IPM CRSP

Trip Report: Ecuador

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Purpose of Trip: Paul Backman from Penn State University accompanied by M.S. student Anna Testen, and Ph.D. student Hillary Kessler arrived after travel from the U.S. in Quito to visit IPM CRSP scientists (primarily at INIAP's Santa Catalina station just south of Quito) that are our counterparts for the project. Objectives were to determine achievements over the previous year, discuss impediments to progress, discuss future experiments, and to refine our collaboration to achieve better results at both institutions.

Sites Visited: The sites visited included the INIAPs Santa Catalina station (including its greenhouse, laboratory, and field sites South of Quito). We also visited the agricultural region between Latacunga and Ambato where there were several plant breeding sites, and research trials near Tandapi where improved naranjilla, tree tomato and mora plantings were being evaluated on steeply sloping mountainsides.

Description of Activities: Visits were made to key locations in the region, particularly to discuss progress in developing sustainable IPM practices for key crops, particularly in Andean fruits, and also crops that might be used as perennial strips. Discussions also were directed to next year's trials, and for coordination of graduate student activities, including discussions of permits for experimental use of beneficial and pathogenic microbes.

5/9&10/2011

On the first full day in Ecuador, we were given a tour of the Santa Catalina station by entomologist Patricio Gallegos. Patricio described his work with entomopathogenic nematodes (*Steinernema sp.)* as control agents for plant-damaging insects. Patricio's laboratory group also works on fungi and viruses that can be used to control insects. We visited his insect rearing facilities, as well as his greenhouse trials and discussed future plans for IPM research.

We were introduced to several greenhouse experiments with the major Andean fruit crops: naranjilla and tree tomato. These crops are susceptible to *Fusarium* wilt and nematodes, which necessitates the use of resistant rootstocks. The resistant rootstock used for naranjilla comes from a forest-type naranjilla, and is currently at the F_4 stage of breeding, and Ing. Ochoa thought he would have stable, F_8 lines in about 3 more years. The resistant rootstock for tree tomato is a tobacco (*Nicotiana tabacum*) rootstock. Jose Ochoa and his tesista student Paty are performing trials with populations of naranjilla to evaluate genetic resistance (large gene, or vertical resistance) to Fusarium wilt and late blight (caused by *Phytophthora infestans*) and nematodes. We also visited the diagnostic clinic run by Maria Insuaste. They were dealing with an eyespot of papaya that was leading to condemned shipments to Europe, and diagnosing a canker disease on mora. They also indicated that they are seeing increasing amounts of *Clavibacter xylii* (bacterial canker) in naranjilla, which is usually, transmitted by seed, and by hand transfer between plants during horticultural activities.

After our tour of Santa Catalina station, we travelled to a farm near Tandapi (at about 1,500 M, a few km off the road to Santo Domingo). At this farm, Jose Ochoa is conducting experiments with tree tomato, naranjilla and blackberry (mora) on highly sloped soil that appeared to be a deep volcanic andisol. The farmland on this farm is from clear-cut jungle and some of the experiments are to determine if the cropping systems can reduce erosion and if the varieties planted are sustainable, given the pest issues in the area. Ing. Ochoa predicted that significant losses from Fusarium disease would occur in 3-4 years, even on his improved and grafted lines. Since the farmer had interplanted with mora, this crop would continue and become the dominant source of funds as the naranjilla declined. The phytophthora blight problem will increase in intensity over the next several years, and will require frequent applications of fungicides for sustainable management. Botrytis fruit rot seems to be the primary problem in mora, but colletotrichum (anthracnose) is increasing regionally. The fungicides used for blight can suppress this disease too, if they are appropriately selected, and applied on a timely basis.

5/11/2011

A trip was made to faba bean and quinoa breeding and production sites to see key impediments to production, and efforts to control disease. At the faba bean site, chocolate disease, downey mildew and viruses were most prevalent, and obviously they produced heavy losses. There were however, some lines of faba with much lower mildew severities. This was particularly evident when we visited the site where INIAP was evaluating ICARDA lines introduced from Syria, which had several viruses that had probably been seed-borne to the Santa Catalina location. Eduardo Peralta did a great job of presenting information on the challenges of developing new faba bean cultivars. Similarly, in the quinoa plantings, the downy mildew pathogen was severe, and as we saw last year in Illangama, the newly developed INIAP quinoa almost certainly introduced downy mildew to that area in the form of seed-borne oogonia of that fungus.

As we finished the last day at the INIAP station, Dr. Gioconda Garcia visited with us to voice her personal support for the IPM project and for the SANREM project as well. I was impressed with her knowledge of Science and plant breeding, and impressed with the improvements at the station over the past 4 years since my first visit.

List of Contacts Made:

Name	Title/Organization	Contact Info (address, phone, email)
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