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## Trip Report

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**Mali and Senegal**

**11 – 28 September 2011**

### **IPM CRSP Associate Awards:**

**Mali: Building Local Capacity in IPM Solutions**

USAID/Mali Associate Cooperative Agreement No. 688-A-00-10-00015-00

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**IPM CRSP Africa Food Security Initiative (IPM CRSP AFSI)**

*USAID/EGAT Associate Cooperative Agreement No. EDH-A-00-08-00015-00*

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**Country(s) Visited/Dates of Travel:** Mali, Senegal

**Traveler Name and Affiliations:** Larry Vaughan, IPM CRSP Associate  
Program Director

### **Purpose of Trip:**

Mali associate award – Follow-up on workplan development.

Food Security Associate award – In Mali: implement research activities (rice yellow mottle virus diagnostics, blister beetle management) and technology transfer activities (certified rice seed production for women’s groups, area-wide tomato virus management)

In Senegal: meet with AFSI coordinator and tour activities on tomato and rice in St. Louis

### **Sites Visited:**

Mali – Bamako, Bema, Kati Sikasso

Senegal – Dakar, St. Louis

### **Description of Activities/Observations:**

I departed the United States *Sunday 11 September*, arriving in Bamako on Monday evening the 12<sup>th</sup>.

#### ***Tuesday 13 September***

I set a meeting date for Wednesday with Halima Traoré of LCV.

1015h meeting with personnel at IER/Sotuba

I met with Sidiki Traoré to discuss the blister beetle experiments to be carried out in Bema. I picked up the light traps that had been stored at IER since last year.

I talked with Aminata Ntoumé Dolo about the pots that I brought to compare bare-root tomato seedlings with potted seedlings. I talked with Youssouf Traoré of WASA about the status of the rice seed production activity with which we are collaborating in Sikasso.

13:40h – 1400h. Peace Corps. Jolie Dennis and Yacouba Koné. Sidiki Traoré and I met with Jolie and Yacouba to discuss the rice seed production collaboration in Sikasso and the status of a volunteer being placed in the village of Niéna where we are working with WASA. A volunteer had been placed there earlier in the year, but had to leave for personal reasons. Two volunteers will be placed at Niéna in January 2012. One will

work in health and the other will be an environment volunteer. Mamdou Traoré remains the regional coordinator in Sikasso. Beatrice, the Sikasso region coordination volunteer had completed her service. Three points were discussed: purchasing supplies for Peace Corps collaboration through the AFSI associate award, strengthening collaboration on the rice seed production work in Sikasso, and finding other areas for Peace Corps/IPM CRSP collaboration. Jolie and I agreed to meet during our separate trips to Sikasso the following week.

I talked to Bokary Timbo of DNA about meeting to discuss DNA's need to send signed contract documents.

I learned that the Bamanan word for blister beetle *mina*. I was told a story by one of the waiters at the hotel. His father worked for the railroad in Kayes. His father told him that railroad workers would avoid wearing white shirts during the season when blister beetles were numerous. Otherwise they would be pelted with blister beetles on the trains at night.

### ***Wednesday 14 September***

At 8:00am I had a meeting with Halimatou Traoré of LCV.

We discussed the quotes for a laboratory generator, the delivery date of computers for installation of gas chromatograph, the process of selecting the appropriate model of high performance chromatograph (HPLC), and the need to purchase a fume hood for the Soxhlet extractor. Halima proposed local degree training for one of the residue laboratory technicians for Year 3. We also talked about progress on spending targets, revision of the business plan and scheduling the business plan study tour, constructing a platform for the generator.

At 0930h Halima and I went to IER/Sotuba to meet Kadiatou Gamby, head of the fruit and vegetable laboratory. Together we discussed allowable personnel costs associated with the project, short-term training in the U.S for IER and LCV personnel. For LCV, Boubacar Maiga was selected. At IER, I got the okay I had been seeking for the past month to proceed with short-term training for Aminata Doucouré in October. Madame Gamby also proposed Binta Diallo for U.S. English training. Issa Sidibe, project coordinator for OHVN, arrived at 1040h, shortly before Halima left,. We talked about collaborative tasks between IER and OHVN, including the upcoming pesticide safety training. We also discussed the two institution's roles in building capacity in Mali for tomato grafting to protect against bacterial wilt. I told Madame Gamby about the idea Issa and I discussed during my previous trip to assess the interest of a handicapped NGO as recipients of grafting training once we have trained IER staff. I learned from

Madame Gamby that it had not rained in Bema during the past 19 days. Bema is where the blister beetle work takes place.

Issa took me back to my hotel to check out and load the pesticide training supplies that I brought for Pat Hipkins. He took me to the airport where I took the 1340h Kenya Airways to Dakar. I arrived at 3:15pm.

At 1800h I had a meeting with Emile Coly, director of the horticultural center at ISRA and coordinator of ISRA's activities in the AFSI associate award. We planned the trip to St. Louis to meet the station staff.

### ***Thursday 15 September***

There was a problem with transportation, so I worked in my room from seven to ten at which time an ISRA chauffeur picked me up. We arrived at CDH at 1100h, where I met Emile again. We worked in his office until a vehicle from Thies arrived to take us to St. Louis. We left at 1300h. On the road at Pout, the main fresh fruit market in Senegal, I bought eleven big mangoes for 2000CFA. I gave away most of them. The flesh of the one that I ate was of poor quality. It had a lot of soft spots that suggested fruit fly larva damage, but I found no larvae in it. We arrived in St. Louis at 1900h. Arriving at the St. Louis ISRA station at 1722h we met with Aziz N'Gom, *Chef de Service Administratif*. The center's director was absent. At 1740h Emile and I met with the research team: Aminata Ba Sow, Souleymane Diallo, Samba Diaw, and Papa Demba Kane. Samb and Papa are based at CDH in Dakar, but had gone to St. Louis ahead of us to do some project work on tomato. We talked about the work that remains before the end of the project in April 2012.

1. Rice field leveling
  - a. Rice field leveling. Last year Souleymane leveled two small plots were leveled. Weed density was compared between the two leveled fields and non-leveled fields. Yield could not be measured because rats consumed a lot of rice. This year four leveled parcels are planned to compare with unleveled rice fields— two at Fanaye and two near Richard Toll. Both rice yield and weed infestation will be measured. There will be a follow-up meeting with villagers regarding the results. Souleymane said, "Field leveling should be considered as integral to rice production as a tin of fertilizer." He said that field leveling is not included when people think of mechanization.
2. Herbicide resistance in weeds of rice fields

- a. Last year two species of weed were tested with inconclusive results. It will be done again this year with seeds collected from places where the herbicide Ronstar is used. Two species of Echinochloa and nutsedge, *Cyperus rotundus* will be tested.
3. Farmer socioeconomic survey
    - a. Aminata talked about the labor requirements for interviewers as well as the distance that is economically practical for them to travel. Four interviewers are needed at a cost of 150,000CFA/month in order to interview 120 producers. I was told that the reason the study hadn't been started was that there wasn't enough money in the project account at any one time to cover the costs of getting started. Paying the interviewers for one month would take more than the St. Louis station's portion of the advance. I said I would discuss increasing the advance to allow ISRA to meet these costs. (Subsequent inquiry at OIRED showed that we had already increased the advance adequately in August.)
  4. Tomato disease management.
    - a. Observations in the target areas of Thilène and Gnith last year showed no tomato leaf curl virus. Gnith, on the west shore of *Lac de Guier*, had been chosen as a zone of intervention because it was outside the zone of the tomato committee that manages tomato production in most of the Senegal River Valley. In 2011, Gnith joined the tomato committee. That means they will be sowing their tomatoes earlier than usual this year in order to have a harvest that coincides with the canning season at the SOCAS cannery. Samba and Papa had been to Gnith earlier in the day to meet with leaders and were planning a workshop with growers' unions the following week to build awareness about the no-host period and assess their interest in trying it. This will be done through collaboration with the tomato committee led by Matar Fall.
    - b. The project intended to bring to Senegal the no-host period that was successful in Mali. We discussed our experience over the last two years. Tomato yellow leaf curl virus is no longer considered much of a problem in the Senegal River Valley since adoption of improved varieties years ago. Because only one tomato planting is made per

year and it is done after the rice harvest, there is a default no-host period that probably keeps the virus at a low level. Growers are even able to continue to grow a desirable yet virus-sensitive variety like Rio Grande. The bigger risk of tomato virus is in places where tomatoes are grown over a longer period and without the entrained harvest period required by the canneries. Gnith had been in this latter category because it sold its tomatoes as fresh market tomatoes instead of for canning. The other place where tomato virus is more probably than the valley is the Niayes zone of ancient dunes along the west coast between St. Louis and Dakar. Illustrative seed prices are 30,000 CFA/kg for Rio Grande versus 1 million CFA/kg for seeds of the hybrid Gempride.

- c. *Ralstonia solanacearum*, is a serious disease that is spreading from Dagana, where it has been documented in fields over the past five years. It spread this year and the agricultural credit bank is saying that it won't finance growers in the zone of bacterial wilt infection. The tomato committee sent a letter to ISRA requesting help. Samba is getting ready to work with 1000 producers to test seeds from the company East-West in *Ralstonia*-infested fields.
- d. We talked about the opportunity to test planting tomato nurseries in pots. In this case it was suggested to plant in egg cartons (pépinière en alvéole) as a means to both protect young tomatoes from whitefly damage (for which growers spray even if virus is not a serious threat) and as a method to facilitate tomato grafting that protects against bacterial wilt. Egg cartons cost 1150CFA for 114 plants.

The meeting ended at 1900h.

### ***Friday 16 September***

Emile and I returned to Dakar from St. Louis. I flew back to Bamako in the late afternoon. Bob Gilbertson, plant virologist from U.C. Davis arrived later that evening.

### ***Saturday 17 September***

Bob and I were picked up by Issa Sidibé of OHVN. We went to Kati with Aminata Dolo and Mamadou Alou Traoré both of IER/Sotuba to look at tomato work being done there through the AFSI project. Kati is a special tomato production zone because it has a

tradition of growing rain-fed tomatoes during the rainy season. Most tomato production in Mali is done during the dry season to avoid diseases.

In the village of Mayambougou we studied the trial set up in the field of Abu Diarra. Shasta and Quanto are the varieties planted in the field we visited. There are some open-pollinated varieties planted elsewhere. Quatro was the variety preferred by the growers with whom we spoke in this village. Their preference was based on these tomatoes selling well and selling quickly. For a 30kg basket of tomatoes a grower can get 4000CFA for Quatro if regular tomatoes are going for 3000CFA. One of the farmers that had experience with the open-pollinated varieties liked the variety coded OPG1. The OP was getting 2500 – 4000CFA per basket. He said it sells well in the market. Bob says the OP varieties that were being tested were moderately resistant to leaf curl virus, sensitive to fungi, and sensitive to bacterial wilt. They produce round fruit. We asked about price fluctuations. He said that prices vary from week to week, not day to day. He does not know the price until he gets to the market. The Kati market sells mostly into Bamako, but there is a truck that regularly comes from Kayes.

The grower used about 10kg of DAP fertilizer per 1/4ha, putting a “pinch” in each transplant hole. According to the grower, no pesticides were being used. There were maize, peanuts, and cotton fields surrounding the tomato field. We were told no cotton pesticides were used on the tomatoes.

The weeding of the field is done by men. The field was about 1ha. We were told that a team of six or seven persons can weed it in four hours.

Septoria leaf sport was observed, and is an expected problem during the rainy season. Bob told the accompanying farmers that overhead watering encourages septoria infection. Bob said that transplants for the second planting are more at risk than the first transplant in of the rainy season.

We estimated the loss of failed transplants by dividing into four teams of two. Walking sample rows one person counted the number of plants and another person counted the number of those plants that were dead or dying. About 19% of the plants had been lost after transplant.

Bob agreed to bring varieties 9881, Shasta, Quanto to expand grower availability through local seed dealers, plus two open pollinated varieties to test.

We visited a second field that was a replanting of an open-pollinated variety that Bob had provided the previous season. The transplants were too tall, having been planted at 30 days instead of 20 days because of a poor start to the rainy season. The grower

explained that they had to wait until rains resumed. Some of the plants were lying on the ground because the stems were too long. There was African eggplant interspersed in the tomato field. The grower explained that the jakatu was planted when a tomato failed. Jakatu comprised 23% of the field based on counting five rows of plants. There had been a lack of rain in August/September that was hard on the plants.

Bob was satisfied not seeing virus. He said before the host period was adopted, he would see yellow leaf curl virus by this time of year in Kati's rainy season production.

### ***Sunday 18 September.***

Seribé Katile of IER, Bob Gilbertson of UC Davis, and I drove to Sikasso in the southeast of Mali. The objectives were to look at the rice seed production activity being done in collaboration with WASA, demonstrate the rice yellow mottle virus test kit to Moro Traoré, and observe a rainy-season tomato trial being carried out in the south.

Met with WASA/Sikasso staff:

### ***Monday 19 September***

In the morning Katile, Bob, and I picked up Moro Traoré of the IER/Sikasso station and his technician Harouna Yossi. Before we left IER/Sikasso, we paid a courtesy visit to Harouna Yossi, director of the station.

We then went to the WASA/Sikasso office to discuss the rice seed production activity with Ibrahima Sanogo, *chef d'équipe* and Arouna Sangaré, the seed technician. We learned that the 0.5ha plot in Niéna had been rejected by the inspectors on Friday.

After the meeting with WASA Bob and I went with Katile and his local technician Moussa Kanté to observe a tomato trial in the village of Natiacoura on the highway to Bamako, but well before Niéna. The trial was set up in the field of Mamadou Diouté. Resistance against bacterial wilt and other rainy-season tomato diseases was being tested. The field were almost entirely wiped out by foliar disease. One variety by East West was producing some fruit despite the heavy disease pressure. The variety Floridad seemed to exhibit some resistance to the onslaught of fungal disease. The plants looked bad, but they were bearing some fruit. The variety Karibu were heavily attacked by fungal diseases and producing no harvestable fruit. We returned to Sikasso about 1600h.

We observed that yellow sticky panels were being deployed. These were ineffective for several reasons. First, they were not sticky. The motor oil that was supposed to be applied regularly was not being applied. Second, the motor oil is unlikely to have been sticky enough for long enough. Third, even if the small panels attracted whiteflies, they



could not possibly attract enough whiteflies to affect the population. Fourth, because the trial was set up to test tomato varieties' resistance to ambient disease pressure, there is no reason to try to reduce the whitefly population. Finally, because tomato yellow leaf curl virus can be transmitted by a single feeding by a whitefly, mere reduction of the whitefly population would not protect tomatoes from infection. Yellow sticky cards are ineffective for population control. Their use should be discontinued.

The variety that was performing relatively well under the very high disease pressure should be further tested in rainy season trials.

In the evening we met with Jolie Dennis of Peace Corps/Mali, who was on a trip to look at volunteer placements in the region and visit volunteers. We also met Mamadou Traoré, the regional staff member of Peace Corps for Sikasso. We agreed to send up to two people from Peace Corps to the regional master trainer session for pesticide safety.

### ***Tuesday 20 September***

Bob, Katile, and I met WASA's Arouna Sangaré and Gaoussou Diawara for a trip to Niéna, a village where WASA had been working to promote production of certified rice seed by the women's group there. At Niéna we met the president of the women's group, Rokoia Diallo, and several members of the group. We walked to the groups field, where they had planted Nerica 4 with training and support from WASA. In August the group had been put on notice for the poor condition of the field when there field was inspected by the regional agriculture service. We arrived just after the second inspection during which the plot was rejected because of high weed density and poor stand. An adjacent plot, was in much better condition. We discussed with the women. The group's field was planted after personal fields had been planted. The planting was not late in relation to a normal season, but the rain stopped for several weeks, resulting low soil moisture and low germination. For this reason the field stared with low potential that was compounded by further irregularity in the rain. An earlier planting date would have given it the opportunity to establish before the period of water stress. Inasmuch as the field was unlikely to yield much rice, the women largely abandoned their weeding obligations. I agree that to invest the labor to weed this field would have been a poor use of their time.

I was surprised that this field was planted as a communal field because I thought each individual would plant her own plot. This would have avoided the problem of the planting date being delayed until personal fields were planted.

I took a video of one of the women explaining the importance of the task to increasing their livelihoods. Being in Bamanan, I don't know what it says.

In the afternoon after lunch we tried to go to M'Pegenesso, where another grower group was working with WASA to grow certified rice seed and having success. There was a small earth-on-wood bridge through a rice basin that had been collapsed by the front wheel of a large truck, which was stuck across the bridge. There was just enough room for our vehicles to get past the truck. We watched a tractor and donkey cart cross successfully. If a vehicle got stuck trying to pass the truck, the bridge would have been impassable and we would have been on the wrong side of it to return to Sikasso. Therefore, I decided to cancel the trip and turn around.

WASA was being prolonged until the end of December, so support to M'Pegenesso would continue through the harvest. I proposed in the work plan continuing support by IPM CRSP through the Mali associate award in 2012.

Upon returning to Sikasso we used the time to review with Moro and Harouna in detail the protocol for using the RYMV test kit. We spent between one and two hours reviewing the English instructions, translating them into French and practicing the motions with the test kit materials.

Bob and I met Aissata Traoré, Dick Cook, Adjé Diakaté, and Djigiba Kouyaté – all working for IICEM. They were on a planning mission for the project.

### ***Wednesday 21 September***

We returned to Bamako.

### ***Thursday 22 September. Malian Independence Day***

Sidiki Traoré and I left with Kadidiatou Gamby for Bema in the north of the region of Koulikoro to set up experiments for blister beetle management in millet. A varietal field trial, repeating the trial of 2010, had already been planted. Madame Gamby inspected the varietal trial when we arrived in the early afternoon, then returned to Bamako.

Bob Gilbertson remained in Mali to visit field sites of tomato trials with Moussa Noussourou and Madame Gamby.

### ***Friday 23 to Monday 26 September***

Based at the IER station in Bema, Sidiki and I set up and monitored field experiments in millet fields. The first night we set up the light traps in a maize field on station in front of our quarters where they could be easily observed. The traps performed were still functioning in the morning, so I was satisfied that we could start a real experiment in a millet field. There were few blister beetles in

the traps because we were not in good habitat for them. We had the surprising result of capturing a impressive number of the head borer moth *Heliocheilus albipunctella*, which is also a millet pest.

There had been no rain in Bema for the previous 19 days. The soil was dry. Fields that had been planted after the first rain were looking okay. Fields planted later were stunted.

We carried out the following experiments:

1. Color preference for light traps. We used LED arrays of different wavelength, to test color preferences of blister beetles and the attractiveness of the traps to non-target invertebrates. Blister beetle density was recorded in the evening from the three millet plants nearest the light trap. Catches were recorded in the morning.
2. We did a field application of spinosad (an organic insecticide) and neem ( a botanical extract of the tree *Azadirachta indica*) in a millet field where blister beetles were observed. *Psalydolytta vestita* were collected from sprayed and unsprayed plots to monitor survivorship. This experiment was repeated after my departure.

We discovered that the light traps could not generate enough power from their solar panels to ensure the trap would stay lit throughout the night. Traps that did not continue to function when we checked them in the morning had to be discounted from the test, making it difficult to get enough samples of each tested wavelength to test color preferences. After three days, blister beetles left the first field; most of the millet was beyond the stage of maturity that blister beetles could feed upon. We moved the traps to a second field where a substantial portion of the millet was still susceptible to blister beetle attack. Despite the batter problems and the need to shift fields, over time we were able to see that *P. vestita* and *Psalydolytta fusca* were attracted by the near-UV and violet LED arrays, as expected. After having found that long-recharges of up to two days in direct sunlight did not revive the rechargeable batteries, we resorted to non-rechargeable batteries in order to keep the traps running all night. Using non-rechargeable batteries required that we unscrew the battery compartment and remove the dry cells every morning so that the solar panel circuit would not ruin them by charging them. We found the Mali-manufactured Mansa brand of batteries were the most reliable and longest-lasting compared to the Chinese imported batteries, which were of low quality and were quickly made to leak by the solar charging circuit. The re-charging problem may be because the solar panel on each trap is insufficient to

compensate for the power required to run five LEDs overnight. It may also be the result of the high daytime temperatures that make charging inefficient. Both factors need to be considered in modifying the design of the traps.

On the evening of the 26<sup>th</sup>, the IER vehicle arrived for our return to Bamako

***Tuesday 27 September***

We left for Bamako early in the morning. Upon arriving late in the morning Sidiki and I stopped at OHVN to see Issa Sidibe as well as Pat Hipkins who had arrived from the U.S. to work with Issa to give the master training for pesticide safety trainers.

At 1600h I had a de-briefing at USAID with the AOTR, Augustin Mamadou Dembele, Eric Shutler, and Oumarou Camara After the debriefing at USAID, I went back to the hotel and met Pat Hipkins over dinner, then went to the airport for the flight to Paris.

***Wednesday 28 September***

Return home

## **Abbreviations:**

AEG USAID Accelerated Economic Growth

AFSI. African Food Security Initiative. (IPM CRSP associate award)

AOTR. Agreement Officer's Technical Representative

DG Director General

DNA *Direction Nationale d'Agriculture* (Mali)

IER. *Institut d'Economie Rurale* (Mali)

LCV *Laboratoire Central Vétérinaire* (Mali)

LTCQE *Laboratoire de Toxicologie et du Contrôle de Qualité Environnementale*

(LTCQE)

OHVN Office de la Haute Vallée du Niger

OIRED. Office of International Research, Education, and Development. Virginia Tech

OPV *Office de Protection Végétaux* (Mali)

PMP Performance Management Plan

RYMV rice yellow mottle virus

USAID. United States Agency for International Development

VT. Virginia Tech. Blacksburg, Virginia USA

WASA. West African Seed Alliance

**Contact List:**

<b>First Name</b>	<b>Last Name</b>	<b>Institution</b>
Mama	Diarra	IER/Sotuba. Sociologist technician
Aminata Nantoumé	Dolo	IER/Sotuba. Researcher
Aminata	Doucouré	IER/Sotuba sociologist
Kadidiatou	Gamby	Chief of the Vegetable and Fruit Research Laboratory. IER/Sotuba
Bob	Gilbertson	University of California at. Davis
Ilias	Goro	Office du Niger, <i>Directeur d'Appui du Monde Rural</i>
Pat	Hipkins	Virginia Tech
Moussa	Noussourou	IER/Baguineda. Researcher
Issa	Sidibé	<i>Chef de Recherche Développement OHVN</i>
Eric	Shutler	USAID/Mali
Aissata Traoré	Thera	IICEM consultant. IER/Sotuba. Researcher
Moro	Traoré	IER/Sikasso
Sidiki	Traoré	IER/Sotuba. Research technician
Youssouf	Traoré	WASA National Coordinator