

# IPM CRSP Trip Report

<b>Countries Visited:</b>	Senegal and Mali
<b>Dates of travel:</b>	3/15/11 - 3/27/11
<b>Traveler:</b>	Dr. Robert L. Gilbertson Professor of Plant Pathology University of California-Davis
<b>Sites Visited and Activities:</b>	See below

## 3/13

- Depart Davis fly to Washington-Dulles
- Depart Washington-Dulles for Paris (6:25 PM)

## 3/14

- Arrive in Paris (~6:30 AM)
- Depart for Dakar Senegal around 5 PM
- Arrive in Dakar ~9:30 PM and was met by Larry Vaughn
- Check into the hotel Farid and have dinner with Larry and Muni

## 3/15

- Head to ISRA and briefly met with Dr. Emile Victor Coly, an entomologist that is in charge of CDH
- We also meet Papa Demba Kane (Papa), who is in charge of plant pathology activities at CDH and Dr. Dienaba Sall, an entomologist who will be heading up the cabbage IPM project
- Toured the laboratory facilities

- Papa shows us around the phytopathology lab, which is fairly well equipped, including having some equipment for molecular biology research (a PCR machine, centrifuges, pipetmen, etc.)
- It become clear that one of the big problems in Senegal is regular availability of power as we experience regular power outages throughout our visit. This will make it difficult to conduct molecular biology techniques in this facility
- Papa shows us the tomato plants inoculated with bacteria isolated from tomatoes with suspected bacterial wilt from Dagana-the plants are look like they were killed by the bacteria-this is fully consistent with bacterial wilt being the disease in Dagana
- Head to DPV (Direction Protection Vegetal) and meet Kemo Badji
- Kemo shows us some ongoing whitefly feeding preference studies
- Visited Lamine Senghor's laboratory-it looks fairly well-equipped, especially for standard plant pathology work
- Depart to initiate the pest survey in the Niaje region
- Went to Bayakh and visited a cabbage field
- The soil type is sandy and the field is sprinkler irrigated
- There is a significant amount of black rot disease caused by *Xanthomonas campestris* pv. *campestris* based on the typical V-shaped lesions and black veins in affected leaves -black rot is typically a seed-transmitted disease that is also spread by water
- Surveyed a potato field that was near the cabbage field
- Early to medium vegetative growth stage
- No symptoms of virus infection
- Major disease problem is a fungal leafspot, probably early blight caused by *Alternaria solani*, based on the concentric rings present in some of the lesion
- Headed to Djender and a vegetable production area
- Here we see mixed vegetable production-cabbage, lettuce, peppers and tomatoes of various ages
- Cabbage has a lot of insect damage (diamondback moth?) but no black rot-suggests a different seed lot used than in Bayakh and/or cultural practices
- A tomato planting (green-red fruit stage) with a fair amount of ToLC was found (sampled)-interesting that there was very few whiteflies in this planting-shows that there is fairly high virus pressure in this area
- In another tomato planting saw wilting but it turned out to be bacterial soft rot not bacterial wilt

- Saw a potato field with a high incidence of early blight-favored by dew and sprinkler irrigation-not clear if it came in late or if it was a problem throughout the growing season
- No evidence of virus or potato tuber moth
- Saw cassava with cassava mosaic (sampled)
- Headed to Residence (Lat-Dior Thies) for dinner and for the evening

### 3/16

- Breakfast at Lat-Dior
- Heading toward the Niaye
- Papa indicated that African cassava mosaic virus and the cassava mealybug were introduced into Senegal in 2004 with germplasm
- Reached Mboro village a vegetable cropping area
- Transplanting tomatoes and watering with a hose-could see fungal disease already developing on lower leaves!
- Also found volunteer tomatoes around this area with ToLC (sampled)-thus a good source of inoculum for this newly planted plants
- Also found root knot nematode on some of the older tomatoes
- Here they grow a local tomato variety called Mboro-a round variety with ribbed fruits- looks like it is quite susceptible to ToLC
- Cabbage loaded with diamondback moth but no black rot disease
- Visited a second farmer who had young tomatoes interplanted with lettuce
- Already ToLC was starting to appear on some of these plants (sampled)
- Found some root knot nematode on the cabbage
- Found some very old (left for dead) tomatoes that were sprouting and had lots of ToLC
- Farmers indicated that they do not see extension agents-they get most of their information from seed and chemical reps
- Headed to Potou Village, mostly a cabbage and onion growing village
- Water comes from deep wells in the ground
- Cabbage had lots of DBM, no black rot
- Did find some tomatoes, a few had ToLC symptoms (sampled)
- They were growing the cultivar Xina, a small round fruited variety.
- Price is OK, 30X more during the rainy season!
- Headed to St. Louis

- Checked into Hotel Poste

3/17

- Depart for Dagana
- Stopped at ISRA-Saint Louis
- Muni found an interesting whitefly species
- Drove through Richard Toll-lots of sugarcane being grown here
- Enter Dagana-come to Socas cannery
- Met with leader of tomato committee: Ablaye Dieng
- Indicated that bacterial wilt was first seen in 2005 (I agree Issoufou and I saw it back in 2007)
- Now entire areas are being affected by the disease and substantial losses being experienced
- Varieties grown: Yaki, Gempride, Goodyear, RioGrande (OP-most resitant) and Rio Fuego (OP).
- Company called Top Mountain obtains the seeds and provides them to growers
- Each farmer produces their own transplants in a nursery-this could be improved
- Grow rice or maize in rainy season
- Concern is that bank may not fund farmers who had wilt in their fields
- Met extension agents with SAED-Cheikh As Tall
- Field 1-had wilt but rotated to rice-now looks pretty good-evidence rice rotation can work?
- Field 2-Yakii/Gempride-in various stages of wilt and death-live plants have obvious vascular discoloration-set-up streaming test-positive both for tomatoes and wilting nightshade weeds
- Field 3 a variety trial-all look susceptible-lots of nightshade with wilting symptoms
- Dagana C-Gempride-lots of bacterial wilt-continuous cropping of tomato-some areas 100% loss-Datura with wilt and discoloration
- Field 5-field a female farmer-Mariama Fall-Gempride-she has gotten a number of harvests-still concern about planting tomatoes next season-but then no money from the bank

- Very little virus and whitefly observed in any fields (due to resistance, natural enemies of the whitefly and the natural host-free period)
- Head back to St. Louis
- Stayed at Hotel Poste again

### 3/18

- Depart St. Louis
- Pass through Louga
- Lunch at LeCroissant Magique
- Back to CDH-Dakar
- Met with Emil Coly and discussed the IPM-CRSP project
- Cabbage: Djeneba and team of technicians
- Tomato: Papa and Samba
- Potato: Emile and Papa
- Back to Farid
- Process samples

### 3/19

- Breakfast at the Farid
- Head to DPV and met with Kemo and Lamine Senhor
- Head to the Niaye through a big mango producing area
- Visited a fairly large farm at Notto Gouye Diama with drip irrigated cabbage, tomatoes and eggplant
- Observed a weed host with large populations of whiteflies
- Also whiteflies on the crops but not as much
- Cabbage has lots of DBM, but no black rot
- Older tomato field at harvest-whiteflies and honeydew but not much virus-variety is Asilia-apparently resistant? They are also spraying once per week for whiteflies
- Younger field-no obvious virus symptoms-some virus-like symptoms though-especially in younger leaves (sampled)

- Also saw some yellowing in older leaves-possible clostrovirus symptoms or nutritional deficiency
- Also some early blight, Helicoverpa and burn damage
- Field manager indicated that the grower would be very interested in IPM
- Stopped at another tomato field along the way Keur Lemou
- Lots of ToLCV
- Also yellowing and wilting-when the outer tissue is trimmed away, it revealed obvious vascular discoloration-thus, it is probably Fusarium wilt
- Wonder what race they have here?
- Proceed to Fass Boye-an area near the ocean
- Very sandy soil, growing potatoes, tomatoes, carrots,
- Young tomato field, cv. 6000 (?)-very clean-no whiteflies or virus symptoms
- Older field also very clean-one plant with TYLC-like symptoms-sampled
- Carrots have some Xanthomonas blight
- African eggplant has what looks like Septoria blight
- Potatoes have a severe cases of early blight-Alternaria solani-the question is did much of this come in later when the plants had senesced or is it really causing yield loss
- Head to Dakar
- Briefly stop at Agricultural Research Station
- Potatoes with lots of early blight
- African eggplant with mite damage that mimics symptoms of virus infection
- Dinner at Kemo's house
- Back to Farid

**3/20**

- Check out of Farid
- Checkin for flight to Bamako on Kenya Air
- Arrive Mali 7 PM
- Head to Le Loft Hotel

### 3/21

- Breakfast at Le Loft
- Head to IER at Sotuba
- Met Mme Gamby and looked at 75 OP tomato varieties she brought back from Paris to and is screening for resistance to bacterial wilt and virus
- Visited Biotechnology laboratory-still plagued by problems with air conditioning and electricity
- Visited the Director of the Station-Abdoulaye Hamadou-entomologist-he indicated that there is not much *Rice yellow mottle virus* (RYMV) in the area
- Saw the Brazilian cotton research building neary finished-for rearing *Trichogramma*
- Head to Baguineda and visited growers fields
- Field #1 all 5 varieties-recently transplanted
- Field station-harvesting Mme Gamby's variety trial-one plot has obvious bacterial wilt- confirmed based on vascular discoloration and streaming
- Moussa's variety trials has our varieties and some from WASA
- Field#2-Nice plots of OPGP 1 and 5, H9881 and Shasta-some bacterial wilt but not too bad-look much better than Roma
- Field #3-Chief Buba Synayogo-out in middle of irrigated perimeter-OPGP5 looks great- H9881 and Shasta look pretty good too-green fruit stage.
- Back to Sotuba briefly
- Then to Le Loft for dinner and the night

### 3/22

- Breakfast at Le Loft
- Depart for Segou
- Lunch at Hotel L'Auberge
- Visit vegetable production area along river-Seboukou area
- Area #1 African eggplant, lettuce, celery, and papaya
  - Saw what looks like downy mildew of African eggplant-yellow blotches on the upper surface of the leaves and brown sporulation on the undersurface
  - Also broad mite damage on African eggplant
  - Virus damage on papaya (PRSV?)

- Area #2 Carrots, peppers, potatoes, onions
  - Nice powdery mildew on carrots
  - Potatoes were pretty old and no obvious diseases but hard to tell
  - Young potatoes had an outbreak of broad mite
  - Outbreak of harlequin grasshoppers on lettuce
- Area #3 Senoukourabada
  - Beans, peppers, cabbage, some tomatoes
  - Cabbage very clean!
  - Beans with some mite damage
  - Tomatoes were clean
  - Found a wild cucurbit with virus symptoms also
- Spend the night at the Independence Hotel in Segou

### 3/23

- Head to Niono
- Sirabala-lots of tomato production-important crop there now
- Visited women's cooperative-drying onions
- Stopped at IER station and met with Director Amadou Kodio
- He says that RYMV not so important but bacterial blight is becoming a big problem
- Potatoes are becoming more important
- Tomatoes are also important problem with transformation when there is over production
- Location Nango Sahel
  - Field #1-New varieties look good-H9881, Shasta, OPGP5 and OPGP1
  - Farmer says he might be willing to buy the seeds if available
  - Field #2 Seedbed flooded only OPGP1 and control left
  - Field#3 OPGP 1 and 5, H9881 and Control-improved varieties look good-some problem with flower drop and a possible necrosis-associated virus-like agent (though not too many plants affected)
- Location Koulamba Were
  - Women's plot-some problems with labeling because the woman in charge passed away



- Older tomatoes in non-IPM plots have strong virus symptoms- begomovirus or the unknown virus-like agent that causes epinasty, stunted growth and necrosis
- Location #3
  - Field #1 Heavier soil-Qwanto, Shasta and OPGP1 and 5-look good better than control Tropmesh
  - Field #2 Woman farmer Alimata Koubaly
  - Shasta-beautiful-OPGP 1 and 5 not bad-better than Tropimesh
  - Field #3-Shasta, H9881 and OPGP1 and 5 look very good-better than Tropmesh-sprayed dimethoate-grower is Bourema Coubaliy
  - Field #4-Woman farmer-field partly flooded-Shasta and OPGP 1 and 5 look good
- Overall relatively little whitefly and virus
- Dinner and spend the evening at Independence

### 3/24

- Check out of Independence
- Stop at Artisan Textile Outlet
- Lunch at L'Auberge
- Stopped at a number of cassava fields on the way to Bamako
- Field #1-Younger 50% ACMV (sampled) and found whiteflies and cassava mealybug
- Field #2-Older plants 80-100% ACMV (sampled)
- Had dinner with Jeanne Harmon
- Spent night at Le Loft

### 3/25

- Met with Ram Shetty of WASA
- Final year of the project
- Done some variety trials-for tomato the variety Maxipeel F1 looks good
- Seed availability continues to be a big problem
- Gave us the name of a local seed company in Kati-Fasokaba

- Headed to Kati-met Sekou Cissi
- Visiting the Kalifabougou area of Kati
- Here they also grow cotton and a local tobacco variety
- Sekou mentions the idea of establishing demonstration plots with improved varieties and new IPM technologies
- Meet extension agent Sekou Togo
- Go to village Niamana
  - Field #1 Lost Qwanto and OPGP1-Shasta and OPGP5 look OK
  - Biggest problem is with bacterial wilt
  - Field#2 Qwanto, Shasta, OPGP1 and 5-Mangala Alou Diarra-likes Qwanto and OPGP5 best-larger fruits that sell better at the market-no virus or whitefly
  - Field#3 Beautiful field of Qwanto in one of the womens fields
  - Field#4 Tiekorobougou-Issa Konare
- Nice late-planted field of OPGP5 and Shasta-no virus and very low whitefly populations

### 3/26

- Work on samples most of the day
- Dinner and depart for airport around 7:30
- Depart Bamako around 12 PM
- Stop in Dakar

### 3/27

- Arrive Paris
- Depart and arrive in Washington DC
- Depart for Sacramento around 6:00 PM
- Arrive Sacramento around 8:30 PM