FAMU - CAFS

# CENTER OF BIOLOGICAL CONTROL
## NEWSLETTER

Florida A&M University
COLLEGE OF AGRICULTURE AND FOOD SCIENCES
Tallahassee, FL 32307

2015-2016 Volume 14

## Cultural and sustainable management of insect pests of vegetables

**Jesusa C. Legaspi, Ph.D.**

Major insect pests in vegetable crops include the sweetpotato whitefly and aphids. Dr. Jesusa C. Legaspi, USDA-ARS, CMAVE, and collaborators evaluated the commercial methyl salicylate product, "preda-lure", and the use of refuge plants sweet alyssum, *Lobularia maritima*, intercropped with kale and broccoli, in attracting beneficial natural enemies against these pests. Preliminary studies indicated that the most abundant hoverfly insect predator collected from malaise traps was *Toxomerus marginatus*, followed by 5 other species of hoverflies. Sweet alyssum can potentially serve as refuge plants for hoverflies as a cultural strategy in the sustainable management of whiteflies and aphids in vegetable crops.

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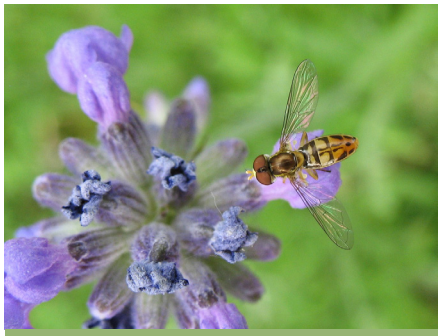
Sweet alyssum, *Lobularia maritima*. (Picture by Forest and Kim Starr)



Hover fly, *Toxomerus marginatus* (Picture by Gilles Gonthier)

**2015 ESA Annual Meeting**
Center of Biological Control Faculty, Staff and Students at the 2015 Entomological Society of America Annual Meeting in Minneapolis, MN. Pictured from left to right: Dr. Muhammad Haseeb, Dr. Jesusa Legaspi, Key'erra Rozier, Dasia Harmon, Eric Turner, Tavia Gordon, Dr. Raymond Hix, Xavier Price, Whitley Stewart, Angela Galette, and Dr. Lambert Kanga. (Picture by Chunyan Jiang)

# Outlook for Optimism with Growth, Challenges and Changes


Dr. Lambert Kanga

The Center for Biological Control (CBC) continues to excel in its mission although limited by reductions in budget and faculty. Together with its federal agency partners (USDA-ARS and USDA-APHIS), the CBC remains committed to achieving successfully its goals and objectives. The Center continues to offer programs to better serve its clientele and strengthen its collaborative linkages with national and international collaborators.

The major priorities in the coming years are (a) the construction of a building to house and combine the expertise of the Entomology Program, the CBC and partners, (b) the expansion of breadth of research projects and (c) the filling of vacant positions. The Center has made substantial efforts towards these priorities: (a) Florida A &M University has identified the site for the new building on its Master Plan; (b) the facility program (blueprint) for the building as well as the fundraising brochure has been completed. The CBC will be receiving assistance for the FAMU Administration for fundraising activities. Appropriate staffing and facilities are critically important for the continued success of the activities of the Center. Currently, the CBC is in a process of hiring a new faculty member for the Urban Entomology position. An additional faculty member with expertise in Integrated Pest Management (IPM) will soon be hired.


Dr. Jesusa Legaspi

The Center continues its support of academic programs with enrollment of more than 70% of the graduate student population in the College of Agriculture and Food Sciences. Faculty members and students of the Center continue to succeed and raise our public professional profile. Dr. Jesusa Legaspi was the recipient of the Integrated Pest Management (IPM) Award from the Southeastern Branch of the Entomological Society of America. Graduate student Julius Eason was the 1st place winner of the graduate student poster competitions at the annual meeting of the Entomological Society of America, and graduate student Latasha Tanner was the 3rd place winner of the graduate student poster competitions at the Minorities in Agriculture, Natural Resources and Related Sciences annual meeting. Danielle Wolaver was the winner of the Undergraduate Student Presentation Award from the Florida Associations of Benthologists. Further, seven students were recognized with "W. L. Peters Memorial Scholarship Awards" from the Reuben Capelouto Foundation. The Debate Team coached by Dr. Raymond Hix competes successful at the 2015 are proud of the accomplishments of our faculty and students as the CBC continues to gain worldwide recognition. We appreciate your continuing support of the Center as we move into the future.

## Use of Non-Native Invasive Tree Logs for Commercial Mushroom Production on Small Farms

Non-native trees are common in the rural landscape, often planted for shade or as ornamentals. However, by their very nature as non-native introductions, they arrive without natural enemies to keep their populations in check and many species can spread from a few scattered trees to dense stands if not managed. In Florida, almost one-third of the plants growing wild in Florida are non-native and some of these have become serious problems. We evaluated whether non-native trees could be removed and used to produce edible shiitake mushrooms. Shiitake production on non-native tree logs was compared against native oak logs (laurel & water oaks), the common trees used to produce shiitake mushrooms in south Georgia and north Florida. Trees were felled in February-March and taken to four collaborating farms. Logs were drilled and inoculated after a short resting period, then stacked under shade and kept moist (Fig. 1). (continued on page 3)


Fig. 1. Stacking of recently felled tree logs after inoculation with shiitake mushroom spawn. Logs from previous years' inoculation are stacked on "A-frame" fence for mushroom collection.

## Research & Outreach News

### Use of Non-Native Invasive Tree Logs for Commercial Mushroom Production on Small Farms (continued from page 2)

The number and weight of mushrooms harvested for each log was recorded (Fig. 2).

Initial outcomes from this project (Table 1) revealed that logs inoculated from Chinaberry, mimosa, and earleaf acacia failed completely to produce shiitake mushrooms, melaleuca logs produced only a few mushrooms, but Chinese tallow tree logs were prolific producers. Although Chinese tallow tree logs produced fewer mushrooms than the oak logs, each mushroom from the Chinese tallow was on average heavier than the average mushroom on native oak logs. A second year of study has been initiated to further compare production of shiitake mushrooms on Chinese tallow and native oak logs. [Source S. Hight]

Fig. 2. Shiitake mushroom production on log in north Florida.

**Table 1. Initial outcome of shiitake mushroom production on logs of native and non-native tree species in north Florida. Increasing "+" signs corresponds to relative increase in mushroom production. The "----" sign means no mushroom production.**

| Tree Species | Tree Origin | Shiitake Production |
|---|---|---|
| water oak & laurel oak | North America (southeast) | ++++ |
| Chinese tallow tree | China | +++ |
| Melaleuca (paper bark tree) | Australia | + |
| Chinaberry tree | China | ---- |
| mimosa tree | China | ---- |
| earleaf acacia | Africa | ---- |

Mrs. Jan Peters and Dr. Muhammad Haseeb show FAMU Grape Harvest Festival attendeess live insects

From Left, Dr. Youssef Omar, Dr. Lois O'Brien, Dr. Charles O'Brien, Dr. Runzhi Zhang,
Dr. Alonso-Zarazaga, and Muhammad Haseeb at the Chinese Academy of Sciences (Invasive Weevil Pests of the World Working Group).


Dr. Muhammad Haseeb hosted a summer training visit of Alcorn State University led by Dr. Daniel Collins (Summer 2015).

## Entomology Insect Science Summer Camp (EISSC)

The College of Agriculture and Food Sciences through its Cooperative Extension Program held its 1st annual Entomology Insect Science Summer Camp (EISSC) which ran from June 13-17, 2016. The camp which was specifically personalized for elementary school students in grades 2 through 5. The inaugural program enrolled 16 participants who explored the wondrous world of insect science. Two of the participants traveled from Panama City, Florida to participate in the camp. The one week program gave students a brief introduction to entomology. Throughout the course of the week, students learned about insect biodiversity, made their own insect collections and pinned the insects they collected on campus and at home. Students also learned about invasive species such as the Kudzu bug and Red Bay Ambrosia beetle. During the mosquito lesson the students impressed the instructor with their wealth of knowledge and had a blast conducting the mosquito larval experiment. Students also enjoyed learning about insect survival and eating insects. At the end of the week, the future entomologist participated in a game show to review all that was covered throughout the week.

A EISSC student learns how to pin insects

The first EISSC was hugely popular as participants are eager to come back again next year. The program provided students with unique learning opportunities that foster creativity, helped develop their critical thinking and helped to enhance their social skills as well.

The program is an exciting way of getting this age group of students to appreciate and realize the significance and the role insects play in our everyday lives, and for them to see and be able to make the interconnectedness entomology and other disciplines. [Source: S. Hayes]

A EISSC student examines a zebra longwing butterfly

*Do you know someone who will be interested next year, or do you have children you would like to participate?*
*Contact Sabrina Hayes: Sabrina.hayes@famu.edu*


Graduate student, Jessica Jinadu, participates in the 2016 Jefferson County 4-H Field Day

## 41st Annual Famu Field Day and Workshop

Florida A&M University Entomolgy held its 40th Annual Field Day & Workshop at the Donald L. Tucker Civic Center in Tallahassee, FL on November 2 to 4, 2016 The three-day conference covered updated information on fumigation, mosquito control, general household pest issues, wood destroying organisms, and lawn and ornamental pests. CEU's were given for these topics for Florida and many of the states in the Southeast. The conference included both seminars and small group hands on workshops. [Source: B.A. Hottel]

For more information on the Florida A&M Field Day and Workshop, please visit: famuent.org/field.html.

Pest management professionals listen to a talk at the 40th Annual FAMU Field Day and Workshop. (Picture by Dr. Muhammad Haseeb)

## Improving Honey Bee Heath and Initiation of a Potential Integrated Model

A biologically-based management of honey bee pests was developed in our previous studies using the fungal pathogen Metarhizium anisopliae # 5858 (Fig. 3). Dr. Lambert Kanga and collaborators evaluated a potential integrated model on honey bee health which incorporated the use of *M. ansiopliae*. The model was field tested (Fig 4) to validate empirical data in the experimental period of July 23 to September 20. Preliminary results indicated honey bee populations decreased initially early august, significantly increased to reach a peak in mid –August and slightly declined by the end of the season in September. The model in the absence of any treatments resulted in very high bee populations. The model with treatment (*Metarhizium*) most powerful (80% mortality) showed some differences in the data explained by the impact of the treatments which is affected by the date of the treatment regimen. Varroa mite populations remained low under fungal treatment regimen. Additional studies are needed to provide a complete forecasting potential of the model.

Fig. 3. Beekeeping Education in Qunincy, FL with Dr. Lambert Kanga

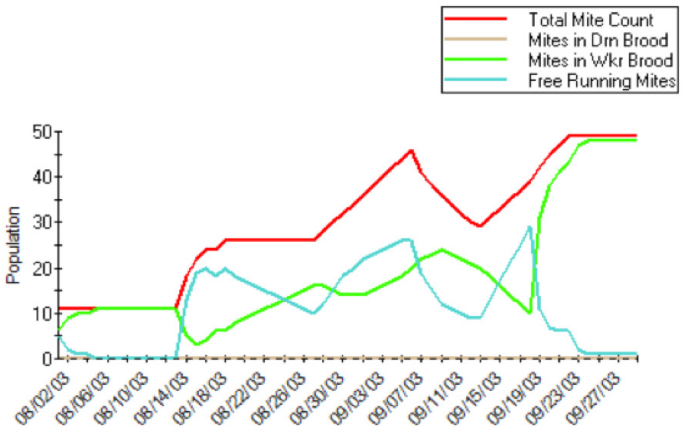



Fig. 4. Dynamics of mite populations in drone and worker broods in the experimental period of July 23 to September 20.

## Student News

### IPM of the Southern Green Stink Bug, *Nezara viridula* (Hemiptera: Pentatomidae) Using Trap and Refuge Crops in Tomatoes

Tavia Gordon graduated in spring 2016. The focus of her MS research work was on the Southern Green Stink Bug (SGSB), *Nezara viridula* (Hemiptera: Pentatomidae) which is a serious insect pest of tomatoes and numerous vegetable and fruit plants in north Florida. She evaluated three trap crops and three refuge crops to investigate their potential to be used for IPM (Integrated Pest Management) of *N. viridula*. The experimental trap crops were composed of striped sunflower, WGF (Wild Grain Feed) sorghum and brown top millet and refuge crops were three varieties (var: carpet of snow, royal carpet and tall white) of sweet alyssum. The trap crops were grown on the periphery of tomato fields to attract adults of the SGSBs. The refuge crops were planted close to tomato fields to attract and conserve biological control agents.

Tavia Gordon at graduatoin

Among the three trap crops, stinkbugs recorded on sorghum had the highest number of adults compared to the two other trap crops examined. Other hemipteran pests were also recorded on both sorghum and sunflower. During the sampling, This study confirms the application potential of selected trap and refuge crops for IPM of *N. viridula* on tomatoes in north Florida. Earlier, she presented her research findings in the Southeastern Branch of Entomological Society of America and Association of Research Directors Meetings. [Source: M. Haseeb]


FAMU Entomology student scholarships awarded by the Reuben Capelouto Foundation - presented at the William L. Peters 40th Annual Field Day and Workshop in Entomology, Nov . 3, 2016, Tallahassee, FL. Award winners were Abertha Parkins, Tashani Brown, Whitley Stewart, Worrel Diedrick, and Daniel Stanaland. Also in photo: Dr. Robert Taylor, Eric Turner, Mr. Raymond Capelouto, Mr. John Dukes, and Grant Capelouto.


Southern green stink bug, *Nezara viridula* feeding on a panicle of sorghum plant, a potential trap crop (photo by Dr. Muhammad Haseeb).


From left., Dr. Jian Duan, Mr. Daniel Stanaland, and Dr. Richard Mankin in the Quarantine facility of USDA, ARS Insects Introduction Research Unit, Newark, DE.

## Monitoring and Management of *Drosophila suzukii* (Diptera: Drosophilidae) in Blueberry and Blackberry Fruits in Florida

Dasia Harmon completed her MS study in fall 2016. She worked on an economically invasive species of *Drosophila* known as Spotted Wing Drosophila (SWD), *Drosophila suzukii* (Diptera: Drosophilidae) which was detected in Florida in August 2009 in Hillsborough County. The species is native to Southeast Asia. The pest is now widespread in Florida and several other States. The current study was conducted in blueberries and blackberries during the 2015 & 2016 growing seasons Tallahassee, and Citra, Florida.

Dasia Harmon out in the field

The first objective of the study was to evaluate the physical trap features and bait solutions that affect captures of *D. suzukii*. In four different experiments, the combinations of commercial traps (Trécé trap and Scentry trap and a homemade trap) were evaluated to capture adults of the SWD. Treatments also consisted of two baits: a yeast/sugar/water mixture, and a commercial *suzukii* bait. In an overall analysis, we found that the Scentry trap/Scentry bait performed the best by capturing more *D. suzukii* in all four treatments.

The second objective of this study was to conduct a phylogenic analysis and identify *D. suzukii* collected from different areas for its exact origin. She amplified a 709-bp region of the mitochondrial DNA cytochrome oxidase from the specimens collected from: Georgia, Florida, Washington, California, and China. She used DNA extraction followed by PCR analysis. Based on these analysis, she did not find any significant differences in *D. suzukii* genetic materials which suggests that in the United States we may have population from the same origin.

These results will help to monitor and manage the SWD on commercial crops. Earlier, she presented her research findings in the Southeastern Branch of Entomological Society of America and Association of Research Directors Meetings. Also, she travel to Shandong province and Beijing to explore pest management options for *D. suzukii* in its native ranges. [Source: M. Haseeb]

Graduate student, Xavier Price, shows attendees of the 2015 Monarch Butterfly festival in St. Marks, FL.

Pepper weevil and white fly IPM demonstration plot for stakeholders and students training. (picture by Dr. Muhammad Haseeb)

## Peer-reviewed Publications and Book Chapter:

Amalin, D. M., L. Averion, D. Bihis, J. C. Legaspi, and E. F. David. 2015. Effectiveness of kaolin clay particle film in managing *Helopeltis collaris* (Hemiptera: Miridae), a major pest of cacao in the Philippines. *Florida Entomologist*. 98: 354-355.

Eutychus M. Kariuki, Raymond L. Hix, Stephen D. Hight, Stuart R. Reitz, and Moses T. K. Kairo. 2016. Influence of sun and shade conditions on *Gratianaboliviana* (Coleoptera: Chrysomelidae) abundance and feeding activity on tropical soda apple (Solanaceae) under field conditions. Florida Entomologist 99:552-554.

De Castro, Ancideriton A., J. C. M. Poderoso, R. C. Ribeiro, J. C. Legaspi, J. E. Serrao, and J. C. Zanuncio. 2015. Demographic parameters of the insecticide-exposed predator *Podisus nigrispinus*: implications for IPM. *BioControl*. 60: 231-239.

Legaspi, J. C., N. Miller, D. Wolaver, L. Kanga, M. Haseeb and J. C. Zanuncio.2016. Repellency of mustard (*Brassica juncea*) and arugula (*Eruca sativa*) plants, and plant oils against the sweetpotato whitefly, *Bemisia tabaci* (Hemiptera: Aleyrodidae*). Subtropical Agriculture and Environments*. 67: 28-34.

Hallman, G. J., J. C. Legaspi, and Darmawi. 2016. Phytosanitary irradiation of *Diatraea saccharalis*, *D. grandiosella*, and *Eoreuma loftini* (Lepidoptera: Crambidae). *Florida Entomologist*. 99: 182-185.

Kanga, L. H.B., J. Eason, M. Haseeb, J. Qureshi and P. Stansly. 2015. Monitoring for insecticide resistance in Asian citrus psyllid (Hemiptera: Psyllidae) populations in Florida. J. Eco. Ent. 1-5.

Kanga. LHB, Siebert, S.,M. Sheikh and D. Kambiranda. 2015. Assessment of honey bee health in conventional and organically-kept apiaries for the development of sustainable beekeeping practices. BMC Genomics.

Kanga, Lambert H. B., K. Marshall, and J. C. Legaspi. 2016. Mechanisms of insecticide resistance in field populations of the varroa mite in Florida (Acari: Mesotogmata: Varroidae) in Florida. *Florida Entomologist*. 99 (2); 324 – 326.

Legaspi, J. C., D. Amalin, R. Ward and B. C. Legaspi, Jr. 2016. *Trichogramma* spp. (Hymenoptera: Trichogrammatidae) as biological control agents in the Philippines: History and Current Practice. *In* Biological Control of Pests using *Trichogramma*: Current Status and Perspectives", pp. 430-454. Vinson, S. B. (senior ed.), S. M. Greenberg, T. –X. Liu, and L. F. Volosciuc (eds.). Northwest A&F University Press, China.

Molineri, C., F.-F. Salles & J. G. Peters. 2015. Phylogeny and biogeography of Asthenopodinae with a revision of *Asthenopus*, reinstatement of *Asthenopodes*, and the description of the new genera *Hubbardipes* and *Priasthenopus* (Ephemeroptera, Polymitarcyidae). ZooKeys 478: 45-128. [doi: 10.3897/zookeys.478.8057].

Netalie Francis, Tavia Gordon, Edidiong Inyang, and Whitley Stuart. 2016. Topic 3: What is the single best tool to reduce malaria cases throughout the world? *The American Entomologist* Vol 62:98-107. This was from the National Entomological Society student debates held in Austin, Texas in November 2014. This event is considered as an invited presentation by the ESA and also results in a peer reviewed publication in The American Entomologist.

Overholt, W.A., Rayamajhi, M.B., Rohrig, E., Hight, S.D., Dray Jr, F.A., Lake, E.C., Smith, M., Hibbard, K., Bhattarai, G., Bowers, K.E., Poffenberger, R., Clark, M., Curry, B., Stange, B., Calise, E., Wasylik, T.K., Martinez, C.M., Leidi, J.G. 2016. Release and distribution of Liliioceris cheni (Coleoptera: Chrysomelidae), a biological control agent of air potato (Dioscorea bulbilfera: Dioscoreaceae), in Florida. Biocontrol Science and Technology. 26:1087-1099.

Varone, L., Logarzo, G., Martinez, J.J., Navarro, F., Carpenter, J.E., and Hight, S.D. 2015. Field host range of Apanteles opuntiarum (Hymenoptera: Braconidae) in Argentina, a potential biocontrol agent of Cactoblastis cactorum (Lepidoptera: Pyralidae) in North America. Florida Entomologist 98: 803-806.

## Presentations, proceedings, abstracts, newsletters, etc:

Legaspi, J.C., N. Miller, M. Haseeb, L. Kanga, and D. Wolaver. Evaluating plant and plant oil repellency against the sweetpotato whitefly, *Bemisia tabaci*. Annual Meeting of the Entomological Society of America, Minneapolis, MN, Nov. 15-18, 2015.

Legaspi, J. C. "The spined soldier bug *Podisus*: an important commercial and natural predator", Fall meeting of the Association of Natural and Biological Control Producers, Orlando, FL, September 2015

Haseeb, M., T. Gordon, G. Umar, D. Harmon, M. Paret, J. Legaspi, A. Bolques, L. Kanga and B. Phills. IPM of specialty crops and community gardens in north Florida. College of Agriculture and Food Sciences 2015 Research Forum, Florida A&M University, Tallahassee, FL, March 31, 2015

## Presentations, proceedings, abstracts, newsletters, etc (continued):

Legaspi, J. C. and N. Miller. Companion and refuge plants to enhance control of insect pests in vegetables. College of Agriculture and Food Sciences 2015 Research Forum, Florida A&M University, Tallahassee, FL, March 31, 2015.

Haseeb, M., T. Gordon, G. Umar, D. Harmon, M. Paret, J. Legaspi, A. Bolques, L. Kanga and B. Phills. IPM of specialty crops and community gardens in north Florida. 8th International Integrated Pest Management Symposium: IPM Solutions for a Changing World, Salt Lake City, UT, March 23-26, 2015.

Legaspi, J. C. and N. Miller. 2015. Companion and refuge plants to enhance control of insect pests in vegetables. 8th International Integrated Pest Management Symposium: IPM Solutions for a Changing World, Salt Lake City, UT, March 23-26, 2015.

Turner, E., N. Miller, D. Wolaver, J. C. Legaspi and L. K. Kanga. 2015. Analysis of functional and numerical response of spined soldier bug, *Podisus maculiventris* when reared on kudzu bug, *Megacopta cribaria* (Hemiptera: Plataspididae), Center for Biological Advisory Committee Annual Meeting, Florida A&M University, Tallahassee, FL, Dec. 3, 2015.

Haseeb, M., T. Gordon, G. Umar, D. Harmon, M. Paret, J. Legaspi, A. Bolques, L. Kanga and B. Phills. 2015. IPM of specialty crops and community gardens in north Florida. pp. 24-25. Proceedings of the College of Agriculture and Food Sciences 2015 Research Forum, Florida A&M University, Tallahassee, FL, March 31, 2015

Legaspi, J. C. and N. Miller. 2015. Companion and refuge plants to enhance control of insect pests in vegetables. p. 25. Proceedings of the College of Agriculture and Food Sciences 2015 Research Forum, Florida A&M University, Tallahassee, FL, March 31, 2015.

Haseeb, M., T. Gordon, G. Umar, D. Harmon, M. Paret, J. Legaspi, A. Bolques, L. Kanga and B. Phills. 2015. IPM of specialty crops and community gardens in north Florida. pp. 84-85. 8th International Integrated Pest Management Symposium: IPM Solutions for a Changing World, Salt Lake City, UT, March 23-26, 2015.

Legaspi, J. C. and N. Miller. 2015. Companion and refuge plants to enhance control of insect pests in vegetables. p. 120. 8th International Integrated Pest Management Symposium: IPM Solutions for a Changing World, Salt Lake City, UT, March 23-26, 2015.

Stephen D. Hight, James E. Carpenter, and Angela S. Galette. 2015. Control tactics developed against the Argentine cactus moth, *Cactoblastis cactorum*, a threat to North American native prickly pear cactus, *Opuntia* spp. IUCN SSC Iguana Specialist Group Annual Meeting, Guana Tolomato Matanzas National Estuarine Research Reserve, 10-13 November 2015, St. Augustine, FL.

Haseeb, M. and Hottel, BA. 2016. Why Entomology? Tallahassee Community College STEM Center Meeting. Tallahassee, FL.

Hottel, BA. 2016 . New Techniques in Termite ID. Florida Pest Management Regional Meeting. Tallahassee, FL.

Hottel, BA. 2016. Detecting and Monitoring Bed Bugs. Florida A&M Field Day & Workshop. Tallahassee, FL.

J. C. Legaspi, M. Haseeb, T. Gordon, D. Harmon and cooperators. IPM and Horticultural Practices for Crop Productivity and Profitability Field Day, FAMU Center for Viticulture and Small Fruits Research, FAMU, Tallahassee, FL, May 16, 2016

J. C. Legaspi, N. Miller, M. Haseeb and L. Kanga. Companion and refuge plants to control insect pests. International Congress of Entomology, Orlando, FL, Sept. 25-30, 2016

Legaspi, J. C., N. Miller, M. Haseeb and L. Kanga. 2016. Companion and refuge plants to control insect pests. Abstracts of the International Congress of Entomology, doi:10.1603/ICE.2016.113827, Orlando, Florida, USA, September 29, 2016

Haseeb, M., T. Gordon, J. Legaspi and L. Kanga. Integrated Pest Management of the southern green stinkbug, *Nezara viridula* on tomato crop using trap and refuge crops. 2016. Proceedings of the 52nd Annual Meeting of the Carribean Food Crop Society, Guadeloupe FWI, July 10-16, 2016

## Outreach activities:

J. C. Legaspi and N. Miller. "Push-pull strategies and integrated pest management (IPM) of insect pests in vegetable crops", FAMU Center for Viticulture, Tallahassee, FL, Crop Production and Protection Practices, Vegetables, Small Fruits and Nut Crops Field Day, May 30, 2015

J. C. Legaspi, J. Peters, M. Haseeb, L. Kanga, L. Tanner, D. Harmon, S. Hight, T. Brown, J. Lindsey, B. Hottel and cooperators. Science Saturday Festival, Tallahassee, FL, Oct. 3, 2015 and Sept. 10, 2016

J. C. Legaspi, D. Wolaver, P. Shirk, M. Haseeb, T. Gordon, D. Harmon, J. Peters, E. Turner, B. Hottel, W. Diedrick, and cooperators. Grape Harvest Festival, FAMU Center for Viticulture, Tallahassee, FL, Aug. 29, 2015 and Aug. 27, 2016

## Outreach activities (continued):

J. C. Legaspi, J. Peters, P. Shirk, L. Kanga, M. Haseeb, and cooperators. William L. Peters 39th Annual Field Day and Workshop in Entomology, November 4-6, 2015, Tallahassee, FL

J. C. Legaspi, L. Kanga, M. Haseeb, and cooperators. Center for Biological Control advisory committee meeting, FAMU, Tallahassee, Dec. 3, 2015 and Dec. 2, 2016

J. C. Legaspi, P. Shirk, S. Hight and cooperators. Pathways to Professions in Agriculture and Food Sciences Conference, FAMU, Tallahassee, FL, April 6, 2016 and Oct. 12, 2016

## Service on Committees:

Legaspi, J. C., Co-Chair Diversity Committee, Member, organizing committee; co-organizer of a symposium on climate change and agricultural invasive pests (2013-2016), International Congress of Entomology, Orlando, FL, September 25-30, 2016

Legaspi, J. C. Legaspi, J. C., member, scholarship committee, Reuben Capelouto Foundation, Tallahassee, FL, 2015 and 2016.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## Website Links

FAMU:
www.famu.edu/index.cfm?a=cesta&p= Center for Biological Control

USDA-ARS:
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