



# Two Months Attachment Program on Diagnostics of Plant Viruses

at  
Laboratory of Tropical Plant Protection  
Tokyo University of Agriculture (Tokyo NODAI), Japan

*October 26 – December 25, 2015*

Organized by:



Tokyo University of Agriculture  
(Tokyo NODAI), Japan

In Collaboration with:



ASEAN Network on Taxonomy

2016

# **Two Months Attachment Program**

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## **Attachment Report**

by

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### **Background**

Plant viruses cause various diseases and give strong impact on agricultural production, conservation of plant resources and international plant quarantine. Symptoms caused by plant viruses are various and virus diseases are known to be responsible for crop yield loss both in quantity and quality. We, however, have almost no effective treatments against plant viruses and this is a different situation from fungal and bacterial diseases against which we have effective fungicides and antibiotics. In this regard, proper management and application of available control measures upon early diagnosis are most significant.

In advance, “Training Workshop on Diagnostics of Plant Viruses” funded by Japan-ASEAN Integration Fund (JAIF) through ASEAN Plant Health Cooperation Network of the ASEANET (APHCN-ASEANET) have been successfully carried out by Dr. Marita S. Pinili, Training coordinator, UPLB, and Dr. Soetikno S. Sastroutomo, Secretary, APHCN-ASEANET at University of the Philippines at Los Banos for 2 weeks in August 2015 in which I joined as one of the resource speakers from Aug 17 to 24. Then I was invited to organize the “Follow-up Attachment Program” for two months at my laboratory for three selected participants from the previously mentioned workshop.

### **Objectives**

At the “Training Workshop on Diagnostics of Plant Viruses” in August 2015, all the participants learnt basic technology needed for diagnostics of plant viruses. Plant viruses are diverse and cause disease in many important crops. As it is almost impossible to eliminate viruses, early and accurate diagnosis is most requested in agricultural sectors and plant quarantine systems. In this regard, more advanced technology for diagnostics of plant viruses is necessary. Objectives of this “Follow-up Attachment Program” for selected participants are to help them to master advanced technology and give them confidence in their technology to disseminate it to their colleagues.

## Contents of the program

- 1) Lectures were given for participants;
  - General guidance of the program
  - History and education policy of Tokyo NODAI
  - Molecular detection of plant viruses
  - Nematology by Dr M.S.Pinili
  - Use of database and phylogenetic analysis by Dr. N.Furuya
  
- 2) Experimental courses or laboratory works were given by me, Dr. Pinili, Dr. T.Natsuaki and with the help of several graduate students of Tokyo NODAI.
  - Artificial inoculation including preparation of inoculation buffer and index plants.
  - Aphid inoculation of banana viruses.
  - RT-PCR detection of the genus Potyvirus and *Cucumber mosaic virus* including preparation of necessary solutions.
  - PCR detection of DNA virus such as *Banana bunchy top virus* including preparation of necessary solutions.
  - Electron microscopic observation technology including preparation of samples and PTA staining solution.
  - ELISA for Potyvirus using several samples such as bamboo, passion fruits, papaya and others. Preparation and results analysis were also included.
  - Gel-electrophoresis for protein analysis.
  - FTA sheets sample storage
  - Detection of ds RNA for unknown viruses at Utsunomiya University on December 3-5.

As for PCRs and ELISA, experiments were conducted repeatedly until participants can carry out the whole experiments by themselves.

### 3) Participation to an international congress

Three participants joined International Congress of International Society for South East Asian Agricultural Sciences (ISSAS) which was held at Tokyo NODAI from November 7 to 9 including field excursion. Participants learnt general agricultural sciences in SE Asia by key note and other lectures, and poster sessions. They could have good communications with scientists from various countries.

### 4) Participation to a defense for PhD degree on plant virology

Three participants joined the final 40 minutes presentation of a PhD candidate on her *Rice yellow mottle virus* work on December 17.

### 5) Visit to Plant Quarantine office and research institute

Three participants visited above mentioned office and institute in Yokohama and learnt by a short lecture and guide on their activities on December 11.

### 6) Final presentation using power points by each of the participants.

On December 21, three participants gave oral presentation on plant quarantine in each of their country and also the outcome of this program for 20 min each.

7) Participation to several events such as scientific presentation at Tokyo NODAI university festival on November 1, the farewell party for Dr. Pinili, and the farewell party for themselves on December 21. Communication with Japanese students and also international students from Afghanistan, Taiwan, Uganda and others were made friendly and students were invited to work together at the time of experiments.

### **Outcomes**

I highly evaluated the excellent ability and sincere attitude of three participants, Mr. Tran Van Chien, Ms. Norhayati Binti Madiha, and Ms. Nur Fitriawati Msi, which they showed during the program. I can proudly report here that they performed as they were expected wonderfully.

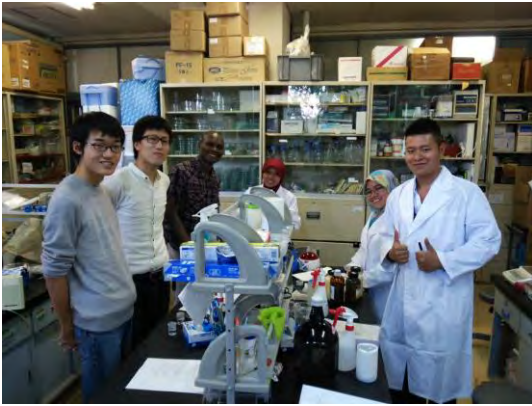
1. By a few lectures and talks during the experiments, the participants could learn more advanced knowledge and information on plant viruses which is necessary to master plant virus diagnostics.
2. By experiment course, the participants mastered advanced plant virus diagnostic techniques. They can conduct inoculation, aphid transmission, ELISA, RT-PCR, ds-RNA detection, gel electrophoresis and electron microscopy by themselves only if they have necessary facilities and chemicals.
3. The participants improved their ability and deepen their knowledge on plant viruses by lectures and discussion with resource speakers.
4. The participants understood more about plant quarantine system in Japan by the visit to Yokohama Plant Quarantine in Japan as well as systems in Vietnam, Malaysia and Indonesia by exchange of information among the participants.
5. The participants learnt laboratory management of Tokyo NODAI and also Japanese culture. They are expected to be the bridge between ASEAN countries and Japan.

### **Problems and suggestions**

1. Three participants were selected in this program and they worked really hard. I hope in next program, however, not only three but at least four or more persons will be selected. The reason one is that odd numbers of participants are not possible to be grouped evenly at the time of experiments. The reason two and the most important reason is that this program is very significant to all plant quarantine officers in ASEAN countries and thus I hope more people can join this program.
2. I would like to suggest to organize training programs such as a training program for diagnostics of Begomoviruses and a training program for diagnostics of phytoplasma. Begomovirus is a group of emerging and whitefly vectored plant viruses with DNA genome. This group is devastating in many crops and thus diagnostics of this group is very important. As for phytoplasma, disease occurrence is not common but we need special technology in diagnostics which is different from diagnostic technology of viruses.
3. To maintain the network and communication among participants, I hope we can exchange plant virus or even personal information from time to time by email.

### **Acknowledgement**

I thank Japan-ASEAN Integration Fund (JAIF) for their strong and generous financial support to this program in Tokyo. It was a wonderful experience to work with Dr Soetikno S. Sastroutomo (APHCN-ASEANET) and I thank him a lot for bringing me the opportunities to carry out this program. Many thanks go to Dr. M.S.Pinili for her excellent contribution as a resource person in giving the vivid and fruitful experiment course to the participants. I also thank Dr. T.Natsuaki, Utsunomiya University for accommodation of 3 participants for dsRNA experiments and Dr. N. Furuya for her attractive lecture on phylogenic analysis. In every program including lectures, laboratory sessions, visit to institutions, parties, my students and I shared unforgettable experience with Dr Pinili and three trainees. I would like to also thank Ms. Yoko Otsuka, NODAI Research Institute, for her kind and careful work for all accounting procedures and Mr. Chung Ilsung for his constant support in the laboratory during this program.



The first day of the training with Japanese and Ugandan students at Tokyo NODAI (right)  
Observation of virus diseases in the campus with a Tokyo NODAI student (left)



Experiment training (left) and after the seminar (right) with Dr. M.S Pinili.



With Dr. N.Furuya after her lecture and workshop.



With Dr. T.Natsuaki and students of Utsunomiya University and Tokyo NODAI at Utsunomiya University, Utsunomiya.



A group photo at the visit to Yokohama Plant Quarantine Office, MEXT, Japan.



At the SAYONARA party with the students and staffs of the laboratory of tropical plant protection.