

GUATEMALA PA TRIP REPORT

by

**Roger Williams, Brhane Gebrekidan
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August 8 - 19, 1994

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IPM CRSP US Institutions

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Montana State University
Ohio State University
Penn State University
Purdue University

Rodale Inst. Res. Ctr.
Univ of CA/Berkeley
University of Georgia
USDA Veg Lab
Virginia Tech

Host Country Institutions

Prime Sites
Guatemala - Agri-lab, ALTERTEC,
CARE, ICTA
Jamaica - CARDI, Ministry of Agriculture
Mali - IER
Philippines - NCPC/UPLB, PhilRice

Satellite Sites
Ecuador - INIAP
Honduras - EAP
Thailand - Dept of Agriculture
Uganda - Makerere University

International Centers

AVRDC - Taiwan
IRRI - Philippines

CIAT - Columbia
CIP - Peru

Private Sector

The Kroger Company

Caito Foods

PICO

NGOs/PVOs

CLADES

TRIP REPORT
IPM-CRSP-GUATEMALA
P.A. August 8-19, 1994
Roger Williams, Entomologist
The Ohio State University-Wooster

Initial meetings for the P.A. for Guatemala were held in one of the classrooms at U.V.G. There was good attendance by all of the agencies and institutions concerned: Virginia Tech was

represented by the largest contingency, Brhane Gebrekidan, Kent Reid, and Virginia Seitz; Purdue by Glenn Sullivan and his Guatemalan colleague Linda Asturias, Ohio State by Roger Williams and Helda Morales, a Ph.D. student; and U, of Georgia by Anne Dix, a Ph.D. student. Guatemala institutions included: ICTA (the agricultural research arm of the government), Altertec (agency specializing in Organic Farming), Agrilab (a private Soil Testing Lab), CARE (the Micuenca Project),

This report will be comprised of my observations in the field and visits made to various contacts in Guatemala rather than what took place in the workshop portion of the meeting,

After three days of preparation at the WG two groups were formed. The large group did participatory interviews in Chilasco, Baja Verapaz and the small group, of which I was a member, did similar interviews in the Department of Chimaltenango. First we visited the Agrilab facilities and met several of the key people. Next we visited bramble producers farms. The first farm visited in San Andres Itzpa produced both raspberries and blackberries. Brazos and Autumn Bliss (blackberries) have been grown in the area for some time, however, red raspberries, cv. Brussels, are a promising new export crop. After visiting another bramble farm, a packing facility used for export of various crops was toured in order to glean more information on export potential. Agrilab has expressed interest in a cooperative project with OSU in developing IPM strategies for brambles for export, Insects, diseases, and nematodes are all problems which cause great concern in bramble crops in the Guatemalan Highlands.

The next trip to the Highlands was a visit to organic farmers which are cooperators of Altertea. We were accompanied by a representative from Altertec and another from ICTA. What an eye opener this was to see a family of 6 and in another case a family of 9, each being supported and apparently sustained by the production from a single manzana (1.7 acres) of land. Both were former or present associates of Altertec, Both were utilizing every inch of land and only one place used any pesticides - about 20% of corn production still used some pesticides but that was being phased out.

The third trip to the Highlands was to the area of Patzun where Helda will be conducting a major portion of her survey in August and most likely her research in 1995. We visited the Cooperative "Flor Patzunera". The director of the Cooperative went with us to show us there new packing facility with cool room and then to visit vegetable growers that raised snow peas, broccoli, corn, beans, squash, mini-squash, faba beans, and other vegetables. On our way back to Guatemala City we stopped off at a berry farm and had a tour through a blackberry producing farm that also sold bramble plants. :

Surprise: In what turned out to be a grand serendipity we now have the possibility of having the best qualified IPM specialist as the local Guatemala Site Coordinator. This proposal was made by the Gerente General of ICTA, Ing. Agr. Mario Amezquita, The candidate is Dr. Victor Salguero who works very closely with many institutions in Guatemala and throughout Central America. We could not have asked for a better liaison person since he moves between agencies and institutions with the greatest of skills. He still

needs approval from CATIE and the blessings of USAID which should be forthcoming. Victor has many IPM publications on NTAE and is currently coordinator of the September Workshop of Whitefly to be held in Guatemala. A copy of the brochure with details of the Whitefly Workshop are attached,

Wishful thinking: One of the people I met at the MIP (IPM) meeting in Costa Rica in July was Flavio Linarest Associate Director of the Peace Corps in Guatemala. Flavio has a M.S. degree in Entomology and Acarology and is in charge of the 10 new IPM recruits that will arrive in Guatemala in October. Flavio spoke to our group and expressed an interest in interacting with the IPM CRSP in hopes of leveraging both programs

Transportation: In a recent discussion with the OSU specialist in obtaining surplus equipment it was learned that two or three possibilities exist to obtain a vehicle for Guatemala. This is so important in that it would greatly enhance the quantity and quality of research that we are able to perform, Unfortunately there are some areas in the hinterland which have difficult roads to maneuver and a 4-wheel drive vehicle would be extremely useful.

On the ground and running: Helda Morales in doing her initial survey on traditional versus non-traditional pest control during the month of August 1994. She is making nice headway and will soon be back in the States to consolidate her findings. She is working in Patzun and plans to do some work in Chilasco. She will provide me with a summary of her activities during the first few days of September.

Literature Review: Great strides have been made in obtaining citations of pertinent publications of traditional and NTAE. The CD-ROM from IICA entitled "Bases de datos agricolas de America Latina y El Caribe" contains a world of information and most references are accompanied by a resume (in Spanish) of the contents of the article. In addition more recent publications were obtained at the MIP Congress in Costa Rica and this P.A.

The plan calls for establishing and improving systematics research centers in all countries, supporting institutions that educate systematists, and expanding the number of research positions. Raven says, "The goal is not to produce a major encyclopedia, but to engage our knowledge to be readily accessible to support human survival." —JAM

ODD SPECIES, CLOSE NEIGHBORS

Phylogenetic relationships, as reflections on the history of life, can help us to make decisions and establish priorities, says David B. Wake of the University of California at Berkeley. As an example, he describes setting conservation priorities to preserve lineages of special value. If one thinks of phylogeny as a tree, some branches are longer than others. If two species have diverged from each other recently, say less than a million years ago, they sit at the end of short branches and are likely to share many characteristics. However, if a species has no near relatives and diverged from other extant species many million years ago, it sits at the end of a long branch. When priorities for conservation must be set, Wake says, there should be special emphasis on protecting long-branched species, because they will contain the largest amount of evolutionary novelty. "In the long-branched taxa, we are preserving something unique," Wake says. The task becomes easier because Wake has found that long-branched taxa are concentrated in some habitats.

Consider the frogs. With one exception, all 4000 or so known extant species reside in one much branched clade. There is today only one representative of another clade, the earliest divergence from the lineage leading to all other living frogs, a split that may have occurred as long ago as 150 million years. This species, *Ascaphus truei*, is called the tailed frog or tailed toad because the male has a unique false penis controlled by tail muscles. Restricted to the closed-canopy forest on the Olympic Mountains of the US West Coast, the tailed toad is clearly a long-branched taxon.

But the tailed toad is not the only long-branched taxon in that habitat. Ancestors of the torrent salamanders *Rhyacotriton* spp. four species whose only measurable differences from each other are biochemical, may have diverged from the other salamanders 100 million years ago. In addition, these mountains are home to the mountain beaver, *Aplodontia rufa* which is not found anywhere else in the world. Wake says that this animal, which is actually not a beaver but a primitive rodent, may belong to a taxon long ago split from the squirrels and rodents. Scientists have also identified in that area six longbranched taxa among insects, including the world's largest flea, *Hystrichopsylla schefferi*. This flea, which is 6-8 millimeters long, has been found only on the mountain beaver. Another recent finding is a parasite—a trematode of a new order, genus, and species—that lives only in the cloaca of one of the torrent salamanders.

"I predict that more long-branched taxa will be found there," Wake says. "The area has a unique history of lineage preservation."

A CROP THAT MIGHT PREVENT ETHIOPIAN FAMINE

It is food against hunger, wrote Portuguese priests who explored northern Ethiopia in the 1600s. "Anyone who has this food never suffers." They were describing enset (*Ensete ventricosum*), a bananatree-like plant that disappeared more than 200 years ago from central and northern Ethiopia, including regions where famines in the 1980s killed millions of people. Enset continued to be grown in southwest Ethiopia, an area isolated by mountains.

Scientists investigating the disappearance of enset from parts of Ethiopia discovered the Portuguese documents. They also uncovered historical data that described how farmers in central and northern Ethiopia abandoned enset when eighteenth- and nineteenth-century governments, under the influence of colonial preferences for bread and other foods made from grains, put greater economic value on growing drought-sensitive grain crops imported from Europe. If drought-tolerant enset had still been cultivated in the northern and central areas in the 1980s, the droughts might not have had such devastating effects, says Steven Brandt, a University of Florida archaeologist.

Brandt was prompted to probe historical records after realizing that Ethiopians in the Southwest did not suffer from severe food shortages during the recent drought years, partly because of their reliance on the corms, pseudostems, and leaf stems of enset for food and animal fodder, as well as for clothing fiber and building materials. He is conducting preliminary anthropological and archaeological surveys in Ethiopia, working with agronomist Cliff Hiebsch and cultural anthropologist Anita Spring, both of the University of Florida, Tsedeke Abate of the Ethiopian Institute of Agricultural Research, and Kassaye Begeshaw from the government's Center for Research and Conservation of the Cultural Heritage.

Little is known about enset. Wild species grow from Nigeria in west Africa through the central and southern parts of the continent. However, Ethiopia is the only place where the plant has been domesticated. Enset grows quickly into large tree-like plants. Besides the many uses of harvested enset, Ethiopian farmers also rely on the trees to prevent soil erosion; its shade protects sun-sensitive plants such as vegetables. Although it is in the same family as the banana, enset fruit is inedible.

SUMMARY TRIP REPORT - GUATEMALA

August 8-19, 1994

Representatives of the U.S. institutions working with the IPM CRSP spent two weeks in Guatemala with their counterparts conducting participatory workshops and appraisals. The objectives of this effort focused on: (1) training in participatory methods, (2) generation of baseline information, (3) establishing research goals and programs for year two and beyond, and (4) team building among the collaborating institutions.

August 8-9. The first two days were devoted to project briefings, baseline information gathering, and training workshops. Host country collaborators and stakeholders were briefed on the IPM CRSP by U.S. project coordinators Brhane Gebrekidan, Kent Reid, and Glenn Sullivan. All collaborators and stakeholders were given country situation briefings on the status of IPM activities in Guatemala, the overall political and economic "climate" in Guatemala, and the IPM institutional capabilities in Guatemala by host country presenters, including: Flavio Linares, Cuerpo de Paz; Victor Salguero, CATIE; Robert Rice, WG; Danilo Dardon, ICTA; Hermogenes Roldan, CARE; Guillermo Sanchez, AGRILAB; Linda Asturias, ASIES; Wayne Williams, USAID; Estuardo Secaira, AGRICULTURA SOSTENIBLE; Rafael Solorzano and Rodolfo Guzman, ALTERTEC.

The day of 8/9/94 was devoted to participatory training and team building. The PA workshop was conducted by Ginny Seitz, Virginia Tech. In-depth training was completed, and collaborators were prepared for the field PA's during the next two days in Baja Verapaz and Chimaltenango.

August 10-12. Collaborators were divided into two groups - Baja Verapaz and Chimaltenango for the participatory appraisals. The Baja Verapaz site represents more recently established production, primarily broccoli. Farmer/householder PA's were conducted. Insights into pest, disease, market, economic and socioeconomic issues were explored. Broccoli crops appeared vigorous and healthy. Intensive farming practices were predominant. *Plutella* was found to be a common pest problem, and Bt control is being attempted. Organic farming is visible in the area, but not common. Baseline PA information suggests that issues of intensive cropping, division of household labor, economic sustainability of small farm operations, and environmentally safe pest management are all important issues at this site.

The Chimaltenango site represents a more established non-traditional crops production area, with a broader variety of crops and more advanced pest management programs. ICTA has an excellent field research station in the region, and is carrying-on an impressive research program - given the availability of operating resources. Organic farming (lead by ALTERTEC) has a relative strong presence in this region. PA's at two of these farms revealed that ALTERTEC is doing a very credible job of balancing integrated biological control methods with economic sustainability. For example, both farms (1.7 acres each) supported large families (6 to 9) and yet yielded enough production to generate cash income - all from fully integrated cropping systems employing only biological control methods! PA's further revealed that the family division of labor, family economic welfare, and perceived "quality of life" had all improved since adopting these farming strategies.

Further PA's in the region revealed that many farmers had become heavily dependent on one or two crops, and often lacked the diversity needed to "weather hard times". Intensive, monoculture farming practices that depended heavily on export markets were found to be highly vulnerable, and less sustainable over time. In some instances, family labor had to be sent outside the farming unit to generate income and assure sustainability of the family unit.

PA findings are now being summarized and prepared for use in developing future activities.

On Friday, August 12th, Sullivan and Williams made a visit to the central offices of ICTA. The purpose of this meeting was to brief ICTA senior management on the status of IPM CRSP and establish commitments for proceeding. The General Director, Mario Amezcuita was very cooperative and receptive. He has been General Director for only eight months, but he has taken a real leadership role in strategically assessing ICTA - who they are, why they exist, what they need to be in the future. This has led to the preparation of an impressive plan to revitalize ICTA, and he sees this IPM CRSP as an important catalyst in that plan. The World Bank will be visiting ICTA in October to discuss funding for this plan, and Sr. Amezcuita intends to promote this IPM CRSP collaboration as visible evidence of ICTA's future direction. This, in our opinion, represents an exciting opportunity for enhancing and leveraging the IPM CRSP. Follow up meetings with the General Director were held to solidify collaborations and IPM CRSP commitments.

August 13. Working group sessions were held at UVG to discuss PA activities and findings during the past two days, and establish the agenda for the coming week.

August 14-15. These two days were election/holiday in Guatemala. The U.S. IPM CRSP team met to discuss PA activities to date, establish priorities for proceeding and finalize procedural issues. Year-two IPM CRSP activities were discussed and prepared for presentation to the Guatemala collaborators.

On Monday, selected collaborators visited PATZUN, including the vegetable production cooperative. PA baseline information was developed. In addition, the group made PA visits to three small farms in the region. Snow peas, broccoli, maize, and squash were found to be common crops in this region, with thrips, cutworms, and mildew the primary pest problems. Blackberries (and raspberries) are also visible non-traditional crops in this region. Both have strong markets and minimal pest control problems at this point in time. The economic and socioeconomic issues of concern were probed during the PA process, and later summarized for prioritization of workplan activities - and future program development.

August 16. PA activities continued in the Chimaltenango region. In addition, selected collaborators met with institutional stakeholders having important contributions to IPM CRSP, including: AGRILAB, FLACSO (socioeconomic research group with existing databases), PROEXAG II (commercial export support organization), ICAITI (economic research group with existing baseline information), and ASIES (economic/socioeconomic research group). The purpose of these institutional visits was to solicit collaboration in providing baseline information that already exists for the IPM CRSP sites, thereby minimizing replication and conserving budgetary resources.

August 17. The IPM CRSP collaborators reconvened at UVG to discuss the results of our PA activities and, given those findings, establish priorities for year-two workplan activities. After much discussion, interaction, and consensus-building, the collaborators decided on eleven (11) workplan activities for the 1994-95 program period - and the lead institution/collaborator for each. These eleven prioritized activities are as follows:

1. *Assessment of insect, disease, and weed pests and natural enemy occurrence within and between the commercially important fruit and vegetable cropping systems in the Guatemalan highlands. Activity led by ICTA.*
2. *Determine the potential for improvement of *Bacillus thuringiensis* (Bt) for control of *Plutella* and other pests in broccoli. Activity led by ICTA.*

3. *Testing of IPM alternatives for white fly control in fruits and vegetables. Activity led by ICTA and CATIE.*
4. *Conduct and document farmer baseline studies at the household and community levels. Activity led by CARE and Virginia Tech*
5. *Documentation of transferable traditional knowledge and practices related to pest management, sustainability, and ecological balance in fruits and vegetables. Activity led by ALTERTEC*
6. *Documentation of transferable traditional knowledge and practices related to pest management, sustainability, and ecological balance in fruits and vegetables. Activity led by Purdue University, Linda Asturias, and Virginia Tech*
7. *Evaluate economic, social, and gender impacts of pest management alternatives. Activity led by Virginia Tech and Purdue University.*
8. *Baseline assessment of non-traditional crop exports and development of expansionary export market strategies. Activity led by Purdue University and Linda Asturias.*
9. *Determine the impact of insect and disease carryover within and among adjacent fruit, vegetable, and herbs cropping systems. Activity led by Agrilab.*
10. *Determination of the influences of weed populations on insects, diseases, and natural enemies in fruit and vegetable cropping systems. Activity led by ALTERTEC*
11. *Enhancing biological control of insects and diseases in fruit, vegetable, and herb cropping systems. Activity led by ICTA.*

August 18. This was a day of real achievement for IPM CRSP! The collaborators spent the entire day discussing year-two workplan activities and the respective budget requirements. This was a most rewarding session - difficult, but rewarding! For the first time ever (in most cases) the collaborators were engaged in "give-and-take" consensus building. The open dialogue and honest exchange of ideas/concerns/interests provided each collaborator with new insights to the others point-of-view, leading to an unprecedented spirit of candor, cooperation and consensus. The results of these program and budgetary discussions are summarized in Table 1 attached.

In addition, the collaborators reached consensus agreement on a site coordinator. Given the enabling background work done by the U.S. IPM CRSP team with ICTA, Victor Salguero (CATIE) agreed to serve as Guatemala Site Coordinator. Victor will operate from ICIA's central office, and provided the necessary support needed to be effective. This was a major accomplishment, and a giant step forward for the Guatemala IPM CRSP program. Victor Salguero is highly regarded as an IPM researcher and facilitator.

August 19. With the PA agendas and workplan consensus completed, the U.S. IPM CRSP team spent the day preparing final reports and meeting with key institutional stakeholders. Meetings were held with USAID (Wayne Williams, Alex Dickey, and Martin Schwarz) to brief them on IPM CRSP progress in Guatemala, and seek their continued support for Victor Salguero's selection as Guatemala Site Coordinator.

In addition, meetings were held with GEXPRONT (Ricardo Santa Cruz, Executive Director) to establish stakeholder collaboration in IPM CRSP. We were received with enthusiasm, and various commitments for collaboration were finalized. GEXPRONT has a large amount of baseline economic, market, and regulatory information that will be made available to IPM CRSP as program demands dictate.

August 20. U.S. IPM CRSP team departed Guatemala.

Submitted By:

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In collaboration with:

Brhane Gebrekidan, Program Director, VPI
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Roger Williams, Principal Co-Investigator, OSU
Ginny Seitz, Principal Co-Investigator, VPI
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Rafael Solorzano, ALTERTEC
Victor Salguero, CATIE
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GUATEMALA TRIP REPORT

August 7 - 20, 1994

Prepared by **Brhane Gebrekidan and Kent Reid**

Purpose

The primary purpose of this trip was to take part in the Participatory Appraisal and Year Two Workplan development of the Guatemala Prime Site of the IPM CRSP.

August 7 (Sunday)

We arrived Guatemala City early evening and checked into Hotel Villa Espanola. Other participants from the U.S. were Glenn Sullivan, Roger Williams, and Virginia Seitz.

August 8 (Monday)

Meeting at Universidad del Valle de Guatemala. Participants were from Virginia Tech, Purdue, Ohio State, Georgia, ICTA, ALTERTEC, AGRILAB, USAID, CATIE and CARE. The day was spent covering overview, discussion of purpose of this PA exercise, institutional and organizational reports, and special reports from invited speakers. In the overview, it was emphasized that at the conclusion of the two week workshop the following major tasks had to be accomplished:

- Identification of a Guatemalan lead institution
- Identify a Guatemalan host country coordinator for this CRSP
- Conduct a PA and identify key locations for the involvement of this CRSP in Guatemala
- Identify the strategic commodities for IPM CRSP focus
- Identify the strategic pests for IPM CRSP focus
- Develop projects/activities for Year Two of this CRSP
- Develop a budget that goes with the activities developed

The Peace Corp Program in Guatemala has an excellent IPM program being implemented jointly with ALTERTEC. The focus is on small farmers producing non-traditional export vegetable crops. This program attempts to promote IPM and minimize pesticide use. Opportunities for collaboration of the IPM CRSP with this program look excellent. USAID/Guatemala emphasized the importance of the inter-relationships of IPM and the environment in the non-traditional export crops. The focus in the IPM program should be the small farmer. Reduction or elimination of pesticide residue should be a priority in an IPM program.

ICTA/CATIE gave an overview of IPM activities in Guatemala. The joint venture in IPM involving ICTA, CATIE, and ARF was highlighted and presented as a success story. The focus crops are broccoli, snow peas, and tomatoes. The important pests are aphids and *Plutella* in broccoli, *Aschochyta* in snow peas and whitefly/virus in tomatoes.

Effective controls for these and other pests and diseases have been developed and extended to farmers through the cooperative program.

About eight major export houses handle most of the non-traditional export vegetable crops in Guatemala. These are ALCOSA, INAPSA, INEXA, AGRIPLAN, PLANTERRA/TIERRA

FRIA, CONSOLIDADOS, CHESTNUT HILL, and VERDUFREX. These companies have a major role to play, not only in exporting, but also in producing the export vegetable crops.

August 9 (Tuesday)

Meeting continued at the Universidad del Valle. Reports from various institutions/organizations were presented. The bulk (81%) of the Guatemala export vegetables goes to the US market. A range of insecticides are used on broccoli and snow peas. Thrips continue to be a major problem in snow peas. In tomatoes, insecticides have been ineffective in the control of whitefly (vector for virus disease).

CARE/Guatemala has a good IPM program and is involved in IPM extension, as part of its MICuenca (Integrated Management of Watersheds) project. The major components of IPM in CARE involve cultural control, regulatory measures, chemical application, behavioral control (use of traps), and biological control (use of parasitoids).

AGRILAB is a private company interested in the use of IPM in farmer's fields. They have the capacity and the interest to be involved in laboratory analysis of soil, plant tissue, diseases and pests. They would like to be involved in this CRSP.

Linda Asturias, anthropologist, with no permanent institutional linkage is interested in socio-economic aspects of this CRSP. She understands local customs, languages and social values.

ALTERTEC works at the grassroots farmer level in IPM issues. Conducts training for farmers at regular intervals. They have been working with local farmers on IPM since 1987 and are still active and interested in working with farmers. They are primarily interested in IPM using non-insecticidal approaches.

Ginny Seitz conducted the workshop in the use of PA methodologies. Interested Guatemalan staff took part in the workshop. She presented slides on her recent trips to Nepal and Jamaica. A follow-up of the PA presentations in the workshop was to be done in the field visits to Chilasco and Chimaltenango.

August 10 (Wednesday)

Left Guatemala City for Salama /Chilasco in Baja Verapaz. We arrived at Salama at 9:00 a.m. and checked into the guest house of Defensores de la Naturaleza. We drove to Chilasco and arrived there at mid-day. Under guidance of local informants and farmers, we visited several local broccoli farms. In a number of farms we saw *Bt* being used for the control of lepidopterous larvae (especially *Plutella*). The broccoli crop we saw looked clean and vigorous and relatively free from pests and diseases. The disease and pest control programs of broccoli farms in monitored and supervised by different companies exporting the crop. The companies generally provide seeds, chicken manure, chemical insecticides, and technical advice to their client farmers from whom they purchase the produce. We saw a broccoli variety trial in a farmers field conducted under the auspices of ICTA/CATIE/ARF/EXPORTING COMPANIES. The trial was well conducted and appeared impressive. The most widely grown broccoli hybrid grown in the area is Marathon (from the USA). A technician of the INEPSA Company (Francisco Fortim) informed us that farmers spray their fields based on insect scouting and a threshold level of insect presence.

August 11 and 12 (Thursday and Friday)

We visited two organic farms in Salama which are being supported, advised and promoted by ALTERTEC. Both farms are fairly small in size but are able to support their families. The range of crops being cultivated in a mixed farm fashion was very large - about 70 different crops - fruits, vegetables, field crops, spices, herbs and medicinal plants. The farmers emphasized that they have no pest problem on their farms because of the mixed cropping system they follow. The medicinal plants they grow give them all the medicines their families need. One of the farmers (Rene Santos) has an innovative way of producing nutritive organic fertilizer from cow dung through the intermediary of earthworms. He is looking for a market for his organic fertilizer.

We visited the ICTA San Jeronimo station late in the afternoon. The buildings, grounds and experimental plots looked very impressive. However, the labs lacked equipment and were currently used as dormitories for staff. The main crops/areas handled at the station are horticulture, maize, fruits, and seed production. The viticulture program is strong and has support from the Chinese Mission. We saw a very serious problem of virus disease of tomatoes transmitted by whitefly.

August 13 (Saturday)

The participants of the workshop reconvened in the Universidad del Valle. Reports of the two groups which visited Chilasco and Chimaltenango were heard. Both groups reported favorably on the field visits and the activities of the institutions and the farms they visited.

August 14 (Sunday)

This was the election day for the Guatemalan Congress.

We had a meeting of the IPM CRSP Team from the US institutions. Procedural issues bearing on the management of the IPM CRSP were raised and discussed. The need for institutionalizing and streamlining the decision making process in this CRSP was raised and discussed. In particular, it was suggested that the authorities of and responsibilities of the Site Chair be spelled out clearly. It was also proposed and agreed that Roger Williams be the alternate Vice Chair for the Guatemala site. Glenn Sullivan is to follow-up the relevance of this issue with Ron Carroll.

The team worked on a draft list and description of Projects/Activities for the Year Two Workplan of the Guatemala site. It was agreed that the draft will be presented to the entire group of workshop participants.

August 15 (Monday)

We visited the Vegetable Production Cooperative in Patzun. Manuel de Jesus Joyote (Coop Rep.) gave us an overview of the activities of the Coop. The Coop provides insecticides, fertilizers, seed and technical advice to its members. The Coop was established in 1977 and exports its produce (vegetable crops) to the US through a Miami based broker. The Coop uses only EPA/FDA approved insecticides and fungicides because of its dependence on the US market only. Thrips and cutworms were mentioned as the main pest problems on snow peas. Seasonally low prices for their produce is a major problem for the Coop. Prices for snow peas can range from Q0.15 to Q7.00 per pound.

We visited three different farms in the Patzun area. The first two produced sweet peas, broccoli, maize and squash. We witnessed a major mildew problem on the snow peas because of the rainy season. Farmers have to spray fungicide every day to control mildew on snow peas.

The third farm we visited grew an excellent and impressive field of blackberry (=Mora). We saw a noctuid borer problem which was of concern to the farmer. The pest girdles the stem of the plant, the larva stays in the stem as a borer and forms a protective frass cover. The farmer did not take any control measures.

August 16 (Tuesday)

We visited the ICTA Chimaltenango Station under the guidance of Mr. Danilo Dardon, the Coordinator of the ICTA Crop Protection Division. We saw research on horticultural and medicinal plants as well as spices. The station has an impressive live collection of medicinal plants, well identified with scientific names and uses. There is a major effort at the station to develop a range of processing and packaging technologies appropriate for small farmers and semi-industrial cooperatives. The technologies are mostly based on solar dehydration. In the medicinal plant collection, *Tagetes erecta* and *Ruta chalapensis* were mentioned as specially valuable for insect control in crops.

We saw one special trial on broccoli which was evaluating different types/formulations (11) of *Bt* for the control of *Plutella*. This project was being cooperatively conducted by ARF-CATIE-ICTA. Such trials identify the best *Bt* formulation for use of broccoli farmers in Guatemala. Three vegetable exporting companies contribute funds and participate in sponsoring the joint research programs. These three are ALCOSA, INEXA and AGRIPLAN. ICTA trains the technicians of these three companies in IPM procedures. Based on this training, the technicians do not recommend spraying chemicals on calendar basis, but on scouting and threshold level determination of pests on a given farm.

Late in the afternoon, we visited the head office of ALCOSA (the largest exporter of nontraditional export vegetable crops). We met Mr. Erich Sundfeld, who gave us an overview of the company's activities in IPM. They have vegetable production in five major zones Chilasco, Zacapa, Central, Central Highlands and Western Highlands. They export entirely to the US (Hanover Foods of Pennsylvania) amounting to 25, 18, 4, 1.8 and 1.2 million pounds yearly of broccoli, okra, brussel sprouts, sugar snap and snow peas respectively. ALCOSA works only with small farmers through contract growing. They provide seed, fertilizers, pesticides and technical assistance to the farmer who is obligated by contract to sell his produce to the company. ALCOSA has 25 agronomists working on about 10 crops throughout the country. ALCOSA technicians spray all fields of snow peas to ensure that the proper chemicals are used. All other spraying for other crops is done by the farmer himself. ALCOSA has its own laboratory for analyzing products for pesticide residue before it is exported to the US. Through this testing, it ensures that all its exported products meet the EPA/ FDA specifications. ALCOSA expressed that it is interested and willing to cooperate with this CRSP in any appropriate way.

August 17 (Wednesday)

The entire group of participants met again at the Universidad del Valle. The major topic discussed during the entire day was the identification of projects/activities for this CRSP in Guatemala. Lead and collaborating institutions for each activity were identified. The four Guatemala-based institutions interested in working with this CRSP were identified as ICTA, ALTERTEC, AGRILAB and CARE. In the course of the discussion, it was agreed that ICTA will be the lead institution for coordinating the IPM CRSP activities in Guatemala.

The list of project activities agreed upon were:

1. Assessment of insect, disease, weed pests and natural enemy occurrence in fruits and vegetables in the Guatemala Highlands

- ICTA lead, AGRILAB & ALTERTEC collaborating
- US (Ohio State, U. of Georgia)

2. Determine improvement of *Bt* for *Plutella* control in broccoli

- ICTA lead, CARE collaborating
- US (Ohio State)

3. IPM alternatives for whitefly control

ICTA lead, CATIE and AGRILAB collaborating
US (Ohio State)

4. Conduct farmer baseline study

CARE lead, ALTERTEC collaborating
US (Virginia Tech, Georgia, Purdue)

5. Traditional IPM knowledge documentation

ALTERTEC lead, ICTA and AGRILAB collaborating
US (Ohio State, Virginia Tech, U. of Georgia)

6. Institutional Policies and regulations on IPM and export Market opportunities

- Linda Asturias lead
- US (Purdue, U. of Georgia)

7. Economic/social/gender impacts of IPM alternatives

- Linda Asturias lead
- US (Virginia Tech, Purdue, U. of Georgia)

8. Export markets strategies baseline assessment (non-traditional export crops)

- Linda Asturias lead
- US (Purdue)

9. Impact of insect and disease carryover in fruit and vegetable cropping systems

- AGRILAB lead, CARE and ICTA collaborating
- US (U. of Georgia)

10. Influence of weed populations on insects and pests

- ALTERTEC lead, ICTA and AGRILAB collaborating
- US (U. of Georgia, Purdue)

11. Biological control of insects and diseases

- ICTA lead, ALTERTEC and AGRILAB collaborating
- US (Ohio State)

In the evening, we had a productive meeting with the Director General of ICTA, Ing. Agr. Mario A. Amezcua. In addition to the IPM CRSP US team, Dr. Victor Salguero (CATIE Guatemala Coordinator) and Ing. Agr. Danilo Dardon were present. The DG of ICTA agreed

for ICTA to take the leadership for IPM CRSP. He also informed us that ICTA will have functioning telephone and FAX lines within about a month. He also identified Dr. Victor Salguero to be the interim Guatemala host country coordinator for this CRSP. Dr. Salguero agreed and is enthusiastic to serve in this capacity. He currently has a position as CATIE coordinator, based in Guatemala, and funded by USAID through CATIE. His current contract goes until September 1995.

ICTA will provide all the institutional support to Victor to function effectively as the IPM CRSP Coordinator.

During the same evening meeting, the Memorandum of Understanding for IPM CRSP's operation in Guatemala was signed.

August 18 (Thursday)

The day was spent discussing the budget and fund allocations by institution. The distribution of funds, as agreed by all participants, by activity and institution is given in Table 1.

August 19 (Friday)

We visited USAID/Guatemala Mission and gave them a debriefing. Those present in the meeting were Wayne Williams, Alex Dickey and Marti Schwarz. The Mission was very supportive of the IPM CRSP involvement in Guatemala. Victor Salguero's designation as the host country coordinator was discussed and received well by the Mission. Martin Schwarz will bring up the issue to the attention of the CATIE administration in Turrialba next week. He believes that CATIE will support the idea.

Upon our departure from the Mission, we agreed that the IPM CRSP will write a letter to the USAID/Guatemala Mission Director, William S. Rhodes, proposing that Victor Salguero's position be supported through Mission funds beyond September 1995.

We had the opportunity to visit the GEXPRONT and speak to Ing. Ricardo Santa Cruz, who is the Executive Director of the ARF Program. He explained to us the involvement and support of the Exporters Association (GEXPRONT) in IPM research. Some 300 companies support the activities of the GEXPRONT. We saw an excellent video showing the research activities of the ARF supported IPM work in Guatemala. Other partners of the IPM research effort are ICTA, CATIE and Universidad del Valle. Glenn Sullivan is to make copies of the video for use of this CRSP.

August 20 (Saturday)

We left Guatemala City early in the morning and returned to Blacksburg early in the evening.

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