FAMU-CAFS

Center for Biological Control Newsletter

Florida A&M University

College of Agriculture and Food Sciences

Tallahassee, FL 32307

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The CBC Enters a New Phase

Norman C. Leppla
CBC Advisory Council, Chair

The Florida Agricultural and Mechanical University (FAMU), Center for Biological Control (CBC) was established in 1999 under the administrative leadership of Dr. Bobby Phills, Dean and Director, Land-Grant Programs and Dr. Charles O'Brien, Professor and Director, CBC. From its inception, the CBC was envisioned as a tripartite partnership among FAMU; the USDA, Animal and Plant Health Inspection Service (APHIS); and USDA, Agricultural Research Service (ARS). Consequently, based on the objectives and investments of these organizations, APHIS and ARS appointed Co-Directors, Dr. Kenneth Bloem and Dr. Stuart Reitz, respectively. The founding mission of CBC was "to collaborate with governmental agencies, academic institutions and the private sector to improve agriculture through research, teaching and extension in biological control." Priorities during the first approximately five years were to secure the necessary funding, staff and facilities to conduct important research projects, establish a superior graduate academic program, and enlist additional collaboration and support. Broad-based research was conducted on insect systematics, vegetable insects, invasive insects, and aquatic weeds. From the beginning, the CBC was envisioned as a premier 1890 Land Grant program intended to deliver one of the best opportunities for minority students to obtain solid educations clearly leading to fulfilling employment. The emphasis was on biological control of insects and weeds within the broader context of integrated pest management.

Vegetable production in the mountains near Kenscoff, Haiti

Building on the accomplishments of the first phase, CBC establishment, Dr. Moses Kairo served as the second director beginning in 2005 and led the next period with an emphasis on program development. His vast global experience in biological control and integrated pest management enabled CBC to increase its international projects during his tenure. He articulated a shared vision for the CBC in a comprehensive strategic plan and led for a very productive approximately 6-year period during which many of its objectives were achieved. Highlights of CBC accomplishments included significantly strengthening the diverse research program, substantially expanding the education component by attracting and supporting a sizeable number of excellent students, obtaining prestigious center of excellence status for

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Dr. Lambert Kanga
Professor/Interim Director, FAMU-CBC

Dr. Suzie Legaspi
Co-Director, USDA-ARS-CMAVE-CBC

Dr. Robert Taylor
Dean
College of Agriculture and Food Sciences

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Editor: Dr. Raymond L. Hix
Raymond.Hix@FAMU.EDU

Contact Details
FAMU:
Tel. (850) 561-2216
Fax. (850) 412-7263

USDA-ARS:
Tel. (850) 656-9870
Fax. (850) 656-9808

Outlook for Optimism with Growth, Challenges and Changes

Dr. Lambert Kanga

The Center for Biological Control (CBC) continues to grow and excel in its mission, while facing significant challenges following the departure of the Director and Co-director of the Center and the arrival of a new Dean of the College of Agriculture and Food Sciences, Dr. Robert W. Taylor. We welcome Dean Taylor and thank him for his unconditional support for the Center. We also take this opportunity to thank Dr. Moses Kairo for his excellent leadership of the Center and wish him great success in his new position. During his tenure as Co-director of the Center, he shared his vision in a comprehensive strategic plan and led a very productive period based on its objectives. Dr. Stuart Reitz, one of the Co-directors, shared leadership for the center and was responsible for much of its success. Dr. Reitz prefers to operate quietly in the background but has been very effective in advancing the Center. We also welcome the Interim Director, Dr. Lambert Kanga and the Co-director, Dr. Jesusa Legaspi; both of them have substantial experience in leadership and have been very instrumental for the success of the Center over the last 10 years. Thus, we look to the future with optimism.

With reductions in the budget and human resources, the CBC continues to refocus its programs to better serve its clientele and strengthen its collaborative linkages with the United States Department of Agriculture (USDA)-Agricultural Research Services (ARS) and the Animal and Plant Health Inspection Service (APHIS) partners and international collaborators. This initiative has been very rewarding as the CBC continues to gain worldwide recognition.

The Center has developed a biologically-based control strategy for the two major pests of honey bees, the Varroa mite and the small hive beetle. It plays a key role in offshore mitigation of destructive invasive species such the red palm weevil in the Caribbean (a high risk threat to US Agriculture). The Center provides data to be used for limiting the expansion and possibly eradicating the invasive cactus moth in the US and Latin America. The Center has designed push-pull strategies for silverleaf whitefly management which include integration of plant-based repellents, trap cropping and natural enemy attractants.

Dr. Jesusa Legaspi

Other research provides practical IPM strategies for Florida vegetable producers and many others accomplishments.

The Center continues its support of academic programs as it carries more than half of the graduate student population in the College of Agriculture and Food Sciences. In 2012, nine (9) students in the Center graduated with a Master of Science degree. Currently there are nineteen (19) students including three Ph.D. students in the cooperative program with the University of Florida.

As we move into 2013, the CBC has started to plan for the next five year-period of the strategic plan by holding a very productive retreat. The major priorities in the coming year are (a) the construction of a building to combine the expertise of the Entomology Program, the CBC, the USDA-ARS and USDA-APHIS partners, (b) the growth in the portfolio and breadth of research projects and issues addressed and (c) the filling of vacant positions.

We thank you for continued support, we remain confident and enthusiastic. We are extremely grateful to our various partners and funding agencies, especially ARS and APHIS, and look forward to another productive year.

The CBC Enters a New Phase (cont. from page 1)

CBC from the Florida Legislature, considerably improving funding support, and greatly increasing the visibility of the Center nationally and internationally. In cooperation with the FAMU entomology program from about 2001 through 2012, the CBC produced 39 Bachelor of Science and 29 Master of Science graduates, 60% being U.S. minorities. A total of nine Ph.D. students are either enrolled or have graduated from the joint FAMU-UF entomology program. The number of faculty members reached nine before declining to five in 2012 and concomitantly the number of grants soared from 3 to more than 20. CBC received the prestigious “Friends of IPM Award” from the Southern Region IPM Center, 13 students were recognized with “W. Peters Memorial Scholarship Awards” from the Capelouto Foundation, the Debate Team coached by Dr. Raymond Hix won second place overall at the 2012 Entomological Society of America national conference, and Dr. Lambert Kanga received the “FAMU Researcher of the Year Award.”

In December 2012, Dr. Kanga, the Interim Director, and Dr. Jesusa Legaspi, the locally appointed ARS Co-Director, organized a retreat to begin planning for the third phase of CBC. The FAMU and USDA partners remain committed to the success of CBC relative to their different organizational missions, FAMU being the only one with a specific educational responsibility. The USDA, APHIS is a regulatory agency and ARS conducts agricultural research. Because of these complimentary and somewhat overlapping missions, and the interests and extraordinary cooperation of the faculty, staff and students, CBC remains exceptionally productive. Unfortunately, however, many of the challenges remain from the previous resource acquisition and program development phases. It is critically important to fill vacant faculty positions as soon as possible, at least those of the previous CBC Director and APHIS and ARS Co-Directors. Within the next two years, the CBC program should be adequately housed in joint FAMU and USDA facilities, ideally including a plant quarantine facility. Appropriate staffing and facilities will be required to attract an outstanding new CBC Director who can advance the existing excellent research, teaching and outreach activities. Additional goals for the immediate future include increasing the national and international recognition of CBC as a center of excellence, strengthening partnerships and collaborations with stakeholders, and attracting the best students and producing high caliber graduates who will make significant contributions to agriculture and society.

Research & Outreach News

50th Anniversary Celebration of the USDA-ARS CMAVE

On August 29, 2012, administrators and a team of scientists in the College of Agriculture and Food Sciences (CAFS) at Florida A&M University (FAMU) joined a special celebration observing 50 years of service to higher education and scientific research through the Center for Medical, Agricultural and Veterinary Entomology (CMAVE), which is a part of the United States Department of Agriculture (USDA)- Agricultural Research Service (ARS). Robert W. Taylor, Ph.D., Dean and Director of Land Grant Programs (FAMU-CAFS), and administrators and scientists in the college participated in the 50th Anniversary Symposium of the CMAVE in Gainesville, Florida. FAMU-CAFS was represented by Oghenekome Onokpise, Ph.D., Interim Associate Dean-Academic Programs; Lambert Kanga, Ph.D., Professor and Interim Director, Center for Biological Control (CBC); Jesusa Legaspi, Ph.D., Entomologist, USDA-ARS CBC; Stephen Hight, Ph.D., Entomologist, USDA-ARS CBC; and Muhammad Haseeb, Ph.D., Entomologist, FAMU CBC.

The event was a day of historical reflection on the contributions of the CMAVE to the agricultural industry and other stakeholders. The ceremony was organized by Dr. Ken Linthicum, Director, and the CMAVE team. Guest speakers who presented historical perspectives, current challenges and opportunities in agricultural research in Florida and beyond included the following: Captain Mark Beavers, Director, Armed Forces Pest Management Board, Department of Defense; Dan Strickman, Ph.D., National Program Leader for USDA-ARS; Tom Holt, Ph.D., Director, Division of Animal Industry, Fla. Department of Agriculture and Consumer Services (FDACS); David Dame, Ph.D., CMAVE Scientist (Retired); Cliff Lofgren, Ph.D., Retired CMAVE Research Leader; Robert Meer, Ph.D., CMAVE Research Leader, John Sivinski, Ph.D., CMAVE Research Leader, and Ken Linthicum, Ph.D., CMAVE Center Director. Taylor stated that, “FAMU plays an important role in the development of academic and professional research, and also promotes further cooperation and collaboration with viable partners like USDA (ARS-APHIS), the Florida Department of Agriculture and Consumer Services (FDACS), University of Florida/Institute of Food Sciences (UF/IFAS), private industry and many significant stakeholders through the efforts of the outstanding scientific team in the Research Division of our College.” Taylor met with all cooperators and collaborators to discuss projects of mutual interest. He also provided full support to strengthen the relationship between the FAMU Center for Biological Control (CBC) and the USDA-ARS CMAVE, which began in 1999.

The FAMU CBC team expressed, “Our 13-year partnership with CMAVE is second to none. The future looks even brighter as we work to produce young scientists adept with necessary skill and knowledge needed for discovering new approaches using biological and integrated pest management techniques to enhance farmer profitability and environmental stewardship.” Since its inception, the CBC research team has jointly conducted several research projects with the scientists of the USDA-ARS CMAVE to carry out basic and applied research work related to pest management. The FAMU Center for Biological Control (CBC) conducts research, academic, extension and outreach work aimed at managing established and invasive pests on crops, stored products, forests, livestock and humans. As a result research efforts of the CBC, FAMU obtains approximately $650,000 per year, which supports students, faculty and staff in scientific undertakings.

The CMAVE work emphasizes both control and prevention. Effective prevention depends on developing rapid, sensitive methods for detection and surveillance. All research includes a basic component, and the CMAVE greatly utilizes biological and integrated pest management (IPM) tactics that put less pressure on the environment and are self-sustaining. Finally, all of the CMAVE scientists strive to be both sensitive to the needs of American agriculture and committed to transferring their discoveries to field as rapidly as possible. The CMAVE supports the CBC towards research projects of mutual interests, student academic research and trainings. The partnership developed over the years is very successful for projects of mutual interests.

(L-R) Muhammad Haseeb, Oghenekome Onokpise, Lambert Kanga, Stephen Hight, Ken Linthicum, Robert Taylor, John Sivinski and Abbie Fox.

What is buzzing!

In collaboration with Envera (Fungal Producing Company, West Chester, PA); Dr. Lambert Kanga has developed a biologically-based product that you can now use to control the two major pests (Varroa mite and the small hive beetle) which kill honey bees, the pollinators of our food crops. This fungal product kills the pests but not the honey bees, unlike chemicals this product does not contaminate the honey and honey products; it is safe for human consumption and has worldwide application in increasing healthy food production.

Offshore Studies on the Rice Stem Stink Bug *Tibraca limbativentris* (Hemiptera: Pentatomidae), a Potential Invasive Pest for U.S. Rice Growers.

Raymond Hix

In the past 20 years, two invasive stink bug pests of rice have been introduced into the U.S. *Oebalus ypsilongriseus* was reported in 1994; *O. insularis* was first reported in 2010. So far, *O. ypsilongriseus* and *O. insularis* do not occur in the rest of U.S. rice growing areas. *Oebalus species* feed on the developing grains reducing yield and quality. Quality reduction of the rice grain results when it is pierced and develops an area of discoloration. Called "pecky" grains by the industry, they are specifically counted in the grading process, and commercial lots of rice that have greater than 0.5% by weight of "pecky" grains cannot be designated U.S. No.1 rice. While lower grades have higher tolerances for this, it results in significant reduction in the value to the producer.

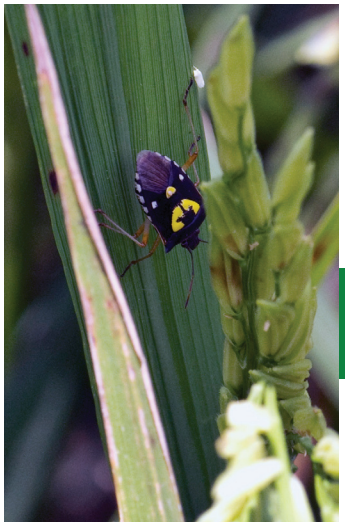
The rice stalk stink bug *Tibraca limbativentris* (Hemiptera: Pentatomidae) was introduced into the Dominican Republic. Unlike *Oebalus* spp which effect individual seeds, *T. limbativentris* feed on plants causing complete panicle loss during harvest affecting yield. While stink bugs are reported of agricultural significance in South America, few data are available on the economic importance and damage functions of *T. limbativentris* in rice. Growers in South America typically control it with various insecticides.

With the exception of a vector of a disease causing organism, *T. limbativentris* could be one of the worst insect pests in U.S. rice fields. U.S. rice growers don't normally monitor for *O. pugnax* before rice heading. The introduction of this insect would necessitate a change in sampling periods due to *T. limbativentis* feeding at the base of the plants in the vegetative stage causing "dead heart" and feeding during the reproductive stage causing "white panicle." Other economically important crops may be impacted by this alien species such as soybean, tomato, wheat, and native Gramineae.

Dr. Raymond Hix went to the Domincan Public and surveyed for *T. limbativentris*. He was accompanied by Mr. Enger German-Ramirez. Sweeps and searches were conducted in heading rice in the provinces of Monseñor Nouel (Bonao) and La vega on May 28; Duarte (San Francisco de Macorís) On May 29; and María Trinidad Sánchez (Nagua), and Valverde (Mao) Santiago de los Caballeros on May 30. Samples were taken to the I.D.I.A.F. Entomology Lab in Santo Domingo and quantified and sorted for shipment to the U.S.A. Six sets of 50 sweeps were done in each of 4 fields in each of 6 provinces. A 15" standard sweep net was used. During the sweeps, 3 people also searched the bases of plants etc. for *Tibraca*. Stink bugs collected in rice were stored in 90% ethanol for voucher material.

They found 19 adult and 2 *Tibraca* nymphs over the 3 days. These were found near Nagua and SFCO. The dominant stink bug in our sweeps and searches was *Oebalus ornatus*. *O. insularis, O. pugnax, O. ypsilongriseus* are reported from the Dominican Republic, but only 2 specimens of *O. insularis* were recovered in sweeps. The interesting thing was that our *O. ornatus* collections were adults with some egg masses found with a few hatching. This indicates that the fields in the rice have been sprayed with pyrethroids and may have been recolonized from neighboring fields and plants. *Tibraca* is apparently treated early in the year with *Beauveria bassiana*. Treatment with the fungal pathogen and the common spraying for *Oebalus* with pyrethroids could explain the relatively low numbers of *Tibraca*. From a smaller collection on May 3, 3 *Tibraca* and 8 *O. ornatus* were recovered near Higuay, and 1 *Tibraca* and 6 *O. ornatus* were recovered near El Seybo; on May 10, 5 *O. ornatus* were recovered near Bonao and 3 *Tibraca* and *O. ornatus* were recovered near Duarte (SFCO). Given that 2 species of *Oebalus* have been introduced into the U.S. since 1994, there is a potential risk of *T. limbativentris* being introduced given its current status in the Caribbean basin (North American Plant Protection Organization-Phytosanitary Alert System). While *Tibraca* is of concern as a potential invasive alien species in U.S. rice growing areas, *O. ornatus* should be given consideration.

The invasive *Tibraca limbataventris* the rice stem stinkbug recovered from heading rice in The Dominican Republic.



***Oebalus ornatus*, the ornate rice stink bug native to The Dominican Republic.**

Sweeping for stink bugs in Dominican Rice

Research & Outreach News

Saundra Wheeler Featured in the Winter Issue of A&M Magazine

Ms. Saundra Wheeler was featured in the Winter Issue of A&M Magazine regarding her research on the honey bee. Wheeler received a $10,000 Sustainable Agriculture Research Education Graduate Student Grant, which she uses to evaluate the efficacy of entomopathogenic fungi in controlling the small hive beetle.

USDA-ARS / FAMU-CBC and UFV, Brazil Enter Collaborative Research Program

Upon invitation by Dr. José Cola Zanuncio, Professor and Head of the Laboratory of Biological Control of Insects, BIOAGRO, Department of Entomology at the Universidade Federal de Vicosa (UFV), Vicosa, Minas Gerais State, Brazil, Dr. Jesusa C. Legaspi, USDA, ARS, CMAVE / FAMU-CBC spent 15 days at UFV from October – November 2012. Her trip was funded in part by UFV and CAPES Foundation (Brazilian Ministry of Education). Dr. Legaspi presented 6 seminars on biological control and integrated pest management of different invasive pests using predators and parasites as part of a class (ENT 790-Special Topics in Entomology) at UFV. A cooperative agreement has been established between USDA, ARS, CMAVE (J. C. Legaspi), FAMU (Drs. L. Kanga and M. Haseeb) and UFV (J. C. Zanuncio), which will facilitate the exchange of visits between faculty, scientists and graduate students at UFV, FAMU, and USDA-ARS. Joint research and collaborative activities have been developed to enhance student experiential learning and provide expertise in biological control of invasive pests in horticultural and forest systems that are of mutual interest and benefit in Brazil and the USA. Currently, a PhD student from UFV, Ancidériton de Castro, is spending 1 year (Nov. 2012 – Nov. 2013) in Dr. Legaspi's laboratory and will conduct research on biological control and integrated pest management of invasive pests as part of his PhD thesis (see accompanying article on A. de Castro). *[Source: J. C. Legaspi]*

From left to right: PhD student Wagner de Souza Tavares, Dr. José Cola Zanuncio (UFV), Dr. Jesusa C. Legaspi (USDA, ARS), Sebastião Lourenco de Assis, Jr., Professor, and Arley José Fonseca, MS student from Universidade Federal dos Vales do Jequitinhonha e Mucuri (UFVJM). *Photo by W. D. S. Tavares, UFV*

First Brazilian PhD student from UFV arrives in Tallahassee

Ancidériton A. de Castro (Anci), is currently a visiting research scholar in Dr. Jesusa Legaspi's laboratory from Nov. 2012-2013 at USDA, ARS and FAMU-CBC. He is a PhD student in the Department of Entomology at the Federal University of Viçosa (UFV), Minas Gerais State, Brazil. He obtained a B.S. degree in Agronomy in 2009 and an M.S. degree in Entomology in 2010. His M.S. thesis title was "Morphology of the salivary glands and phytophagy of the predator *Supputius cincticeps* (Heteroptera: Pentatomidae)". He expects to obtain his PhD degree in Entomology in 2014, and his PhD thesis topic is "Toxicity of insecticides to *Anticarsia gemmatalis* (Lepidoptera: Noctuidae), selectivity to predatory stinkbugs, reproductive morphology and behavioral aspects of these natural enemies". His major professor at UFV is Dr. José Cola Zanuncio, Laboratory of Biological Control of Insects, BIOAGRO, Department of Entomology. Ancidériton received a scholarship to stay in the US for 1 year from CAPES Foundation (Brazilian Ministry of Education) to do part of his PhD program. This experience will be essential to human resources training and strengthen partnerships between Brazilian researchers and foreigners to transfer technology and knowledge between the institutions involved. His planned research in collaboration with Dr. Lambert Kanga and Dr. Muhammad Haseeb (FAMU-CBC) is to assess the toxicity of new generations of pesticides to the generalist predator, *Podisus maculiventris* (Heteroptera: Pentatomidae) and a major pest of soybean and tomato crops, the beet armyworm, *Spodoptera exigua* (Lepidoptera: Noctuidae), for potential use in an integrated pest management program. *[Source: A. de Castro]*

A. de Castro learning sampling techniques in mustard and collard field research plots - photo by J. C. Legaspi, USDA, ARS

Ladybeetle Predator, *Delphastus catalinae,* May Control New Invasive Pest of Florida

Ficus Whitefly *(Singhiella simplex)* was first reported in Miami-Dade County in August 2007. Since then, the whitefly has been found throughout southern Florida, as well as along both coasts of Florida up to central Florida. This invasive pest causes infested plants to exhibit leaf yellowing, followed by leaf drop. The whitefly is a pest of many species of Ficus plants with horticultural and ornamental value. Little information is known of the ficus whitefly biology and its potential to be controlled by natural enemies currently present in Florida. We studied the development and reproduction of this whitefly species under different constant temperatures. We found that the whiteflies will not develop at temperatures below 7°C and will not survive at 46°C. The whitefly females laid the highest numbers of eggs at 27°C. The ficus whitefly adults lived an average of 3 days at 27°C . We also evaluated the predation rates of the ladybeetle predator, *Delphastus catalinae* (adults and larvae) presented three life stages of ficus whitefly: eggs, small nymphs (2nd-3rd instars), and large nymphs (4th instar-pupae). We found that both adult and immature *D. catalinae* preyed on substantially more eggs than the small or large nymphs of the ficus whitefly in a 24-hr feeding period. Results from these studies suggest that this ladybeetle predator is a promising biological control agent and can be used to develop future management strategies. *[Source: J. C. Legaspi]*

Adult ficus whitefly, *Singhiella simplex* Photo by J. C. Legaspi, USDA, ARS

Adult ladybeetle predator, *Delphastus catalinae*, feeding on whiteflies. Photo by J. C. Legaspi, USDA, ARS

Neil Miller, USDA-ARS (arm extended in center) showing growers a squash bug trapping field study during IPM field day, FAMU, Tallahassee, FL

CBC advisory committee members and faculty during retreat at Wakulla Springs, FL, December 5, 2012.

Staff News

Raymond Hix Assesses Pesticide Use in Haiti

Dr. Raymond Hix participated as a volunteer to the USAID Farmer-to-Farmer program October 17 – 30, 2012. The Farmer-to-Farmer program is administered through the office International Agriculture in the FAMU College of Agriculture and Food Sciences. Harriet Paul is the project director. The cosponsor of the program in Haiti was The Partners of the Americas. His assignment was to Haiti to assess pesticide usage and safety around Port-au-Prince and Cap Hatien area over a 2 week period. He learned from that Haiti currently has no regulation on the kinds of pesticides bought and sold in Haiti or regulations on how they are used. They hope to see legislation from Parliament to help rectify the management of chemicals coming into Haiti. They want to create a list of pesticides sold in Haiti based on international standards.

Dr. Hix visited various farms and stores that sold agricultural chemicals. He suggested that product labels and msds sheets be included with containers with proper use and safety information. Some of the chemicals he found on farms and in stores included Tambo, Tricel, Emthane M-45, Malathion 15% WP, and Bayfolan Forte, Distan, Chenile Oil, Seven (carbaryl dust), Benlate 50 DF(fungicide), Arctic 3.2 (permethrin), Banrot, Ridomil (fungicide), other generic formulations of permethrin, Neem Oil, Bullesye (spinosad), Pyola (pyrethrin and canola oil), Fossil Shell Flour (diatomaceous earth), Karate Zeon (lamda-cyhalothrin), diazinon, malathion, Distan (fungicide), Emthane M-45, Ridomil (fungicide), Glyphosate (herbicide), 2-4-2 (herbicide used in rice), Agrisol and Commando.

Some of the materials found such as spinosad, pyrethrin, canola oil and neem oil are considered biorational pesticides. Tambo EC (Agrochem International, NY, NY) contain the active ingredients profenophos (400 g/L) and cypermethrin (40 g/L) and are insecticides in the classes organophosphate and pyrethroid respectively. Tricel (Excel Crop Care LTD, India) contains the active ingredient 48% E.C. chlorpyriphos an insecticide in the class organophosphate. He found this concentration shocking, and that concentration hasn't been available in the U.S.A. for years. Malathion 15% WP (King America) was in an unmarked bag other than Malathion 15% WP. Emthane M-45 (Sabero Organics Gujarat LTD) contains moncozeb 80% WP and is a fungicide. Bayfolan Forte (Bayer CropScience) is a foliar fertilizer.

The last day, he gave a pesticide safety seminar to a group of growers University of Notre Dame campus in Cap-hatien.

Pesticide Dealer in the Mountains Near Kenscoff.

Teacher of the Year at Florida A&M University

Dr. Lambert Kanga has proven to be an outstanding teacher, taking on unique challenges in and outside the classroom. Dr. Kanga is very creative in his teaching methodology; he developed a discussion web-base site, facebook, blackboard to support the lectures and discussion groups. Dr. Kanga taught several courses for both undergraduate and graduate students. He re-energized the teaching program in Entomology, designed new courses and integrated innovative teaching strategies. He provided the students with a comprehensive and clear syllabus (vehicle for communicating the structure of the course and the operating procedures) to help the students succeed in his class. His courses are well prepared and well organized with clearly defined learning outcomes and concise methods to evaluate students' performance. He includes in his lectures up-to-date and relevant materials and information from new publications, radio, and documentary on television and other instructional outlets. Dr. Kanga has arranged innovative courses to be taught to the students from remote campuses via Video-conferencing system (POLYCOM system). Dr. Kanga has been an outstanding advisor and mentor and also provided experiential learning opportunities for several undergraduate and graduate students. He is very knowledgeable of several areas the disciple of Entomology and effectively interact and transfer information to audiences from diverse backgrounds. Dr. Kanga was also recognized by Florida A&M University as the Research of the Year in 2011.

Student News

The CAFS Entomology Debate Team Wins Section and Finishes 2nd Overall During ESA National Meeting Student Debates

The CAFS Entomology Debate Team competed in the Graduate Student Debates at the Entomological Society of America Annual Meeting in Knoxville, TN on Nov 15, 2012. They won their section against Virginia Tech. The topic was "What is the Best Single Solution to the Worlds Growing Energy Needs?" The position assigned to the CAFS Debate Team was "Biofuels" and Virginia Tech's was "Solar Power." The team also finished 2nd overall 2 points behind the University of Kentucky. The CAFS team finished ahead of the University of Arkansas, University of California-Davis, Idaho, and Virginia Tech. This was the first team from an 1890 school to compete in the event. The team's paper will be published in a future issue of The American Entomologist. In the attached photo from left to right are Eutychus Kariuki, Megan Wilkerson, Saundra Wheeler, Julius Eason, Omotola Dosunmu and Dr. Raymond Hix (Faculty Adviser).

CAFS Team (Stage Right) Debates Single Most Sustainable Renewable Energy with Virginia Tech's Team (Stage Left)

CAFS Debate Team Receives 1st Place for Winning Their Section and 2nd Place Overall. From Left to Right: Saundra Wheeler, Julius Eason, Megan Wilkerson, Dr. Grayson Brown (ESA President), Eutychus Kariuki, and Omotola Dosunmu.

Enger Germán-Ramirez

Enger Germán-Ramirez

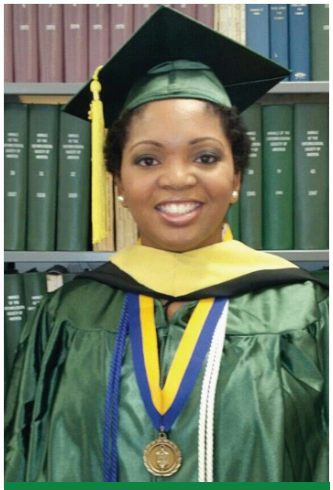
Enger Germán-Ramirez Completed the Master's degree in Agricultural Science with emphasis in Entomology. His major Professor was Dr. Moses Kairo. The title of his thesis project is "A Faunistic Survey of Mealybugs (Hemiptera: Pseudococcidae) and Their Natural Enemies Occurring on Coffee (*Coffea arabica* L.) and Cacao (*Theobroma cacao* L.) Agroecosystems in the Dominican Republic."

Mealybugs are invasive insect pests that threat ornamental and agricultural crops, therefore the importance to know about their richness and current status; they have been introduced to new places by agricultural trades and other human activities, causing serious outbreak in different countries and commercial crops around the world. This assess objective is to collect and identify the mealybug fauna found in coffee and cacao agroecosystems, other host plants in the area and any natural enemies (parasitoids and insect predators) found attacking them.

Of the 31 provinces in the Dominican Republic, 131 localities were surveyed within 19 provinces, resulting in more than one thousand and five hundred specimens of 10 species. The most widely encountered species in order were: *Pl. citri*, followed by *F. virgata*, *Pt. barberi*, and *P. marginatus*, *Ps. jackbeardsleyi*, *D. neobrevipes*, *D. brevipes*, *S. sacchari*, *D. boninsis*, and *H. pungens*.

Christine Sigua (left), undergraduate student intern, assisting in conducting an experiment with Dr. J. C. Legaspi (right), summer 2012

Student News



Saundra Wheeler

Saundra Wheeler graduated this fall with a Master's degree in entomology and agricultural biosecurity under the direction of Dr. Lambert Kanga. Her thesis title was "the susceptibility of the small hive beetle (Aethina tumida Murray) to fungal pathogens and new generations of insecticides". Saundra found that the one of the two strains of M. anisopliae that she screen against SHB in field trials maintained hive health while it managed SHB populations. She also found that four of the five insecticides that she screened against SHB adults using the glass-vial technique caused mortality. One of the insecticides was also found to be 3.4-fold more toxic than the active ingredient in current chemical control method. Additionally, Saundra isolated and identified two fungal pathogens that she found on SHB cadavers that could be used as microbial control for the small hive beetle. Saundra used the knowledge that she gained from conducting her study to develop an integrated pest management strategy for the small hive beetle. Her study proposes an IPM strategy that might encompass observations and good management practices in the spring (before the honey flow) and the sequential or rotational use of low doses of insecticides (Acetamiprid) in combination with microbial agents (Metarhizium anisopliae, isolates) to delay the onset of resistance and to encourage natural enemies in the summer and fall months. Lower concentrations of insecticides and microbial agents in each approach will reduce hazards to applicators and bees as well as minimize chemical contaminations of bee colonies, bee products, and the environment.

Saundra was recently hired as a research assistant for the Entomology program in the College of Agriculture and Food Science at FAMU. She plans to start a Ph.D. program in the fall. During her matriculation she received the following awards:

- Friends of Southern IPM Graduate Student Award, 2013
- CAFS Graduate Student Oral Competition, First Place, 2012
- MANRRS Conference Impromptu Speech Third Place, 2012
- MANRRS Region II Cluster Impromptu Speech Second Place, 2012
- William Peters Memorial Scholarship, 2012
- Entomological Society of America Graduate Student Debate Topic 2 Winner, 2012
- Entomological Society of America Graduate Student Debate Second Place Overall, 2012

Continuing Graduate Students in 2012

Several graduate students featured in the 2011 CBC Newsletter are continuing their work in 2012. These were Mr. Gunasegaran Chelliah, Ph.D. Student (Major Adviser Dr. Lambert Kanga),Mr. Eutychus Kariuki, Ph.D. Student (Major Adviser Dr. Raymond Hix), Ms. Latasha Tanner, M.S. student (major adviser Dr. Lambert Kanga), Ms. Shalom Siebert, M.S. student (major adviser Dr. Lambert Kanga), Ms. Courtnee Eddington M.S. student (major adviser Dr. Lambert Kanga), Ms. Angela Hutcherson (major adviser Dr. Stephen Hight), Ms. Jordan Williamson, M.S. student (major adviser Dr. Raymond Hix), Ms. Megan Wilkerson, M.S. student, (major adviser Dr. Raymond Hix), Mr. Julius Eason M.S. Student (Major Adviser Dr. Lambert Kanga), Ms. Omotola Dosunmu, M.S. Student (Major Adviser, Dr. Muhammad Haseeb).

FAMU Entomology student awardees of the William Peters scholarship from the Reuben Capelouto Foundation during Entomology Field Day. Back Row From Left to Right: Dr. Lambert Kanga, Angela Galette, Courtnee Eddington, Julius Eason, Grant Capelouto, Shalom Siebert, Danielle Wolaver, John Dukes, Saundra Wheeler, Dr. Susie Legaspi; Front Row: Enger German, Gunasegeran Cheliah, Omotola Dosunmu, Angie Hutcherson.

Ms. Angela Galette is originally from California. She started the M.S. in Entomology program Fall 20012. Dr. Stephen Hight is her major advisor.

FAMU Linnaean Games Team Competed in Little Rock Arkansas

The FAMU Linnaean Games team competed at the 86th Annual Meeting of the Southeastern Branch-Entomological Society of America meeting in Little Rock, Arkansas, March 2012. The FAMU team was Eutychus Kariuki, Germán-Ramirez, Megan Wilkerson, Omotola Donsunmu, and the alternate was Kaneisha Barr an undergraduate. FAMU defeated Auburn in the first round and lost a close game in the semifinals against the University of Florida that went down to the last tossup question, tossup 16.

Angie Hutcherson. Entomology students and faculty during Entomology Club Meeting.

Peer-reviewed publications:

Flowers, R.W., M. Haseeb, M.T.K. Kairo and T. Walters. 2012. Web-based digital insect identification: Our progress, challenges, and opportunities. 57(4): 222-223.
Haseeb, M., M.T.K. Kairo and R.W. Flowers. 2011. New approaches and possibilities for invasive pest identification using web-based tools. American Entomologist 57(4): 223-226.
Kanga H. B. L and A. B. Somorin. 2012. Susceptibility of small hive beetle, *Aethina tumida* (Coleoptera: Nitidulidae), a destructive pest of honey bee (*Apis mellifera*) colonies to insecticides and insect growth regulators. Apidologie, 43:95-102
Kanga H. B. L, A. B. Somorin and K. Aronstein. 2012. Molecular Characterization and Pathogenicity of Fungal Isolates for use against the Small Hive Beetle (*Aethina tumida*). Journal of Insect Science (in review).
Legaspi, J. C., A. M. Simmons, and B. Legaspi, Jr. 2011. Evaluating mustard as a potential companion crop for collards to control the silverleaf whitefly, *Bemisia argentifolii* (Hemiptera: Aleyrodidae): olfactometer and outdoor experiments. Subtropical Plant Science. 63:36-44.
Paraiso, O., Hight, S., Kairo, M.T.K., Bloem, S., Carpenter, J., and Reitz, S. 2012. Laboratory Biological Parameters of *Trichogramma fuentesi* (Hymenoptera: Trichogrammatidae), an Egg Parasitoid of *Cactoblastis cactorum* (Lepidoptera: Pyralidae). Florida Entomologist 95: 1-7.
Simmons, A. M., J. C. Legaspi and B. C. Legaspi. 2012. Adult survival of *Delphasus catalinae* (Coleoptera: Coccinellidae), a predator of whiteflies (Hemiptera: Aleyrodidae), on diets of whiteflies, honeydew and honey. Environmental Entomology. 41(3): 669-675.
Tavares, W. D. S., G. Salgado-Neto, J. C. Legaspi, F. D. S. Ramalho, J. E. Serrao, and J. C. Zanuncio. 2012. Biological and ecological consequences of *Diolcogaster sp.* (Hymenoptera: Braconidae) parasitizing *Agaraea minuta* (Lepidoptera: Arctiidae) and the effects on two Costus (*Costaceae*) plant species in Brazil. Florida Entomologist. 95 (4): 966-970.

Proceedings, Abstracts, Newsletters

Legaspi, J. C. and N. Miller. 2012. Evaluation of mustard and other products to control sweetpotato whitefly, *Bemisia tabaci.* p. 119. Proceedings of the 7th International Integrated Pest Management Symposium, Memphis, TN, March 27-29, 2012.

Presentations, Seminars, Extension Activities

Haseeb, M. and M.T.K. Kairo. Palm Weevils of the Genus *Rhynchophorus* (Coleoptera: Dryophthoridae): Emerging Threats to Cultivated Palms in the United States and Abroad: Talk presented at the 60th Annual Meeting of Entomological Society of America, Knoxville, TN, (11-14 November 2012).
Haseeb, M. Invasive Species in The United States. Kyoto University, Kyoto, Japan (August 2012).
Hix, R. L. Rice IPM in the Southeastern U.S. Seminar, IDIAF, Dominican Republic, (June 2012)
Kanga H. B. L and M. Haseeb. 2012. Management of *Varroa destructor*, the Ecto-Parasitic Mite of the Honey Bee by using Fungal Pathogens. International Congress of Entomology, Daegu , Korea.
Legaspi, J.C. 2012. Insect and Plant Interactions: Then and Now (Honoring Hessian Fly USDA Program), Purdue Centennial Symposium, Entomological Society of America Annual Meeting, Knoxville, TN, Nov. 11-14, 2012.
Legaspi, J. C. 2012. Biology and population dynamics of an insect predator, Podisus maculiventris (*Heteroptera*), ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012
Legaspi, J. C. 2012. Evaluation of mustard plants and commercial oils as repellents against Bemisia argentifolii (*Hemiptera*), ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012
Legaspi, J. C. 2012. Integrated pest management of the Mexican rice borer, Eoruma loftini (*Lepidoptera*) in sugarcane, ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012
Legaspi, J. C. 2012. Ecology and control of an invasive pest, the cactus moth, Cactoblastis cactorum (*Lepidoptera*), ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012
Legaspi, J. C. 2012. Life history and biological control of the ficus whitefly, Singhiella simplex (*Hemiptera*), ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012

Legaspi, J. C. 2012. Reproductive biology and predation by the ladybeetle, Delphastus catalinae (*Coleoptera*), ENT 790 class – Special Topics in Entomology; Universidade Federal de Vicosa, Minas Gerais State, Brazil, October 20 – November 4, 2012
Tanner, Latasha and L. H. B. Kanga. 2012. Evaluation of monitoring methods for the redbay ambrosia beetle (*Xyleborus glabratus*), a new invasive species from southeast Asia. Entomological Society of America annual meeting in Knoxville, TN.
Wheeler, S. and L. B. H. Kanga. 2012. Molecular characterization and pathogenicity of fungal isolates against the small hive beetle (*Aethina tumida*) a destructive pest of honey bee (*Apis mellifera*) colonies. Entomological Society of America annual meeting in Knoxville, TN.

Poster Presentations:

Haseeb, M., R. Said, B. Phills, A. Bolques and G. Umar. Some Priority Pest Problems in Small Scale Fruit and Vegetable Production in North Florida. Extension Poster presented at the 7th International Integrated Pest Management Symposium, held in Memphis, TN (26-29 March 2012).
Hix, R. L., M. T. K. Kairo, and E. German-Ramirez. 2012. Survey of the invasive rice stem stink bug *Tibraca limbativentris* (Hemiptera: Pentatomidae) in rice fields in the Dominican Republic. Poster presented at the 60th Annual Meeting of Entomological Society of America, Knoxville, TN (11-14 November 2012).
Legaspi, J. C. and N. Miller. Evaluation of mustard plants and other products to control sweetpotato whitefly, *Bemisia tabaci*. 7th International IPM Symposium, Memphis, TN, March 26-29, 2012.
Legaspi, J.C., N. Miller, C. Mannion, and D. Amalin. Predation of the ficus whitefly, *Singhiella simplex*, by the coccinellid beetle, *Delphastus catalinae*. Annual Meeting of the Southeastern Branch of the Entomological Society of America, Little Rock, AK, March 3-7, 2012.

Participation (University and Public Service / Outreach Activities / Workshops):

Haseeb, M. 50th Anniversary of the USDA, ARS, CMAVE Symposium, held in Gainesville, FL, The United States (29 August 2012).
Legaspi, J. C. and N. Miller. Push-pull strategies to control insect pests of vegetables. Integrated Pest Management Field Day, Florida A&M University Center for Viticulture and Small Fruits, July 14 and 16, 2012, Tallahassee, FL
Miller, N and R. Mizell. Integrated pest management of stinkbug pests. Red Hills Small Farm Alliance, February 12, 2012, Tallahassee, FL
Miller, N. Biological control in greenhouses, Sopchoppy Farms (owned by Tim Carroll), December 16, 2012, Sopchoppy, FL
Legaspi, J. C., Member-at-large, Executive Committee, SEB-Entomological Society of America Meeting, 2011-2012
Legaspi, J. C. Member. Preliminary Organizing Committee, Entomological Society of America that won the bid for the International Congress of Entomology to be held in Orlando, FL in September 2016
Legaspi, J. C. and A. de Castro. Biological control of major insect pests using soldier bug predators. FAMU visit by home schooled children from Thomasville, GA, December 20, 2012.
Monarch Butterfly Festival, Entomology Club, St. Marks National Wildlife Refuge, St. Marks, FL. October 27, 2012
FAMU Grape Harvest Festival, Tallahassee, FL, August 25, 2012
W. L. Peters 36th Annual Field Day and Workshop in Entomology - FAMU, Tallahassee, FL, November 5-8, 2012
Vegetable and Small Farm Fruit IPM workshop, Center for Viticulture, FAMU, spring 2012

Trainings/Workshops/Symposium Organized:

Kishimoto, H., M. Haseeb, and D. James. Agricultural Acarology: Invasion and Expansion. Symposium organized for the 24th International Congress of Entomology, held in Daegu, South Korea, (18-25 August 2012).
Moses T.K. Kairo and M. Haseeb. Invasive Alien Species in the Caribbean Basin of Concern to The United States. Symposium organized for the Southeastern Branch of Entomological Society of America, held in San Juan, Puerto Rico, The United States (18-22 March 2011).

Training / Continuing Education:

Legaspi, J. C. Coaching Towards High Performance, USDA AgLearn Webinar, June 27, 2012
Legaspi, J. C. How to Improve Your Powerpoint Presentations. Entomological Society of America Webinar Series, May 22, 2012
Legaspi, J. C. Rosetta Stone Spanish Language Immersion, USDA AgLearn Webinar, November 2010 - April 2011; December 2011 – March 2012

USDA - ARS – CMAVE / CBC-FAMU Contact information

USDA-ARS-CMAVE 6383 Mahan Dr. Tallahassee, FL 32311
Center for Biological Control, Perry-Paige Building South Room 308, Tallahassee, 32307

Dr. Jesusa (Susie) Legaspi
Research Entomologist & CBC Co-Director
850-656-9870 ext. 10
Jesusa.Legaspi@ars.usda.gov

Dr. Stephen Hight
Research Entomologist
850-656-9870 ext. 18
Stephen.Hight@ars.usda.gov

Mr. Neil Miller
Biological Science Tech
850-656-9870 ext. 28
Neil.Miller@ars.usda.gov

Mr. John Mass
Biological Science Tech
850-656-9870 ext. 27
John.Mass@ars.usda.gov

Ms. Kristen Bowers
Biological Science Tech
850-656-9870 ext. 22
Kristen.Bowers@ars.usda.gov

Mr. Marcus Edwards
Farm Manager
850-510-0385
Marcus.Edwards@ars.usda.gov

Dr. Lambert Kanga
Professor and Center Director
850-599-8725
Lambert.Kanga@famu.edu

Dr. Raymond Hix
Associate Professor
850-561-2216
Raymond.Hix@famu.edu

Dr. Muhammad Haseeb
Research Associate
850-412-7060
Muhammad.Haseeb@famu.edu

Ms. Rashunda Keenon
Administrative Assistant & Office Manager
850-599-4929
Rashunda.Keenon@famu.edu

Dr. Robert Taylor
Dean, CAFS
850-561-2644
Robert.Taylor@famu.edu

Advisory Council Members

The invasive weed *Hydrilla verticillata* chokes Cassidy Spring on the Wacissa River.

Eutychus Kariuki (Ph.D. Student) surveys the invasive weed *Hydrilla verticillata* on the Wacissa River.

Graduate Assistantships Available

Interested in joining our M.S. Entomology Program or the cooperative Ph.D. Program? Please write to Dr. Lambert Kanga (Lambert.Kanga@FAMU.EDU).

Website Links:

FAMU: http://www.famu.edu/index.cfm?a=cesta&p=CenterforBiologicalControl

USDA-ARS: www.ars.usda.gov/saa/cmave/ibbru

Protecting the Nation's Food Supply, Natural Resources and Human Health

Center for Biological Control
Florida A&M University
310 Perry-Paige Building
Tallahassee, FL 32307-4100