Peanut Collaborative Research Support Program

QUARTERLY PROGRESS REPORT

JANUARY - MARCH 1994

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

PEANUT

COLLABORATIVE RESEARCH

SUPPORT PROGRAM

QUARTERLY PROGRESS REPORT

JANUARY - MARCH 1994

Supported by USAID Grant No. 263-0152-G-00-1019-00
and the Participating U.S. Universities
and Host Country Institutions

PEANUT CRSP QUARTERLY PROGRESS REPORT

QUARTERLY REPORT NO. 15, Period JANUARY 1, 1994 To MARCH 31, 1994

1. Research Progress

A. Host Countries

(AAMU/FT/BF) - Burkina Faso - Scientists have determined research priorities for further utilization of peanuts and peanut products. Collaboration with the peanut paste factory in Bobo-Dioulasso continues.

Ghana - Arrangements for preparation of personnel and materials for initiation of surveys on uses and conditions of peanut products have been made.

(GA/FT/TP) - At Kasetsart University, a textured protein product based on peanut flour containing 1% oil was processed and found to be comparable in quality characteristics to textured soybean flour.

At the University of the Philippines at Los Baños, a yogurt drink containing aqueous peanut extract and reconstituted skim milk is being formulated and tested.

(GA/PH/CAR) - Thailand - Determination of Peanut Postharvest Handling Systems in Rainfed Area of the Northeast
Thirty farmers in each of Loei and Srisaket provinces where peanut is grown in rainfed area were surveyed to identify opportunities for improving peanut quality. The survey data is being analyzed and expected to be done by the end of April 1994. This result together with the result from Year 1 will indicate opportunities for improving peanut quality for both irrigated and rainfed areas.

Aflatoxin Measurement Early and Late Rainy Season Peanut
Aflatoxin levels for early and late rainy season peanut grown in Loei and Srisaket provinces were measured at farm level during the stages of harvesting, stripping, drying, and storage prior to sale. The initial results indicate that the late rainy season peanut has lower level of aflatoxin than the early rainy season peanut. This is mainly due to harvesting of the late rainy season peanut after the rainy season is over.

Jamaica - Peanut Socio-Economic Survey - Preliminary work on this project got into full gear in January 1994. A survey instrument was prepared and tested and staff to administer the questionnaire selected and trained during the months of February

2

and March. Administration of the questionnaires began at the end of March. It is anticipated that the survey will be completed by Mid May. The report of the findings should be completed by June 1994.

As an adjunct to the socioeconomic study, case studies of key players in the peanut industry are being carried out by Joe Lindsay. Persons interviewed to date include processors, and a large producer.

The United Farmers Union of Braes River St. Elizabeth, under the guidance of Sister Shirley Agoo of the Roman Catholic Church, has been making steady progress with peanuts. They have signed preplanting contracts with two of the largest processors for the purchase of peanuts from the spring crop. Several members of the group have expanded their acreage of CARDI-Payne. Last year some 20 members had been provided with 20 lbs each of unshelled CARDI-Payne peanuts. At the end of the crop the 20 lbs were returned to the Coop. for advancing to other farmers. The group is now involved in limited processing of peanuts. They have also recently purchased a motorized peanut sheller for the members.

Preparations are now being made for planting a new crop at Melrose Hill site. Organic matter will be added to the plots to improve yields. At the Moneaque site in St. Ann drought stress and rat damage resulted in very poor yields.

The fluctuations in availability of peanuts have resulted in record prices for peanuts at this time. A good spring crop should start maturing within the next month.

The Rural Agricultural Development Authority (RADA) in collaboration with the CIDA sponsored Soil Nutrients for Agricultural Productivity (SNAP) project is continuing a study of fertilizer response of peanuts on a range of soils in the main peanut growing areas.

(NCS/IM/TP) - PHILIPPINES - The shift of research efforts from the Los Baños area to actual production regions continues. This encourages field validation under actual production conditions. Research programs validating previous research are currently underway in the Cagayan Valley area as well as the Pampanga area. These research projects include the validation of thresholds, varietal resistance, biological control strategies, and crop loss assessments.

THAILAND - Past studies on the relationship between several common insect vectors and subsequent disease outbreaks continue. In addition, the judicious use of pesticides in association with previously developed thresholds are being validated at several field sites.

3

B. U.S.

(AAMU/FT/BF) - Proximate analysis of composite flours with peanut flour as a component was initiated and optimum ratios determined for preparation of weaning foods and food snacks. Studies on viscosity of pastes made from the composite are in progress.

Preliminary studies on reduced-fat peanut butter provided some insight into textural and organoleptic quality of the finished product. Three types of fat replacers were used. Flavor analysis of the butter will be soon conducted.

(GA/PV,N,TP) - Plants have been regenerated from protoplasts of *Arachis paraguriensis* and some genotypes of *A. Hypogaea*. A new buffer, composed of glycylglycine and potassium glutamate, has been demonstrated to be most effective for gene transfer in electroporation-mediated protoplast transformation of peanut. Up to 7-fold higher level of gene expression has been obtained by using this new buffer when compared to commonly used electroporation buffers. Optimum conditions for electroporation of peanut protoplasts have been defined via transient gene expression analysis. Among several CaMV 35S and Peanut Chlorotic Streak Virus promoters, a compound promoter containing a double 35S promoter and an Alfalfa Mosaic Virus RNA leader sequence conferred the highest level of gene expression in peanut protoplasts.

(GA/FT/TP) - At the University of Georgia, optimization of a formulation for low-fat peanut spread is in progress. Analysis of a consumer test on several formulations is being done.

(NCS/IM/TP) - The role of plant stress in creating insect and mite problems has been further elucidated with studies on the effects of ozone and carbon dioxide on spider mites. This work is of critical importance to our understanding of the pest/host plant relationships and may influence future plant breeding programs. One manuscript has already been accepted on this study and another one is in preparation.

The overwintering mechanism for thrips is still uncertain. Studies during the winter of 1993-94 have failed to recover any significant numbers overwintering in the soil. Studies to follow-up on their migration into peanuts will continue this spring.

(GA/IM/BF) - Analysis of the effects of pesticide treatments, peanut cultivar, and age of peanut at harvest on pod damage by the lesser cornstalk borer showed that only peanut age at harvest significantly affected the percentage of externally damaged pods or percentage of penetrated pods. Data on aflatoxin as affected by these variables are currently being

analyzed. Evaluation of peanut cultivars for resistance to damage by the lesser cornstalk borer revealed that NCAc 343 sustained significantly less external damage than NCAc 2240 (NCAc 343 20.6% c; NCAc 2240 40.0% a; Florunner 33.8% abc) and that NCAc 2142, PI 159664, and NCAc 343 had significantly fewer penetrated pods than NCAc 2240 (NCAc 2142 3.2% d; CC 234 5.5% cd; NCAc 343 5.8% bcd; Florunner 6.2% bcd; NCAc 2240 14.6% a). No difference was detected among peanut cultivars for resistance/susceptibility to the sweet potato whitefly.

C. Impact analysis

(AAMU/FT/BF) - Results from the various ongoing projects show promising results in terms of peanut product utilization and improvement of nutritional quality (reduced fat products, high energy density weaning foods).

(GA/PV,N,TP) - Improving the effective gene transfer to transform peanut protoplasts advances the science of transformation and regeneration of peanut. An efficient model system to insert specific genes into peanut would lead to reduction in diseases, pests, aflatoxin and other constrains in the production of this world food crop.

(GA/IM/BF) - Application of chlorpyrifos at different time intervals for control of the lesser cornstalk borer did not significantly affect lesser cornstalk borer damage to peanut pods. Even an application at pegging and an application during the infestation did not affect the extent of pod damage by this insect. Likewise, no difference in damage was noted between Florunner and Southern Runner. Only age of the peanut at harvest significantly affected damage; pod damage increased as length of time after the initiation of the lesser cornstalk infestation increased. Evaluation of peanut genotypes with resistance to termites in Burkina Faso showed that NCAc 343 had the least amount of total pod damage of all lines evaluated. Interestingly, NCAc 343 was also the most resistant to termites in West Africa.

2. Workshops, Meetings, Special Publications

(GA/PV,N,TP) - J. W. Demski attended the information exchange group meetings on; 1) Plant viruses transmitted by white flies and thrips held in Orlando, Florida on January 24, 1994. 2) Peanut Molecular biology held in Raleigh, NC on February 22-23, 1994.

(NCS/IM/TP) - A special one day workshop titled "Review and Planning Workshop on Peanut Integrated Pest Management (IPM) was held on January 17, 1994 at PCARRD Headquarters in Los Baños. The whole day workshop included Drs. B del Rosario, E. Lopez, R. Brandenburg, V. Ocampo, E. Cadapan, C Adalla, J. Bailey, M.

Natural, A. Baltazar, and V. Perdido. The workshop reviewed past work and established priorities for future studies. Plans include a publication of the proceedings from this meeting.

Barbour, J. D. and R. L. Brandenburg. 1994. Vernal Infusion of Thrips into North Carolina Peanut Fields. J. Econ. Entomol. 87:446-451.

3. Training

(AAMU/FT/BF) - One student at Alabama A&M University is at the final stages for completion of an M.S. Degree in Food Science.

(GA/FT/TP) - Ms. Grace Divino and Mr. Augustin Ramos from the Philippines continue to pursue their M.S. degrees at UGA. Mr. Witoon Prinyawiwatkul and Mr. Anuvat Jangchud from Thailand are pursuing Ph.D. degrees at UGA.

4. Other

(AAMU/FT/BF) - Dr. John Cherry, Director of the USDA-ARS in Philadelphia and a member of the EEP Review Team visited the Food Research Institute in Accra, Ghana, and the University of Ouagadougou in Burkina Faso to discuss the Food Technology Project with Alabama A&M University (March 1994).

Texas A&M University -Congradulations to Suzanne Segner, Ruth Taber's technican on Mycorrhizae Project was awarded the 1993 Outstanding Staff Award in the Department of Plant Pathology, Microbiology, Texas A&M University, College Station, Texas. Much of Suzanne's time was spent working on the Mycorrhizae project.

Management Entity

Drs. David Hsi, Joe Smartt, and Bo Bengtsson of the Peanut CRSP External Evaluation Panel (EEP), Dr. Dianne Janczewski, USAID Program Manager, and David Cummins visited Thailand on 22 - 30 January 1994.

Meetings and on-site visits where conducted at Field Crops Research Institute at Bangkok, Chiang Mai University at Chiang Mai, and the Kassetsart University at Khon Kaen.

Drs. Milt Coughenour, Robert Schilling, and John Cherry of the Peanut CRSP External Evaluation Panel (EEP), and Dr. Keith Ingram, Assistant Program Director of the Peanut CRSP travelled to Philippines on 20-29 January. Dr. Dianne Janczewski, USAID Program Manager, visited the Philippines at a later date.

Meetings and on-site visits were conducted at USAID Manila, PCARRD, University of Philippines at Los Baños, and Visayas

State College of Agriculture at Baybay, Leyte.

The teams went to review and evaluate on-site progress of projects in harvesting, breeding, virus diseases, and insect management.

Drs. Harlan Davis, Associate Vice President for Services, The University of Georgia and David Cummins travelled to Bolivia on 8-11 February 1994. They met with Mr. William Baucom, Chief, Agricultural and Rural Development, USAID La Paz to discuss the potential collaboration with Peanut CRSP in Bolivia.

Dr. Keith Ingram travelled to India, on 20-25 March 1994 to meet with Dr. Duncan McDonald to discuss phase out/extension of Peanut CRSP with researchers at the International Crops Research Institute for the Semi-Arid Trops (ICRISAT) and discuss potential collaboration on dryland/rainfed cropping systems with ICRISAT, the Central Research Institute of Dryland Agriculture (CRIDA), and the Indian Council for Agricultural Research (ICAR).

Conference calls for March 3 and 10, 1994 with Peanut CRSP Board of Directors and March 11, 1994 conference call with U. S. Principal Investigators. The minutes for these calls were sent out of the ME office on March 24.

Peanut CRSP Annual Report and Newsletter volume #5 was mail to Peanut CRSP participants on February 17.

Dr. Harvey J. Hortik, Acting Director, USAID sent letter dated April 8, 1994 to our office in regard to the decision to phase out three CRSPs --- The Soil Managemenat CRSP in FY 1994, and the Peanut and Small Ruminant CRSPs in FY 1995. US AID office will be developing a close out plan in coordination with each CRSP.