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Welcome, to the Fall 2018 IPM Innovation Lab Newsletter!

Autumn has been a busy time for the IPM Innovation Lab: Nepal, Niger, and Switzerland are just a few of the places we've journeyed to within the last few months. From tackling the devastating fall armyworm invasion in Africa, to monitoring the tomato pest, *Tuta absoluta*, to celebrating the numerous awards won by many IPM IL collaborators, we are again headed into a season of progress, success, and continued momentum. Happy reading!

Project Updates and Accomplishments:



- Biological control of the invasive weed *Parthenium hysterophorus* in East Africa: Two *Parthenium* biocontrol agents, *Zygogramma* and *Listronatus*, have been approved by the Ethiopian Government and are being reared at three sites in Ethiopia. The mass-rearing has improved immensely this season; staff are more trained and skilled in rearing techniques. In FY 2018, a total of 7,900 *Listronatus* adults and

25,200 *Zygotogramma* adults were released throughout Ethiopia.

- Vegetable crops IPM in East Africa: Several farmer field days have been conducted this season, including one in Msufini village, attended by a total of 180 farmers. Training workshops on vegetable viral diseases and insect vectors were conducted at Morogoro, Mvomero, Iringa, Ilula, and Kilolo. Additionally, WhatsApp IPM diagnosis groups have been formed in Morogoro and Iringa. In Kenya, entomopathogenic nematodes are being tested against *Tuta absoluta*. *Trichoderma* treatment has reduced the incidence of bacterial wilt in tomato plots.



- Rice, maize, and chickpea IPM for East Africa: Over 700 farmers have demonstrated push-pull technology in the Hawassa area. Farmers have benefited from reduction in stem borer and fall armyworm damage, increased milk yield, and improved soil fertility. Further, the egg parasitoids, *Trichogramma* sp. and *Telenomus* sp. and larval parasitoids, *Cotesia icipe*, *Palexorist zonata*, *Coccygidium luteum*, and *Charops ater* were collected from eggs and larvae of fall armyworm in maize fields in Kenya. The biocontrol of the fall armyworm in East Africa is in its beginning stages.

- Vegetable crops and mango IPM in Asia: At the Royal University of Agriculture, trials on the bio-efficacy of *Trichoderma* have been conducted. In Bangladesh, mango bagging is reducing fruit fly damage by 100 percent. Field trials were conducted on the performance of Bt and non-Bt eggplants, mango leafhopper, and fruit fly management, and management of white mold of country bean. Bt eggplant recorded 90.3% reduction in fruit damage. In Nepal, activities include testing lures for control of fruit fly on cucumber and bitter melon, IPM packages for chili, onion and French bean, and management of *Tuta absoluta*. Lures have been sent to Cambodia and Vietnam for early monitoring of the pest.



- IPM for exportable fruit crops in Vietnam: The causative organism for witches' broom syndrome of longan has been identified as an eriophyid mite. A knitted nylon bag was developed for bagging longan clusters, a waxed paper bag was developed to cover mango fruits, and a plastic sleeve was developed to cover dragon fruit flowers to prevent pest and disease damage. A collaborator on the project, Hanh Tran, was recognized for her blog on farmer trust by the [Agrilinks Young Scholars Blog Contest](#) and also spent a semester at Virginia Tech learning English and attending courses in gender, entomology, and statistics. She returns to Vietnam in December.
- Ecologically-based Participatory IPM packages for rice in Cambodia (EPIC): Application of *Beauveria bassiana* reduced damage caused by grasshoppers and leaf feeders. Both

community trap barrier system and linear trap barrier system were effective in controlling rat damage in the fields. Rodent and disease management trials were set up at the CE SAIN technological park in Battambang.



- Modeling for biodiversity and climate change: Field trips were made to identify patches of plant species of interest at Chitwan, Tanahu, and Kaski districts. Satellite images and Aster images of these sites have been procured since 1988. Five MS and five PhD students have been trained in GIS and remote sensing in order to work on the project.
- Invasive Species Modeling for South American Tomato Leafminer and Groundnut Leafminer: A network-based model to study the spread of invasive species has been developed. The model predicts a faster southward spread of *Tuta absoluta* from Bangladesh, Myanmar, Thailand, Malaysia, and Singapore than eastward, due to higher trade activity. Country specific analysis shows that once introduced to a major production area, the pest will spread all over Nepal within 2-3 years.

Recent IPM Innovation Lab

Activities:



- July 24-26, IPM IL Director Muni Muniappan attended the Farmer Field Day and Annual Review Workshop in Kenya, hosted by *ICIPE*.
- July 29-August 3, the IPM IL team traveled to Boston to participate in a symposium at the International Congress of Plant Pathology 2018: Plant Health in a Global Economy.
- In October 2018, Muniappan was invited, along with over 200 other leading experts from international organizations, to the International Conference on Fall Armyworm in Addis Ababa, Ethiopia.
- With an invitation from TAC member Lawrence Datnoff, IPM IL

Associate Director Amer Fayad presented on IPM activities at Louisiana State University in October.

- From August 27-29, Muniappan traveled to Bengaluru, India for the [First International Conference on Biological Control](#). IPM IL represented five continents with nearly 50 participants presenting on *Tuta absoluta or Parthenium*.
- Muniappan was invited to present [as a keynote speaker at the International Biological Control of Weeds Conference in Switzerland](#), joined by IPM IL collaborators Wondi Mersi and Lidya Alemayehu.
- The IPM IL team hosted a booth at [Hokie BugFest](#) in October exhibiting live aphids, crop pests collected from around the world, and bug origami. Nearly 9,000 people visited BugFest this year.
- November 30, Muniappan traveled to Nepal to attend a stakeholders workshop on [preparedness and rapid response to threats of the Fall Armyworm in Nepal](#).
- In September, the IPM IL team traveled to Niger to assess progress on the biological control of the millet head miner (a sub-award from the [Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet](#)). Technicians in Niger trained a technician from Kenya on the mass-production of natural enemies, a regional technology transfer, and natural enemies of the fall armyworm were found, jump-starting the biological control of the pest in Africa.
- [Women and Gender in International Development](#) presented at the [Sustainability and Development Conference](#) November 9-11 at the University of Michigan. The team presented on *Gendered knowledge, roles, and spaces: IPM vegetable cultivation and social change in the Nepali mid-hills*.
- The Women and Gender in International Development team traveled to Cambodia and Vietnam to conduct evaluations, collecting stories from men and women on how IPM IL research has impacted their farming livelihoods and everyday lives.

Recent Publications:



VIDEO: Virginia Tech Proposes IPM with an Emphasis on Biocontrol to Manage the Fall Armyworm



Male Out-Migration: A Change in Households, a Change in Public Spaces:
Agrilinks



How Science and Extension Services Benefit from International Collaboration: Agrilinks



Fighting Nature with Nature: Scientists Mobilize Biological Control Against Devastating Fall Armyworm: Entomology Today



Not Just Maize: Africa's Fall Armyworm Crisis Threatens Sorghum, Other Crops, Too: Entomology Today



Value-Added Food and Processes: Biocontrol Opens New Prospects in the Sahel: Agrilinks



Virginia Tech to host gender and international development conference:
VT News

Publications Continued...



- Virginia Tech teams up with researchers in Niger to improve livelihoods: VT News
- Virginia Tech researchers make small discovery that could keep millions from going hungry: VT News
- Training on *Trichoderma* and Plant Growth Promoting Rhizobacteria: IAPPS Newsletter

Professor awarded for research contributions and four decades of service: VT News

- Center for International Research, Education, and Development names communications director: VT News
- Agrilinks Young Scholars Blog Contest: We Have a Winner!: Agrilinks
- Entomologist from Vietnam gains global perspective at Virginia Tech: VT News

Success Stories:



- Push-Pull: One Simple Farming Technique Successfully Battles Africa's Key Agricultural Constraints

Looking Ahead:



- The Women and Gender in International Development team will be hosting a gender conference in February at Virginia Tech, inviting multiple renowned speakers from across the country and world to present.
- *ICIPE* will host a training workshop on Fall Armyworm in Kenya in January.
- IPM IL has come out with a 2019 Calendar (make a request to any IPM IL team member to receive one!).

Buzz-worthy News:



- The Fall Armyworm, a pest that is resilient to most management methods and moves quickly from country to country, [enters Asia](#).
- [Crop-protecting insects could be turned into bioweapons, critics warn](#).
- [Earth Island](#) makes a special edition celebrating women and the way they've contributed to, nourished, and interacted with the environment over the decades.

**Some of our Favorite Photos of
the Year:**



Niger



Vietnam



Kenya



Cambodia



Nepal



(Top Left) The Sustainability and Development Conference. (Top Right) Fall Armyworm Workshop in Nepal. (Bottom Left) *Parthenium* and *Tuta absoluta* Symposia in India. (Bottom Right) IPM IL, ICRIASAT, and ICIPE team members in Niger.



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