Intsormil

TRIP REPORT

MEXICO, HONDURAS, COLOMBIA, BRAZIL

by

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Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln

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April 10 - May 5, 1983

Traveler: Henry N. Pitre, Mississippi State University

Purpose: To attend the Sorghum Breeding Workshop for Latin America held at CIMMYT, El Batan, Mexico, and to formally organize armyworm research programs for 1983 with cooperating scientists in Mexico and Honduras. To visit CIAT in Colombia and EMBRAPA in Brazil to further discussions on armyworm investigations with INTSORMIL.

Places Visted: Mexico, Colombia, Honduras and Brazil.

Summary:

The Sorghum Breeding Workshop for Latin America, held at El Batan, CIMMYT, was a success. Programs of entomological research were formally established in 4 geographical areas in Mexico, one in Honduras, one in Colombia and several locations in Brazil. Cooperative research relationships were further developed with INIA and CIMMYT (Mexico) and EMBRAPA (Brazil) scientists in the respective countries. A research program involving one graduate student was developed for Honduras (this student is in Honduras as of May 16, 1983). Research in these 4 countries will be coordinated to include primarily aspects of armyworm population dynamics, sorghum host plant resistance and biological control. Plans have been made to revisit the study areas in Mexico and Honduras in mid-July to accumulate additional data and evaluate research progress in the established studies.

Activities:

MEXICO.

April 10-14. I traveled to Mexico City on April 10 to attend the ...um Breeding Workshop for Latin America held at CIMMYT, El Batan ...sponsored by INTSORMIL/INIA/ICRISAT. Meetings were held on April 11 and 12 in which formal papers were presented. I presented a paper, "Evaluation of Progress in Insect Resistance in Sorghum", on April 12. The porgram for the meeting was well prepared and the papers presented were informative. The coordinators of the meeting, Drs. Vartan Guiragossian and Fred Miller, and others who assisted in organizing and the conduct of the meeting are to be recognized for their performance in making this meeting very successful. The participants were involved throughout the meeting and during the field trip to Poza Rico on April 13 and 14. Emphasis in the field was on the sorghum breeding nurseries; I was interested in sorghums showing some forms of resistance to insects, particularly the sorghum midge and fall armyworm.

Armyworm larvae of different age classes were collected on corn (no young sorghum in fields) at the Poza Rica Research Station. The larvae were placed individually in containers with artificial diet and mailed to the Quarantine Facility at Stoneville, Mississippi. The larval collections will be continued in Mexico (and other cooperating LDC areas in which I am participating) during the sorghum growing season to determine species population fluctuations and incidence of mortality by entomopathogens and entomOphagous parasites. This

work will be concentrated at Celaya. This work addresses part of the biological control objective of the MSU-5 project. These insects will be identified to species and observed for parasite emergence and disease diagnosis. Biotic mortality will be determined. Parasites obstained will be held in culture in the greenhouse insectary. At least 4 parasite species were reared from larvae collected at Poza Rica; dead larvae are being examined for entomopathogens.

Additionally, sorghum material tested in the fall armyworm screening trials in Mississippi in 1981 and 1982 and to be planted in 1983 were hand delivered to cooperating scientists for plantings in selected areas of Mexico where armyworms are an annual problem on sorghum. Several areas were selected due to the apparent geographical intensity of the insect species of interest, the fall armyworm (*Spodoptera frugiperda*) and the true armyworm (*Pseudaletia unipunctata*). The significance of each species at selected sites will be described. Test plots will be established at Los Moches and Ocotlan, Celaya, and Poza Rico with Dr. Albert Betancourt, Mr. Gabriel Vega and Mr. Jesus Naro, and Dr. Vartan Guiragossian, cooperating, respectively. Planting dates have been determined for each location beginning in early June at Los Moches to late June at Celaya. The plots at Celaya will be evaluated on 3 dates during early plant development; the first two observations will be made by INIA scientists and the last will be made by myself when I return to Mexico in late July. Insects (armyworm larvae) will be collected every 2 weeks during the growing season and preserved for later identification. I shall work closely with INIA personnel during my July trip to obtain as

much entomological information as possible, particularly in relation to species identification, population fluctuations, crop damage, host plant resistance and biological control. The INIA Subdirector at Celaya (Dr. Gabriel Diaz Castro) is attempting to find an interested person for the entomological training at that Station. This was discussed during my visit in September, 1982.

April 15: The trip to Mexico was concluded in visits with CIMMYT scientists on April 15. Information was obtained concerning the armyworms that will assist in future plans of research in the areas established for continued study. The insect rearing facility was visited and its function discussed. Dr. John Mihm, CIMMYT entomologist, was extremely helpful during my visit.

HONDURAS.

April 14-18. On April 16, I was joined by Drs. Lynn Gourley (MS) and Ralph Clark (NE) in traveling to Honduras with Dr. Dan Meckenstock to visit with the INTSORMIL personnel in that country. We arrived in Tegucigalpa and traveled by car to Choluteca. Dr. Kathlene DeWalt and one of her graduate students were residing in Dr. Meckenstock's home, where we were housed for our stay, allowing us the opportunity to visit with them and discuss our respective programs in Honduras. We visited the Lalujosa Research Station during the afternoon of April 17 and the morning of April 18. Dr. Meckenstock described the activities and mission of the station, and I discussed with him

the cooperative research planned for 1983 and 1984. Plans were made for a graduate student to arrive in Choluteca during mid-May to begin research with armyworms on sorghum. Mr. Marco Castro, from Honduras, is completing his B.S. degree at Mississippi State University in May, 1983 and will begin the M.S. program immediately, working with me in the INTSORMIL program. Plans were made for the conduct of research involving insect population fluctuations, biological control, host plant resistance and cultural system studies. Plans were made to coordinate aspects of Dr. Kathlene DeWalt's work involving farming systems surveys with observations on the impact of burning the fields on insect pest populations. I shall coordinate this research (with graduate student participation) with Drs. K. DeWalt and D. Meckenstock. Information obtained in the K. DeWalt surveys will be used to select observation fields. This interdisciplinary team effort will contribute to our understanding of the farm management systems and to the development of cultural practices for integrated pest control programs.

Drs. Gourley and Clark and I had the opportunity to visit a farming community in the coastal plains region with Dr. DeWalt and her student during the afternoon of April 18. Dr. DeWalt is using a large sample of the homes in a survey of the feeding habits and nutrition of the inhabitants. This was indeed an enlightening experience in observing the work of another discipline within the INTSORMIL program.

April 19-20. Armyworms, principally the true armyworm, were causing extensive damage to seedling sorghum at the LaLujora Station. Larvae of different early age classes were collected from the young sorghum,

placed on diet in cups and prepared for shipment to the Stoneville, MS Quarantine facility as were the larvae collected in Mexico. These insects are being observed for parasite and pathogen mortality. Parasite emergence to data has been rewarding. Additional sanitation papers for shipment of these insects were obtained from the office of Recursos Naturales in Tegucigalpa on April 19, at which time I visited with Dr. Justo Torres of this office in the Department of Agriculture, who recenlty replaced Dr. Antonio Silva. Dr. Torres was enthusiastic about the return of Mr. Marco Castro to conduct his research in Honduras, particularly since Mr. Castro plans to return to Honduras upon the completion of his educational program in the United States.

COLOMBIA.

Apirl 20-27. Traveled to Colombia with Drs. Gourley and Clark to visit CIAT. Dr. Gourley presented the CIAT facilities in a tour, after which we visited with Dr. Douglas Laing, Director of Investigations on Crops. Dr. Laing described certain aspects of CIAT responsibilities and program involving crops of particular interest, including beans, cassava, rice and pastures. The sorghum research program on breeding for aluminum toxicity involving the work of Dr. Gourley and INTSORMIL was discussed. This research is very important in the CIAT program because of the lack of internal research on this agronomic constraint to sorghum production in much of Colombia. Dr. Laing is entirely supportive of Dr. Gourley's research program, which certainly should be

extend into its second year to achieve the most from this effort over a relatively short period of research time.

I had the opportunity to visit with several entomologists on the CIAT staff, including Dr. M. Calderon, graduate of Mississippi State University, involved with pasture research, and Dr. Art von Schoonhoven, the bean entomologist. I continued my visits and tours with staff in the entomology, seed and microbiology programs on Monday and Tuesday (April 25 and 26).

On April 23, I visited the CIAT field research station at Sandindar de Quilichao. Of particular interest in travel to the station was the change in farming systems from sugarcane to pasture as we traveled south through the Cauca Valley to the mountains at Quillichao. We observed the small farm systems practices of the indians much higher in the mountains at Silvia. While at Quilichao, I collected armyworms, identified as fall armyworms in the laboratory. Less than 5% of the sorghum plants were ifested with armyworms at this location. The general distribution of the larvae in the field suggested that some biological control activity was involved in suppressing pest infestations. Unlike in fields examined in Mexico and Honduras, where large numbers of larvae survived through the early instars to late stages when they cause extensive damage, only small numbers of larvae appeared to survive in the Quilichao area. Similar observation was made at CIAT headquarters at Cali. This could be a geographical area for detailed observations on armyworm biology in relation to biological control systems. Dr. Gourley and I will work together, in consultation with CIAT entomologists, in collecting arymworm larvae during the

growing season for observation of species population fluctuations in density and aspects of biotic mortality. Live insects will be shipped to Mississippi as described above. Detail arrangements for this work have been made.

April 25 and 26 was spent visiting with CIAT scientists, specifically Dr. Art Schoonhoven and Guy Hallaman (bean program), Dr. Mario Calderon (pastures), Dr. Tony Belloti (Casava) and Dr. Peter Jennings (rice). Some time was spent in Dr. Gourley's sorghum field at CIAT headquarters collecting armyworms for identification. While visiting with scientists in the bean group, I was asked to present a seminar on the afternoon of April 26, at which time I addressed my role as entomologists in INTSORMIL and specifically discussed the impact of insect pests in soybean and the development of IPM systems (as requested).

BRAZIL.

April 29-May 4. Dr. Clark, Gourley and I were met in Campanis, Brazil on the evening of April 27 by Drs. Candido Bastes, Pedro Furlani, and Otavio Tisselli, Administrative Director of Industrial Crops, plant physiologists and soybean breeder, respectively, of the Instituto Agronomico de Estado de Sao Paulo, Campinas, S. P. During the morning of Apirl 28 we were introduced to Dr. Nelson Sabino, Director General of the Instituto Agronomico, and then Drs. Angelia Furlani and Pedro Furlani and associates presented a slide presentation of their research at Campanis on mineral deficiencies in plants. Particular emphasis was placed on aluminum toxicity, since this was the area of interest of Drs. Clark and

Gourley. Their work on plant growth in nutrient deficient toxicity was again emphasized in the talks.

I visited with Dr. Carlos Rossetto, entomologists, during the afternoon of Apirl 28. Dr. Rossetto discussed his research on sorghum and soybean. Of particular interest was his work on sorghum resistance to the sorghum midge on sorghum. I visited some of Dr. Rossettos' soybean field plots and observed some of his greenhouse investigations.

During the morning of Apirl 29, we visited with Dr. Bernardo van Raij, Director of the Soil Fertility Section of the Instituto Agronomico. Dr. van Raij discussed soil testing procedures and problems involved with techniques and development of criteria for making recommendations relating to fertility. Acid soils and aluminum toxicity were again emphasized in the talks. We concluded our visit with a tour of the soil testing laboratory.

On May 1, we were met in Sete Lagoas by Mr. Laudelino C Leite, plant pathologists with EMBRAPA. A well organized schedule (by Mr. Laudelion) of meetings with EMBRAPA scientists and field trips were completed during the next 2 days (May 2 and 3). We initiated the meeting schedule in a visit with Dr. Roland Vencovosky, General Director of the station at Sete Lagoas. During our visit we discussed the opportunity for establishing a cooperative agreement between EMBRAPA and INTSORMIL. Dr. Vencovosky encouraged this agreement and initiated correspondence with the EMBRAPA headquarters in Brazilia (Drs. Gourley and Clark visited EMBRAPA in Brazilia; I returned to the United States).

I spent most of my time visiting with Mr. Ivan Cruz, entomologist, who is working with the fall armyworm. We discussed a cooperative program of research of interest to both, and developed plans for the 1983 sorghum growing season in several areas of Brazil. Particular emphasis will be given to population ratios of armyworm species, host plant resistance and biological control investigations. Mr. Cruz and I will work closely with Dr. Bob Schaffert and other plant breeders at the Sete Lagoas station.

Drs. Gourley, Clark and I were asked to present seminars on May 3 on aspects of sorghum production: breeding for aluminum tolerance, selected sorghum nutritional disorders and selected sorghum insect pests, respectively, were selected as topics. Our roles in INTSORMIL were explained.

I departed Brazil on May 4, 1983 in my return to the United States.