PD-ABE-113
77095

Peanut Collaborative Research Support Program

Peanut CRSP
The University of Georgia
Georgia Experiment Station
Griffin, Georgia 30223-1797
U.S.A.

United States Agency for International Development

Grant No. DAN-4048-G-00-0041-00

PD-ABE-113

PEANUT

COLLABORATIVE RESEARCH

SUPPORT PROGRAM

QUARTERLY PROGRESS REPORT

January - March 1992

Supported by USAID Grant No. DAN-4048-G-00-0041-00
and the Participating U.S. Universities
and Host Country Institutions

PEANUT CRSP QUARTERLY PROGRESS REPORT

QUARTERLY REPORT NO. 7 , Period January 1, 1992 To March 31, 1992

1. Research Progress

a. Host Country(ies)- (GA/IM/BF)

Data for the 1991 tests have been entered on the computer, copied to diskettes, and shipped to the U.S. for statistical analyses. Samples of 1000 g of pods from each of 3 tests at 2 locations were submitted to the Food Science Project in November for cooperative research on in-country aflatoxin analysis as suggested by the Director in our meeting in Niamey in 1989. The number of samples by test are as follows:

	TEST	TREATMENTS	REPS=	SAMPLES
Test 2.	Groundnut Harvest Date	8	5	40
Test 3.	Termite-Resistant Groundnut Lines			
	Gampala	15	4	60
	Farakoba	15	4	60
Test 4.	Insect Control With Neem			
	Gampala	20	5	100
	Farakoba	20	5	100
		TOTAL SAMPLES		360

Using ELISA techniques for aflatoxin analysis, approximately 80-100 samples can be analyzed/day, requiring 4-5 days for the above samples. As of April 10, 1992, no data on the aflatoxin analyses have been received.

(GA/FT) At Kasetsart University, Bangkok, studies on the efficacy of oil extraction systems for producing high quality peanut flour from Thai peanuts continues. Village scale roasting, packaging and marketing of peanuts in Aumphur Phrao also continued into its second quarter of activity. This technology transfer initiative looks promising.

(NCS/IM) Completed dry season studies in Thailand. Currently preparing two research papers in the Philippines. Varietal resistance trials in Thailand going well with good insect pressure and significant differences among entries. Philippines expanding

(TX/MM) During the 1990 and 1991 rainy seasons, two experiments were conducted in Nioro. In the 1st experiment, 25 genotypes/cultivars were examined for resistance to seed invasion by Aspergillus flavus. Several genotypes ranked in good position with regard to 55-437 and PI 33739UF which are known to have good resistance to A. flavus infection. The second experiment, which involved 3 local cultivars (55-437, 73-30, 73-33) examined the effect of plant soil sprayings with a conidial suspension of A. flavus, on the evolution of fungal propagules within the soil as well as on the level of food and seed infection at harvest and subsequent aflatoxin contamination. During both years cultivars 55-437 and 73-30 displayed significantly lower levels of aflatoxin contamination and fewer propagules of A. flavus per gram of soil at harvest than cultivar 73-33. Low spraying treatments increased soil propagula levels of A. flavus for all 5 cultivars in 1990 and 1991. The spray treatments also clearly increased pod and seed infestation by A. flavus and aflatoxin levels in seed for all 3 cultivars in 1990 and for 55-437 and 73-30 in 1991.

b. United States -

(GA/IM)

Research on the relation of pod damage by the lesser cornstalk borer and aflatoxin showed increased levels of Aspergillus flavus infection in seed from externally damaged pods compared with seed from undamaged pods. Evaluation of peanut germplasm for resistance to insects resulted in identification of several lines with significantly less damage due to tobacco thrips, potato leafhopper, and velvetbean caterpillar than was recorded on "Florunner". Evaluation of peanut lines recommended for production in Georgia showed that all were essentially equal in their susceptibility to insects. The sweetpotato whitefly, Bemisia tabaci, had 4 nymphal instars on peanut. The average length and width (u) for the instars were: 1st = 207.8, 120.9; 2nd = 314.9, 194.0; 3rd = 442.6 289.1; 4th = 619.3, 428.7. Immatures occurred on both the upper and lower leaf surfaces and were most abundant on leaves 3, 4, and 5 of a lateral branch, and then numbers declined with increase in leaf age. Few immatures were found on the terminal or the second leaf. Numbers of immatures were equally distributed among the tetrafoliates of a peanut leaf. Yellow sticky traps placed horizontal at ground or canopy level and with the sticky surface upward were most effective in capture of adult sweetpotato whiteflies.

(GA/FT) Changes in catalase content and pH of peanut milk in which Aspergillus parasiticus was cultured were monitored over a 10-day period at 30°C. a 3-to 10-fold

increase in catalase content was detected after 6 days of incubation while the content in uninoculated (control) peanut milk decreased by about 50% after 3 days of incubation. The pH of uninoculated catalase-supplemented peanut milk remained essentially unchanged. Production of catalase by A. parasiticus and perhaps other molds could be a basis for developing a hydrogen peroxide treatment for separating mold contaminated kernels from sound kernels. Studies are in progress to investigate this possibility.

(NCS/IM) Two publications accepted for Peanut Science. Traveled to Thailand, the Philippines late February - early March.

(GA/PV) a system to transform and regenerate peanut protoplast has been developed. The protoplasts are derived from immature cotyledons using cellulose. These protoplasts are transformed using polyethylene glycol treatment and then co-cultured with actively growing nurse cells derived from a long-term suspension culture of Arachis paraguariensis.

(TX/MM) A high pressure liquid chromatographic (HPLC) technique has been recently established to detect and quantitate aflatoxin B_1 and major aflatoxin metabolites in blood, urine and milk. Prior to analysis, these aflatoxin are isolated from samples using a high affinity monoclonal activity. The HPLC profile includes parent aflatoxin B_1, the major aflatoxin - DNA adduct, and the oxidative metabolites--aflatoxins M, P, and Q_1. The major objective of this work is to develop a rapid method for monitoring aflatoxins in complex biological samples and to utilize this method to compare the effectiveness of aflatoxin detoxification strategies.

c. Impact analyses -

(GA/IM)

Groundnut rosette virus and aflatoxin contamination of peanut seeds as a result of termite damage to pods are the most important constraints related to insects in Burkina Faso. More effective cooperation in obtaining aflatoxin analyses on a timely basis is essential if methods are to be identified to reduce/eliminate aflatoxin contamination in West Africa.

The sweetpotato whitefly is the most important whitefly species worldwide because of its ability to vector viral diseases of plants. The insect is a relatively new pest of peanut in the U.S., having been first reported in Florida in 1987. Populations of immatures on peanut can be monitored by counting their numbers on the upper and

lower surface of leaf 3, 4, or 5. Numbers on only one tetrafoliate need be counted as they are statistically comparable on all four leaflets. Populations of adults may be monitored with yellow sticky traps placed at canopy level with the sticky surface upward.

(GA/FT) At Kasetsart University, a study was initiated to determine the market potential of peanut-supplemented noodles. Working with faculty in the Marketing Department, objectives are to interview consumers for consumption patterns and willingness to pay a premium price for the product. Promotional media will be tested for their effectiveness to sell peanut supplemented noodles.

(TX/MM) Peanut cultivars may have some influence on the level of soil infestation by A. flavus. In the present study, the susceptible cultivar was associated with a higher level of soil infestation by A. flavus. Additional data from these experiments indicate that levels of A. flavus propagules within the soil at the pegging stage might induce high levels of toxins within the seeds at harvest time.

2. Workshops, Meetings, Special Publications

(GA/IM)
Robert Lynch attended the Sweetpotato Whitefly Workshop in Houston, TX, in February and attended the Southeastern Branch of the Entomological Society of America in Savannah, GA in March where he was elected President-elect.

(GA/FT) Peanut CRSP investigators representing Kasetsart University, University of the Philippines at Los Banos and the University of Georgia attended the 4th ASEAN Food Conference in Jakarta, Indonesia, February 17-21. Five papers reporting results from project research were presented.

3. Training

(GA/FT) Three M.S. candidates supported by the project are working toward fulfilling requirements of their degrees at Kasetsart University. At the University of Georgia, two Thai, two Filipino and one American student continue to work toward advanced degrees in Food Science and Technology.

(NCS/IM) Organizing training for Dr. Ocampo in July.

(TX/MM) Julius Fajardo has completed his Ph.D. defense and plans to graduate in May 1992.

4. Other

(GA/IM) Served on the Ph.D. committee for Solibo Some and submitted written preliminary questions in March for his exams in early April.

(NCS/IM) Three additional research manuscripts in preparation.

5. ME

Participated in CRSP Council planned educational visits to selected congressmen and senators to report on CRSP accomplishments. Also visited various Bureau groups in AID/Washington.

Prepared MOU for Honduras collaboration. Completed arrangements for subgrant for a peanut enriched noodle marketing study in Thailand.

Assisted PIs in equipment and travel approvals and other project support activities.

Contracted and assisted in the preparation of a 1991 Peanut Update, which summarizes the 1990-91 research year accomplishments.