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THREE WORKSHOPS IN A WEEK IN TANZANIA !

The Feed the Future Integrated Pest Management Innovation Lab conducted three workshops in Tanzania during the week of July 20, 2015.

The first workshop, featuring a regional focus on production and use of *Trichoderma* spp., was held at the AVRDC Regional Center in Arusha, on July 20-23. The 23 participants consisted mostly of plant pathologists. In attendance, were six Ethiopian participants, nominated by EIAR, seven Kenyan participants, nominated by KALRO, and 10 Tanzanian participants, nominated by TPRI and SUA. Two professors from the Tamil Nadu Agricultural University in India led the workshop—an educational event that was truly a collaboration of the south.

Trichoderma is an antagonistic fungus that prevents pathogenic fungi from attacking seedlings and also induces plants' instinctual defense mechanisms against pests and diseases. In the previous phase, IPM IL popularized the use of *Trichoderma* in vegetable production in Asia, and in the current phase, IPM IL is introducing this technology to Eastern Africa. So far, IPM IL has

conducted four international workshops on *Trichoderma* and trained more than 75 scientists from a dozen different developing countries in the tropics. *Trichoderma* allows vegetable farmers to greatly reduce or eliminate pesticide applications to control soil-borne diseases.

The second workshop, highlighting management strategies for an invasive pest, the South American tomato leafminer, *Tuta absoluta*, was held at the Tropical Pesticides Research Institute in Arusha, on July 21. The 103 participants from northern Tanzania, included scientists, extension agents, representatives from private companies and value chain projects, and farmers. The Director General of TPRI, Mrs. Epi Kimaro inaugurated the workshop. TPRI Entomologist, Mr. Maneno Chidege and Director of IPM IL, Dr. R. Muniappan, led PowerPoint presentations, followed by a question and answer session. In the afternoon, the team observed the *Tuta absoluta*



Workshop participants at AVRDC Regional Center, Arusha, Tanzania



Tomato farm visit, scouting for *Tuta absoluta* and its natural enemies

damage firsthand during visits to tomato farms. The third workshop, featuring *Tuta absoluta* once again, was held at the Sokoine University of Agriculture in Morogoro, on July 23. The 40 participants from southern Tanzania, included research and extension faculty, students, representatives of private companies, and farmers supported by TAHA. Dr. Amon Maerere, Horticulturist at SUA inaugurated the workshop. SUA Entomologist, Dr. Mwatawala and Director of IPM IL, Dr. R. Muniappan

presented PowerPoint slides, followed by a question and answer session. After the presentation, participants viewed damage wrought by the tomato leaf miner as well as local natural enemies during a series of tomato farm visits.

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NEED FOR EMERGENCY RESPONSE FOR A NEW VARIANT OF RHINOCEROS BEETLE (GUAM BIOTYPE)

The rhinoceros beetle (*Oryctes rhinoceros*) is thought to have evolved in South East Asia where it developed a biology adapted to feeding on palm trees. Adult beetles fly to the crowns of palms where they will move into the leaf axils and bore through the frond bases into the emerging fronds and meristem macerating tissue and destroying the emerging fronds. The beetles produce an aggregation pheromone which will attract more beetles to the attacked palms increasing the damage and sometimes even killing the standing palms. Female beetles leave the feeding sites and disperse to dead and rotting palms to lay their eggs which hatch into larvae to feed on the decaying tissue. Palms felled by typhoons or during renovation of plantations provide abundant sites for development and can lead to severe outbreaks. A cycle of damage can be self-perpetuating as increasing numbers of beetles cause palm death and produce more breeding sites. With ineffective control the beetle will cause major palm death (e.g. 50% loss of coconut palms on Palau in the 1950's) and an ongoing loss in food supplies and production of palm products.

The movement of rhinoceros beetle into the islands of the Pacific and Indian Oceans is a demonstration of the need for biosecurity and quarantine systems. The beetle was transported with rubber seedlings from Ceylon to Samoa in 1911 where it quickly became established and was

spread to the surrounding islands by inter-island shipping. New outbreaks were recorded in the off-shore islands of Papua New Guinea following WW2 and in the Indian Ocean in the subsequent years. In all cases, damage to coconut palms was severe and prompted an international effort to develop a solution. An Integrated Pest Management (IPM) system was developed based around importation and release of a biocontrol agent (the *Oryctes nudivirus*) discovered in Malaysia, the centre of origin of the beetle, in the 1960's by Dr Alois Huger. The virus weakened the beetle populations and, coupled with cleaning up of breeding sites and other management measures, meant that the beetle populations were held at acceptable levels. More importantly the weakened state of the beetle populations, together with increased awareness of biosecurity, meant that there were no significant new beetle invasions reported in the period from 1980 into the 2000's. In the last decade concern has been raised over fresh invasions of the beetle. In 2007 rhinoceros beetle was reported from Guam, the attack has been severe and persistent and proven impossible to eradicate despite a relatively small area affected and application of an attempted eradication programme which has cost about US\$4M over the past 7 years. In 2009, beetle damage was recorded in Port Moresby, Papua New Guinea and the beetle has since spread through the district causing severe palm damage. Residents report that fresh coconuts are no longer available in the local markets. In 2014, the beetle was reported in Honolulu, Hawaii and a US\$7M campaign has been launched to attempt to eradicate the pest. In January 2015, rhinoceros beetle was reported from Honiara, Solomon Islands but it is suggested that the beetle has already spread from the city into the outlying areas.

Clearly after a period of quiescence and limited concern something has happened to bring rhinoceros beetle back into the limelight. Analysis at AgResearch has shown that the new invasive populations are free of the biocontrol virus. Furthermore it has been shown that the invasive populations are all of a new, genetically distinct biotype (Guam) which has only been found in these locations. Disturbingly, tests for control of the beetle with *Oryctes nudivirus* have proven negative suggesting that the Guam biotype is resistant to the biocontrol. Our analysis suggests that healthy beetles of the Guam biotype are more vigorous and hence more successful as invaders being able to survive transport and establish in new environments. Once established they are more



damaging and difficult to eradicate or contain (see picture on the left for a typical damage symptom).

We consider that the rhinoceros beetle Guam biotype poses a major threat to the Island States of the Pacific and beyond. Plans for renovation of coconut plantations to meet food security needs and growing opportunities for coconut niche products are threatened by emergence of the pest. Plans to move into higher value palm crops such as oil palm will also be threatened. Uncontrolled populations of beetles in transport

hubs, such as Hawaii, pose a serious threat to not only the unaffected states of the Pacific region but also the tropical Americas. The potential impact in Asia is unknown.

We recommend the following actions;

- Raise awareness through biosecurity networks of the potential threat of CRB-G and provide information for early detection and eradication of limited outbreaks.
- Form an International Working Group to develop a strategy for control and containment and coordinate activities.
- Identify funding sources and secure funding for key participating institutes
- Carry out a thorough delimiting survey to identify current distribution of CRB-G and identify its center of origin.
- Find and test *Oryctes* nudivirus variants to find CRB pathogenic strains
- Implement control and containment strategy to limit impact and spread of the beetle

Failure to act will result in the rapid spread of the beetle with damage to economic activity and food security through many of the most vulnerable parts of the tropical world.

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IAPPS Mission: to provide a global forum for the purpose of identifying, evaluating, integrating, and promoting plant protection concepts, technologies, and policies that are economically, environmentally, and socially acceptable.

It seeks to provide a global umbrella for the plant protection sciences to facilitate and promote the application of the Integrated Pest Management (IPM) approach to the world's crop and forest ecosystems.

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