Trip Report

Country Visited: Cambodia

Dates of Travel: 4/30/2017 – 5/8/2017

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Purpose of Trip: To advise of IPM cucumber field trials and next season’s long bean IPM package

Sites Visited: Royal University of Agriculture in Phnom Penh and Farmer Field Sites in Siem Reap

Description of Activities:

*Monday May 1:* Meetings at RUA with Ong Socheath (plant pathology) and Khun Kimkhuy (entomology). Field experiment showing wilting after transplanting with heavy rains and high temperatures.

The experiment is a randomized complete block design with 4 treatments with both researchers and their students working in the same field. Each plot is three rows wide and Socheath (plant pathology
samples the outer two rows of the plots while Kimkhuy samples the center row. Update: Upon discussions of experimental design, we concluded that the RUA treatments and the Siem Reap field treatments should mirror one another. The treatments at RUA will include: 1) control unsprayed, 2) BAU with both conventional herbicides and pesticides as needed; 3) the IPM treatment with Trichoderma, Orange Oil, Bacillus subtilis, Beauvaria basiana, Bacillus thuringiensis, cuelure, and sticky traps; 4) Treatment #s 2 & 3 combined.

Rainy season Chinese kale experiment. The seedlings were currently being grown as transplants as per the pictures below. We discussed planting them in trays with peat as this had proven to work well in the previous year’s experiment and resulted in improved root growth. However, this season the seedlings are being produced earlier in the year and it is hotter. Therefore, the exclusion netting does not work well because it increases the temperature and humidity too much. However, there is flee beetle damage already apparent on the cotyledons. There is also concern that there is not enough nutrition in the peat. Update: We discussed growing the seedlings in peat and trays using fertilizer to provide sufficient nutrition for the transplants.

Tuesday May 2:

Gave seminar to students about IPM techniques at RUA in coordination with the CE-SAIN program with approximately 30 students in attendance who are part of the new English degree program. The new program has now two cohorts of students who start taking classes in English their second year. Approximately 15/200 students per year are in this new English program. I provided a copy of my
presentation to CE-SAIN for distribution. **Update:** In the future, it would be good to coordinate with CE-SAIN further ahead of time to print copies.

After seminar, I met with Lyda Hok of the CE-SAIN project. **Update:** CE-SAIN is supporting a new full-time MS and PhD program at RUA. They will be providing scholarships for 8 PhD students along with 4 MS students starting this fall and four more starting in a couple years. The cost is about $300/mo for PhD students and $250/mo for MS students. CE-SAIN will also launch a mini-grant program providing faculty and students at RUA up to $15,000 for a research project. CE-SAIN is also launching 5 technology parks across the country including one at RUA. They will provide demonstrations of new technologies as well as space for research. The IPM IL research at RUA will be considered part of the technology park. It is not clear how they choose which technologies to demonstrate but there should be opportunities to demonstrate IPM IL technologies in the future.

In the afternoon, Kim Hian and I met to in-brief at the embassy with Theng Vuthy (agricultural specialist), Tohn Mok (M&E specialist), and a mission program coordinator (U.S. citizen, did not have a card). We provided updates about our work accomplished in 2016 and upcoming work in 2017. **Update:** The embassy was very interested in our use and perception of the google spreadsheet to coordinate all the IPM IL projects. They want us to update it during the 4th week of every month with any accomplishments because they will use information from the spreadsheet to brief the ambassador during the first week of the following month.

*Wednesday May 3: Travel to Siem Reap*

*Thursday & Friday May 4 & 5:*

We scouted all the field sites in Siem Reap at the following farms collecting data on ten plants per treatment (control, BAU, IPM) about: virus, downy mildew, and insect damage. The overall impression was that IPM did at least as well as BAU in all but 2 out of 11 farms. In particular, the IPM appeared to stave off virus infection. Farmers reported that the IPM treatments did not look good after transplanting because it was hot and dry but now during harvest the IPM seems to have caught up. In the experiment, all treatments received silver plastic, drip irrigation, and fertigation. This is not common BAU for farmers and observations of the cucumbers they grew on their own were not very good except for one farm (Megan #7), which had pretty severe virus across our experiment. **Update:** There were some experimental problems that can be improved upon in the next experiment. 1) The plastic mulch was closer to black than reflective silver and the soil was quite hot; we will look for more reflective plastic mulch. 2) It was recommended to farmers during the first half of the experiment to irrigate for about 5 minutes three times per day; this was causing plant stress and was corrected to irrigating fully once every 1-2 days. 3) The soil used to grow transplants was a heavy charcoal style instead of peat; peat with fertilizer will be used in the future similar to fall 2016 experiments with Chinese Kale transplants that proved successful.
Interviews with the farmers indicated that they were pretty happy with the IPM strategies. Only two were not very interested in continuing with IPM techniques. The most popular IPM strategies were the sticky traps and cue-lures because they were obviously catching insects. All but one farmer reported feeling some level of illness from applying conventional pesticides. They did not report the same effects from our treatments and were convinced that our treatments were not toxic because they do not have a strong chemical smell and they smell “earthy.” Multiple farmers indicated that they would pay double
for biological treatment options compared to conventional control. Three confirmed the example that if they pay 4,000 Riel for conventional pesticides they would pay 10,000 Riel for biological pesticides.

Monday, May 8:

We returned to the field with the assistance of Ong Socheath (plant pathology) from RUA to help identify some of the plant diseases. There are three distinct virus types. On the left is cucumber mosaic, which was very common. On the right are two others that were less common but consistently distinctive. They big yellow leaf tended to get most yellowed in the middle of the plant and the leaves had a shiny, silvery hue to them also. We wondered if those plants had a virus or magnesium deficiency. Below left is downy mildew symptoms. Below right is cabbage worm damage.
Typical farmer practice growing practice

IPM field trials with cue-lures and sticky traps apparent