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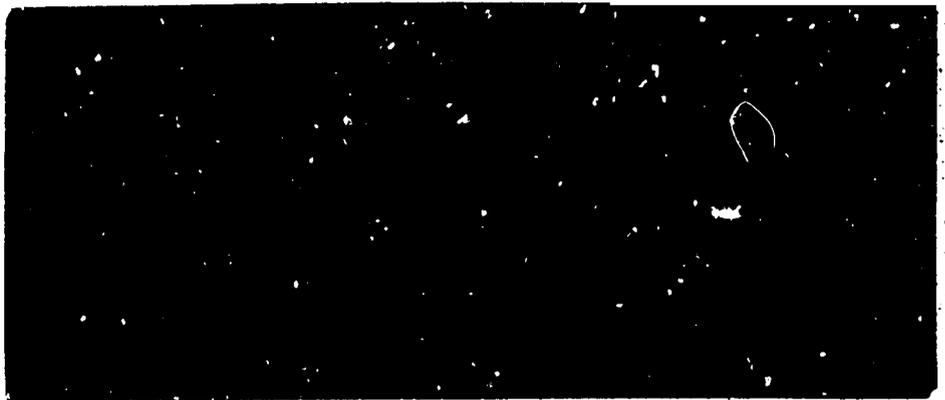
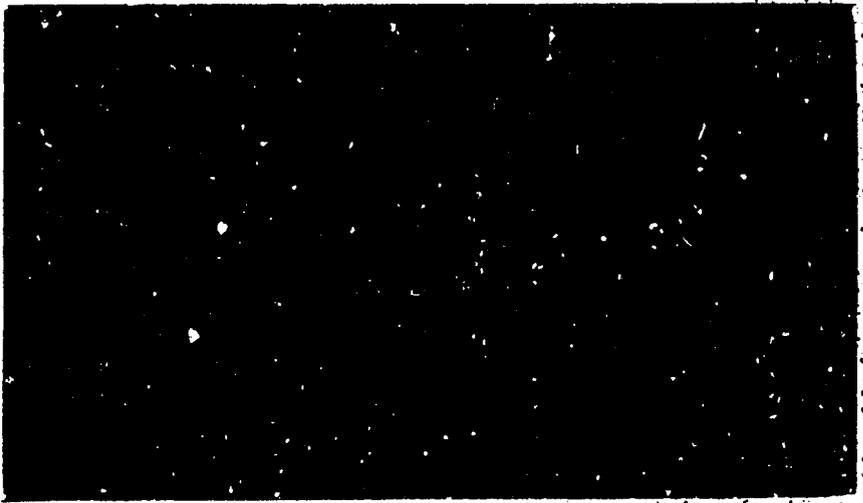
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LA PAZ, BOLIVIA

004/78

END OF TOUR REPORT

Name: Charles R. Ward*

Job Title: Cereals Agronomist

Date of Appointment: October 1, 1976

End of Tour: September 30, 1978

*Entomology Specialist, Department of Entomology and Plant Pathology, New Mexico State University. Assigned as Cereals Agronomist and Counterpart to the Station Director of Saavedra, Santa Cruz, Center for Tropical Agriculture Investigations (CIAT), Santa Cruz, Bolivia.

End-of-Tour Report

Charles R. Ward

Job Description

An agronomist will be assigned as counterpart to the research station directors in the Santa Cruz and Saavedra Experiment Stations and others which may be organized in the area. His principal task will be to advise on research programs of the stations, and assist in researching problems related to basic grains crop production. He will also assist in developing extension programs related to research results. He will collaborate with university staff on teaching, research activities, and advise students on research projects at the University of Gabriel René Moreno.

Accomplishments Related to the Plan of Work

Agronomic Program

My contract covered two crop years (1976/1977 and 1977/1978) and responsibilities included all of the agronomic programs in rice, corn and sorghum, and wheat during the first year and all except corn in the second year. In general all phases of the plans of work for both years were completed; however little success was achieved the first year in the regional trials proposed. This record was improved during the second year by involving the extension agents in this program.

A detailed report on the results obtained from these agronomic programs has just been completed. In general, the dedication and enthusiasm of the young Bolivian researchers involved in these programs deserves most of credit for the fact that so much was accomplished. The results will be included in the two-year self-evaluation of the CID Contract.

My major emphasis in improving these programs was to foster and/or encourage a closer relationship with the international programs such as the International Rice Research Institute (IRRI), Philippines; the Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia; and the Centro de Investigaciones de Mejoramiento de Maíz y Trigo (CIMMYT), Mexico. Since

the director of the corn and sorghum program, Ing. Florian Rodriguez, had just returned from a 6 months training program at CIMMYT, little encouragement was required to build on this association; in fact some think too much emphasis has been given to testing the genetically improved material from this program. The director of the CIAT rice program was brought to Saavedra on a short-term consultancy and, subsequently, the director of the rice program at Saavedra, Sr. Francisco Paz, was given a CIAT grant for a 6 month training program at the Center.

Encouragement was also given to developing a cooperative effort with the National Directors of these programs. Special effort was made to help develop a good relationship between CIAT (Saavedra) and the National Wheat Program and Corn Program directors.

Sorghum program improvement group associated with the Texas A&M University Agricultural Experiment Stations. One of these researchers, Dr. George Teetes, was invited to Bolivia to further development of this cooperative effort.

The professional development of Bolivian researchers associated with these programs was further encouraged by helping to provide an opportunity for them to attend scientific meetings. The corn, sorghum, and entomology program directors all attended the International Grain Sorghum Conference in Buenos Aires. Arrangements were made for the CIAT plant protection program director to attend the Latin American International Entomology meetings in Bahia, Brazil.

Assistance was also given in preparing various field day and extension bulletins to be used in getting the research results to the producer. Attempts made to encourage journal publications were not successful since the Bolivian Agriculture Journal was not published by MACA.

Entomology Program

Due to my specialty training as an entomologist, considerable emphasis was placed on developing a pest management research program, especially for the cereals programs. Considerable progress was made in this program

due to the assignment of Ing. Hugo Serrate R. as my counterpart. He was a very energetic, dedicated researcher with a keen interest in economic entomology and, with my encouragement, guidance, and assistance, a very ambitious program was realized.

Considerable emphasis was placed on developing a data base from which sound short-term chemical control solutions to current pest problems could be recommended. An evaluation of effects of the treatments on beneficial arthropods and secondary pests was given considerable priority.

Host plant resistance studies were also initiated in all but the wheat agronomic programs. These programs should be given more emphasis once short-term chemical solutions are defined, since host plant resistance requires much less technology transfer to the producer than a pest management system based on chemicals.

Biological control methods could not be attempted in most cases due to the lack of knowledge of endemic beneficial species and the lack of proper quarantine and insect rearing facilities. However, surveys were made of the endemic beneficial species and the chemical control trials were monitored for effects on them.

Through the assistance of two short-term consultants, Drs. Alton N. Sparks and Everett R. Mitchell, an extensive study was made on the activity of synthetically produced pheromones for a wide range of economically important pests. The results were very encouraging and, with additional personnel and equipment (especially a vehicle assigned to the CIAT entomologist), this could be developed into a population survey tool to use as an early warning system for outbreaks for several of the key pests of the area.

The future development of a sound pest management program has been partially assured by Ing. Serrate being awarded one of the USAID-053 Loan study grants. He is currently at New Mexico State University working on his Master of Science Degree in Pest Management. He has been replaced by another young, energetic researcher, Sr. Victor Gonzalez, who will complete his Ing. Agron. degree in early October.

Development of a National Entomology Laboratory (Museum):

It was observed during my short-term contract in March-April 1976 that limited insect identification services could be provided by the Ministry and it was recommended in my report that such capabilities be developed. Therefore, I was given this responsibility as a part of my plan of work during the past two years.

Approximately 2,200 pinned insect specimens were collected, mounted and labeled, as a result of my short term consultancy in 1976. Following this consultancy arrangements were made with the USDA-ARS (now SEA), Insect Identification and Beneficial Insect Introduction Institute, Beltsville, Maryland to identify these and future collections of crop associated insects. Many of the non-crop insects were identified on a time available basis. All returned material to date that has been deposited in the National Museum and amounts to 1,279 identified pinned specimens and another 116 vials of identified alcohol preserved specimens. These totals include additional specimens that have been collected during my long term contract period.

From this material synoptic collections have been prepared to be deposited at the Saavedra Experiment Station and the Gabriel René Moreno University. A total of 123 pinned specimens or vials were prepared for Saavedra and 113 for the University.

Another 9,400 pinned specimens and 200 vials of alcohol preserved material have been collected, preserved, and labeled during the long term contract. A considerable number of these specimens were collected and/or identified to family through the assistance of the short term consultants, Drs. Lois and Charles O'Brien (CID Working Paper No. 016/78). Many more of the specimens collected by the O'Briens are to be prepared at the museum in Cochabamba.

This large amount of material required a considerable amount of storage cabinet space which was provided through the CID contract and as a loan from UBGRM through Dr. C. Daniel Candia. His assistance in this regard was sincerely appreciated. One of the 5 insect cabinets purchased by CID

will be assigned to UBGRM and another to Saavedra to be used to house the identified material mentioned above. Another was assigned to the National Museum which is currently located at the San Benito Experiment Station near Cochabamba.

The development of the Museum was assisted by the commitment by MACA-IBTA of \$US 12,000.- for the purchase of laboratory equipment and the approval of additional equipment purchases on the USAID-053 loan. However, the purchase of badly needed microscopic and camera equipment and library reference books has not been approved. Unless approved, this will greatly hamper museum development. The procurement of a basic reference library in conjunction with the museum will be critical to its further development. Also, the museum must have daily access to these publications. If these are placed in the main library in La Paz they will serve little useful purpose for the museum. Also, the cabinet and drawer space currently available at the museum will become a limiting factor unless the equipment ordered on the 053 loan is delivered by the end of this year.

Development of Extension Program:

My involvement in the extension program has been largely indirect primarily due to the presence of the CID extension technician for assisting this program and involvement in the extensive research programs, Museum and University commitments, plus time demands as counterpart to the Saavedra Station Director.

However, two seminars were given to the CIAT extension agents as a part of their annual training meeting in 1977 and assistance was given when pest control problems were encountered. The slide series that was developed for teaching insect pest and damage identification and beneficial insect recognition was duplicated and made available for their use. These slide series were also used in making presentations to farmers and other interested persons at the Santa Cruz Fair in 1977 and 1978. Scripts were prepared for these slide sets and the Director of the Agricultural Section of the Fair had cassette tapes made and synchronized to the slide set to simplify the presentations.

In addition to the pest management slides for rice, corn, soybeans, and wheat, slides were provided for use by the Bolivian research technicians to use in presenting their research results to other researchers, extensión agents, and to producers. Complete sets of these agronomic program slides will be maintained in the CID Santa Cruz office and made available for presentation to or by any interested group.

Ing. Hugo Serrate and I were also requested by CIAT to present a two hour pest management seminar as a part of the continuing education program for the Santa Cruz Menonite Volunteers. We also presented a four hour pest management seminar to the special campesino program at the Muyurina School at Montero. Over thirty local campesinos attended this seminar.

Additional activities included an attempt to obtain equipment needed by the extension agents to conduct their various activities. A commitment was obtained from the CIAT Executive Director, Ing. Carlos Vaca Díez, to purchase a large part of the needed equipment and the remaining items were ordered through the CID, Utah office. Very little of either group of equipment has been received in Santa Cruz. An order of vehicle parts was filled through the CID, Utah office to assist in the maintenance of both the research and extension vehicles. A supplemental order has been made, also, but these have not been received. However, this did not alleviate the overall vehicle problem as additional vehicles are needed.

Collaborative Activities with the University:

Early attempts to give seminars at the University were delayed but three seminars on pest management were eventually given at Universidad Gabriel René Moreno during the first year (Oct 1976 - Sept 1977). An additional six seminars were given this past year. Since each seminar lasted at least two hours, this amounts to almost a one-half of a regular university course.

A system of student vacation, agricultural-experience was established the first year with 6 students participating at Saavedra and was continued the second year with 7 students. This experience satisfied University re-

quirements for "Practicus Vacacionales" and greatly assisted in completing the plan of work at the station. Considerable benefit was gained by both the students and CIAT as three of these students are now employed part or full time by CIAT.

Collaborative efforts in research activities were limited to thesis research projects due to the heavy involvement of the University entomologist in research on crops not included in the CID contract. I was thesis advisor for three students, Sr. Victor Gozalez, Sr. Angelo Colamarino, and Sr. Dardo Alvarez. I assisted in the writing and preparation of slides for use in the thesis defense of four additional students - Ing. Hugo Serrate, Ing. Florian Rodriguez, Ing. Zenon Nuñez, and Sr. Melvin Pozo. I have given considerable assistance to another student working on nematodes, Sr. Gonzalo Navajas.

I also assisted the entomologist and Dean of UBGRM, Dr. Daniel Candia, in making arrangements to hold the first Bolivian Entomology Conference in Santa Cruz in October 1977. This conference was very successful and resulted in a beneficial exchange of research results. Of major interest was the formation of the Bolivian Association of Entomologists. My museum counterpart, Ing. David Villarreal, was elected president and my entomology program counterpart at Saavedra, Ing. Hugo Serrate, was named Vice-President. I was elected to serve on the Board of Directors of the newly formed Association. I regret that I will be unable to attend its second meeting to be held at UBSS, Cochabamba in late October 1978.

Assistance was given to both UBGRM and UBSS in obtaining approval for the purchase of entomological equipment on the 053 loan for use in their research and training programs. Although bid specifications were prepared by me and delivered to La Paz some months ago for additional microscopes and photographic equipment, I have been unable to obtain final approval. This request included similar equipment for Plant Sanitation and the San Benito and Saavedra Experiment Stations. Some entomological equipment was also purchased for UBGRM on the CID contract in support of their research and teaching programs.

Duplicate copies of part of the pest management training slide series were also provided to both UBGRM and UBSS.

Other Training Activities:

Although CID is not directly responsible for the USAID 053 loan study grants program, I have assisted in the selection of prospective trainees and in their obtaining the necessary approvals. I assisted in obtaining the final approvals and travel arrangements for Ing. Emilio Salas and Ing. Luis Martinez. Applications and arrangements for Ing. Hugo Sarrate were made by me. I have initiated the requests and University applications of two others - Ing. Florian Rodriguez and Ing. Gustavo Pereyra.

All of these are in addition to the day-to-day training activities with the Bolivian technicians on a one-to-one basis while planning, conducting, analyzing, and preparing research reports of the agronomic and entomology programs at Saavedra.

Accomplishments as Counterpart to the Station

Director at Saavedra

CIAT at first objected to a CID technician being named as counterpart to the Saavedra Station Director but I was named as his counterpart by December 1976. Due to the difficulties involved in an out-sider being given responsibilities in the financial management of the Station, my role was largely that of an advisor on research program and personnel management. The time involved in this endeavor is very difficult to measure in terms of results. However, it appears that through the assistance of Dr. David James, the station will begin to maintain better records for use in station land management and keep records of the research that has been conducted, including all field notes and records as well as records of statistical analyses.

Through the assistance of Drs. James, Kidman, and the short-term consultant Dr. Richard Griffin, the badly needed land leveling at the Station will finally be completed before the next cropping season. Considerable

levelling was accomplished last season using a hand-made land plane. The motor and pump was finally installed on the new well but water output was so low that the well was never used. Considerable effort has been made to see that a new well is drilled prior to the next season but this had not been accomplished by the time of the writing of this report.

The station was almost inaccessible during rainy periods due to the unimproved entrance roads. This was remedied prior to the 1977 rainy season by graveling the main entrance road. Farmers can now come to the station for information during the rainy period when they are not involved in field work.

Considerable time was spent in screening the equipment, vehicles, tools, etc and buildings being purchased for Saavedra on the USAID 053 loan. Much of the equipment needed but not on the list for the loan was ordered through the CID, Utah Office and some of this equipment has been delivered. Only a very small part of the 053 loan material has been delivered to date. In spite of much discussion, pushing, etc. there is no evidence that the buildings planned for Saavedra from the 053 loan will ever be constructed.

Due to the delay in the buildings to be constructed on the 053 loan, CID provided air conditioners for the development of the station entomology laboratory and the modification of an existing structure to be used as a research seed storage facility. Many pieces of equipment and laboratory supplies have been purchased by CID to keep both the agronomic and entomology programs going until the 053 loan items are received.

The other major problem encountered in keeping these programs productive was the lack of vehicles for both research and extension. The Station has U.S. made vehicles (Willys Jeeps, International Pickups, and a Chevrolet truck), and the available vehicles were frequently inoperable due to a lack of replacement parts. Therefore, I tried to help alleviate this problem by ordering parts through the CID, Utah Office.

The long delay in delivery of the parts resulted in little help during the last growing season. However, if the supplemental parts order

can be filled in the next months, most of these vehicles should be operable for the next growing season.

No solution has been found to the lack of sufficient Bolivian technicians to assist in program development. Except for a half-time assistant assigned to the corn and sorghum program, each program is being conducted by a single Bolivian technician. This greatly limits the amount and quality of research that can be conducted and greatly restricts the amount of time that can be devoted to off-station farmer trials. The recruitment of additional technicians should be given high priority, especially if a large off-station program is to be developed. High priority should also be given to developing positions for the other specialty groups such as plant pathology, soil fertility, etc.

Another critical issue is the financial problems encountered. Many times critical expendable supplies could not be purchased due to the failure of the Ministry of Finance to make budgeted funds available for use. Also, the Bolivian technicians were expected to keep working and be in good spirits when they had not been paid their salaries for as long as three months. This is an intolerable situation and must be rectified if the system is to function properly.

CID Office Responsibilities

In addition to my responsibilities outlined in the Contract Job Description and plans of work, I was also made manager of the CID, Santa Cruz office. Although the excellent cooperation of the choeffier, Mr. René Noya, and secretary, Miss Mossy Avila, made this an easy job, it did require a time commitment.

This responsibility was extended to cover the writing of the final report of the oilseeds program for 1976/77 and the proposed plan of work for the oilseeds and corn programs for 1977/78. Considerable time and effort was also required to initiate and support these program until Dr. Fisher's replacement, Mr. Kidman, arrived in December of 1977.

Recommendations

1. Priority must be given to the delivery of all vehicles, equipment, and supplies to be provided on the USAID 053 Loan.
2. Construction should be started immediately on the buildings for Saavedra.
3. Improvement must be made in the delivery of equipment and other support materials by the CID Utah office.
4. Harassment of CID technicians by the Ministry of Finance over vehicle importation and liberation and sale must be stopped. The same is needed for the customs agents in regard to equipment, supplies, household goods, etc. They should be helping not hendering the progress of the contract.
5. Improvement is needed immediately on the delivery of the CIAT budget by the Ministry of Finance and an augmentation by both the Ministry and Obras Públicas is needed to increase the number of technician positions.
6. Priority must be given to solving the irrigation needs at Saavedra as well as completion of the land levelling.
7. The major rice research program should be moved to the Portachuelo substation and to on-farm locations. This will require the assignment of a vehicle to this program as well as an assistant investigator.
8. Another full time technician should be assigned to the corn and sorghum program so that the program can be expanded to include more on-farm trials. An expansion of the sorghum program is badly needed. This would also allow a shift from the mass selection breeding program to a more modern, acceptable improvement program.
9. Additional vehicles will be required if the off-station trials are to be expanded. This could be partially handled by leaving the CID van and pickup in Santa Cruz when the new vans arrive, hire a driver and make the old van and new driver available to take care of regional trials whenever possible. This vehicle could also be used by the CID team members when they visit from Cochabamba and La Paz without disrupting the plans of CID-Santa Cruz technicians.

10. Considerable priority should be given to putting another CID technician in Santa Cruz.
11. Hebert Zurita should be made the National Director of the Oilseeds Program as recommended by Warner Fisher in his final report.
12. A noxious weed control unit should be established to define methods to curb the spread of rogheli (Rottboellia exaltata) in Santa Cruz and the Chapare.
13. Priority should be given to implementing these recommendations. In reading the End-of-Tour report of Mr. Max Long, my predecessor, and the report by Dr. R.L. Smith, et al. on the Status of Agricultural Research in Bolivia and my previous monthly and quarterly reports, the same problems and recommendations are seen time after time. These problems should be solved immediately if CID is to accomplish its goals.

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