IPM Innovation Lab Trip Report

Country Visited: Malaysia

Dates of Travel: September 24th - 29th, 2018.

Traveler Name and Affiliations: Nguyen Thanh Hieu, Southern Horticultural Research Institute (SOFRI).

Purpose of Trip: To present on "Effect of various degree of canopy pruning on plant growth, yield and control of canker disease (*Neoscytalidium dimidiatum*) of dragon fruit crop" at the *International Conference on Tropical Fruit Pests and Diseases (TROPED 2018).*

Sites Visited: Conference held at Le Meridien, Kota Kinabalu, Sabah, Malaysia

Description of Activities/Observations:

September 24th:

I traveled from Ho Chi Minh City (HCMC) to Kuala Lumpur, and then to Kota Kinabalu.

September 25th: The first day of the Conference

There were three sessions during the morning time. In session 1 "New and emerging tropical fruit pests and diseases" with two keynote papers and six other papers were included in this session. Prof. Randy C. Ploetz (University of Florida, U.S) and Dr. Mohamad Roff Mold Noor (Malaysian Agricultural Research and Development Institute, Malaysia) presented the two first keynote papers on "Progress on, and the future outlook of managing tropical fruit disease" and "Tropical fruit pests and its management options in Malaysia," respectively. The Chairman for session was H.E. Eng. Wassfi Hassan El-Sreihin, Secretary General of African-Asia Rural Development Organization (AARDO). Six other papers were presented on different subjects of pests and diseases in Malaysia, the Philippines and China. In particular, these topics focused on nematode and *Fusarium* TR4 infestation in Malaysia (Dr. Rahman, University of Malaysia) and the Philippines (Dr. Herradura, Bureau of Plant industry, Department of Horticulture), while report from China was on banana breeding program for Foc-resistant varieties through HIGS and gene editing (Dr. Yi, Guangdong Academy of Agricultural Science). A dieback of papaya in Malaysia is known as the new emerging disease in Sabah, Malaysia during last few years was also presented.

Sessions 2 and 3 on "Advances in biotechnology research on tropical fruit pests and diseases" and "Challenges and opportunities in bio-security and quarantine" were chaired by Dr. Zarina Amin (Director, Biotechnology Research Institute, University of Malaysia Sabah) in the afternoon. Two keynote papers in Sessions 2 and 3 were Prof. Zakaria (University of Sains Malaysia) and Mr. Afadi (Department of Agriculture, Malaysia) who gave reviews of roles of

biotechnology for genetic improvement of fruit crops especially banana, papaya, pineapple and mango, and strengthening sanitary and phyto-sanitary (SPS) capacities for improving trade of tropical fruit in Malaysia.

During this session, Dr. Nguyen Thi Kim Thoa from SOFRI presented a paper of "Abundance of mesofauna on mango (*Mangifera indica* L.) ecosystem in Bengaluru, Kanataka, India."

For opening ceremony, welcome address was given by H.E Dato' Mold Sallehhuddin Hassan, Secretary General, Ministry of Agriculture and Agro-based industry, Malaysia and Chairman of International Tropical Fruit Network; Prof. Dr. Kamaruddin D. Mudin, Vice Chancellor, University of Malaysia Sabah; Director of Department of Agriculture Sabah, H.E Datuk Idrus Shafie; Assistance of Minister, Ministry of Agriculture and Agro-based industry, H.E YB Sim Tze Tzin.

September 26th: Day 2 of the conference

Sessions 4, 5 and 6 were on topics of plant heath, soil nutrition, and disease-free planting material; advances in biological control methods and development in plant protection. Various fields of integrated pest and disease management of dragon fruit, pomelo, mango, and banana were reported by the scientists from Indonesia, Malaysia, Vietnam, Koppert Biological Systems, and FAO. Besides that, an FAO participant pointed out the window of global prospects for production and trade of banana and other tropical fruits.

Mr. Huynh Thanh Loc and I (from SOFRI) were involved in the session 4 and 5 as speakers in the day 2 of the conference. Our topics are "Validation of artificial diets for rearing of *Galleria mellonella* larvae and mass multiplication of entomopathogenic nematodes for use in the control of fruit flies" and "Effect of various degrees of canopy pruning on plant growth, yield, and control of canker disease (*Neoscytalidium dimidiatum*) of dragon fruit crop."

Closing ceremony took place after finishing the second day of the conference.

September 27th: Field trip at Durian Farm, Ranau district.

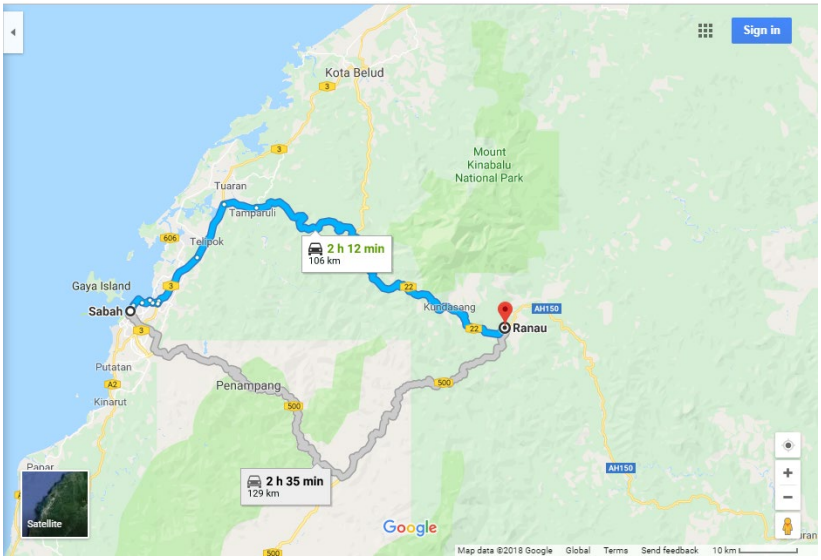
General information about Ranau: Ranau is an important agricultural and tourism center in Sabah and these two sectors have been the main economy backbone for the district. Most of tourism business has centered on the highlands of Kundasang, a sub-district in Ranau, while agriculture business is widespread all over Ranau. Therefore, most people of Ranau work as farmers or operators of their own business although there are white-collar workers as well mainly in the government sectors such as health, education, service, administration, and a few banking sectors. The moderate temperature of the Ranau highlands coupled with its fertile soil has been fully utilized by farmers to grow different types of vegetables and fruits such as cabbage, spring

onion, tomato, lettuce, carrot, certain extent cauliflower, capsicum, and many others. Strawberry has been successfully cultivated here and there were attempts in growing apple as well, although the result has been varying. Different kinds of flower have also planted here for commercial purposes.

We visited Durian Farm at Ranau district to understand durian cultivation and pest and disease problem. It was around 100 km away from Sabah to Ranau. We met the farmer, Ms. Ellvie, and group of government officials from Sabah.

According to Mr. Yacob Ahmad, Advisor of TFNet, tropical fruit crops rarely develop in Sabah.

This farm was established in 1996. Recently, approximately 40 ha of the farm has been cultivated with durian crop. There are many varieties i.e Kanzao, Udonpak, D24 grown at her father's farm, however, Musangking variety is just a new one that her father wants to enlarge area.



We had a chance to taste the durian variety. D24, another local durian variety, and mango juice was provided by the farmer and the district officials. Prof. Dr. Ploetz, from University of Florida, shared his knowledge on Phytophthora management by Phosphonate injection. Mr. Affandi and I, participants from Indonesia and Vietnam, described how to make a hand injector which is cheaper and more effective than a commercial one from Australia. Unfortunately, Phosphonate chemical was not available in Ranau yet. Then, I showed to Ms. Ellvie, the official, and others how to show typical symptom of Phytophthora appearing on the trunk, and the association between Phytophthora and *Xyleborus* sp. to give more seriously disease damage to durian tree. During feeding on infested tree, *Xyleborus* sp. could carry *Phytophthora* spores through their legs and spread to other trees. Moreover, the holes made by this insect play a role in infection. I guided to Ms. Ellvie and local officials the way to solve this problem in the future. We could paint a trunk up to 1.5-2 m high from the base by lime solution, then remove infected parts, either treat with Phosphonate or Fosetyl-aluminum by chemical painting/injecting or spraying on

the trunk (if localized infection), apply organism matter plus with *Trichoderma*, drain off the water in rainy season, and other methods.

On the way back to Ranau and Sabah, we had the opportunity to visit Desa Dairy Farm, Ranau Kundasang; Vegetable and fruit market; Nabalu Handicraft market, and look out Mount Kinabalu. In the evening, we visited the local fruits and vegetable market in Sabah.

September 28th: Traveled back to HCMC, Vietnam

Summary and knowledge sharing from the conference:

Based on two days of the conference and the field trip, we received new information on pest and disease management on tropical fruit crops i.e banana, papaya, dragon fruit, citrus, durian, etc. There were many fields of research in related:

- Overview of new and emerging tropical fruit pests and diseases and current solutions and future strategies on its management such as Panama wilt TR4, papaya dieback, fruit rot of jackfruit, longkong fruit drop (*Lasiodiplodia* sp.), thrips, nematode, etc.
- Breeding program for *Foc*-resistant and role of plant biotechnology for genetic improvement; Develop IPM practices to control pests and diseases on banana crop such as using thrips predator to control *Thrips hawaiiensis* and *Chaetanophothrips signipensis*, antagonist bacteria and fungi *Alcaligenes faecalis* and *Lecanicilium* sp. against *Erwinia psidii* (papaya dieback), essential oil for anthracnose, a importance postharvest disease; Spray program on black spot disease of citrus; Season and climate influence on papaya dieback and thrips occurrence on papaya and mango crops;
- Raising impact of climate change on implication of insect pests, natural enemies in tropical agriculture.
- Window of global prospects for banana production, others and trade
- Plantwise approach and strengthening to the plant health system

During the conference, I shared knowledge on dragon fruit and durian disease management i.e dragon fruit canker, Erwinia soft rot, durian trunk canker (Gummosis) to many colleagues, local officials, and the farmers from Malaysia, Sudan, Netherlands, TFNet, and CABI Malaysia. I had discussed with Mr. Bart de Graaf, from Koppert Biological Systems (Netherlands) how to collaborate on developing thrips predators for tropical fruit crops in Vietnam. I welcomed Prof. Randy Ploetz to SOFRI when he could get a chance to visit Vietnam.

Acknowledgments

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List of Contacts Made:

No	Name	Organization	Country
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2	Bart de Graaf	Koppert Biological Systems	Netherlands
3	Randy C. Ploetz	University of Florida	USA
4	Sivapragasam Annamalai	Centre for Agriculture and Biosciences, International, South East Asia	Malaysia
5	Muhammad Faheem	Centre for Agriculture and Biosciences, International, South East Asia	Pakistan
6	Lina Yip	Centre for Agriculture and Biosciences, International, South East Asia	Malaysia
7	Manoa Iranacola	Ministry of Agriculture	Fiji
8	Sabine C. Joshi	University of the South Pacific	Fiji
9	Sabine Altendorf	Food and Agriculture Organization	United Nations
10	Chong Tan Chun	Department of Agriculture Sabah	Malaysia
11	Evenni Poi Li	Department of Agriculture Sabah	Malaysia
12	Sim Khay Chuan	Ancom crop Care SDN BHD	Malaysia
13	Aftandi	Indonesian Tropical Fruit Research Institute	Indonesia
14	Lorna E. Herradura	Bureau of Plant Industry, Department of Horticulture	Philippines