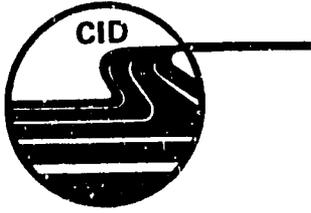


PD-AAN-899

**CONSORTIUM FOR INTERNATIONAL DEVELOPMENT**

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PDAAV899

05/82

END OF TOUR REPORT

Name: Donald R. Foster\*

Date of Appointment: December 15, 1970

End of Tour: June 30, 1982

Job Title: Entomologist-Cereals  
Agronomist

\* Department of Entomology and Botany,  
New Mexico State University, Las  
Cruces, New Mexico. Assigned as  
Entomologist-Cereals Agronomist,  
Consortium for Int'l Development,  
Bolivia.

## END OF TOUR REPORT - DONALD FOSTER

### Job Description

The original job description of this position in the contract was for a Cereals Agronomist, but by amendment, the position was changed to include work in Entomology, in production, and work on the national insect museum. The actual work requested from the person filling this position began to change in 1977 when studies of insect pests were added to the duties of the Cereal Agronomist.

Upon my arrival to fill this position in February of 1979, the duties outlined included variety testing of rice and sorghum, insect control in corn, rice, potatoes, soybeans, sorghum, peanuts, sunflower, and other minor crops, and management of the Bolivian National Insect Museum. In September, 1980, the Santa Cruz office of CID was closed, and I was transferred to the CID office in Cochabamba. By this time, it had become obvious to me that the major pest problems in Bolivia were in the most important food crop, potatoes. Since the majority of the CID staff were already working in potatoes, it was decided that my main emphasis should be in investigations of insect problems in potatoes in Bolivia. Duties at the insect museum were also continued. Thus, from 1977 to 1979, the duties of the position of "Cereals Agronomist" underwent drastic changes which reflected the need for solutions to problems caused by insects in Bolivian crops.

## Activities and Accomplishments

### CIAT, Santa Cruz - February, 1979 to September, 1980

Work was conducted at the Saavedra Experiment Station and Santa Cruz area in cooperation with several counterparts. Rice trials were conducted with Ing. Francisco Paz, and sorghum trials were conducted with Ing. Florian Rodriguez. Insect studies at Saavedra were begun with Ing. Victor Gonzalez and later with Ing. Nelson Reyes. Studies were conducted on the Saavedra Experiment Station, at the Portachuelo sub-station, and regional trials were conducted at Mairana, Santa Rosa, Yapacani, Abapo-Izozog, and Cotoca. Results of these trials and studies are found in CID semiannual reports. Collection and preparation of insects for identification was conducted with Ing. David Villarroel at the San Benito Experiment Station.

This phase of work was inhibited by many problems. There were too many studies being conducted to manage any one of them closely. Many of the studies were located too far away from the station to visit them as frequently as necessary and much time was needed to train the entomology counterparts, each of which was only beginning to learn entomology. Much of the equipment needed to gather basic information was not ordered or never arrived. Insect rearing chambers, essential for doing quality studies of insect pest life cycles could never be ordered although they were frequently requested. Despite these difficulties and others, several studies were conducted with promising results.

IBTA, Cochabamba - September, 1980 to June, 1982

Studies of insect problems in potatoes were begun in 1980 with a survey of insects in potatoes and trials using pheromone traps for monitoring potato tuberworm moth populations. Studies were planned for the Toralapa Experiment Station in insect control and pest biology and populations. Since no counterpart for entomology could be provided by the Toralapa Experiment Station, the studies were organized as thesis projects of three students. The majority of these studies were conducted in facilities graciously provided by Toralapa where the students were also given living quarters.

Results of studies on soil insects affecting potatoes were disappointing mainly because the areas chosen for study failed to develop significant populations of soil insects. In plots at Tiraque, near Toralapa, no soil insects were found until almost harvest time. Plots being studied on the station at Toralapa yielded only moderate populations of scarab larvae. Nearby, however, plots being used for production of seed potatoes had up to 70% infestation of tubers by larvae of a moth which is a new, undescribed species, and other plots not under entomological investigation were heavily infested by weevil larvae. This weevil is also believed to be a new species.

Studies of insects attacking stems and leaves did not suffer the above misfortune of being located in the wrong place. Populations were quantified quite well for several of the foliar pests attacking potato foliage at Toralapa and Tiraque. Another study showed that there is extensive distribution of a stem boring weevil in the lower Cochabamba valley and near Lake Angostura.

The stages in the life cycles of many of these insects were identified and types of damage classified, but detailed studies of pest biology could not be conducted because of lack of growth chambers and difficulties encountered in efforts to construct these from local materials.

Trials of insecticides conducted at Toralapa identified chemicals useful in controlling certain pest populations but no differences in yield were observed because no pest developed a large enough population to decrease yields on these plots. An insecticide trial at the Belen Experiment Station using soil insecticides for control of weevil larvae showed that weevil larvae could be controlled, but we need to know more about the biology and behavior of these weevils to obtain consistent control. The weevil control study also showed very high infestations of stems and tubers by a tuberworm moth. Because of the high elevation, this is probably not the common tuberworm moth but a new species. Specimens are now in Czechoslovakia being identified by the world expert in this group. This moth has potential to develop into a serious pest on the altiplano.

Work in the insect museum at San Benito was slowed because Ing. Villarroel accepted a leave-of-absence to work with an insect project in Europe, and his replacement was assigned very little time to work in the museum. Several collecting trips have been made however, and identified specimens have been returned and added to the museum.

#### Other Activities

Studies conducted at Saavedra Experiment Station (CIAT) and Toralapa Experiment Station (IBTA) compose only a part of the work of this position.

Other activities were conducted because they were specifically requested by the Ministry of Agriculture or because they could make the work on the experiment stations more effective.

Studies were conducted for one month with CID short term consultant, Dr. Oscar Bacon, in which sex pheromone traps for the potato tuberworm moth were evaluated. Other insects of potatoes were also collected and various potato growing regions were visited. Dr. Bacon was in Bolivia for only one month, but planning for trips before his arrival and preparing insects collected during the trips occupied about three months of work. Pheromone traps were proven to be a useful tool in working with potato tuberworm moths in Bolivia, and insects collected on that trip are still being received with identifications to be placed in the museum.

Initial contacts were made with Dr. K. V. Raman, entomologist of the International Potato Center (CIP) in 1980. I visited CIP and spent five days talking with Dr. Raman, touring the facilities and gathering literature from the library for the potato studies to be conducted in Bolivia. Plans were made to have Dr. Raman visit Bolivia and tour potato growing regions, but because of government and contract problems here in Bolivia, these plans could not be carried out. In 1982, I presented a seminar to the X Annual Potato Meetings at CIP on "Insect Problems in Bolivian Potatoes" and participated in a workshop to plan Pest Management Strategies for the future in potatoes. At that time, it was felt desirable to have a week-long conference on Insect Pest Management and this conference is now in the planning stages. Dr. Raman has aided in the identification of several moth

pests by sending them to expert taxonomists who are under contract to CIP. There has been interest expressed by CIP in continuing cooperation with IBTA, but since there is still no entomologist assigned to work on potato insects at Toralapa, it appears that contacts will have to be reestablished at a later date.

In 1980, Bolivian agricultural products were banned from exportation because of the suspected presence of Khapra beetles. I was requested to survey products in various locations and determine if indeed there was a Khapra beetle infestation in Bolivia. Results of a survey conducted with members of Sanidad Vegetal and Jorge de Las Casas of FAO-Rome indicated that indeed there were beetles of the family Dermestidae in some Bolivian products. There was, however, no way to determine the genus and species of these beetles in Bolivia. The insect museum contained only three specimens, none of which were identified. All collected specimens were sent to the U. S. National Museum and from there to Arizona, where it was determined that the beetles were from the same genus as the Khapra beetle, Trogoderma, but was as yet an undescribed species. With this news, the ban on exportation was lifted and official interest disappeared. I have continued to rear larvae to obtain taxonomic specimens and as yet no name has been assigned to the Bolivian Trogoderma.

Much of my time, especially in Cochabamba, was spent working with students in the CID supervised scholarship program. This was especially important in the area of entomology because at the time of my arrival there were only five persons working in entomology and some of these people had

their formal training in other areas. Students trained under this program are now working in IBTA, Phyto Sanitation, Tamborada University, and in private industry. Some students found that other areas of agriculture interested them more than entomology and are pursuing activities in these areas, but their exposure to entomology and training with insects should help them perform better in their new endeavors. The students continuing in entomology will probably have the opportunity over the future years to make an impact on several institutions in Bolivia because the past has shown that few individuals stay in only one institution for all of their working career.

In addition to working with students on their thesis projects, I taught the Entomology course at La Tamborada in Cochabamba. Initially plans were made to assist Ing. Carlos Montellano, the only Entomology professor, who had many administrative responsibilities and was not in good health. One month before classes were to begin, the health of Prof. Montellano became worse and he died. The burden of the entire class was left to me. The extra work was preferable to cancellation of the class. A total of 38 students were trained in entomology.

Training was also conducted in the form of seminars. In addition to the CID seminar series recently completed, I was invited to present a seminar for the opening of new laboratory buildings at IBTA in Tarija. In Santa Cruz, insect seminars were conducted for farmers with Ing. Victor Gonzalez and Ing. Cleto Siles. Special seminars on "Scientific Photography" were presented in La Paz to IBTA communications experts.

### Recommendations

1. A National Program of Entomology should be initiated within IBTA to solve insect pest problems. This program should include an entomologist as national coordinator and at least one full-time entomologist in each IBTA experiment station.
2. The Bolivian National Insect Museum (BNIM) should be moved to Cochabamba and located in a place where it will be accessible to extension personnel, farmers, and other interested persons.
3. A full-time entomologist should be placed in charge of the museum and given only the responsibility of collection, identification, and preservation of pest insects.
4. Two full-time entomologists should be located at Toralapa Experiment Station. One of these people should study population change, control and distribution of potato pest insects. The other should study pest biology and plant resistance to insect attack. These two entomologists should also conduct cooperative experiments with entomologists in other potato growing regions.