Center; the U.S. National Arboretum in Washington, D.C.; and worksites in Chatsworth, New Jersey; Presque Isle, Maine; and McMinnville, Tennessee. BARC is the largest and most diversified agricultural research complex in the world. BARC's record of accomplishments and its ongoing programs have made it a world leader in agricultural research.

Technology Transfer

POINSETTIAS

Impacts of Beltsville Agricultural Research Center Research on the Poinsettia Industry

The poinsettia plants that are purchased today are a far cry from the wild, 8-plus feet tall plants that originated in Mexico. Research performed over the past seventy years at Beltsville has significantly influenced this $200+ million wholesale industry. Poinsettias are the number one potted plant in market value.

1920s - **Drs. Wightman Gardner** and **Harry Allard** discovered that poinsettias require longer nights to induce flowering. When a poinsettia flowers, the upper leaves (the bracts) turn bright red and the center of the plant forms small yellow flowers.

1960s - **Dr. H. Marc Cathey** began studies on the lighting requirements of poinsettia as well as the use of growth regulators for improving commercial production of poinsettias. Dr. Cathey's research resulted in a production protocol that not only guaranteed when the poinsettia would "flower" but also a plant with a compact growth form.

1970s - **Dr. Robert Stewart** developed poinsettia breeding lines with significantly improved keeping quality. Before this research, poinsettia leaves would fall off the plant shortly after they were developed. Dr. Stewart's research resulted in the development of cultivars (i.e., 'Ruff and Ready') in which the leaves and bracts remained on the plant for the entire holiday season. 'Ruff and Ready' is still used as a parent for new poinsettia cultivars on the market today.

1990s - **Dr. Ing-Ming Lee** discovered that free-branching, dwarfed poinsettia, which produce the brilliant-red bracts favored by consumers, is due to infestation by a phytoplasma. Phytoplasmas are minute organisms which are usually disease causing in plants. But in this case they induce the growth form which is highly prized in poinsettias. This finding has also led the way to produce virus-free plants.

The new poinsettia colors like pinks and yellows, and spotted types are another outgrowth of the work done by Dr. Steward on chimeras. Chimeras are plants with tissues that are genetically different than their parents. The basic science done by Dr. Steward has enabled commercial breeders to produce new color variations.

DO

- Place your plant in indirect sun for 6 hours/day.
- Provide room temperatures between 68-70 degrees.
- Water your plant when the soil feels dry to the touch.
- Use a large, roomy shopping bag when transporting your plant.
- Fertilize after blooming season with a balanced, all-purpose fertilizer

DO NOT

- Place your plant near cold drafts or excessive heat.
- Expose your plant to temperatures below 50 degrees.
- Over-water your plant or allow it to sit in standing water.
- Expose your plant to chilling winds when transporting.
- Fertilize your plant when it is in bloom.

Blowing Our Own Horn!

PERUVIAN NGO RECOGNIZES BARC RESEARCH

The Institute of Tropical Crops (ICT) in Tarapoto, Peru recently honored **Dr. Eric Rosenquist**, National Program Leader for Crop Production and Protection and Senior International Coordinator of Alternative Crops, and two scientists from BARC's Sustainable Perennial Crops Laboratory, **Dr. Lyndel Meinhardt**, Research Leader and **Dr. Virupax Baligar**, Lead Scientist, with certificates of appreciation for their outstanding contribution and support to ICT. The awards were presented by the president, Mr. Enrique Arévalo Gardini, and vice president, Mr. Luis Cernades of ICT. ICT is a Peruvian NGO (non-governmental organization) that works with small landholder to develop sustainable farming methods in the Peruvian Amazon.

Community Interest

OUTER SPACE SEEDS – AN EDUCATIONAL EVENT AT NATIONAL ARBORETUM

The U.S. National Arboretum partnered with the Department of Education (DoEd), National Aeronautics and Space Agency, and the Herb Society of America to hold an event at the Arboretum in Washington, D.C., as part of International Education Week. On November 15, seventy-two fourth grade students from the Arlington Science Focus School brought lunar plant growth chambers they constructed as part of NASA's 2007-2008 Engineering Design Challenge. Under Secretary for Research, Education and Economics **Dr. Gale Buchanan** welcomed the students, and a NASA scientist, as part of a panel of experts, reviewed the chamber designs. Other panel members included Arboretum scientist **Dr. Richard Olsen**, the Deputy Director of the DoEd International Affairs Office, and a NASA educator. Following the students' presentations, they asked questions of three STS-118 astronauts: Commander Scott Kelly, Mission Specialist Barbara Morgan, and Canadian Space Mission Specialist Dave Williams. Ten million cinnamon basil seeds were also on STS-118's August, 2007 flight. The students were given packets of those seeds to grow in their lunar growth chambers, and the National Arboretum will sow some in its National Herb Garden in the summer of 2008.

On the Research Side...

Citrus canker disease is one of the most destructive diseases of citrus. Because of the importance of the disease, extensive collections of diseased plant materials were preserved by scientists over the past century as the disease moved out of southern Asia and became established worldwide. The BARC maintains one such large collection. These specimens constitute a historical record of the expansion of citrus canker disease and are preserved with records of the date and place of their collection as well as the host on which they were collected. However the bacterial pathogen is dead in such materials and so can not be studied by ordinary microbiological means. **Dr. John Hartung** and colleagues developed methods to isolate the DNA from these specimens and uniquely identify and distinguish the strains of the pathogen present in the samples. DNA samples were prepared from ninety preserved plant specimens collected from 1914 through 1985 from citrus grown in 34 countries or oceanic atolls. The results confirm the 90 year old hypothesis that the original introduction of citrus canker to Florida in 1911 was from Japan. The team also found several genetically distinct strains of the pathogen in samples from Florida at that period, consistent with multiple independent introductions of the pathogen at that time. Separate analyses of contemporary strains from Florida also indicate multiple independent introductions of the pathogen. Herbaria preserve rich collections of 'fossil' pathogens in the plant tissue. These new methods demonstrate that this material can be used to document the history of plant diseases. This research, "Genetic Diversity of Citrus Bacterial Canker Pathogens Preserved in Herbarium Specimens" by Wenbin Li, Qijian Song, Ronald H. Brlansky, and John S. Hartung, was published on-line in November in the Proceedings of the National Academy. For additional information contact Dr. Hartung at John.Hartung@ars.usda.gov.

Mark Your Calendar!

BELTSVILLE AREA DISTINGUISHED LECTURE SERIES

This seminar is open to the public

Dr. Raymond Rodriguez, Director and Professor, Center of Excellence in Nutritional Genomics, University of California,Davis

Date: Wednesday, ***January 23, 2008***

Time: 10:30 am – 11:30 am

Place: *Building 003 Auditorium, BARC-West*

Title: *"Nutritional Genomics: Linking Agriculture, Nutrition and Genomics to Human Health"*