

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

Batch 64

1. SUBJECT CLASSI- FICATION	A. PRIMARY Food production and nutrition	AF00-0336-G302	
	B. SECONDARY Plant production--Oil crops--Soybean--Latin America		
2. TITLE AND SUBTITLE Trip reports on soybean cultivation in Peru and Puerto Rico			
3. AUTHOR(S) Ferrier, L.K.; Thongmeearkom, Pornpod			
4. DOCUMENT DATE 1977	5. NUMBER OF PAGES 11p.	6. ARC NUMBER ARC	
7. REFERENCE ORGANIZATION NAME AND ADDRESS Ill.			
8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)			
9. ABSTRACT			

10. CONTROL NUMBER PN-AAE-028	11. PRICE OF DOCUMENT
12. DESCRIPTORS Peru Puerto Rico Soybean	13. PROJECT NUMBER
	14. CONTRACT NUMBER AID/CM/ta-C-73-19 Res.
	15. TYPE OF DOCUMENT

TRIP REPORT - PERU

Les K. Ferrier, INTSOY, Food Science

June 30, 1977

ITINERARY: 20-21 June Champaign to Lima, Peru

21-27 June Lima

28 June Lima to Champaign

OBJECTIVES:

1. To assist Food Technologists at the Instituto de Investigaciones Agro-Industriales (IIA) with problems involving their soybean food research.
2. To participate in the program of the Intsoy Food & Nutrition team where that program related to preparation and use of soybean foods. The general objectives of the team were to identify:
 - (a) How soy foods might be used, in what form, and by what target groups.
 - (b) Methods of gaining acceptance of soy food.
 - (c) Organizational relationships required for the development, production, and use of the soy foods.
 - (d) The constraints in getting soy foods used in primary areas of nutritional deficiency.
 - (e) Potentials for coordination with other international agency soy food programs.

RESULTS/ACCOMPLISHMENTS:

1. I assisted some of the staff at IIA by answering questions about their research projects on soybean processing and soy containing foods.
2. Five pieces of equipment for processing soybeans had recently arrived. I inspected these and answered questions from Maria Zuluetta about them. The new equipment consists of an Alpine fan beater mill, a Fitzpatrick hammermill, a seed cleaner, a soybean dehuller and a Gaulin homogenizer. The homogenizer arrived in February and was first used at the end of April. The other equipment had just arrived and had not been tested before my visit.
3. I assisted with the design and selection of equipment for a pilot plant for manufacture of dried cereal:legume food products such as weaning food and corn-soy-milk (CSM).
4. In company with other members of the team, I visited (a) a communal farm kitchen which is operating under the auspices of the Office of Applied Nutrition (ONAA), (b) the Institute of Nutrition and (c) the Institute for Nutritional Research located in the Clinica Anglo Americana.

FOLLOW-UP ACTION NEEDED:

1. Send information as requested.
2. Contact the Gaulin Corporation concerning a malfunctioning Gaulin homogenizer at IIA.

COMMENTS AND RECOMMENDATIONS:

1. Protein calorie malnutrition (PCM) is estimated to affect 30% of children under age 6 in Peru. It is undoubtedly a major factor in the high infant mortality rate (also 30%) in Peru. The most important factors which appear to contribute to PCM in Peru are:

- (a) The depressed general economy in Peru.
- (b) The particularly depressed rural economy and very low agricultural productivity in Peru. (According to a 1977 report by the agricultural attache, U.S. Embassy, the rural people constitute 40% of the population but received only 13% of the income in 1976).
- (c) The rapid population growth (3%/year) relative to the growth in agricultural productivity (1%/year).
- (d) The lack of an infrastructure capable of making best use of existing food supplies.
- (e) The generally poor knowledge of sound nutrition by the common people.

Thus it is imperative that substantial improvements be made in food production and food utilization. However, such improvements will be inadequate without concomitant improvements in the general economy, food storage and distribution systems and nutritional education of the common people.

2. IIA and other food, agricultural and nutritional institutions in Peru recognize that PCM is one of the most important problems facing Peru today. These people need strong encouragement and they must be provided adequate finances to continue this work.

3. There is a clear and urgent need for well trained technical personnel to perform the necessary research, education and technical tasks necessary to solve national nutrition problems.

Therefore technical education at all levels from paraprofessional field worker to Ph.D. should be a top priority objective of the GOP.

DETAILED ITINERARY AND DISCUSSION

Tuesday 21 June

Arrived in Lima at 0810 and at the Pension Beech at 0930. Discussed the activities of the other team members with Dr. Pauline Paul. The team schedule had been changed considerably from the original proposed schedule and travel was limited to Lima and the immediate area partly because of political problems in Peru. The group had progressed to the point of making independent arrangements and contacts in order to gain information in their individual areas of expertise.

In the afternoon I met Maria C. Zulueta, Institute for Agro-Industrial Research (IIA), and we planned the remainder of my program as well as discussing the soybean project at IIA.

Wednesday 22 June

Along with Dr. C. MacKenna, I visited the Direccion de Promocion y Educacion Alimentaria (DIPREA) which is part of the Oficina Nacional, Apoyo Alimentacion (ONAA). Dr. Reynaldo de Salinas Caceres (Director of DIPREA) and Senora Hilda Hinostroza (Nutritionist) described the organization and activities of DIPREA. DIPREA's major activities are education and extension concerning applied nutrition and food education (See team report by Dr. Paul, et al.).

Travelled to Lurin to observe a communal farm kitchen. The commune contains about 100 adults and children, most of whom are members of the food cooperative. The kitchen is operated with the assistance of DIPREA and donated food. This feeding program includes soybeans in the form of CSM and probably could be used as a vehicle for other soy foods. (See team report for more detail)

The team visited Mr. Robert Foulkes, Agricultural Attache U.S. Embassy. Some of the nutritional needs of Peruvians were pointed out to the attache along with some general methods for attacking the problem. The attache appeared to have little first-hand understanding of food and nutritional problems or solutions for the Peruvian poor. He did appear to have some second-hand knowledge of how to provide cheaper protein (than meat) to middle class Americans. As a consequence the INTSOY team left his office feeling somewhat frustrated.

Dr. Al Harms and I visited Jose Rodriguez, Food for Peace Officer, USAID. We discussed the general program and purpose of the INTSOY team's visit as well as my specific program especially with respect to IIA.

Thursday 23 June

Drs. Klein, Picciano and I visited the Instituto Investigaciones Nutricional for about 2½ hours. It is located in the Anglo-American clinic from which it rents space. The Institute is supported by USAID and associated with Johns Hopkins University. The Nutrition Institute specializes in protein-calorie-malnutrition (PCM) in infants and we were told that it is the only hospital in Peru which does so. It provides free services in its 18 bed unit for infants with PCM in exchange for information about the patients' family and permission to conduct clinical trials with infant foods on the patient. The diets tested are those which have been shown acceptable using animal tests.

We were told here and elsewhere that about 30% of children under 5 in Peru suffer from PCM and that severe PCM is generally not treated at Peruvian hospitals because the demand for beds is too high to allow time (3 to 6 months) for adequate treatment. Thus, Peruvian children with severe PCM usually die.

Dr. Klein and I spent the afternoon at IIA. I began discussion with Senor Ernesto Giannoni, Food Technologist, concerning their plans for a pilot plant for preparation of weaning foods and CSM-like products. We reviewed his plan in more detail on Saturday, the 25th of June and my comments are included with the discussion for that day.

I also spent some time with Martha Marin, Head of the Cereals Labora discussing her activities and problems associated with the use of soy flour and quinoa in bread making. Addition of full fat or defatted flour to bread has resulted in a decreased loaf volume even with the addition of SSL, an emulsifier. The cause is unknown at this time but it may result from use of the high extraction wheat flour manufactured in Peru.

Friday 24 June

Along with other team members, I visited the Institute of Nutrition which is part of ONAA. The organization and activities of the Institute were explained by Dr. Arroyo, Assistant Director, and Sra. Riboti, Head of the Applied Nutrition section. A discussion of their organization and activities is contained in the team report. Three major nutritional problems which occur in Peru were discussed. These were:

- (a) Protein-calorie-malnutrition which affects about 30% of children under 5 and a lesser proportion of school-age children.
- (b) Endemic goiter which affects up to 50% of the people in some parts of highland jungle.
- (c) Iron deficiency anemia which is also a serious problem.

I left this meeting early to go to IIA for another meeting with Maria Zuluetta. We discussed her project on development of a method for manufacture of soy milk. She is making good progress. At present, she has developed a method for preparation of an acceptable beverage. Some minor tactual defects still exist but the flavor is equivalent to a University of Illinois beverage. New processing equipment for soy milk has arrived and this should help in improving the tactual qualities of the beverage. She expects to begin pilot scale production late this year.

We spent about one hour examining a new Alpine fan-beater mill and a soybean dehuller to ensure that they were complete. The mill was ordered without a collection system (due to insufficient funds) and one will have to be improvised. The dehuller appeared operational but one drive belt had to be reversed before it could be tested.

Friday afternoon was a National holiday and we discontinued our work at about 2:00 p.m.

Saturday 25 June

I visited IIA again and worked for about two hours with Sr. Ernesto Giannoni and Ing. Victor Begazo, Chief of the Division of Food Technology, on the design of the pilot plant. The pilot plant is intended mostly for manufacture of drum dried legume-cereal, weaning foods and replacements for CSM and similar products. (Supply of CSM products by the U.S.A. will be discontinued in 1978). Raw materials to be tested include common beans, soybeans, lupinos, quinoa, rice and maize. Several combinations of two or three of these raw materials will be manufactured to (a) further refine the manufacturing processes which are presently under development at IIA, (b) prepare products for testing as infant foods and (c) to prepare CSM type products for testing in school lunch and other programs.

This basic idea is acceptable and the pilot plant should certainly be constructed. However, several important problems were apparent. These include:

(a) Research is still underway on several of the potential raw materials and insufficient information appears to be available to make sound judgments about preparation of flours of some of the products. Thus, at this time, the processes and the list of equipment needed must be regarded as tentative.

(b) A processing line capable of producing 50 to 100 kg of product per hour was desired. However, the pilot plant designer did not appear to have a clear idea of the potential uses of the products nor the amount which would be required for human feeding trials. For example, a 50 kg/hr processing line can easily produce 1 ton of product/week which is clearly enough for a substantial human feeding test. Sr. Giannoni had apparently not made this important calculation.

(c) The pilot plant is being designed by a man who has just graduated from the University with a degree in Food Technology. This is his first project on his first job and he clearly does not have the experience necessary to do an adequate job on this project. Therefore, I have asked him to forward his completed plans and a detailed list of equipment to me as soon as he completes them so they may be evaluated.

(d) The money budgeted for the pilot plant was only \$100,000. This appears to be only 1/2 to 1/3 of the money which will actually be required. Therefore, I was requested to ask USAID about the possibility of purchasing a drum drier for the pilot plant. I also suggested that IIA may not need to build a pilot plant with a 50 to 100 kg per hour capacity. This would reduce the cost substantially.

(e) At this time an expeller is the best means for preparation of CSM-like products and weaning foods. If a production plant is built in Peru in the near future it will probably be based on an extruder. Thus it would be far more logical to build a pilot plant with an expeller line rather than a drum drier. However, this would require about another \$200,000. An extruder pilot plant based on a Wenger X-20, for example, would have a capacity of 200-300 kg/hr of soy:cereal weaning food. If operated 16 hr/day it would produce roughly 100 tons/month. Thus it might serve initially as a small production plant.

The team attended a luncheon of soy foods, prepared by Senora Carmencita Eschandia of IIA, for about 30 university freshmen. This luncheon was similar to one provided for the Soybean Short Course held in Tumbes, Peru in January, 1977. The luncheon was well prepared and well accepted and the products appeared to be good to excellent. The soybean products presented included a soybean milk-pisco cocktail, 3 cooked whole soybean casseroles, 3 products which contained CSM or soy flour and a flan-type dessert made with soybean milk. The luncheon lasted until about 2:00 p.m. I spent more time with Maria Zuluetta during which we finished our discussion concerning her soybean milk.

Sunday 26 June

A substantial amount of Sunday was spent in discussing the soybean and nutrition situation in Peru and working on this report with other team members. During the evening we continued our daily team evaluation of food consumed by well-to-do Peruvians in the restaurants of Lima.

Monday 27 June

The Intsoy team attended a "round table review" at IIA. Each team member was asked to give a brief report upon his or her observations in Lima and to make informal recommendations for improvement in the nutrition of the population and use of soybeans in the diet. After the formal presentation which lasted about one and one-half hours, a question period lasting about 3/4 of an hour was held.

I spent the afternoon at IIA examining the homogenizer in order to find the reason why its maximum pressure could not exceed about 2,000 psig. I was not successful in correcting the problem but gained sufficient knowledge to pursue the question in more detail with the manufacturer. I also had short discussions with other members of the staff about some of the problems they faced in their projects.

Tuesday 28 June

Departed from the Lima airport at 0015 and arrived in Champaign at 1530.

AGENCIES AND PERSONS CONTACTED

USAID/US Embassy

Sr. Jose Rodriguez, Food for Peace Officer
Mr. Robert Foulkes, U.S. Agricultural Attache

Government of Peru

Direcion de Promocion y Educacion Alimentaria (DIPREA)
Oficina Nacional, Apoyo Alimentacion (ONAA)

Dr. Reynaldo de Salinas Caceres, Director
Sra. Hilda Hinostroza, Nutricionista

Instituto de Nutricion, ONAA

Dr. Meguel Arroyo, Asst. Director
Sra. Barta Rios de Riboti, Jefe, Nutricion Aplicado

Ministry of Food

Ing. Nelson Carpio, (Food Technologist) Director General
of Research

Instituto Investigaciones Agro-Industriales, La Molina

Ing. Cesar Flores Cosio, Chairman of the Board and Acting Director

Ing. Victor Begazo, Head of Food Technology

Ing. Martha Marin B., Head of the Cereals Lab.

Srta. Maria C. Zulueta, Food Chemist, Analytical Lab.

Sr. Rodriguez Pastor
Sr. Jose Antonio Castro Villor } Soy Milk Project

Sr. Ernesto B. Giannoni, Food Technologist, Pilot Plant

Sra. Carmencita Eschandia, Home Economist

PN-AAC 223
100-1000
100

University of Illinois
International Soybean Program
Trip Report/Puerto Rico

NAME: Pornpod Thongmeearkom
Graduate Research Assistant

DIVISION/UNIT: Department of Plant Pathology
University of Illinois, Urbana, IL 61801

DATES OF TRAVEL: July 6 - July 11

ITINERARY: July 6 Champaign to Mayaguez
July 7 - July 10 at Isabela Substation
July 11 Mayaguez to Champaign

PURPOSE:

1. To do the second inoculation of soybeans in the yield loss trial I and the first inoculation for the yield loss trial II.
2. To take data on transmission rate in the transmission experiment.
3. To assist in reinoculation of the soybean mosaic virus seed transmission experiment conducted by R. M. Goodman.

RESULTS AND ACCOMPLISHMENTS:

1. R. M. Goodman, T. L. Shock, and E. H. Paschal reinoculated the first yield loss experiment (see Goodman et al. trip report of June 1977). Nearly 100% of inoculated plants became infected. At my arrival the plants were at about the mid-bloom stage which is the right stage for the second inoculation. Inoculation was done the first thing.

The first inoculation (primary leaf stage) of the second yield loss experiment was delayed until the end of my trip since the plants were too small at my arrival time. Inoculation was done when the plants were 10 days old. At this stage, the first trifoliolate leaf was just about to appear. The experimental design for the second experiment was identical to the first one and the beans were planted by E. H. Paschal and R. Dunker on July 1.

2. In the transmission experiment the beetle activity was noticeably sufficient. A total of 27 soybean plants, grown between rows of infected cowpeas, were observed with symptoms similar to CPMV-infected plants. These plants were not confirmed to be CPMV-infected; these tests will be done with antisera during the next trip.

Infected cowpea plants in one half of the field were removed and the change

in transmission rate in this portion of the field will be compared to the other half with infected cowpeas remaining.

3. Results of inoculation in SMV seed transmission experiment were generally good except in replication 5. Leaves from infected plants in this experiment were used as inoculum source for reinoculation. One trifoliolate leaf of each apparently healthy plant was inoculated.

FOLLOW-UP ACTIONS REQUIRED:

An additional trip is required for the second inoculation of the yield loss experiment II at about mid August. The plants in the first experiment will not be ready for harvesting and E. H. Paschal will help harvesting when they are ready.

In the transmission experiment, all the plants with symptoms similar to CPMV-infected plants found during this and the next trip will be checked serologically against antiserum to CPMV for confirmation. Changes in number as well as pattern of transmission could be detected during the next trip.

DETAILED ITINERARY:

- July 6 Flew from Champaign to Mayaguez, picked up by E. H. Paschal and M. Ellis.
- July 7 Prepared inoculum for inoculation of yield loss experiment I. Inoculated rep I in the morning. Rained out in the afternoon.
- July 8 Continued the inoculation until completed. Took data on transmission rate in the transmission experiment, and recorded the locations of infected plants.
- July 9 Reinoculated SMV experiment. Removed cowpea in transmission experiment. Marked the plots in the yield loss experiment II for inoculation.
- July 10 Spent whole day inoculating plants in yield loss experiment II.
- July 11 Departed Mayaguez for Champaign, arrived at 5:07 pm.