Diversity at USDA Everyday in Every Way!

BELTSVILLE AREA GRADUATE STUDENT AGRICULTURAL RESEARCH SYMPOSIUM

100 Years of Agricultural Research

Advancing Agriculture through Research and Partnerships:

ARS and 1890 Land-Grant Universities

FEBRUARY 10- 11, 2011

Henry A. Wallace
Beltsville Agricultural Research Center
10300 Baltimore Avenue
Beltsville, Maryland 20705
www.ars.usda.gov/ba

Diversity at USDA Everyday in Every Way!

USDA

United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

Greetings Participants,

The Agricultural Research Service welcomes you to this unique event.

As the in-house research arm of USDA, the Agricultural Research Service (ARS) conducts scientific research on a national scale with diverse approaches and partners. Among our most valued partners are the 1890 Land Grant Institutions that apply their expertise to State and regional issues. ARS and 1890 Land Grant University scientists complement one another as we work together to address and solve critical agricultural issues facing our Nation.

There are many beneficial outcomes from our sharing of facilities and expertise. Those benefits have merely begun to take shape. For example, the widespread development of new crop varieties and technology exchanges are groundbreaking accomplishments for USDA and 1890 Land Grant Universities. Another exemplary example is the work carried out by ARS scientists and University of Maryland Eastern Shore faculty and students in the development of predictive models for minimizing *Salmonella* and *Campylobacter* in poultry. The best is yet to come.

This Symposium brings together the talents of 1890 Institution students/future scientists with the ARS scientific staff of the Beltsville Agricultural Research Center to form new collaborations that will enhance our joint advancement of the agricultural sciences for public benefit. As the Administrator of the world premier agricultural research organization, I welcome you to the Beltsville Area which constitutes an important part of ARS national programs. We look forward to your contributions to this symposium and continued partnerships in the future.

Edward B. Knipling

Edward B. Knipling
Administrator

ars

Office of the Administrator
Jamie L. Whitten Federal Building • Room 302-A • 1400 Independence Avenue, SW.
Washington, D.C. 20250-0300

USDA

United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

January 25, 2011

Dear Symposium Participant,

Welcome to the Beltsville Area Graduate Student Agricultural Research Symposium!

Speaking on behalf of the Beltsville staff, we are excited about this opportunity to interact with the students and faculty from the 1890 Land Grant Universities. This symposium will allow for an unprecedented opportunity to share research ideas, develop lasting professional relationships, examine career opportunities, and establish long-term partnerships.

The Beltsville Area is made up of the Henry A. Wallace Beltsville Agricultural Research Center, or BARC as it is commonly called, and the U.S. National Arboretum, located in Washington, D.C. BARC is the most diverse and most significant agricultural research center in the world.

In 2010, BARC celebrated its 100th anniversary. Naturally, an anniversary such as that is an invitation to look back on the past. It is clear that BARC scientists have had a lasting impact on agriculture throughout the world, strengthened the food industry, and improved the lives of all Americans. Notable accomplishments include the development of new varieties of horticultural crops that have improved resistance to disease, increased yield, superior storage qualities, and optimal nutritional content. BARC scientists have developed diagnostic methods and intervention strategies that keep our food supply safe. The familiar turkey that we eat at Thanksgiving is derived from the Small White Beltsville Turkey that was developed here. Recent use of biotechnology by BARC scientists and the availability of the cow genome have completely revolutionized the dairy industry in the US leading to increased milk production and reduced costs. Many commonly used insect repellants and pheromones used to trap insects were developed here. BARC scientists have been involved in climate change research long before the public was aware of the issue. Many trees that make up urban landscapes are varieties that were developed here as well. Look at any food product and you will find its nutrient content prominently displayed; this information was developed and is maintained at BARC. Research continues on determining the optimal diet to prevent chronic diseases such as heart disease and cancer. BARC scientists have played a major role in helping to protect and conserve the environment and developed farming practices that improve the air, water, and soil around us.

While BARC can look back on its rich history of major accomplishments, we look forward to the future. The world's population is growing and the need for food is increasing; this demand will not be easy to meet. However, the tremendous potential of biotechnology, an area that many BARC scientists are recognized as among the best in the world, holds enormous promise for meeting that need. It will be a challenge for sure, but with the right people and the unique opportunities that exist in the Beltsville Area, there is every reason to believe that at BARC's 200th anniversary people will look back and know that BARC successfully met that challenge.

Sincerely,

JOSEPH T. SPENCE
Director, Beltsville Area

ars

Beltsville Area Director's Office
10300 Baltimore Avenue, Beltsville, Maryland 20705-2350

USDA

United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service
National Agricultural Library

February 2, 2011

Greetings,

As the National Agricultural Library's Director, it is with great pleasure that I express my strong support of the Beltsville Area Graduate Student Agricultural Research Symposium.

The National Agricultural Library (NAL) is one of four U.S. national libraries which houses the largest most accessible agricultural collection in the world and is the nexus for a national network of state land-grant and U.S. Department of Agriculture field libraries. NAL provides reference and research resources through advanced information technology and on-site assistance.

I am very excited about NAL's involvement in local community events and its ongoing efforts to support education activities. NAL also offers volunteer, internship, and student employment program opportunities throughout the year. Many projects are available within the library and vary from basic office assistance to highly technical positions. Some examples of project tasks include:

- organizing and inventorying collections of photographs, nursery catalogs, manuscript papers, and memorabilia
- creating web pages
- processing large scale bibliographic data in a database environment

NAL is proud to announce academic credit for select internship opportunities as well as flexible schedules to accommodate busy lifestyles.

For more information regarding our volunteer, internship, and student employment programs visit the NAL website at www.nal.usda.gov or to apply please contact Theresa Ridgeway, ODEO Program Manager, via email at theresa.ridgeway@ars.usda.gov or by telephone on (301) 504-7217.

Sincerely,

Simon Liu
Director

ars

National Agricultural Library • Office of the Director
10301 Baltimore Avenue • Beltsville, MD 20705-2351

F A R - B
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P.O. BOX 1061
BELTSVILLE, MARYLAND 20704-1061
www.far-b.org

Dedicated to Promote the Research and Education Programs of the
Henry A. Wallace
Beltsville Agricultural Research Center (BARC), Beltsville, Maryland

On behalf of the Board of Directors of Friends of Agricultural Research – Beltsville (FAR-B) it is a distinct pleasure to welcome you to the Beltsville Agricultural Research Center. We are thrilled that you are participating in the 2011 Graduate Student Agricultural Research Symposium. Virtually all of the FAR-B members were graduate students at one time in the past. We know full well that these years spent in graduate studies are a great time to begin networking with other graduate students and with those who have moved into their research careers.

Please make new friends, learn new things, and tell others about your research and most of all please enjoy your brief stay here at the Beltsville Agricultural Research Center. BARC is not only a nice place to visit; IT'S A GREAT PLACE TO WORK!

Vernon Pursel
President, FAR-B

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SYMPOSIUM SCHEDULE THURSDAY, FEBRUARY 10, 2011

BELTSVILLE AREA GRADUATE STUDENT AGRICULTURAL RESEARCH SYMPOSIUM

Time		Location	Scheduled Event
2:00 PM	6:00 PM	Holiday Inn Lobby	Participant arrival and registration
		BARC Bldg. 003 Room 020	Poster hanging and download of oral presentations
6:30 PM	7:00 PM	Holiday Inn Lobby	Transport to BARC, Bldg. 005, Room 021
7:00 PM	7:20 PM	BARC Bldg. 005 Room 021	Registration
7:25 PM	7:30 PM		Welcome Address: **Dr. Joseph Spence**, Director Beltsville Agricultural Research Center
7:30 PM	8:00 PM		Buffet dinner service
8:00 PM	8:20 PM		Guest Speaker: **Dr. Robert Davis**, Research Leader Molecular Plant Pathology Laboratory
8:20 PM	8:30 PM		Dinner Adjourns
8:30 PM	8:45 PM		Transport back to Holiday Inn

USDA Diversity at USDA Everyday in Every Way! ARS

SYMPOSIUM SCHEDULE FRIDAY, FEBRUARY 11, 2011

BELTSVILLE AREA GRADUATE STUDENT AGRICULTURAL RESEARCH SYMPOSIUM

Time		Location	Scheduled Event
7:00 AM	7:30 AM	Holiday Inn Lobby	Transport to National Visitors Center (Log Lodge)
7:30 AM	8:30 AM	BARC, National Visitors Center (Log Lodge)	Networking Breakfast
			Introduction: **Jennifer Woodward-Greene** and **Jay Green** Public Affairs Specialists
			Opening Remarks: **Dr. Tom Sexton**, Associate Director Beltsville Agricultural Research Center
8:30 AM	9:45 AM		Bus tour of BARC
9:45 AM	10:00 AM		Transport to Bldg. 003, Auditorium
10:00 AM	10:05 AM	BARC, Bldg. 003 Auditorium	**Oral Presentations** Moderator: **Dr. Ramon Jordan**, Associate Director National Arboretum
10:05 AM	10:25 AM		**O-1**, "Botanical characteristics of twenty three accessions of *Hibiscus sabdariffa*" by **Ryan Nicholas**, Southern A&M University
10:25 AM	10:45 AM		**O-2**, "Comparison of growth and survival of total and pathogenic *Vibrio parahaemolyticus* in American and Asian oysters" by **Meshack Mudoh**, University of Maryland Eastern Shore
10:45 AM	11:05 AM		**O-3**, "Localization and identification of ultraviolet-B absorbing compounds in selected Southern tree species" by **Vanessa Ferchaud**, Southern A&M University
11:05 AM	11:25 AM		**O-4**, "Antifungal effects of three copper-based nanoparticles" by **Yongshen Li**, Southern A&M University
11:25 AM	11:40 AM		Break
11:40 AM	12:00 PM	BARC Bldg. 003, Room 020	Keynote Speaker: **Mr. Farook Sait**, Director Civil Rights Division, Food Safety and Inspection Service
12:00 PM	1:25 PM		Lunch **Poster Session**
1:25 PM	1:30 PM	BARC Bldg. 003 Auditorium	**Oral Presentations** Moderator: **Dr. Joan Lunney**, Research Chemist Animal Parasitic Diseases
1:30 PM	1:50 PM		**O-5**, "Bacteriophage treatment in combination with modified atmosphere packaging to control *Escherichia coli* O157:H7 on spinach and lettuce" by **Olcay Boyacioglu**, North Carolina A&T State University
1:50 PM	2:10 PM		**O-6**, "Efficacy of phytoremediation potential and response of *Sapium sebiferum* and *Salix nigra* to heavily contaminated industrial sites" by **Mary Beals**, Southern University
2:10 PM	2:30 PM		**O-7**, "Pigeonpea: A new food and feed legume crop" by **Glen Chappel**, Virginia State University
2:30 PM	2:50 PM		**O-8**, "The effect of carbon-copper coreshell nanoparticles on suppression of three blue stain fungi" by **Michaela Danzy**, Southern A&M University
2:50 PM	3:05 PM		Concluding Remarks: **Verneta Gaskins**, Chair Beltsville Area Diversity Taskforce
3:05 PM	4:00 PM		**Mentor -Student Interactions**
4:00 PM	4:15 PM		Transportation back to Holiday Inn

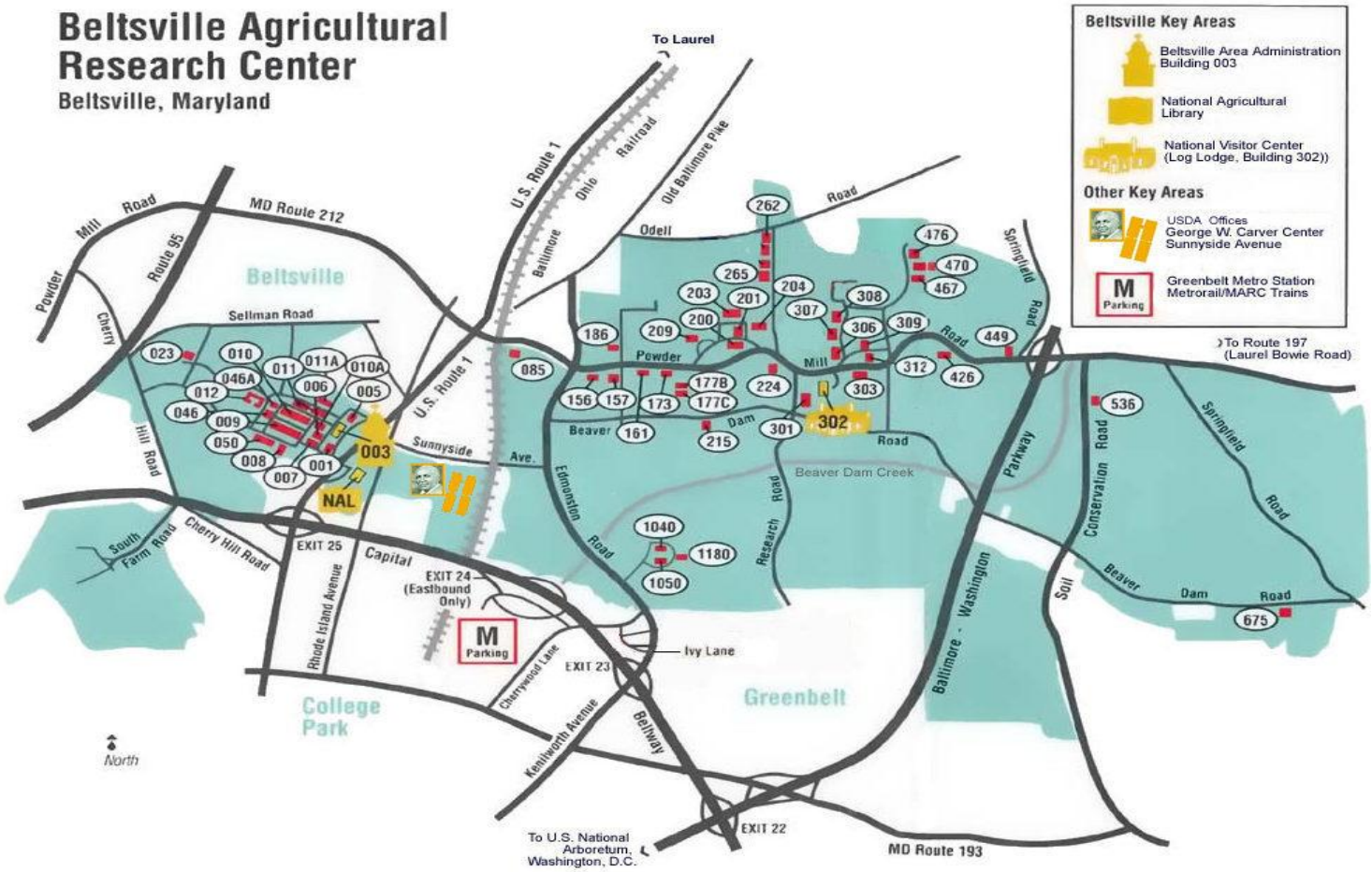
HISTORY OF THE USDA-ARS HENRY A. WALLACE BELTSVILLE AREA RESEARCH CENTER

For the past century, the historic research facility now known as the Henry A. Wallace Agricultural Research Center (BARC) at Beltsville, Maryland, has played an important role in advancing agricultural science and improving people's lives worldwide. During the civil war in 1862, Abraham Lincoln called for the establishment of a Department of Agriculture to improve agricultural production and to better the life of the farmer. Initial studies by the USDA focused on trialing crops for domestic production and to provide information to farmers for increasing productivity.

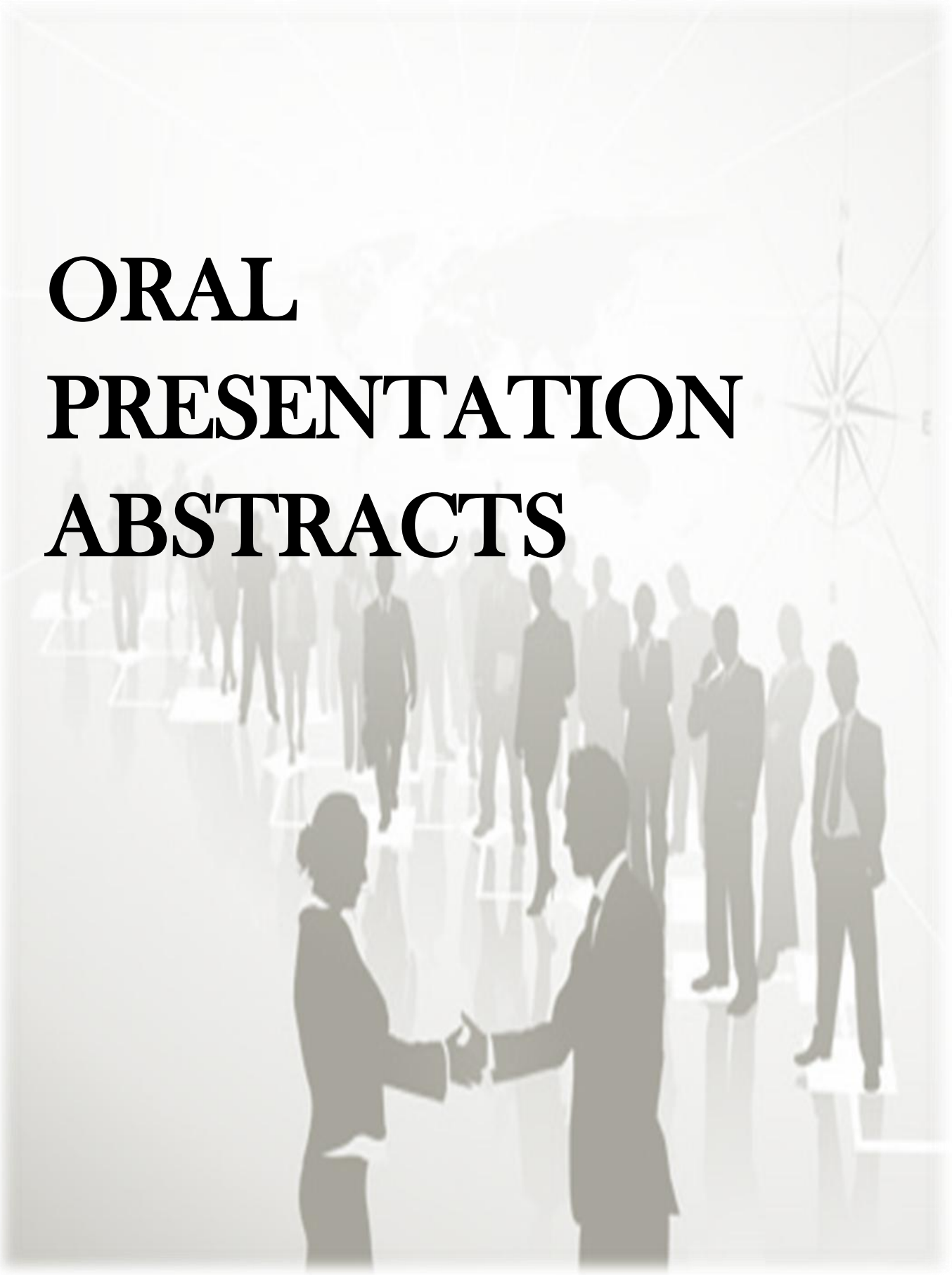
After the Civil War, thirty-five acres of land lying between 12th and 14th streets and Constitution and Independence Avenues on the National Mall in the District of Columbia was assigned to the Department. At the south end of this land, the Agricultural building was constructed in 1869. A large conservatory for maintaining tropical economic plants was erected next to the building in 1871. Because of an increased need for land to perform plant research, military land in Arlington, Virginia was assigned to the Department in 1902. This facility was known as Arlington Farm Experiment Station.

In 1884, USDA leased land on Benning Road in Washington to build the Veterinary Experimental Station. Expanding programs created a need for a larger and more complex facility. In 1897, the station moved to leased land in Bethseda, MD. The increasing need for an expanded facility, coupled with the high cost of leasing, resulted in Congress authorized USDA to purchase land for a permanent Station. In 1910, the USDA purchased land at the Walnut Grange plantation in Beltsville, Maryland. Dairy and animal husbandry research were relocated to this site, marking the beginning of BARC. Three years later, the Dairy Barn became the first building to be constructed in BARC and is the site of the first research activity. For the next 20 years, the USDA continued to gradually acquire surrounding land, constructing permanent buildings and small animal and poultry houses.

Prior to 1935, most research programs at the USDA were extension oriented. One of the results of the 1935 Bankhead-Jones Congressional Act was to provide approximately $10 million toward "research into the laws and principles underlying basic problems of Agriculture in its broadest aspects" (Ling, 1935). Based upon this funding, Secretary of Agriculture Henry A. Wallace moved research projects from experiment stations in surrounding areas to Beltsville, effectively creating the National Agricultural Research Center. The National Agricultural Research Center is now known as the Henry A. Wallace Beltsville Agricultural Research Center (BARC).


Beltsville Agricultural Research Center
Beltsville, Maryland
Beltsville Key Areas
Beltsville Area Administration Building 003
National Agricultural Library
National Visitor Center (Log Lodge, Building 302))
Other Key Areas
USDA Offices George W. Carver Center Sunnyside Avenue
M Parking
Greenbelt Metro Station Metrorail/MARC Trains
To Laurel
To Route 197 (Laurel Bowie Road)
Beltsville
College Park
Greenbelt
Beaver Dam Creek
NAL
003
302
EXIT 25
EXIT 24 (Eastbound Only)
EXIT 23
EXIT 22
Ivy Lane
Sellman Road
Sunnyside Ave.
Beaver Dam Road
Edmonston Road
Research Road
Springfield Road
Conservation Road
Soil Conservation Road
Baltimore - Washington Parkway
Capital Beltway
Kenilworth Avenue
Rhode Island Avenue
Cherrywood Lane
Cherry Hill Road
South Farm Road
Hill Road
Powder Mill Road
Cherry Lane
Route 95
MD Route 212
U.S. Route 1
Baltimore Ohio Railroad
Old Baltimore Pike
Odell Road
To U.S. National Arboretum, Washington, D.C.
MD Route 193
North

ORAL PRESENTATION ABSTRACTS



O-1

Botanical characteristics of twenty-three accessions of *Hibiscus sabdariffa*

Ryan Nicholas, Y. Qi, and K. Chin

Southern University and A&M College

Roselle (*Hibiscus sabdariffa*) is an annual erect, herbaceous shrub that has nutritional and medicinal values known worldwide. In this study 23 Roselle accessions were collected and cultivated in Baton Rouge, LA in 2009 growing season to distinguish their botanical characteristics. The accessions studied were from Cuba(2 accessions), Georgia(1), Ghana(2), India(1), Jamaica(1), Liberia(1), Malaysia(1), Nigeria(2), Poland(1), Senegal(1), South Africa(3), Sudan(3), Taiwan(1), Thailand(1), and Zambia(2). The botanical characteristics were described according to habit, leaf area, leaf dimension, petiole length, leaf chlorophyll content, plant spread, plant height, basal diameter, calyx dimension, color, and production. The research indicates all the accessions studied proved to be similar in species, but exceptionally diverse in representation. They all have potentials to be used for foliage production, which needs to be further explored. However, at least four accessions including Jamaica, Senegal, Nigeria and South Africa Transvaal PI-273459 have proven to be suitable for Roselle fruit and calyx production, under the climatic conditions of Baton Rouge, Louisiana. This study helps select accessions that are suitable for niche market production by small farmers and interested growers in the U.S.

O-2

Comparison of growth and survival of total and pathogenic *Vibrio parahaemolyticus* in American and Asian oysters

Meshack Mudoh

University of Maryland Eastern Shore

Vibrio parahaemolyticus (Vp) is a naturally occurring halophilic bacterium that can cause gastroenteritis in seafood consumers usually associated with the ingestion of contaminated oysters. Information is limited on Vp growth and survival in oysters under various storage conditions. This study compared the growth and survival of total and pathogenic Vp in American and Asian oysters. Oysters from Chesapeake Bay were stored at 5 to 30ºC for selected time intervals. At each time interval, two replicates of six oysters each were analyzed for total Vp levels by direct plating/DNA probe for the species specific thermolabile hemolysin (tlh) gene. Pathogenic Vp levels were determined by MPN-qPCR analysis targeting the thermostable direct hemolysin (tdh) and thermostable-related hemolysin (trh) genes. The Baranyi D and linear models were fitted to the Vp growth and survival data to estimate the maximum growth rate (GR). GR

estimates of total Vp ranged from -0.0018 to 0.099 and -0.0007 to 0.0699 log CFU/h for the American and Asian oysters, respectively. Assuming a linear model for the initial growth phase, the best estimates of GR of tdh- and trh-positive Vp were 0.08 to 0.27 and -0.0021 to 0.14 log MPN/h, for American and Asian oysters, respectively. No growth of pathogenic Vp was detected at 5 ºC. The GR of pathogenic Vp was found to be substantially greater than those observed for total Vp. Pathogenic Vp may multiply more rapidly than total Vp. The results of this study will assist risk managers and the seafood industry in designing more effective food safety systems.

O-3

Localization and identification of ultraviolet-B absorbing compounds in selected Southern tree species

Vanessa Ferchaud, Y. Qi, and K. L.Chin

Southern University and A&M College

Plant tolerance to UV-B radiation is largely due to its possession of UV absorbing compounds, mainly flavonoids and related phenolic compounds. Relatively little information exists on the UV-B tolerance characteristics in urban trees. This study involves identification of flavonoids/phenolics in twelve broadleaf southern tree species during a growing season. Species include American elm (*Ulmus Americans*), Chinese elm (*Ulmus parvifolia*), Chinese tallow (*Sapium sebiferum*), green ash (*Fraxinus pennsylvanica*), nuttall oak (*Quercus nuttallii*), pecan (*Carya illinoinensis*), river birch (*Betula nigra*), shumard oak (*Quercus shumardii*), Southern live oak (*Quercus virginiana*), Southern magnolia (*Magnolia grandiflora*), Southern red oak (*Quercus falcate*), and willow oak (*Quercus phellos*). These species are widely used in urban and community forestry across the south in the U.S. Flavonoids/phenolics were founded existing in young leaves of all the species. The concentration of these compounds varied significantly among the species and increased as the leaves grew and developed. Green ash had the highest increase from leaf emergence to mature stage while American elm and Chinese tallow showed the least increase. The UV-B absorbing compounds were found to be located mainly in leaf epidermises of all the species plus in the palisades tissues of some species. The ability that these species synthesize and accumulate UV absorbing compounds as secondary metabolites will allow them to tolerate continuous UV exposure during the growing season and make them adapt to the harmful UV-B environment. The results will provide a better understanding to scientists, educators and arborists of UV-B tolerance mechanism and adaptation strategies in southern trees.

O-4

Antifungal effects of three copper based nanoparticles

Yongsheng Li, Y. Qi, K. Lian, Q. Wu, and D. Collins

Southern University and A&M College

Antifungal activities of three copper-based nanoparticles including copper-carbon core-shell nanoparticle (CCCSNs), copper-silver nanoparticle (Cu-Ag-NPs) and copper-gold nanoparticle (Cu-Au-NPs) against the plant pathogenic fungus *Bipolaris sorokiniana* were investigated in this study. These nanoparticles were characterized by X-ray diffraction and transmission electron microscopy for crystalline structure and estimation of size. The weight percentages of copper in three raw nanomaterials were analyzed by SEM/EDX. Bipolaris sorokiniana was cultured on potato dextrose agar media in Petri-dishes treated with CCCSNs, Cu-Au-Nps, or Cu-Ag-Nps. For each type of nanoparticle, four concentrations, 0, 0.1, 1 and 5g/L, were used with three replications each. Mycelial growth was imaged daily for 11 days and quantified using NIH Image (ImageJ 1.43u). Results show that all three nanoparticles inhibited the fungal growth. Compared to the control at the end of 11 days, the CCCSNs treatment inhibited the fungal growth by 81% at 0.1g/L, and 99% at 1g/L, and 100% at 5g/L. The Cu-Ag-NPs treatment inhibited growth by 83% at 0.1g/L, 98% at 1g/L, and 100% at 5g/L. The Cu-Au-NPs treatment inhibited growth by 76% at 0.1g/L, 84% at 1g/L, and 99% at 5g/L. These results suggest that the three nanoparticles can be used as effective growth inhibitors to *Bipolaris sorokiniana*, making them a potential new antifungal system.

O-5

Bacteriophage treatment in combination with modified atmosphere packaging to control *Escherichia coli* O157:H7 on spinach and lettuce

Olcay Boyacioglu

North Carolina A&T State University

A multi-state *Escherichia coli* O157:H7 (EHEC) outbreak linked to bagged spinach in 2006 has raised concerns about the safety of ready-to-eat fresh vegetables. Current sanitizing methods have been ineffective in eliminating EHEC on fresh produce. One novel approach is to utilize lytic bacteriophages, which can kill enteric pathogens rapidly without affecting natural microflora on produce commodities. This study investigated the effectiveness of an EHEC-specific bacteriophage cocktail (EcoShield™) in combination with modified atmosphere packaging (MAP) on contaminated fresh spinach, green leaf lettuce, and Romaine lettuce. Pieces (~2x2 cm^2) of leafy greens were inoculated with a nalidixic acid resistant strain of EHEC RM4407 (EHEC NalR), air-dried to promote bacterial attachment, and sprayed with EcoShield™ bacteriophage cocktail.

Concentrations of EHEC NalR and phage on the leaf samples were 5.3 CFU/cm2 and 8.4 PFU/cm^2, respectively. Leaf samples were incubated at 4 or 10°C up to 15 days inside humid petri dishes in sealed packages filled with atmospheric or modified (5% O2/35% CO2/60% N_2) air. The growth of EHEC NalR was determined on MacConkey agar supplemented with 25 µg/ml Nal. On average, phage treatment significantly ($P<0.05$) reduced EHEC NalR counts by 2.2, 2.9, and 2.8 log CFU/cm^2 on spinach, green leaf lettuce, and Romaine lettuce, respectively. EHEC NalR counts were significantly ($P<0.05$) higher on leaf samples incubated under modified air packages by 0.2, 0.5, and 0.5 log CFU/cm^2, respectively. Our results suggest that the EcoShield™ phage cocktail used in this study has the potential to control EHEC contamination on spinach and lettuce.

O-6

Efficacy of phytoremediation potential and response of *Sapium sebiferum* and *Salix nigra* to heavily contaminated industrial sites

Mary K Beals

Southern University and A&M College

This study was developed to determine phytoremediation potential and response of two invasive tree species, *Sapium sebiferum* (Chinese Tallow) and *Salix nigra* (Black Willow). The site is the Maryland Tank Farm, a previously used industrial site for Exxon Mobil Refinery. The overall goal of this project is to enhance progress toward practical and economically sound environmental management strategies for contaminated industrial sites. The objectives of this study are to: 1) Determine the histological effects heavy metals such as Arsenic, Cadmium, Lead, Nickel, and Mercury will have on the soil, roots, stems, and leaves of the *Sapium sebiferum* and *Salix nigra* present at the site; 2) Determine anatomical and physiological effects the specified contaminants have on the soil and trees post hurricanes; 3) Determine if soil type and texture play a role in the amount of contaminants accumulated and remediated; and 4) Increase the awareness of the contaminants directly placed in low-income based communities. For this study tree cuttings and soil samples are collected, prepared, pellet pressed, freeze dried, fixed and tested by AAS, ICP, XRF, CPD, TGA, and SEM. These tests provide an adequate analysis of specified chemicals concentrations above 10ppm and determine anatomical and physiological changes. Ingestion of contaminated food or drinking water exposes humans and animals to toxic levels of heavy metals. This project has the potential to provide environmentally and economically sound management strategies to eliminate or control hazardous chemicals specifically in urban areas.

O-7

Pigeonpea: a new food and feed legume crop for the Southern USA

Glenn Chappell

Virginia State University

Pigeonpea (*Cajanus cajan* L. Millsp), an important legume food crop in the world, is being studied for its' potential in Virginia. We compared four cultivars (GA-1, GA-2, W-1, and W-3), and three intra-row populations (2, 4, or 6 plants per 0.3 m) during 2009. In the experiment planted on May 13, mean forage yields were 25689, 23148, 25093, and 26,970 kg/ha; green bean yields were 1799, 2050, 2819, and 5977 kg/ha; and shelling percentages were 40, 46, 56, and 54, respectively 150, 160, 170, and 190 days after planting (DAP). In the experiment planted on June 17, mean forage yields were 18832 and 25216 kg/ha; green bean yields were 1782 and 1877 kg/ha; and shelling percentages were 61 and 45, respectively 140 and 150 DAP. The crude protein, ADF, ADFN, NDF, and NEL values for pigeonpea plants harvested approximately 150 DAP were 23.7 and 22.8, 32.5 and 29.0, 0.57 and 0.64, 32.9 and 27.4, 63.9 and 67.7, and 0.66 and 0.70, respectively for plantings done on May 13 and June 17. The differences among four cultivars and three intra-row populations were, generally, not significant. Detailed results of these and other experiments, conducted during 2010, will be presented and discussed.

O-8

The effects of carbon-copper coreshell nanoparticles on suppression of three blue stain fungi

Michaela Danzy, Y. Qi, K. Lian, Q. Wu, D. Collins, F. Oliveria, R. Menard, and K. Klepzig

Southern University and A&M College

Over the past few years, nano-materials have generated a tremendous interest because they offer an opportunity to deliver unprecedented material performance. Effect of Copper-Carbon Core-Shell Nanoparticles (CCCSN) on the different fungi within forest trees is my area of concentration. In a preliminary study, CCCSN concentrations of 0 (control), 0.1, 0.5, 1, 2.5 and 5 g/L were incorporated into malt extract agar (MEA) media (3.5% MEA in water). Three blue stain fungi, *O. minus, L. huntii*, and *G. huntii* were inoculated onto the media in Petri-dishes with four replications per concentration per species. The mycelia growth was measured daily for at least 30 days depending on the species. The fungal colony was photographed every other day. The preliminary results indicate that the fungi reacted to the lower concentrations (0.1-1g/L) of CCCSN differently and there seems to be a general stimulating effect on fungal growth with the lower concentrations. However, CCCSN concentrations at 2.5 and 5 g/L can completely

inhibit the growth of all three blue stain fungi. The mechanism is still under investigation. The research indicates that the proper formulation of CCCSN has a potential to improve tree and forest health and pest resistance.

POSTER PRESENTATION ABSTRACTS

P-1

Predictive model for the survival and growth of *Salmonella Typhimurium* DT104 on shrimp

Michline Brice

University of Maryland Eastern Shore

Salmonella is a leading cause of gastroenteritis and is often isolated from various foods such as eggs, poultry, and seafood. *S. Typhimurium* is one of the serotypes that cause 20% human infections and 50% of human deaths. Predictive modeling is a field of study that combines microbiology, mathematics, and statistics to develop models which can describe and predict the growth of microbes under environmental conditions. The purpose of this study is to develop a predictive model for survival and growth of *S. Typhimurium* DT104 on shrimp with native flora. For the development of the model one gram shrimp samples will be inoculated with 0.85 log of *S. Typhimurium* DT104 and stored at designated temperatures 15-50°C for eight hours. Most probable number and colony forming unit values will be combined among storage trials, graphed as a function of time, and expressed as logarithmic numbers. For model development, General Regression Neural Network and Monte Carlo simulation Model will be used to simulate graphs on the progress of the growth of the pathogen. Model performance will be evaluated by calculating prediction bias and accuracy factors that are either mean or median relative errors. For validation, we will conduct the same methodology and compare to different species of shrimp in between temperatures. Once the model is found to provide valid predictions, it can be evaluated for its ability to interpolate and extrapolate. The results of this study will be valuable tools for food safety to predict responses of pathogens that are not yet investigated.

P-2

The use of the Tree Radar Unit (TRU) to determine root growth habit, root architecture, and decline of live oak (*Quercus virginiana*) trees on the Campus of Southern University

Chris Chappell, A. Johnson, and K. Barber

Southern University and A&M College, Agricultural Research and Extension Center

Southern University and A&M College is located on Scott's Bluff overlooking the Mississippi River in the northern section of the City of Baton Rouge, Louisiana, encompassing 512 acres. One of the most dominant tree species on the campus is the Live Oak (*Quercus virginiana*) tree. However increased urban development and mismanagement has resulted in the decline of many of these beautiful trees. The Felton G. Clark Activity Center parking lot which was established in 1976 is the site of 110 Live Oak trees. The objectives of this study were to: 1. determine the effectiveness of TRU in

analyzing root growth beneath pavement and asphalt, 2. determine if constricted root spacing, due to pavement, play a role in live oak tree decline at Southern University, and 3. determine if live oak roots are extending beneath the paved area. Concentric circles were drawn around the base of four randomly selected trees at one, two, and three feet from the base. Scans using the TRU were taken between each of the circles around the base of the tree. A straight line scan was also taken along pavement. Results indicated that at depths between 0.0 to 16.0 inches, there was considerable root growth however little root growth extended beyond this depth. Results also indicated that roots did extend under pavement to a depth of at least 12 inches. Results also showed that the TRU was very effective at analyzing root growth beneath pavement; however in several instances belowground obstructions distorted the data.

P-3

Quantitative detection of bacterial species from fish using real time PCR

Christopher Donald and J.L. Lee

Delaware State University

Quality control of fishery products is a fast growing concern domestically as well as internationally. Several bacterial species reported such as *Pseudomonas* and *Shewanella* spp. were reported to make results in fish spoilage at iced or refrigerated storage. Other gram negative and positive organisms such as *Vibrio, Bacillus, Micrococcus, Clostridium, Lactobacillus* and *Corynebacterium* spp. can also be isolated in varying fish. Spoilage of fish products is major caused by increasing microbial population during processing, transporting and displaying. In order to assess quality of fish products, development of a rapid method to quantify total and spoilage viable bacteria derived from fillet fish will be studied by using the multiplex real-time PCR. In this study, the real-time PCR is applied to the detection of the multi-target genes by primers and specific probes (TaqMan Probe) with different fluorescence dye labels. Universal primers and probes for amplification of a highly conserved bacterial 16S rDNA sequences and specific primers and probes for amplification of targeted genes will be utilized to enumerate total bacteria and spoilage bacterial spp. respectively. This methodology could be used in private sectors and seafood industry for monitoring fish products to eliminate potential risks.

P-4

Monitoring of nitrogen status in egg plants by chlorophyll meter

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North Carolina A&T State University

Vegetables are cash crops and need high level of nitrogen (N) some farmers apply N fertilizer, animal manure and organic wastes without a soil test that results in excess N in the soil. N leaches to ground water in the form of nitrate and it also enters surface water through run off causing water pollution. Nitrate-nitrogen (N03- N) contamination of groundwater and surface water sources continues to be a major concern throughout the USA. These concerns are greatest in areas where groundwater is close to the soil surface. Monitoring of N status in vegetable crops is very limited and there is no information on relationship between leaf N and chlorophyll readings for eggplants and the utilization of chlorophyll meter. A model was developed to predict the N content of the crop by the use of Chlorophyll Meter CM 1000 as follows:-

Hansel eggplants grown in rotation with a cover crop
$Y = 3.946 - 0.002 X$
The regression is the negative linear
Hansel eggplants grown with no cover crop
$Y = 1.096 + 0.006 X$
The regression is positive linear
The following are the models for N prediction by using CM 1000 chlorophyll Meter
$Y = 3.946 - 0.002 X$
$Y = 1.096 + 0.006 X$
Where:
Y is the % nitrogen of the leaf
X is the leaf chlorophyll reading by CM 1000 chlorophyll Meter

P-5

The effects of manganese nutrition on longleaf pine seedling growth, appearance, and physiology

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Southern University Agricultural Research and Extension Center

In Louisiana, forests cover 48% of the state's land area (14 million acres) and forestry is the states second leading manufacturing employer and the leading crop grown in the state. In recent years, loblolly and longleaf pine forests on isolated sites in AL, GA, FL, and NC with resource deficiencies have shown signs of poor crown health, and root disease. Poor crown health and root disease often occur when foliar Mn is elevated, these

negative effects are often alleviated by calcium and magnesium. The objectives of this study were to investigate Long Leaf pine seedling responses to three nutrition treatments. (1) Control (C)- adequate macro- and micronutrient nutrition; **(**2) Imbalanced (I)- adequate nutrition with elevated Mn but not elevated Ca and Mg; and **(**3) Balanced (B)- adequate nutrition with elevated Mn and elevated Ca and Mg. Preliminary results after 12 weeks of treatment indicate that for the first flush Mn concentrations averaged 30 ppm for the (C) treatment and 100 ppm for the (B) and (I) treatments. Seedling appearance after 16 weeks of treatment indicated that there was a trend for the (B) and (I) treatments to cause some flush abnormality and fascicle chlorosis. Net photosynthesis and foliar chlorophyll concentrations were not affected by the treatments after 16 weeks. After harvesting, the relationships between foliar Mn, Ca, and Mg concentrations and growth and physiology will be assessed. This information will lead to a better understanding of how elevated Mn affects long leaf pine and how Ca and Mg alleviate these affects.

P-6

Study of the effects of *Listeria monocytogenes* on the native microflora in teewurst sausage using PCR-DGGE

Ar'Quette Grant

Delaware State University

Teewurst is a soft, spreadable, sausage made from beef and pork products usually served with tea; it is labeled as either uncooked or cooked, with the former of the two being raw. The connection with food born outbreaks and teewurst is well documented; being cited as a source for illnesses associated with *E. coli*. Considering the moisture content and the pH, teewurst favors microbial growth, which makes it an ideal environment to study the behavior of *Listeria monocytogenes*. The purpose of this research project is to examine the effects of *L. monocytogenes* on the native micro-flora in teewurst sausage at abuse temperature, 10°C, using polymerase chain reaction denaturing gradient gel electrophoresis (PCR-DGGE). PCR primers amplifying the V3 region of the 16S rDNA showed a 200-250 base pair product that was able to be evaluated with DGGE. Subtle differences were noted between the control groups, which were not challenged with *L. monocytogenes*, and test groups, which were challenged with *L. monocytogenes*. This study is currently in the process of amplifying the extracted DNA via PCR and analyzing these products by DGGE. Microbial communities will then be analyzed for microbial shifts over the sampling period and DNA bands of interest will be excised and sequenced for species identification specificity.

P-7

The impact of wild birds and farm management on *Campylobacter* and *Salmonella* in small ruminants

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Wild-birds are potential sources of enteric disease infections in farm animals. This study was designed to evaluate the potential pathways and control of foodborne pathogen transmission between wild-birds and farm animals. At two farms, a total of 14 one-acre pastures were fenced to each host 12 sheep and goats. For the control group, pastures were set-up with open water tubs and grain pans to feed animals and attract wild birds. In contrast, the treatment group used nipple-waterers and custom feed pans. Fecal and water samples were taken every two weeks in May-June and October-November for two years. The samples were analyzed for the presence of *Salmonella* and *Campylobacter* using selective plating, immunoassays, and/or biochemical confirmation techniques. From small ruminants and captured wild birds, respectively, 2880 and 440 fecal samples were collected for pathogen detection. *Campylobacter* spp. were found in 5.0 and 8.2% of the fecal samples from small ruminants and wild birds, respectively. *C. jejuni* was isolated from 86 and 97% of corresponding positive samples. *Salmonella* spp. were only found in 0.9% of feces from small ruminants and 0.2% of wild birds. However, the pathogens were not found in any water samples. Although wild birds seem to be more attracted to the feeding areas in some pastures with open water tubs and grain pans in autumn, there was no significant difference in pathogen prevalence between control and treatment animal groups when analyzed by season or location. Pathogens isolated during this study were preserved for further characterization and evaluation.

P-8

Effect of shitake mushroom extract on viability of probiotics in milk during refrigerated storage

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Probiotic bacteria are live microorganisms that when administered in adequate amount confer a health benefit on the host. Dairy foods containing probiotics have been used for preventing various types of diarrhea and gastrointestinal diseases. Probiotics are very essential to a strong immune system, and they are encouraged to grow by certain carbohydrates. Shiitake mushroom (*Lentinus edodes*) contains antitumor oligosaccharides and polysaccharides, and might support the growth of probiotics bacteria. The objective

of this study was to determine the effect of shiitake mushroom extract on the viability of probiotics in milk during refrigerated storage. *Lactobacillus reuteri* CF2-7F, *L. reuteri* DMS 20016, *Bifidobacterium breve* and *B. adolescentis* were individually inoculated into skim milk added with different concentrations of mushroom extract (0%, 1%, 2%, and 4%) and stored immediately after inoculation at 4 °C for 28 days. Aliquots were withdrawn at 7-day interval to check bacterial population, pH and titratable acidity of the milk samples. Results showed that the viability of tested strains was significantly higher in milk sample supplemented with shiitake mushroom extract ($p<0.05$). All tested strains demonstrated culture stability upon refrigerated storage and exhibited no significant loss of viability during storage conditions for 14 d. Cultures showed reductions of 2 $\log_{10}$ viable cells from an initial mean of 10^{9} /ml after 28 d of storage only. Samples had a mean initial pH of 6.5 and titratable acidity of 0.16. Both pH and titratable acidity showed negligible change at 4°C during the 14-d storage. Our results suggest that shiitake mushroom extract can be used as a natural additive to dairy products to improve the viability of probiotics during commercial refrigerated storage and to improve the health of consumer.

P-9

Sensitivity of lactic acid bacteria as a biomarker to detect toxins in milk

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Poor level of biosecurity in dairy farms creates the possibility of intentional contamination of milk with toxins, which could lead to potentially devastating effects on human health. Most of the existing methods to detect toxins in milk are expensive and time consuming. Thus, there is an urgent need for developing simple on-farm techniques that can detect toxins in raw milk. The objective of this study was to determine if lactic acid bacteria (LAB) could be applied as a biomarker to detect the presence of rodenticides in milk. Serially diluted rodenticides were added to tubes containing MRS broth and five commercial yogurt cultures (A, B, C, D, and E), and then incubated at 37 °C, 40 °C, and 42 °C for 6 hours. The optical density (OD) of the broth was recorded at 2, 4 and 6 hour intervals. All of the yogurt cultures showed highest sensitivity to diphacinone at 0.005 mg/ml. Yogurt cultures C, D, and E showed detectable sensitivity to brodifacoum at 0.02 mg/ml, whereas A and B showed detectable sensitivity at 0.04 mg/ml and 0.01 mg/ml respectively. All the cultures were sensitive to bromadiolone at 0.04 mg/ml except D (0.02 mg/ml). Results indicate that LAB could be used as biomarker for the early detection of rodenticides in milk.

P-10

Antibacterial activity of xoconostle (*Opuntia matudae*) against *E. coli* O157:H7

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Antimicrobial agents, including food preservatives and organic acids, have been used to inhibit foodborne bacteria and extend the shelf life of processed food. Many naturally occurring compounds found in edible and medicinal plants, herbs, and spices have been shown to possess antimicrobial functions and could serve as a source of antimicrobial agents against food pathogens. Xoconostle (*Opuntia matudae*) has recently attracted the food industry attention. Xoconostle has demonstrated strong anticancer, antimicrobial and antioxidant characteristics due to the phenolic compounds; therefore, the objective of this study was to investigate the antibacterial activities of xoconostle pears against *Escherichia coli* O157:H7. Xoconostle fresh fruits were obtained from a local store in Greensboro, NC. Four strains of *Escherichia coli* O157:H7 was tested with disc diffusion assay and growth over time assay. This experiment was replicated three times in a randomized block design. Results showed that the average minimum inhibitory volume (MIV), the lowest volume that inhibit growth, was 327µl/ml (V/V) and the average minimum lethal inhibition volume (MLV), the lowest volume that shows significant growth inhibition within three days of incubation, was 550µl/ml (V/V). Bacterial population in control reached 8-9 log CFU/ml, while the addition of 10% xoconostle extract caused the bacterial population to remain within 3-4 log CFU/ml. These results indicated that Xoconostle has potential antibacterial effects against the growth *Escherichia coli* O157:H7. Xoconostle can be efficient substitute to artificial antibacterials and can mitigate food safety risks.

P-11

A pathophysiological assessment of heavy-metal exposed *Pisum sativum*

Tanganika Johnson

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This project was designed to determine the uptake of lead chloride ($PbCl_2$) by marvel peas (*Pisum sativum*) and to determine its ability to be used for phytoremediation. Phytoremediation is an environmental technology that uses plants to remove contaminants from soil and water based on the plant's natural extraction processes. Peas were chosen because they are readily consumed by humans and if $PbCl_2$ is sequestered in its tissue, it may pose a great risk during consumption. We hypothesize two things: 1) peas will uptake $PbCl_2$ by one of the processes of phytoremediation; 2) lead exposure will cause pathophysiological and DNA damage in the plant's cells. Lead is a naturally

occurring heavy metal that is ubiquitous, but biologically non-essential, it is seldom found in its elemental form and causes major heath affects in children in urban and residential areas. The objectives of this project are to: 1) determine the toxicity of lead chloride on peas by exposing the seeds to varying concentrations of lead chloride (0.1-1000 ppm); 2) determine the uptake of lead chloride by peas by determining the concentration of lead in its tissues (leaves, stems and roots) by Atomic Absorption Spectrometry (AA) analysis; 3) determine the pathophysiological changes occurring in plant tissues by histological examination; 4) determine DNA damage to the plants by comet assay analysis; and 5) determine if these plants poses the gene for hyperaccumulation by molecular analysis of plants. The results of this study showed that *Pisum sativum* is capable of uptaking PbCl2 and sequestering it in its tissue, as well as showing pathophysiological changes in the plants tissues in response to uptake of lead chloride. As a result there was damage to the peas DNA. The results of this study also show that a gene that is not present in the control plants is present in higher concentration that may be responsible for heavy metal uptake by *Pisum sativum* once identified. Due to the fact that these pea plants uptake lead chloride they may pose a problems to human health if contaminated plants are consumed by humans.

P-12

Study of antimicrobial activity from plant leaves on bacterial species

Talaysha Lingham

Delaware State University

Antimicrobial properties derived from plant leaves have been reported in articles from other research groups. They exhibited antibiotic activity using several bacterial species. It is commonly known that some plant leaves that contain phytochemicals have these antibiotic properties. In this study, other plant species will be studied to explore new antimicrobial elements from the plant leaf. The purpose of this research is to study the antimicrobial activity from plant leaves on various bacteria species and apply natural antimicrobial components to foods in order to improve shelf life and safety. As a preliminary study, the crude extract of the plant leaf will be tested on several pathogens. Components of the plant leaf will be separated and each compound will be tested using the zone of inhibition and MIC test. The component that exhibits the antibiotic property will be isolated and identified by using TLC and NMR. In addition, the characterization of the antimicrobial activity will be analyzed using molecular biological assays. The plant leaf in this study could be used as a substitute antibiotic and low-cost natural ingredient in food industries.

P-13

Study of bacterial species isolated from fish

KaLonna Maull

Delaware State University

Spoilage bacteria on iced and refrigerated fishery products are well known to increase during storage time and temperature. Therefore, the quality and safety of seafood is the major concern of processors, quality control authorities, fishery markets and finally consumers. Several spoilage bacteria, such as psychrotolerant bacteria (*Pseudomonas* spp. and *Shewanella* spp.) are known for major microbial growth when they metabolize on seafood. This results in the production of trimethylamine (TMA) with unacceptable off-flavors. The aim of this study is to identify and evaluate isolated bacteria from a catfish species. Catfish fillets will be stored at 4˚C for 1-2 weeks; the candidate *Pseudomonas* spp. and *Shewanella* spp. will be isolated onto selectable plates during storage periods. Then bacterial identification and the cluster analysis from catfish will be achieved through biochemical assay, 16S rDNA sequencing, and protein electrophoresis respectively. By determining specific species of bacteria contributing to catfish spoilage, this research could give seafood companies and consumers significant information in understanding, deferring and even preventing microbial degradation on fishery products.

P-14

Use of bacteriophage to control *Salmonella Typhimurium* in laboratory media

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North Carolina A&T State University

Recent outbreaks of *Salmonella* spp. have raised more concerns about the safety of food products and accelerated research on different measures to eliminate such a foodborne pathogen. Bacteriophages can be considered as natural enemies of bacteria, and therefore, are logical candidates to control foodborne pathogens, such as *Salmonella*. This study investigated the effect of bacteriophage treatment on the survival of *Salmonella Typhimurium* (ST-1984) in a liquid media. ST-1984 was cultured in Brain Heart Infusion (BHI) media overnight. Fresh BHIs were inoculated with ST-1984 (4 log CFU/ml). A *Salmonella*-specific bacteriophage cocktail (STP-102) was added at 7 log PFU/ml into BHI tubes containing ST-1984. All tubes were incubated at 4 and 10°C for 48 h. The efficacy of STP-102 phage cocktail against ST-1984 strain was determined by enumerating ST-1984 cells on XLT4 media after 30 min, 2 h, 24 h, and 48 h. Bacteriophage treatment significantly ($P \leq 0.05$) reduced the growth of ST-1984 by 3 log compared to control samples incubated at 10°C after 30 min and 2 h. The effect of STP-102 cocktail was tapered off after 24 and 48 h. At 4°C, a 3 log reduction was achieved at

all incubation times. The results of this study indicate that *Salmonella*-specific phage cocktail (STP-102) used in this study is highly effective in inhibiting the growth of ST-1984 in liquid media at 10 and 4°C.

P-15

Summer squash in rotation of canola for biofuel

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North Carolina A&T State University

During the summer of 2010 at North Carolina Agricultural and Technical University research farm an experiment was established to evaluate the effectiveness of yellow squash and zucchini (Cucurbitaceae family) for use as a rotation crop with canola being utilized for biodiesel. *Cucurbita pepo* L. commonly known as summer squash can be an excellent fast producing marketable vegetable for farmers that are in the process of crop rotation. Canola and summer squash could be alternatives to supplement the loss of income farmers have suffered from in North Carolina due to the loss of tobacco industry. Summer squash was planted in July between canola harvest and planting dates. A Split Plot design was utilized to determine the effectiveness of various fertilizer treatments. There were 32 plots split into 4 replications each replication had 4 plots of each variety randomly selected for the 4 treatments. The plots were prepared with raised beds and black plastic mulch with drip line irrigation. Different fertilizer treatments were tested to evaluate their effectiveness for crop yield. The treatments were based on different rates of fertilizer which consisted of No Fertilizer, 50 %+ Biofertilizer, 100%, 100% + Biofertilizer. Two varieties of the Cucurbitaceae family were used, yellow crock neck squash and zucchini. The highest yielding treatment and variety belonged to yellow crook neck squash with 100% fertilizer recommendation. Based on the results using 100% recommended dose of fertilizer along with a bio-fertilizer did not so any difference in yield compared to the other treatments.

P-16

Detecting citrus trees in urban environments using multispectral analysis

Brian Mims

Southern University and A&M College

The Louisiana citrus industry is valued at 6 million dollars. Plant diseases are a major constraint to the state's citrus industry by reducing yield and quality of fruit. Citrus is also grown in homeowner's yards in urban environments. High consequence citrus diseases such as citrus greening (*Candidates liberibacter* spp.) and canker (*Xanthomonas*

axonopodis) can occur in urban environments and potentially spread to commercial orchards. Currently control measures include eradication diseased trees and quarantine of infected areas. Federal and state regulatory agencies search for host trees by windshield surveys. The objective of this project is to evaluate the feasibility of using multispectral analysis and high resolution aerial photo and satellite images to pin point the location of citrus trees in urban environments to enhance the planning of survey activities. The optical properties of leaves of two citrus species navel orange (*Citrus sinensis*), and satsuma mandarin (*Citrus unshiu* Marc.) along with leaves of live oak (*Quercus virginia*), and red tip (*Photinia fraseri*) were analyzed. Leaves were collected from the Southern University Horticultural Farm, Baton Rouge, LA and sent to the USDA ARS Hydrology and Remote Sensing Lab Beltsville, MD for analysis. Leaves were analyzed using the ASD FieldSpec Pro Spectroradiometer. Preliminary results show difference in leaf reflectance among the various citrus species and ornamentals tested. Navel orange at a wave length of 957 nm had a percent reflectance of 61.1 % compared to red tip with 51.4%. Additional studies are underway to further refine the detection of citrus in urban environments.

P-17

Screening Gulf Coast forest species for susceptibility to *Phytophthora ramorum*

Jason Preuett

Southern University and A&M College

Phytophthora ramorum, the causal agent of sudden oak death is a new and emerging pathogen of California oak woodlands which poses a threat to woody plants in the rest of the nation and the US Gulf Coast area is a high threat location. Several plant species native to the Gulf Coast forest was tested for reaction to *P. ramorum*. The species tested included: yaupon (*Ilex vomitoria*), spice bush (*Lindera benzoin*), Southern magnolia (*Magnolia grandiflora*), sweetbay magnolia (*Magnolia virginiana*), black willow (*Salix nigra*), baldcypress (*Taxodium distichum*), Virginia creeper (*Parthenocissus quinquefolia*), and Eastern baccharis (*Baccharis halmifolia*). This study was conducted at the USDA ARS Biosafety containment greenhouse facility at Ft. Detrick, Maryland. Foliage of the test plants were inoculated with 50,000 zoospores per milliliters with 3 replications per plant species. Inoculated plants were placed in a dew chamber at 20^{o}C for days 4 days. After this incubation period the leaf lesion areas were assessed for disease. Yaupon and Southern magnolia appeared to be susceptible to *P. ramorum*. Yaupon was determined to have an average lesion area percentage of 27.86 for the inoculated plants compared to the control containing 0.13 percent. Southern magnolia was found to have an average lesion area percentage for the inoculated plants was 32.06 compared to the control containing 0.56 percent. Sweetbay magnolia was determined to have an average

lesion area of 8.36 compared to the control percentage of 0.33. The research will continue to analysis additional Gulf Coast forest plant species for reaction to *P. ramorum*.

P-18

Identification of small RNAs in common bean (*Phaseolus vulgaris* L.) from 454 transcriptome sequencing

Yaqoob Thurston, Z. Liu, and V. Kalavacharla

Delaware State University

Common bean (*Phaseolus vulgaris* L.) is an edible bean initially cultivated more than 7000 years ago in Central and South America. Over time, common bean has proven to be a low cost source of protein that is nutritionally and economically important. Common bean is worth $600 million and is a major source of fiber to the U.S. Compared to most plant genomes, common bean is relatively small-600 mega base pairs (Mbp); making it a good model species for studying sequence organization and evolution of the legume family. MicroRNAs in plants are known to play a major in development, nutrient homeostasis, abiotic stress and pathogen responses via interactions with specific target mRNAs. MicroRNAs are well conserved in eukaryotic organisms and are thought to be a vital and evolutionarily ancient component of genetic regulation. In this study, we analyzed our 454 sequences derived from transcriptome sequencing to identify candidate microRNAs. Our analyses show that three sequences carried signature hairpin stem loops. Using a combination of computational (mfold software, and mirBase database), evaluation against published microRNA criteria, and current experimental approaches, we are validating expression of these microRNAs.

P-19

Effects of agricultural and industrial byproducts on collard yield in lead contaminated urban soils

Alexander Wooten

University of the District of Columbia

Lead (Pb) has been used to produce materials and manufactured products for many years. In urban areas and industrial centers atmospheric lead deposition could be very high. Urban environments in general received high deposition of lead due to leaded gasoline use, industrial activity and abandoned resident lots with history of lead paint use. There is concern of possible human Pb toxicity from consuming crops grown in urban gardens. Lead will impair psychological and neurobehavioral functions in human. Remediation of lead contaminated soils by conventional methods is expensive. Use of low cost

environmentally safe amendments for in situ fixation of lead contaminated soil would be less expensive. In situ lead fixation does not reduce the total concentration of soil lead but changes its speciation, thus rendering it less toxic and bio-non-available in the eco-system. In our study, four by-products; poultry litter ash; water treatment residual; steel slag high and leaf compost that were high in phosphate, aluminum, iron, magnesium and organic matter were used. Soils used were collected from three urban locations: Ft. DuPont National Park, Washington, DC and Baltimore City, with averaged total lead of 38, 1099 and 1088 mg kg^{-1} respectively. By-products and soils were mixed at three rates and incubated for three weeks. Collard were planted and grown for 60 days. Averaged over byproducts and rates, collard grown on the Baltimore soil had the highest yield followed by D C and Ft DuPont respectively. Averaged over soils, collard grown on the water treatment residual had the highest yield.

P-20

Use of trap cultures and molecular tools to identify mycorrhizal (AMF) species associated with Appalachian black cohosh and ramps

Harriet Wynn

Virginia State University

Black cohosh (*Actaea racemosa*) and ramps (*Allium tricoccum*) are plants of economic importance native to the Appalachian ecosystem. These species thrive on the forest floor by adjusting growth patterns to seasonal variation in canopy density, and by taking advantage of symbiotic relations with beneficial organisms including arbuscular myxorrhizal fungi (AMF). A poster will be presented to outline a proposed approach for isolating AMF associated with ramps and black cohosh by use of trap plants, and followed by species identification with the help of molecular tools and published genomic databases.

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FEBRUARY 10-11, 2011

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Acknowledgements

This symposium was organized by the Leadership Advisory Committee of the Beltsville Area Diversity Taskforce with the dedication and support of a multitude of individuals affiliated with the Beltsville Area

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Committee

Special Emphasis Committee

U.S. National Arboretum

Moderators
Dr. Ramon Jordan
Dr. Joan Lunney

All the Beltsville Area Scientists that served as mentors during this event

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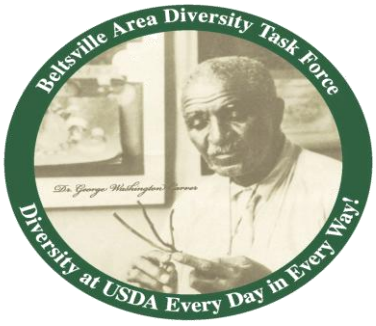
Speakers
Dr. Robert Davis
Mr. Farook Sait

Acknowledgements



Symposium Organizing Committee

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Eton Codling
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Thank You

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