

Feed the Future: Innovation Lab for Integrated Pest Management Trip Report

Country Visited: Thailand

Dates of Travel: 14 May 2017

Travelers' Names and Affiliations: Neang Channeth Technical Official at National Agricultural Laboratory (NAL-GDA)

Purpose of Trip: Regional Training Workshop on Mass Production of Beneficial Insect and Nematodes

Sites Visited: Thailand

Description of Activities/Observations:

1. On 15 May 2017 morning: Training on mass production of *Anagyrus lopezi* for biological control of pink cassava mealybug (*Phenacoccus manihoti*). Mealybug is one kind of insect that destroy cassava to lose the yield or die. Mealybug can be produce from fresh mature pumpkin in lab. Mass production of *Anagyrus lopezi* could control mealybug effectively. The methods of producing mealybug and *Anagyrus lopezi* are also simple which could implement at my country.
2. On 15 May 2017 afternoon: Training on mass production of *Asecodes hispinarum* to control *brontispa longissima* (coconut hispine beetle). *Brontispa longissima* is one kind of insect which destroy coconut leave. Using chemicals pesticide control is very difficult for this insect. The laboratory of plant protection in Department of Agriculture, Thailand produces *Asecodes hispinarum* to control of coconut hispine beetle. The result is really good and it is also cheap and safe. Adult female *Asecodes hipinarum* use its needle-like organ to penetrate the body of *Brontispa longissima* to lay eggs. When the eggs hatched, it would feed on the hosts'body fluids, which in turn, would cause it to move slowly and consume less coconut leaves, and eventually die. To make mass produce of *Asecodes hispinarum*, the lab has to produce coconut hispine beetle to feed the eggs of it.
3. On 16 May 2017 morning: Training on mass production of *Goniozus Nephontidis* to control of black headed caterpillar (*Opisina arenosella walker*) and rice moth (*Corcyra cephalonica stainton*). Black headed caterpillar is one kind of insect which destroys coconut leaves by eating its surface at the bottom part that finally make the coconut tree die or get low yield. Black headed caterpillars can be produce by collecting from the coconut leave and put them in the small box by feeding with young coconut. Adult *Goniozus Nephontidis* feed by larva of black headed caterpillar. Therefore, we can produce lot of *Goniozus Nephontidis* to control black headed caterpillars to protect our environment as well.

4. On 16 May 2017 afternoon: Training on mass production of Entomopathogenic nematode to control of insect pest like *Galleria mellonella* in soil by infect the host body to change color as it dies due to bacterial action, and becomes yellow or brown or reddish. The method of producing entomopathogenic nematode is not easy and need to learn more deeply.
5. On 17 May 2017 morning: Training on mass production of Earwigs spp. to control of *Proreus simulans* Stallen and *Euborellia annulipes* (Lucus) which destroy coconut tree. Earwigs are decomposers. The like to stay in dark and damp places such as beneath decomposing leaves and trees. Therefore, the lab in Thai produces Earwigs by barked rice with 10% concentration of honey. Also training on mass production of Lacewings to control mealybug which destroys cassava.
6. On 17 May 2017 afternoon: Training on mass production *Trichogramma* spp under the order Hymenoptera Suborder Aprocrita and in the super family, Chalcidoidea, family Trichogrammatidae. Female trichogramma spp. can destroy many different types of larvae egg of butterfly pest aging not over two days old. It will use its organ for laying eggs to penetrate the insect pests' eggs around the top area or the side. *Trichogramma* spp. can be used to control eggs of many different kinds of butterfly insect pest such as F. Pyralidae, F. Arctiidae, F. Lymantridae, F. Noctuidae, F. Papilionidae, F. Eucleidae, F. Saturniidae, F. Pieridae, F. Plutellidae, F. Hesperidae.
7. On 18 May 2017: Visiting National Biological Control Research Center (NBCRC) where is the central regional center of biological control agent of many kind of insect which destroy coconut, sugar cane such as black-headed caterpillar (*Opisina arenosella* walker); coconut hispine beetle (*Brontispa longissima* gestro); coleoptera coccinellidae; longhorn beetle; *chilo infuscatellus*; *sesamia inferens* and *chilo sacchariphagus*. For BCA, the center produce *Goniozus nephantidis*; *Asecodes hispinarum*; *Anagyrus lopezi*; Lacewings; *Eocantecona furcellata*; *Metarhizium anisopliae* and *Beauveria bassiana*.
8. On 19 May 2017 morning: Wrap up and Conclusion of the workshop. Most of participant are interest in Entomopathogenic nematode and want to attain more workshops about nematodes.

Suggestions, Recommendations, and/or Follow-up Items:

The training is really good for me as I am a technical official of Plant Biotechnology Laboratory of National Agricultural Laboratory (NAL-GDA). What I am interested in the most are nematode, *Metarhizium anisopliae* and *Beauveria* production.

My lab is also working on trichoderma production and quality assessment for biopesticides which are registered to Ministry of Agriculture, Forestries and Fisheries. Therefore, producing *Metarhizium anisopliae* and *Beauveria bassiana* might be suitable for my workplace. However, my lab still need further support to mass produce these two kinds of fungi. As a start, my co-worker and I will start to produce/research *Metarhizium anisopliae* and *Beauveria bassiana* as soon as possible. We have obtained permit from our supervisor, and have started to purchase the required reagents and materials.

For nematodes, my lab would like to start after we have successfully produced *Metarhizium anisopliae* and *Beauveria bassiana*.

Our lab has been working with trichoderma for a few months for quality control of any product of biopesticide and biofertilizer. Therefore, I am sure that our lab is able to culture *M. anisopliae* and *B. bassiana* as soon as possible. The difficulties are the lack of human and financial resource to support some kind of reagent and equipment to produce these kinds of fungi. However, we have strong interest to mass production of trichoderma, *M. anisopliae*, *B. bassiana* and entomopathogenic nematode in the next few months.

Also, I intend to support any training activity to share what I have learnt in Thailand and what I have done in my lab to others in Cambodia to share and exchange knowledge and experiences for develop our country.

Finally, many thank IRRI who support me to train about Mass Production of Beneficial Insect and Nematodes in Thailand. I do gain more experience and knowledge and I will share what I have learnt to my colleagues. We will try our best to start this work.

List of Contacts Made:

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