

Asian Vegetable Integrated Pest Management Innovation Lab (IPM IL)

CONCEPT NOTE

TRICHODERMA WORKSHOP, JUNE 13-17 2016

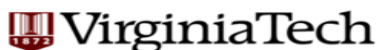
The antagonistic fungus *Trichoderma* is known to occur in all soils. Several strains of *Trichoderma* have been developed as biocontrol agents against fungal diseases of plants. The various mechanisms include antibiosis, parasitism, including host-plant resistance, and competition. This biological agent generally grows in its natural habitat on the root surface, specifically affecting root disease, but it can also be effective against foliar diseases.

In the past, the IPM Innovation Lab has conducted two *Trichoderma* workshops in India and Nepal and one in Tanzania. So far, we have trained a couple of scientists from Cambodia by sponsoring them to attend the *Trichoderma* workshop in Nepal.

We have identified Dr. Nakkeeran, Professor of Plant Pathology at the Tamil Nadu Agricultural University, India, to be the resource person. A Plant Pathology laboratory and a lecture hall available at the Royal University of Agriculture (RUA) are adequate for this workshop.

The *Trichoderma* workshop will be held at RUA from June 13th -17th, 2016. The participants will include members from RUA, the General Directorate of Agriculture (GDA), Cambodian Agricultural Research and Development Institute (CARDI), University of Battambang, GIZ, SNV, Rice IPM and IRRI, GRET, Conservation Agriculture, Horticulture Innovation Lab, Sustainable Agriculture Innovation Lab, and iDE.

We hope the training provided through this workshop will also help some local entrepreneurs become involve in the production of *Trichoderma* and also enhance dissemination of information on beneficial aspects of this fungus.



Asian Vegetable Integrated Pest Management Innovation Lab (IPM IL)

Production and Use of Bio-control agent *Trichoderma* and Plant Growth Promoting Rhizobacteria

June 13 - 17, 2016

Organized by: Integrated Pest Management Innovation Lab, Cambodia

Venue: Royal University of Agriculture (RUA)

OBJECTIVE: The purpose of this workshop is to review current research on the selection, mode of action, delivery system, and mass production of bio-control agents, along with the establishment of a biopesticide lab and formulation development of biopesticides in agriculture and horticulture. Participants will discuss their IPM IL research activities related to the use of Trichoderma and PGPR as a component of IPM programs.

BACKGROUND: Microbial bio-pesticides are used in the biological control of insect pests, plant pathogens, and weeds. Trichoderma is an inexpensive and environmentally-friendly bio-agent used by the USAID-funded IPM IL to reduce farmers' need for expensive chemical fungicides. In several IPM IL countries, farmers have supplemented their income by becoming entrepreneurs of the product. Trichoderma species are beneficial plant symbionts that act as natural bio-control agents against several important phytopathogenic fungi. It can be used to combat soil borne plant pathogens (Fusarium, Rhizoctonia, Phytophthora, Sclerotinia, Alternaria). The mode of action of this biocontrol agent includes rhizosphere competition, antibiosis, mycoparasitism, and induction of host defense responses.

RESOURCE PERSON:

Dr. Sevugapperumal Nakkeeran, Professor (Plant Pathology), Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore, India

Program Agenda

	Event
Day 1: June 13	INAUGURAL SESSION
8.00 – 9.30	Registration
9:30-9:40	Explanation of the workshop and national anthem – Dr. Seng Kim Hian, Project Coordinator
9:40-9:50	Welcome remarks and brief overview of IPM IL-Cambodia – Mr. Michael Roberts- iDE Country Director
9:50 - 10:00	Welcome remarks – USAID
10:00- 10:15	Inaugural Address by Prof. Dr. Ngo Bunthan, Rector of RUA

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10: 15-11:00	Coffee break and group picture
11:00-11:15	Introduction of the participants
11:15-12:00	An overview of IPM Innovation Lab –Dr. Elvis Heinrichs, Asia Manager, IPM Innovation lab
12:00- 1: 00	Lunch break
1:00- 1:30	Objectives of the Workshop and prospects of <i>Trichoderma</i> as a biocontrol agent-Dr. S. Nakkeeran
1:30 -2:00	Current status on production and use of <i>Trichoderma</i> in Cambodia – Dr. Kean Sophea
2:00-3:00	GIZ bio-pesticides program in Cambodia – Mr. Claudius Bredehoeft, GIZ KH
3.00 – 5.00	Potato dextrose agar media, Kings B media, Nutrient Agar media preparation, Isolation of <i>Trichoderma</i> and PGPR from Rhizosphere (Practical) Dr. Nakkeeran
Day 2: June 14	TECHNICAL SESSION
9:00 - 10:30	Selection and mode of action of <i>Trichoderma</i> – Dr. S. Nakkeeran
10:30 - 10:45	Tea/Coffee Break
10:45-12:00	Selection and mode of action of fluorescent <i>Pseudomonas</i> Dr. S.Nakkeeran
12:00- 1.00	Lunch break
1:00-2.00:	Mass production and delivery system of <i>Trichoderma</i> - Dr. S. Nakkeeran
2:00-3:00	Mass production and delivery system of <i>Pseudomonas</i> – Dr. S.Nakkeeran
3.00 -3.30	Tea/coffee break
3:30-5:00	<i>In vitro</i> screening and bio-efficacy of <i>Trichoderma</i> and <i>Pseudomonas</i> , phenotypic characterization of <i>Trichoderma</i> (Practical)- Dr. S. Nakkeeran
Day 3: June 15	TECHNICAL SESSION
9:00 - 10:30	Enumeration of population of <i>Trichoderma</i> and <i>Pseudomonas</i> in the formulation (Practical)- Dr. S.Nakkeeran
10:30-10:45	Tea/coffee Break
10:45-12:00	Enumeration of population of <i>Trichoderma</i> and <i>Pseudomonas</i> in the formulation (Practical) (contd)-

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	Dr. S.Nakkeeran
12:00-1:00	Lunch break
1.00 – 2.00	Current status of <i>Trichoderma</i> use in Cambodia – Dr. Kean Sophea/ Mr. Claudius Bredehoeft
2:00-3:00	Selection of <i>Bacillus</i> spp., mode of action and mass production of <i>Bacillus</i> spp. – Dr. S. Nakkeeran
3:00- 3.15	Tea/coffee break
3:15 – 4:15	Mass production of <i>Trichoderma</i> spp., and PGPR - Dr. S.Nakkeeran
4:15-5:00	General discussion
Day 4 June 16th	TECHNICAL SESSION
9:00 - 10:30	Quality control of biocontrol agents – Dr. S.Nakkeeran
10.30 -10.45	Tea/coffee break
10.45 -12.00	Registration of <i>Trichoderma</i> and <i>Pseudomonas</i> – Dr. S. Nakkeeran
12:00 -1:00	Lunch break
1:00 – 2:00	Group discussion on problem and prospects of using biocontrol agents in IPM
2.00 – 5.00	Mass production of PGPR - Dr. S.Nakkeeran
Day 5 June 17th	TECHNICAL SESSION
9:30 - 10:30	Observations on the bioproducts and tea break
10.30 -11.30	Comments and suggestion from participants
11.30 -1.00	Valedictory function – Distribution of certificates and group photo