MINUTES
of the
MEETING OF THE S-9 TECHNICAL COMMITTEE
"NEW PLANTS"

The Introduction, Multiplication, and Evaluation of New Plants for Agricultural and Industrial Uses and the Preservation of Valuable Germplasm

Hilton Inn
El Paso, Texas

November 1, 1974

Agenda for Meeting
of the
S-9 Technical Committee
Hilton Inn
8: A. M. to Noon, November 1, 1974

1. Call to Order.
2. Approval of Agenda.
3. Regional Station Report.
4. Seed Storage Facility, SMY, and Other Station Needs.
5. Regional Station Budget.
6. Plant Explorations.
7. Plan of Work for 1974-75.
8. Report on Progress of Publications.
9. Report on New Crops and Minor Oilseeds Task Force.
10. Remarks from Administrative Advisor.
11. Remarks from Cooperative State Research Service Representative.
12. Other Business and Reports.
13. Committee Reports and Election of Officers.
14. Adjourn.

1. Call to Order

The meeting of the S-9 Technical Committee "New Plants" was called to order by E. L. Whiteley, Chairman, at 8:05 a.m., November 1, 1974 in the Conference Room of the Hilton Inn, El Paso, Texas. Each attendee that had not been introduced at the joint session of S-9 and W-6 on the previous two days was introduced. Those in attendance were:

S-9 Committee Members Present

1.	C. R. Jackson	Administrative Advisor
2.	W. R. Langford	Regional Coordinator, Georgia
3.	C. S. Hoveland	Alabama
4.	J. L. Bowers	Arkansas
5.	G. B. Killinger	Florida
6.	R. A. Hamilton	Hawaii
7.	R. E. Sigafus	Kentucky
8.	R. J. Stadtherr	Louisiana
9.	R. G. Creech	Mississippi
10.	R. S. Matlock	Oklahoma
11.	J. Velez-Fortuno	Puerto Rico
12.	G. Halfacre	South Carolina
13.	M. J. Constantin	Tennessee
14.	E. L. Whiteley	Texas
15.	H. L. Hyland	Maryland-USDA-ARS-Germplasm Res. Lab.
16.	Q. Jones	USDA, National Program Staff
17.	W. H. Tallent	USDA, Northern Regional Research Laboratory
18.	A. G. Davis	USDA, Soil Conservation Service, Texas

Others in Attendance

J. A. Floyd, Jr.	Horticulture Dept., Clemson Univ.
D. L. Merkel	USDA, Soil Conservation Service, New Mexico
G. A. White	USDA, ARS, Germplasm Resources Laboratory
L. N. Bass	USDA, National Seed Storage Laboratory
W. H. Skrdla	NC-7 Regional Coordinator, Iowa

2. Approval of Agenda and Committee Appointments

The Agenda as presented on page 1 was adopted. The following committees were appointed:

a. Nominations:

A. G. Davis
J. Velez-Fortuno
G. B. Killinger, Chairman

b. Resolution:

J. L. Bowers, Chairman
M. J. Constantin
W. R. Langford

c. Time and Place of Next Meeting:

F. R. Earle, Chairman
C. S. Hoveland
R. S. Matlock

3. Regional Station Report

W. R. Langford, Regional Coordinator, presented the Regional Station Report. The report is attached to these minutes. Highlights of the report are as follows:

a. Seed or vegetative materials of 1130 new introductions were received during the fiscal year ending June 30, 1974.

b. In reference to seed increase and preliminary evaluation, 3, 241 introductions were grown at the Regional Plant Introduction Station at Experiment, Georgia last year.

c. Improvements at the Regional Station include:

(1) New equipment:
Small plot peanut harvester
Thresher for harvesting beans, other crops
Replacement of temperature and humidity controls on the storage room.

(2) Land assignment:
About 5 acres of land adjacent to the nursery was assigned to the Regional Station by the Georgia Station for growing winter crops. In recent years, the planting of clovers and vetches had to be delayed until the summer crops were removed.

4. Seed Storage Facility, SMY and Other Station Needs

Several needs of the Station were mentioned by W. R. Langford

(1) The seed storage facility needs to be enlarged. The present space will be exhausted within three years at the present rate of plant introductions.

(2) The present seed storage building needs to be modernized and made more fire resistant. A tremendous loss in irreplaceable germplasm could occur with a destructive fire. It was suggested that a separate fire proof building for seed storage be funded and erected.

(3) Funds are needed for seed production of short-day and non-hardy winter legumes that do not produce seed under the environmental conditions at Experiment, Georgia. Presently there are about 2400 accessions of assorted

species that fall in this category. The availability of a nursery of 2-3 acres on a continuing basis in the tropics, perhaps Puerto Rico, would be adequate for increase of tropical and sub-tropical accessions. Non-hardy clover and lupines could be increased in Florida or other Gulf Coast locations; however, funds are needed for their increase.

Discussion followed on the possibility of obtaining funds for the needed items and tropical nursery from the Southern A. E. S. Directors. It was pointed out that the other plant introduction stations receive more support for operations and equipment than does the Southern Regional Plant Introduction Station. Administrative Advisor, C. R. Jackson, stated that he would provide documentation of the Station's need in a formal request for funds to the Southern Directors. The Southern Regional Station holds more plant introductions than any other Station, yet, it has the lowest budget.

C. R. Jackson discussed the problemof securing the collections of plant material held by various and sundry plant curators in the United States. Quentin Jones is assembling a list of these curators. The purpose of this list is to minimize the loss of valuable germplasm materials should a curator cease to maintain the collection. It was pointed out that these curators are providing a very valuable service. Should the plant introduction stations have to maintain these collections, the cost would be very high. However, it is very important that these materials be preserved, since they provide genetic variability for the species involved. It is being proposed that materials held by curators, except possibly cotton, be turned over to these plant introduction stations for increase and maintenance. This is preferred to separate funding of the curators. These increases in funds could go to the respective plant introduction station. This will mean, should it be accomplished, a very large increase in the number of accessions for the Southern Regional Plant Introduction Station at Experiment. When the list of curators has been assembled by Quentin Jones, copies will be provided to the technical representatives of S-9.

A discussion arose in reference to the possibility of a tropical nursery at the Mayaguez Station in Puerto Rico. There was an increase of $510,000 in the Federal budget for tropical agriculture. This was a line item in the budget and it was hoped by members of the S-9 Technical Committee that part of these funds would be used for maintenance and increase of tropical germplasm materials. It was understood that most of these funds would go to Hawaii for tropical crops research; however, it was also understood by several members of the S-9 Committee that part of these funds would go to the Mayaguez Station for germplasm maintenance and increase.

C. R. Jackson stated that he would contact Deputy Administrator Cooper of the Southern Region for information in reference to the status of the proposal to establish the tropical crops germplasm and increase program at Mayaguez. It was pointed out that additional funds would be needed by the Mayaguez Station because of the cost of such a program.

Additional discussion followed on the shortage of funds for the Southern Regional Plant Introduction Station. Inadequate funding makes it very difficult to maintain the existing collection of accessions at Experiment. The addition of more accessions will further complicate the situation. It was suggested that the National Science Foundation may be a souce of additional funds for the preservation of genetic variability in crop species. NSF funds apparently are being made available in the area of research of genetic vulnerability of crop species. Perhaps some of these funds can be utilized for accession and maintenance of genetic variability in our crop species and for those species with promising crop use. A suggestion was made that NSF be contacted in reference to improving the laboratories and facilities in the Station at Experiment.

(4) The Committee members recognize the need for an additional scientist at the Southern Regional Plant Introduction Station to conduct entomological investigations and to evaluate plant materials for resistance and/or tolerance to insects causing economic damage to crops. This would involve the characterization of the plant accessions for insect resistance and/ or tolerance and the general nature of the resistance and / or tolerance. This information would be valuable to plant breeders involved in research on host plant resistance and /or tolerance. Further, this information would be of value to production systems agronomists and entomologists in developing systems of pest management for specific crops.

C. R. Jackson commented that he thought the National Germplasm Committee was off to a good start in defining the needs of the four plant introduction stations, including the Southern Regional Plant Introduction Station. As needs are identified, attempts will be made to secure funds to alleviate these needs. The four regional plant introduction station are supported financially by the host state experiment station, Regional Research Funds from all state experiment stations, and the Agricultural Research Service, USDA. Therefore, increases in funds from both state experiment stations and ARS are necessary in meeting the needs of germplasm collection, increase and maintenance. Administrative advisor, C. R. Jackson, reported that at future meetings of the S-9 Technical Committee, Area Director William Bruce, Georgia-South Carolina Area, ARS-USDA, will represent the Deputy Administrator of the Southern Region. Mr. Bruce will be Dr. Jackson's counterpart for the ARS.

5. Southern Regional Station Budget

The budget request of the Southern Regional Plant Introduction Station was presented by W. R. Langford (see attached report in Appendix). After considerable discussion and evaluation, a motion was made by J. L. Bowers and seconded by R. J. Stadtherr to approve the budget request as presented in the Appendix. The motion was unanimously approved.

The relative importance of the plant introduction program as apparently assessed by the Southern Directors was discussed. It was concluded that each representative to S-9 should present frequent reports to the respective Director pointing out the value and needs of the plant

introduction program.

6. Plant Explorations

G. A. White, Germplasm Resources Laboratory, ARS-USDA, reported on the status of the plant exploration proposal from Mississippi, Texas and Florida in reference to Paspalum spp. collections. He indicated that the proposed exploration was on the approved list and plans were being made to conduct the collection in South America in early 1975. C. R. Jackson urged that continuing effort be made to timely inform all concerned parties of the status of such proposals. There was evidence that the states involved were not aware of the approval and authorization of the Paspalum spp. exploration. It was indicated that in the future attempts will be made to give timely reports to concerned persons on the status of plant exploration proposals.

G. A. White indicated that there are no specified funds for foreign plant exploration. These funds are allocated on the basis of need from the ARS Administrator's Account. A discussion ensued on whether or not the states have a responsibility to share in the cost of foreign plant exploration and collections. For example, should the state pay the expenses of a state scientist involved in a collection trip? The general consensus was that while a state generally approves the participation (includes salary) of a state scientist in the plant collection trips, it was doubtful if they would approve foreign travel expenses, especially if the plant collection trip benefited several other states. It was felt that if the plant collections benefited several states Federal funds should be used to pay travel expenses. Either that or some means be developed to have each involved state pay its fair share. In general, state scientists are invited on such trips because of their disciplinary competence and experience with particular crop species.

G. B. Killinger suggested that a Plant Exploration Committee be appointed within S-9 to review proposals, recommend priorities, and present these recommendations through appropriate channels. F. R. Earle indicated that W-6 has such a committee. Dr. C. R. Jackson indicated that a standard format needs to be developed for plant exploration proposals that includes objectives, procedures, suggested personnel and budget information. He further stated that the recommended budgets for approved proposals from the Southern Region should be the included in the annual Southern Regional Plant Introduction Station's budget request for the succeeding fiscal year. Dr. G. A. White indicated that one of the reasons Mississippi, Texas and Florida were not notified of the approval of the Paspalum spp. collection trip was the Presidential veto of the USDA budget for fiscal 1975. Although approved, the proposal had not yet been funded. Again, the suggestion arose that NSF might consider funding the Paspalum proposal with funds earmarked for "genetic vulnerability" investigations.

During further discussion, it was pointed out that the Paspalum request was bonafide, well prepared and justified. Dr. Jackson suggested that the technical representatives to S-9 in the future promote careful preparation of plant exploration proposals with appropriate description, documentation, and justification, similar in style to the Paspalum proposal.

A motion was made by J. R. Bowers that the Chairman appoint a Plant Exploration Sub-committee of S-9 to develop procedures and a format for future plant exploration and collection proposals. The motion was seconded by F. R. Earle and the motion was unanimously passed.

It was pointed out in additional discussion that the United Nations-FAO had received sizeable funds for germplasm collections. It was suggested that FAO might be in a position to fund or partially fund certain plant collection proposals. Dr. Jackson stated that he did not think these funds would be made available to U. S. citizens to conduct plant explorations; however, he indicated willingness to probe the organization as to whether or not assistance could be obtained. Dr. John Creech of the National Arboretu is the U. S. representative to the FAO group. It was suggested that Dr. John Creech be contacted in reference to the availability of funds for appropriate proposals. The emphasis of the FAO program is on cereal germplasm. G. A. White stated that he would be in contact with the people involved and would seek to obtain the suggested information. He indicated that he would also attempt to establish a communication link to keep S-9 informed of the plant explorations of the FAO group. R. A. Hamilton stated that he has received plant materials through the FAO personnel cooperative. It was the consensus that such contacts could be very useful and valuable. Contacts could be made with key people in specific plant explorations. The current plant exploration proposal on cereals has been funded at the level of $203,000. Before S-9 representatives contact the appropriate FAO people, we must first decide what specific plant materials we need.

G. A. White indicated there are many request that do not justifiy a special exploration; however, these collections could be made in conjunction with a larger exploration. R. G. Creech suggested a brochure or pamphlet should be developed by S-9 that would present guidelines for developiing exploration proposals. This pamphlet could be provided to all individuals requesting plant explorations. This would provide the advantage of having a consistent and uniform format for developing the project proposal. G. A. White indicated the ARS group would appreciate such a procedure. Unfunded proposals could be resubmitted and reconsidered the following year if the need still exist. C. R. Jackson again pointed out that a need also exists for a uniform procedure for informing individuals thathave made exploration proposals of the status of such proposals on a timely and regular basis. He stated that even though the S-9 representatives may be informed, the authors need to be informed as well.

A proposal was made by G. B. Killinger that the ARS Plant Germplasm Coordinating Committee be expanded to include at least the administrative advisors of the S-9, W-6, Nc-7 and NE-9 technical committees. It was suggested that perhaps the current chairmen of the 4 technical committees should also be members. Dr. C. R. Jackson will discuss this proposal with Dr. Quentin Jones.

Chairman Whiteley suggested that each state representative to S-9 keep individuals in their respective states interested in plant intrductions fully informed of the procedures for initiating a plant exploration proposal.

C. R. Jackson suggested that we have two levels of request. One level involves a request for a full exploration and collection. This level requires a formal proposal with documentation. The other level requests small collections in conjunction with larger explroations. It should not be necessary for a formal proposal for the second level. Letters to designated individuals should suffice. Dr. Jackson stated that we should listen to the individual requesting the collection of a few materials. These minor requests should be assembled for ready reference and action when the opportunity arises. These minor requests could be attached to larger exploration proposals.

J. L. Bowers moved that the Chairman appoint a Plant Exploration Sub-committee of S-9 to develop a standard format for plant exploration proposals and channel, where time allows, formal proposals to the S-9 Technical Committee for a formal decision in reference to priority for approval and funding. Where time does not allow consideration by the whole technical committee, the sub-committee should make recommendations directly to the Executive Committee of S-9. The motion was seconded by F. R. Earle and was unanimously passed.

7. Plan of Work for 1974-1975

Chairmen Whiteley called for work plans for the next year. W. R. Langford indicated that the Plant Exploration Sub-committee work plans have previously been spelled out. This sub-committee will develop a format and procedures for formal plant exploration and collection proposals.

8. Report on Progress of Publications

R. J. Stadtherr, Chairman of the Ornamental Sub-committee, reported that the ornamental publications are well along. J. A. Floyd, Jr. of South Carolina has a recent publication on holly, entitled "Holly Evaluation at the Horticultural Gardens of Clemson University", Bulletin 1050, South Carolina Agricultural Experiment Station, which included many P.I. and N. A. numbered materials. A second publication, entitled "New Ornamental Plants for South Carolina", Bulletin 571, S. C.A. E. S., has also been released.

Dr. C. R. Jackson stated that a system for cost-sharing for publication of regional manuscripts has been approved by the Southern Directors. First the manuscrip is prepared, one station is designated as the publisher, and the other states promise to buy a certain number of copies.

R. J. Stadtherr indicated that a regional publication on ornamentals may be possible within the next 2-3 years.

G. A. White asked about the plans for publishing the new crops work other than kenaf. E. L. Whiteley indicated that W. T. Fike is still working on this publication and the other materials will be included with that on kenaf. Chairman Whiteley suggested that the new Chairman contact Dr. Fike in reference to the progress of this publication.

9. Report on New Crops and Minor Oilseeds Task Force

Chairman Whiteley requested that R. G. Creech, Chairman of the Southern Regional Task Force on New Crops and Minor Oilseeds, present a brief report on the progress of the Task Force. The list of the members and consultants of the Task Force were presented and is included in the Appendix. Dr. Creech indicated that two meetings have been held, one in the late spring and the second in September, 1974. A rough draft of the Task Force report has been prepared. At the first meeting the Task Force developed an organizational structure and divided the subject matter into four areas for the report: oil and protein crops, carbohydrate crops, gum crops and germplasm, plant introduction and maintenance. Committees were appointed for each of these areas to develop their parts of the report. The Chairman of the Oil and Protein Crops Committee is E.L. Whiteley. The Chairman of the Carbohydrate Crops Committee is W. C. Adamson and the Chairman of the Gum Crops Committee is R. E. Stafford. The Germplasm, Plant Introduction and Maintenance Committee Chairman is W. R. Langford. The four committees have been active. They presented preliminary reports at the September meeting. A Writing Committee was appointed in September consisting of : E.L. Whiteley, W. C. Adamson, R. E. Stafford, W. R. Langford, D. E. Gandy, and R. G. Creech, Chairman. The Writing Committee is to meet in November.

A list of crop priorities was established at the meeting of the Task Force in September. This list is also included in the Appendix.

10. Remarks from Administrative Advisor

Dr. C. R. Jackson indicated that he had nothing to add to his previous remarks except to say that he had received word from C. I. Harris, CSRS Representative, expressing his regrets at not being able to attend the S-9 meeting because of a meeting conflict.

11. Remarks from Cooperative State Research Service

No report.

12. Other Buisness and Reports

J. A. Floyd, Jr. stated that the research program of J. A. Martin (deceased) had been divided at South Carolina. J. A. Floyd, Jr. indicated that Dr. R. G. Halfacre is to be the new representative to S-9 from South Carolina. He indicated that he and Dr. Halfacre will continue to cooperate on the ornamental research program, which involves a large quantity of P. I. numbered materials.

E. L. Whiteley pointed out the problems created with individual P. I. collections when researchers retire or decease. Many of the records are lost or destroyed. He urged that the technical representatives to S-9 be on the alert to minimize such losses by acting to preserve such data at their respective stations.

13. Committee Reports

Nominations:

This committee met and after due deliberation submitted for consideration the following candidates for 1974-75 Technical Committee S-9 Officers.

Chairman - Roy Creech
Sec-Treas - Milton (M. J.) Constantin

Committee members:

Arnold Davis
Velez-Fortuno
Gordon Killinger, Chm.

The Chairman called for additional nominations. There were none and G. B. Killinger moved that the report of the Nomination Committee be accepted and the nominees be elected. The motion was seconded by C. S. Hoveland and was unanimously passed.

Time and Place of Next Meeting:

After considering that it has been five years since S-9 met at the Southern Regional Plant Introduction Station, Experiment, Georgia, the Committee recommended that the next meeting of S-9 be held at the Southern Regional Station and, further, that it be held Thursday and Friday, August 21 and 22, 1975, the week before the ASA Annual Meeting in Knoxville.

Committee members:

R. S. Matlock
C. S. Hoveland
F. R. Earle, Chairman

F. R. Earle moved that the time and place be approved as presented by the Committee. W. R. Langford seconded the motion and it was unanimously approved.

Resolutions: The Resolutions Committee met and drafted the following resolutions for action:

a. "Be it, resolved that the S-9 Technical Committee gives special recognition to Gordon Killinger, University of Florida, for his long time and faithful service on this committee and for his contribution to our knowledge on forage crops and several new crop introductions. His presence in our group will indeed be missed and the S-9 committee wishes for him good health and the opportunity to pursue the things he wants to do."

b. "Be it,resolved that the S-9 Technical Committee gives special recognition to W. C. (Crawford) Young, Soil Conservation Service, for

his longtime contribution to our group and for his contribution to our knowledge on plant materials which are being used in the conservation of soils. We also wish for him good health and the opportunity to enjoy the fruits of his efforts in maintaining road banks and landscapes as he travels during retirement."

c. "Be it, resolved that the S-9 Technical Committee gives special recognition to Charles Galeotti, Oklahoma State University, for his contribution to our knowledge on the plant introductions in Pulse Crop group."

d. "Be it, resolved that the S-9 Technical Committee gives special recognition to J. Velez-Fortuno, University of Puerto Rico, for his contribution in the testing of new materials in the Caribbean area and also for his gracious hospitality in hosting our group."

e. "Be it, resolved the S-9 Technical committee recognizes at this time the outstanding contributions made to this group by our good friend, the late John A. Martin, Clemson University. John was a charter member and a regular attendant at our meetings and he made many contributions to our knowledge on many new crops tested under this program."

f. "Be it, resolved that the S-9 and W-6 Technical Committee give special recognition to the contributions Howard Hyland, recipient of the Myers Award, has made to our regular meetings and his willingness to serve the group through his position with the Plant Introduction Service."

g. "Be it, resolved that the S-9 Technical Committee recognizes that contributions of Fount Earle, Northern Regional Research Laboratory, Peoria, Illinois, has been made towards the New Crops research program in the Southeastern region. We wish for him good health and the opportunity to pursue his hobbies in the future."

h. "Be it, resolved that the S-9 Technical Committee expresses its appreciation to Fred Widmoyer and M. L. Wilson, New Mexico State University for their services in making arrangements for these meetings and the opportunity to meet with the W-6 group as our host."

i. "Be it also resolved that the S-9 Technical Committe expresses appreciation to the management and personnel of the Hilton Inn, El Paso, Texas for the excellent facilities provided for our meetings and the courtesies their personnel extended to our group."

Committe members:

J. L. Bowers, Chm
W. R. Langford
M. J. Constantin

R. J. Stadtherr moved that the Resolutions Committee's report be adopted. G. A. White seconded the motion and the resolutions were unanimously adopted.

Chairman E. L. Whiteley appointed a Plant Exploration Subcommittee, as requested in a previous approved motion by J. L. Bowers, with the following members:

R. G. Creech, Chairman
C. S. Hoveland
A. G. Davis

Chairman Whiteley stated that the station reports will be included in the minutes. These reports are in the Appendix. Chairman Whiteley welcomed the new S-9 members, R. A. Hamilton, A. G. Davis, R. G. Creech, and G. Halfacre.

14. Adjournment

The meeting was adjourned at 11:45 a.m. by Chairman Whiteley.

Respectfully submitted,

Roy G. Creech
Secretary

Report of Regional Station Activities
to S-9 Technical Committee
July 1, 1973 - June 30, 1974

Plant Introduction

Seed or plants of 1130 new introductions were received during the year ending June 30, 1974. Some of the larger collections received are: 198 accessions of cantaloupes and watermelons from Iran and India, 167 accessions of Solanum from India and Japan, and 101 cowpea introductions from Australia and Nigeria. Dr. Ian Forbes supplied us with seed of 52 Medicago accessions that he collected in Morocco, Tunisia, Spain and Portugal. In addition to these new introductions, seed of many clover introductions once held by the Forage and Range Research Branch were placed at the Regional Station. Some of these clovers were already on the S-9 inventory, but there are many that were introduced before the regional projects were initiated and consequently not in our program.

Production of Seed

3241 introductions were grown at the Regional Station last year for seed increase and preliminary evaluation. Good seed increases were obtained from all plantings except some late maturing grasses and legumes and many of the winter legumes. Lack of available land delayed transplanting of clovers until November; and although last winter was mild, cold weather during early December killed many accessions of non-hardy species.

Following is a list of collections grown during the past year:

Plant name	No. of accessions
Watermelons	158
Peppers	191
Summer legumes & misc. spp.	165
Gourds	144
Sorghums	463
Mung beans	176
Pumpkins	51
Cantaloupes	141
Cowpeas	257
Grasses	374
Eggplants	152
Peanuts	384
Winter legumes	585
TOTAL	3241

Cataloguing and Distribution of Seed

The catalogues listing grasses, peppers, peanuts, melons, and sorghum were updated to include materials increased through 1973. Catalogues of edible legumes, okra, Brassica, Solanum, and forage legumes will be revised this winter.

Following is a summary of the distribution of seed and plants in the Southern Region:

	Packets of seed and plants distributed in Southern Region, FY-74					
State	S-9	NE-9	NC-7	W-6	Other	Total
Alabama	109		26	52		187
Arkansas	16		11	107	78	212
Florida	1336	10	101	483	1439	3369
Georgia	954	9	2	363	105	1433
Kentucky	2		96			98
Louisiana	31				10	41
Mississippi	187	1	14			202
N. Carolina	66		130	49	45	290
Oklahoma	2040		25	20		2085
Puerto Rico	76	22	26	3		127
S. Carolina	3		10	275	1	289
Tennessee	5					5
Texas	275		1	56	23	355
Virginia		65	9	162	14	250
TOTAL	5100	107	451	1570	1715	8943

Materials sent outside the Region by S-9

NE-9	182
NC-7	194
W-6	1353
Foreign	1803
TOTAL	3532

Screening for Disease Resistance

Peanut leafspot: Seven peanut introductions, P.I.'s 109839, 162857, 259639, 259679, 259747, 270806, and 350680, were resistant to early leafspot caused by Cercospora arachidicola in replicated field tests at Tifton and Experiment.

Argentine was 50-100% defoliated in all tests while the resistant introductions showed less than 20% defoliation in 2 of the 3 tests (Table 1).

Table 1: Disease index (0-5 scale) on peanuts in Cercospora leafspot test.

P.I. Number	Disease Index		
	Tifton, Ga.		Experiment, Georgia
	1973	1974	1974
109839	1.5	1.0	1.0
162857	3.0	1.0	1.0
259639	3.0	1.0	1.0
259679	3.0	1.0	1.0
259747	2.5	1.2	1.0
270806	2.5	1.0	1.0
350680	2.5	1.0	1.0
Argentine	5.0	3.0	1.0
Florunner	5.0	1.5	4.2

P.I. 109839 has been highly resistant in field tests over a period of 5 years and can be recommended to peanut breeders as a source of resistance to leafspot. By visual criteria Dr. R. O. Hammons, with whom field testing was cooperative, judged the resistant introductions as 2 to 4 weeks later than present commercial cultivars. Preliminary work using the arginine-maturity-index method indicated less difference in maturity than was indicated by visual criteria in the 1973 test.

Bacterial Spot of Pepper: All major sources of resistance to bacterial spot, caused by Xanthomonas vesicatoria were tested in the field in 1974. This work which was done in cooperation with Dr. A. H. Dempsey, demonstrated that all sources including an introduction (P.I. 322719), which has not been reported as resistant previously, were resistant. There is considerable plant to plant variation in fruit size and it may be possible to select large fruited, resistant lines of this introduction. All resistant introductions showed only small necrotic flecks on the leaves and very little defoliation while Yolo Wonder B was 60% defoliated by the disease.

Tobacco-Etch-Virus (TEV) resistant pepper: Experiments to document the resistance of reported sources of resistance to TEV to several isolates of the virus have been completed in cooperation with Dr. Demski. P.I. 152225 (Capsicum chinense) and P.I. 342946 (Capsicum annuum) were consistently resistant to three isolates from North Carolina, Florida and the American Type Culture Collection.

Peanut Mottle Virus (PMV): Two peanut introductions which were resistant in greenhouse tests remained symptomless when inoculated with the necrosis strain in the field. Yield of these plots will determine if the virus has any effect

on yield of the symptomless plants. This research conducted in cooperation with Dr. Kuhn indicates no effect of PMV on top growth of inoculated plants. Additional introductions were screened for resistance to the necrosis strain of PMV in the greenhouse.

Diseases Associated with Plant Introductions

Watermelon Bacteria: A white bacterium which may be distinct from Pseudomonas lacrymans was isolated from seedlings of plant introductions growing in the greenhouse. Evidence now indicates that two pathogenic bacteria may be present with the seed of certain introductions. Fifty-eight introductions in the P.I. 163202 - P.I. 271776 range were planted in the greenhouse to determine the frequency of the symptoms caused by seed transmitted bacteria. The seedlings of nine introductions showed water soaking of the cotyledons of the type previously associated with Pseudomonas lacrymans. As a result of this research we are not distributing seed of watermelon introductions until we determine the frequency and identify of the bacterium (a) associated with the seed.

Downy Mildew of Sorghum was not observed on corn growing in the same field where sorghum-Sudan grass hybrids were severely affected by the disease in 1973. Seed of introductions showing the disease will be planted in 1975 in a location isolated from the plant introduction nursery to determine if the pathogen is carried by this seed. Seed from the 1973 crop has not been distributed since some of the plants were affected by downy mildew.

Oidium sp. on Okra was found again on the few introductions of Hibiscus esculentus grown in 1974. This disease appears to be established in the plant introduction nursery. Since there is no evidence that the disease is seed transmitted, seed from these plots will be distributed as usual. Peanut rust was not observed in the nursery this year and all vegetative material of plant introductions are apparently free of pathogens that might cause problems for their recepients.

Improvements:

Several new pieces of equipment were purchased during the year. These include (1) a small-plot peanut picker, (2) thresher for harvesting beans and many other species, and (3) replacement of temperature controls and humidifying equipment on moist chamber.

Recently a tract of about 5 acres of land adjacent to the present nursery was assigned to the regional station. This should facilitate growing winter crops. In recent years we had to delay planting clovers and vetches until summer crops that occupied the land were harvested.

Needs:

The present seed storage will be filled to capacity in 3 years at the present rate of adding new materials. Although storage conditions with respect to humidity and temperature are satisfactory, the building is not worthy of this seed collection. I would recommend that we consider building a separate fireproof facility for seed storage.

Funds are needed to finance seed multiplication of short-day plants and non-hardy winter legumes that do not produce seed under field conditions at Experiment. Presently we have about 2400 accessions of assorted species that fall in this category. A nursery of 2 or 3 acres on a continuing basis in the tropics would be adequate for increasing the tropical and sub-tropical materials. Non-hardy clovers and lupines could be increased in Florida or on a site near the Gulf Coast, but funds are needed to finance their increase.

Publications:

Sowell, Grover, Jr. and W. L. Corley. 1973. Resistance of Cucurbita Plant Introductions to Powdery Mildew. HortScience 8(6):492-493.

Sowell, Grover, Jr. and W. L. Corley. 1974. Severity of Race 2 of Sphaerotheca fuliginea (Schlecht.) Poll. on Muskmelon Introductions Reported Resistant to Powdery Mildew. HortScience 9(4):398-399.

Sowell, Grover, Jr. and W. L. Corley. 1974. P.I. 321005 (Tainan #2), A High-Quality Source of Resistance to Three Cantaloupe Diseases. Plant Dis. Reptr. Vol. 58, No. 10:899-902.

Sowell, Grover, Jr., D. H. Smith and R. O. Hammons. 1974. Resistance of Peanut Plant Introductions to Cercospora arachidicola. Georgia Agronomy Abstracts. Georgia Chapter, American Society of Agronomy 27th Annual Meeting, Athens, Georgia. Jan. 10, 1974. Page 11.

Regional Station Budgets

Source of Funds	1973-74	1974-75
Regional Research Funds (Pooled)	$ 36,500	$ 36,500
Regional Research Funds (Ga. Sta.)	5,557	5,557
Hatch	4,042	4,042
State	13,286	6,158
Agricultural Research Service	60,200	61,000
TOTAL	$119,585	$113,257

Expenditures		
Personal Services	$109.350	$102,157
Equipment	717*	
Operating Supplies	8,011	9,600
Travel	1,507	1,500
	$119,585	$113,257

* In addition to this the Georgia Experiment Station purchased Plant Introduction a thresher, card file, work bench, and vacuum cleaner at a total cost of $4800.

ALABAMA S-9 (Plant Introduction) ACTIVITIES
July 1974 - October 1974

Carl S. Hoveland, Agronomy and Soils Department
Auburn University, Auburn, Alabama 36830

A total of 1370 recorded introductions were received from the Plant Introduction Station by Alabama cooperators this year. They included 624 orchardgrass, 346 phalarisgrass, 171 tall fescue, 170 forage legumes, 33 walnuts and 26 tomatoes.

HORTICULTURAL CROPS

No new results are available on cantaloupe, peppers, tomato, and ornamental crops. All projects in these areas are utilizing plant introductions in their programs.

Dr. O. L. Chambliss is studying inheritance of crude protein in Vigna unguiculata (sinensis). As a result of analyses in the Vigna PI collection for crude protein, he is using two PI's as parents in a genetic study to determine the inheritance of crude protein in V. unguiculata. The high and low protein parents are PI 189099 (36% protein) and PI 182316 (18% protein), respectively. Parent f_1, f_2, and backcross generations were grown in field plots this summer and chemical analysis to determine protein in the seed will soon begin.

AGRONOMIC CROPS
Phalaris aquatica (tuberosa) and tall fescue
(Dr. R. L. Haaland and C. S. Hoveland)

Dr. R. L. Haaland, formerly with North American Plant Breeders in Brookston, Indiana has replaced Dr. C. D. Berry (now Mgr. Sorghum Research, Cargill & Co., Lubbock, Texas) on the grass breeding project.

Two Phalaris aquatica synthetics, AP-1 and AP-2 have been developed entirely from PI materials and tested for winter production and persistence in replicated experiments for 2 years at 3 locations in Alabama. Winter production of the Phalaris synthetics was far superior to that of Ky 31 tall fescue. Additional Alabama field trials are in progress while out of state tests have been established from Texas to South Carolina. Seed yield is being evaluated in Oregon and Texas. A replicated grazing trial with AP-2 Phalaris was planted in October in central Alabama to compare steer gains on this new grass synthetic with Ky 31 tall fescue. Release of a named cultivar is expected by autumn of 1976. Adaptation of this cultivar will be restricted to clay or loam soils where nematodes are not a problem. Nematode susceptibility of phalarisgrass as well as tall fescue, points out the need for germplasm resistance to stunt, lance, and possibly stubby root nematodes.

Progeny testing of both Pharlris and tall fescue has identified germplasm from plant introductions with superior seedling growth, winter production, and cold tolerance that will be used in a recurrent selection program.

In growth chamber and field experiments, it was found that winter productivity of certain Phalaris genotypes such as PI 240261 and 240280 is a result of rapid development of new leaves and rapid leaf expansion during short periods of favorable temperature. Fructosans (readily translated) comprised a higher percentage of total non structural carbohydrates in winter production than in less winter productive Phalaris genotypes. Genotypes did not differ in photosynthetic rates per unit area of leaf surface at several temperatures.

Summer legumes (C. S. Hoveland)

Screening of Desmodium sandwicense accessions for summer forage continues. The high digestibility of many of these PI's was pointed out in last year's report. Winter survival was good with PI's 322468, 322470, 335746, 322467, and 319469.

Winter legumes (C. S. Hoveland)

A number of winter annual legume introductions appear promising and are being grown in forage yield trials at three locations. Some of the best were Trifolium pallidum 249868 and 201213, T. petrisavii 238368, T. spumosum 295612 and 287175, and Ornithopus sativus 284140. Several T. purpureum introductions were vigorous and productive in forage production but were poor seed producers. Medicago tribuloides 197360 made outstanding growth during autumn drought on Black Belt soil but was badly damaged by alfalfa weevil in spring.

Yuchi arrowleaf clover (from PI 233816) continues to grow in popularity from east Texas to Georgia. Demand for seed in 1974 drove prices from $1.20 to $2.75 per pound. Acreage of this clover exceeds 100,000 acres in Alabama and is between 80,000 and 100,000 acres in east Texas.

Publications issued during the year dealing with PI material

1. Hoveland, Carl S. 1974. Arrowleaf clover (Trifolium vesiculosum Savi), a valuable clover for the southeastern USA. Proc. 12th International Grassland Congress, Section on Improvement of Natural and Production of Seeded Meadows and Pastures, pages 192-198. Moscow, USSR. June 1974.

2. Hoveland, C. S., H. W. Foutch, and G. A. Buchanan. 1974. Response of Phalaris genotype and other cool season grasses to temperature. Agron. J. 66:686-690.

S-9 TECHNICAL COMMITTEE REPORT

Arkansas Agricultural Experiment Station
Fayetteville, Arkansas 72701

Period of July 1, 1973 to July 1, 1974

J. L. Bowers

Rape: We had a complete failure on our rape planting in 1974. Weather conditions in the fall of 1973 did not permit us to carry out a fall planting. A planting was made in the spring but we did not incur enough cold (chill temperatures) to induce seedstalk formation and consequently did not make a seed harvest.

We are now planning to take the four best lines and get these planted this fall. We also plan to check the scheme of seeding rape in the soybean fields in the fall before the bean crop is harvested. This would permit us to check the feasibility of producing another crop with a minimum of land preparation. In the past, we have attempted to get our fall plantings made in November, we are now planning to get the fall planting made any time after October 1, allowing more time for a favorable break in the weather which would enable us to get the crop seeded in the fall.

Cucumbers: The station's cucumber breeding program is making use of the bacterial wilt resistant accessions as well as material obtained from Dr. Nuttall in Ottawa 43. The bacterial wilt resistance in Dr. Nuttall's material was derived mainly from P.I. 200818 and it carries a single dominant gene for resistance. We are attempting to combine with this type of resistance a multigenic resistance discovered in our breeding program.

Much of the disease resistance in our cucumber breeding program is attributed to the P.I. accession 197087. We now have a very high level of resistance to anthracnose and a medium level of resistance to both powdery mildew and bacterial wilt which can be attributed to this plant accession (197087).

Southern Pea: In the spring of 1974, we obtained five cowpea breeding lines from the Federal Station in Mayaguez, Puerto Rico which had been observed to possess resistance to bacterial blight and in some cases resistance was indicated for cercospora leaf spot, target spot and cowpea mosaic virus. This material has been crossed with the best station lines and the F_1 progenies will be grown in the greenhouse this winter, enabling us to take the F_2 generation to the field next spring.

Spinach: The 1973 fall planting of spinach breeding lines were screened for both fusarium decline and white rust. Several lines, which derived the white rust resistance through a plant accession (P.I. 165560) in the U.S.D.A. spinach breeding program, are continuing to come through

the field screening tests showing a high level of resistance to white rust and a moderate tolerance to fusarium decline. The resistance to white rust from this plant accession source is being combined with the resistance found in several plants of a growers planting in 1972.

Cantaloupes: From the cross between plant accession P.I. 321005 with the station's dwarf lines several very good fruit quality selections have been made. The quality of this accession as well as that from a Kansas line (released as Kangold) is being incorporated into the dwarf type.

Chick Peas: Thirteen of the well adapted plant accessions in the Oklahoma trials were obtained from Mr. Charles Galeotti and planted at Fayetteville on May 22. This was about one month later than we had planned but weather conditions prevented us from following our original schedule. The crop was planted with Plantet Junior seeder using the plate opening for peas. The most productive entries in the trial were CP 54 (P.I. 257583), CP 217 (P.I. 315801) and CP 235 (P.I. 315819). The yield from each of these was in the range of 850-900 pounds of seed per acre. The yield of two green seeded types: CP 227 (P.I. 315811) and CP 229 (P.I. 315813) was in the range of 725-800 pounds per acre. This was considerably less than the yield reported for these in the 1973 Oklahoma trial near Stillwater which had been seeded on April 5 and 6. This delay in our planting undoubtedly resulted in considerable reduction in our yields. Another trial will be carried out in 1975 to further check the potential of this crop when grown in the early spring of the year.

Grapes: Three plant accessions of grapes: P.I. 203088 from Argentina, possessing blue, large elongated berries, very crisp texture, susceptible to powdery mildew; P.I. 277577 from Italy, white, large berry, very large cluster, attractive table grape; P.I. 287735 from USSR, red, large berry, very large cluster, very attractive table grape, vigorous and productive, susceptible to powdery mildew, are being used in the Arkansas grape breeding program by Dr. J. N. Moore.

Dr. M. S. Offutt has reemphasized his interest in the search for new germ plasm in the white lupines (Lupinus albus L.).

Dr. Goode, our vegetable pathologist, has stated there is a need for germ plasm with resistance to Rhizoctonia solanii in spinach - damping off, tomato - damping off and soil rot (fruit), cucumber - damping off and soil rot (fruit) and snap bean - damping off, root rot, stem rot, top blight and pod rot.

FLORIDA S-9 "NEW PLANTS" REPORT

October 30-November 1, 1974

El Paso, Texas

G. B. Killinger

Over 1000 accessions of seeds, plants and vegetative material were received by researchers at a number of locations, nurserymen and private citizens during 1973-74.

Great interest was developed in Florida by several fruit growers for information and plants of the Kiwi Fruit Actinidia chinensis prior to announcement of closing the Chico, California, station. Efforts were made to secure some of the Chico material for these growers, but to no avail. Some reports indicated yields of 20,000 pounds of fruit per acre with a market value of one dollar per pound. In 1966, three plants were received at Gainesville and these have grown vigorously but to date have failed to flower.

For a number of years, Eucalyptus seeds and plants of several species have been introduced into Florida by the Florida Forests Foundation and other paper-pulp or timber companies. Some of these Eucalyptus species having some cold hardiness plus rapid growth have now been expanded into plantings of several hundred acres in South Florida and at Disney World near Orlando.

A.A. Cook, Plant Pathology at Gainesville, reports receiving 13 pepper (Capsicum annuum) accessions for study of possible resistance to bacterial leaf spot disease. Fifty or more single plants were selected from a number of accessions for apparent resistance to a specific strain of tobacco etch virus. Both disease resistances will be added to a breeding program for pepper improvement after further verification.

From West Florida, Leonard S. Dunavin at Jay Research Center, notes Cynodon dactylon P.I. 224152 and P.I. 255956 as making excellent growth and will be under grazing. P.I. 224152 is being released in Florida as "McCaleb Bermudagrass" with a release circular in press. A perennial peanut GS-1, thought to be a seedling from "Arb" (P.I. 118457) produced 5870 kg/ha of oven dry material from two harvests in 1973.

From the Agricultural Research and Education Center, Belle Glade, T.A. Zitter reports research with peppers and lettuce Cichorium endiva screening introductions for virus resistance. The Brazilian pepper variety "Avelar", P.I. 342948 is being used as a source of tolerance to two virus diseases. A reprint by T.A. Zitter and A.A. Cook is attached.

D.W. Gorbet from the Agricultural Research Center at Marianna reports that accessions received in 1971 were in field studies in 1973. Nine different lines from three accessions were selected for Cercospora leafspot resistance and yield and four accessions were part of a drought resistance study. F_1 peanuts were grown in 1973 from crosses made in 1972 using several P.I.s. Seed of P.I. 298115 (rust resistant) were planted in a greenhouse for crossing in 1974. Plant Introductions used for resistance to Cercospora, were 268894, 306230 and 262090; Rust resistance 298115; Drought resistance selfed 261893, 268657, 269056 and 269063. P.I.s with seed coat traits (genetic) were 200444, 261906, 262090, 274191 and 268883; Miscellaneous breeding parents used in 1972 were 121067, 145681, 203396, 259785, 261911, 26063 and 269114.

From the Agronomy Department in Gainesville, A.J. Norden reports seed increased from 21 new Arachis hypogaea L. introductions for evaluation in his peanut breeding program. A number of these introductions reportedly have drought resistance and high oil content (57 to 63%). Progeny from a number of recent crosses involving introductions with high levels of tolerance to peanut rust and toxin producing molds are being screened. Also being screened are progeny from crosses with P.I.s having resistance to Cercospora leafspot disease, and with strong peg attachment and early maturity. A few promising introductions are being screened for high hay yield in view of the escalating price of nitrogen. Fruit yields are usually lower, however, some of the late-maturing introductions appear to far surpass the commonly grown varieties in yield of hay. Norden recommends steps be taken to add to the germplasm collections of cultivated and wild species of Arachis. There undoubtedly must be other Arachis species not yet collected in South America. He notes much of the area in South America from where Arachis species originated is being developed by man with the native species being destroyed and new collections should be made very soon or desirable species may be lost.

James M. Crall from the Agricultural Research Center at Leesburg notes that P.I. 255137 is still in his breeding program for tolerance to watermelon mosaic virus. No new variety from his breeding stocks with WMV are close to release.

From the Agricultural Research and Education Center at Homestead, Simon E. Malo reports the introduction of 20 avacado cultivars from other countries. These are being grown under trickle irrigation in a germplasm collection and were introduced from Peru, Ecuador, Venezuela, Trinidad, Honduras, Costs Rica, Panama, El Salvador and Mexico. Ten mango cultivars were introduced for evaluation from St. Vincent, Thailand, Philippines, Hawaii and St. Croix, V.I.

From the Agronomy Department at Gainesville, G.B. Killinger notes an increase planting of a selection of pigeonpeas (Cajanus cajan (L.) Druce) from P.I. 218066 (Norman Variety). This selection flowers from early August to frost and if the corn ear worm can be controlled, has a high yeild potential. Research has

continued on Kenaf (Hibiscus cannabinus L.) with cultural practices and varieties. Yields of over-dry stem from Everglades 41, Everglades 71 and Cuba 108 averaged 19,940; 17,310; and 15,072 pounds per acre respectively for the 1973 season.

Many accessions of annual and perennial grasses and legumes, seed or vegetative, were received by a number of researchers and reports are not available at this time.

PUBLICATIONS

Zitter, T.A. and A.A. Cook. 1973. Inheritance of Tolerance to a Pepper Virus in Florida, Phytopathology 63:9:1211-1212.

Williams, Mary. 1973. Perennial Peanuts Look Good for Forage. Sunshine State Agricultural Research Report. Sept./Oct. 14-16.

Hinson, Kuell, R.L. Smith, R.A. Kinloch, and H.W. Lundy. 1973. Hutton Soybean. Florida Agricultural Experiment Station Circular S-225, 1-7.

Emery, D.A., A.J. Norden, J.C. Wynne and R. Walton Mozingo. 1974. NC-FLA 14 an Early Maturing Large-Seeded Virginia Bunch Peanut Variety. North Carolina State University at Raleigh Agr. Exp. Sta. Bul. 448:1-15.

Woods, Chuck. 1974. Kenaf a New Paper Source. Sunshine State Agricultural Research Report. March, 10-12.

Georgia Agricultural Experiment Stations
Report to S-9 Committee
July 1, 1973 - June 30, 1974

S-9 cooperators in Georgia were supplied 1433 packets of seed or plants last year. Following are reports from some of the cooperators:

R. O. Hammons. Two peanut germplasm lines, P.I. 337394F and P.I. 337409, with significant tolerance to toxin-producing strains of Aspergillus flavus Link ex Fr. were released June 6, 1974, in cooperative research by Alabama and Georgia AES and the ARS, USDA. These two peanuts were introduced into the U.S. in 1968 as part of the Hammons-Langford peanut germplasm collection and came from material cultivated at the Universidad Nacional del Nordeste, Corrientes, Argentina. Both are Valencia botanical type (Arachis hypogaea - fastigiata-fastigiata). A. C. Mixon, ARS research agronomist (now at Tifton) conducted the research leading to the germplasm release.

Another Valencia-type peanut has been shown to have tolerance to A. flavus in cooperative research in Florida (Norden, unpulb.). Mixon has screened above 2000 genotypes and Norden more than 1100 strains of breeding lines thus far. The fact that all three of the tolerant lines are of the Valencia-type may be pure chance. However there is some evidence suggesting a broader range of genetic variation in Valencia than in Spanish, for example.

Therefore, we would like to intensify the search for additional material with tolerance to A. flavus by increasing the amount of Valencia type germplasm available for screening. To this end, we are interested in obtaining several hundred Valencia peanut lines from the collections maintained at INTA, Manfredi, Argentina (J. R. Pietrarelli, breeder) and at the National University of the Northease, Corrientes (A. Krapovickas).

Aubrey C. Mixon. In 1973, 245 peanut accessions obtained from W. R. Langford and Wallace Bailey were grown. Samples from these were screened for resistance to Aspergillus flavus. None of these exhibited any appreciable degree of resistance. However, 24 showed some resistance and have been planted in 1974 for re-evaluation.

P.I. 337394 and P.I. 337409 have been crossed with several agronomic varieties and lines from these in the F_2, F_3, and F_4 generation are being grown for evaluation and selection in 1974.

Briefly this is how we are utilizing peanut accessions in an attempt to breed A. flavus resistance into a highly productive agronomic type.

Robert E. Burns. A centipedegrass (Eremochloa ophiuroides (Munro.) Hack.) collection of 36 varieties was assembled with the help of the Plant Introduction Station. No P.I. numbered varieties were included. A definite difference was found in susceptibility to iron deficiency, and to centipede

decline as well as in rate of spread, anther color and other factors. A Tifton, Ga. selection was most susceptible to iron deficiency. The selection which was most resistant to decline and had the best color was from Mississippi. It had an average rate of spread.

There is a need for a wider germplasm base of centipedegrass for use in breeding and selection programs. While the original introduction was from the Orient centipedegrass should be on the list of all collectors, especially on the fringe areas of its region of adaptation.

Clanton C. Black, Jr. We have found plant introductions exceptionally valuable in our studies on plant metabolism. I could briefly state that such readily available material has, in essence, allowed us to partially elucidate the C_4 pathway of photosynthetic carbon assimilation particularly in Digitaria species. Also we have been able to show some of the variations which exist in C_4 photosynthesis particularly in Panicum species.

I appreciate your help in obtaining Anthephora, Arundinella, Eleusine and Garnotia species during this last year. Our work on these species is too preliminary to be worthy of comment but I would appreciate any new species in these genera you can obtain.

I also would like to obtain a variety of Aristida species this coming year.

R. H. Brown. Dr. Brown has used many plant introductions in his studies of photosynthesis and assimilation of CO_2. Results from these studies have been published periodically, one of his latest reports being "Dark Release of $14CO_2$ from Higher Plant Leaves". Plant Physiol. (1973) Vol. 52:288-291.

Ian Forbes, Jr. At the present time we have plenty of new introduced material to evaluate from my Mediterranean trip last summer, so at present I don't think we need to call for additional introductions.

I'm enclosing a copy of the report I made on the collecting trip to the Mediterranean. This report is to be published by ARS, Southern Region as part of the proceedings of the Southern Pasture and Forage Crops Improvement Conference which was held at Fayetteville, Arkansas May 23-24, 1974. The table in the manuscript summarizes the species collected on the trip. We concentrated this winter on increasing seed stocks of all these introductions, and I've sent the seed increase of the Medicago species to you as I believe they are more suited to neutral to alkaline soils than we have here.

As might be expected a good deal of morphological and maturity variation was observed at Tifton on these introductions. We plan to plant the blue lupine accessions at Blairsville this fall for a winterhardiness test in the hope of finding additional winterhardiness that may be added to that present in 'Frost' blue lupine. We also will be screening these blue lupine lines for brownspot resistance, which we presently don't have in our germplasm at Tifton.

We plan to make experimental plantings of the subclover and Ornithopus species that looked promising as spaced plants last winter.

I am also enclosing a memo that describes Tifton #1 Dolichos lablab which is an experimental (unreleased) variety that had P.I. 316899 (IRI 1303 Sao Paulo, Brazil) as its source of earliness. This accession is numbered 67-13 in the enclosed memo.

G. M. and J. K. Armstrong. In a study of wilt of Brassica carinata and Crambe abyssinica caused by Fusarium oxysporum f. sp. conglutinans race 1 or 2, Crambe was resistant to race 1 from cabbage (Brassica oleracea var. capitata) and susceptible to race 2 from radish (Raphanus sativus), whereas Brassica was susceptible to race 1 and resistant to race 2 (Table 1). Less than 50% wilt is considered as resistance and 50% or more as susceptibility. Both crops were resistant to races 3 and 4 from stock (Matthiola incana var. annua). There were no significant differences in the susceptibility or resistance of the different lots of the two species of Crambe. This was true also of the two lots of Brassica. Plants of Brassica without external symptoms of disease were found in all pots, indicating a heterozygosity, which should allow for the easy selection of wilt-resistant lines. In both crops, an early symptom of disease was an interveinal yellowing, frequently followed by abscission of the leaf. Various degrees of stunting were also apparent. Physiological damping-off in the seedling stage was prevalent, particularly with Crambe, until the plants were about 6.5 cm tall. Heavy seeding, however, provided enough surviving plants for the inoculations.

Because B. carinata was susceptible to race 1 of f. sp. conglutinans and resistant to race 2, and, conversely, both Crambe species were resistant to race 1 and susceptible to race 2, these crops are additional differentials for separating these races. If planted where either race is present, one would expect the disease on the susceptible host under favorable environmental conditions.

Kentucky Annual Report to S-9 (New Crops) Technical Committee

Roy E. Sigafus, Agronomy Department, University of Kentucky
El Paso, Texas, October 30 - November 1, 1974

More than the usual number of people have requested plant materials during the past season. Much germplasm obtained in previous years is still being used but may not be noted in this report. For example, R.C. Buckner reports that segregating populations from Giant Fescue (Festuca gigantea) X Tall Fescue hybrids contain plants more hardy than the Giant and appear to be more palatable than 'Ky 31'. Seed of Giant Fescue was obtained from Washington State before 1970.

H.C. Mohr has found accessions of Cucurbita maxima from different sources to appear to be identical. He feels that several accessions described as "bush" appear to have come from 'Gold Nugget' or its parental line.

Dr. Mohr has developed a new double dwarf (double recessive) type of watermelon using two single gene recessive mutants. Under the Plant Variety Protection Act he cannot protect the new type of plant. He has been informed that "only a combination of uniform and stable characters that constitute a variety may be protected." Therefore, each individual variety of the type must be submitted separately for consideration.

N.L. Taylor now has 205 identified Trifolium species in his collection. He and his associates have had good success in producing tetraploid red clover by treating excised heads for 24 hours in nitrous oxide at 90 psi. The treatments are delayed until 24 hours after crossings have been made. In one test 71% of the seeds produced were tetraploid. His group has made interspecific hybrids by crossing Trifolium alpestre X T. heldreichianum, T. alpestre X T. rubens, and T. medium and T. sarosiense. T. Rubens X T. noricum produced viable seed but seedlings died

R.A. Chapman of Plant Pathology has tested the response of 'Norman' Pigeonpea (Cajanus cajun) to the soybean cyst nematode. Using several strains of the nematode he has found that the nematode can survive on pigeonpea. However, the nematode did not do as well on pigeonpea as it did on the "resistant" variety of soybeans 'Pickett'.

J.G. Rodriguez, C.G. Patterson, of Entomology and D.E. Knavel and Tom Kemp of Horticulture have been trying to identify the chemical compound in the tomato PI 251303 that is toxic to the twospotted spider mite. The mite shows non-preference and antibiosis. The essential oil portion of the tomato foliage was fractionated by gas chromatograph and 10 fractions were topically applied to adult female mites. Two fractions were found to be toxic. Infrared and mass spectrums of the toxic fractions indicated a sesquiterpene compound.

F.W. Knapp of Entomology has been seeking natural plant compounds for use in mosquito control. Seeds from the Peoria lab have been found to physically trap larvae when placed in water. Some seeds as well as other plant parts have been found to contain compounds toxic to mosquito larvae. The toxic compound in Corn Gromwell (Lithospermum arvense L.) is not an alkaloid.

Two small observational plantings of Big Trefoil (Lotus pedunculatus) and Flat Peavine (Lathyrus sylvestris) were found by Roy Sigafus to be severely damaged by leafhoppers. If they had not been sprayed it is doubtful that they would have become established.

W.C. Templeton, Jr. is seeking additional sources of Bigflowered Vetch (Vicia grandiflora). A naturalized strain obtained in the 30's by L. Henson is being increased and tested for possible release as a variety. Seed shatter at maturity is a problem. However, the use of Paraquat at 1/2 pound per acre 72 hours before direct combining worked very well with both Bigflowered Vetch and Birdsfoot Trefoil. Several plantings have been put out this fall with a new legume seeder-renovator. Only two assessions were obtained in response to a request from the regional coordinator.

Publications and other references

Doubling the Chromosome Number of Red Clover Using Nitrous Oxide. N.L. Taylor, M.K. Anderson, and K.H. Quesenberry. American Soc. of Agron. 1974 Annual Meetings (Abst.) p. 63.

Interspecific Hybridication of Perennial Trifolium Species related to Red Clover. K.H. Quesenberry and N.L. Taylor. American Soc. of Agron. 1974 Annual Meetings (Abst.) p. 59.

Studies in the Resistance of tomatoes to Mites. J.G. Rodriguez, D.E. Knavel, and O.J. Aina. J. Econ. Entomol. 65:51-53 (1972).

Biologically Active Plant Extracts for Control of Mosquito Larvae. Piyarat Supavarn, F.W. Knapp, and Roy Sigafus. Mosquito News. 34(4)521-524. (1974).

Investigation of Plant Extracts and Plant Seeds for Possible Insect Control Agents. M.S. Thesis of Piyarat Supavarn. University of Kentucky (1974).

S-9 Report

October, 1974

Potato - James F. Fontenot

One of our potato breeding objectives is frost resistance. In order to obtain desirable combinations we brought in widely diverse genetic material. Crosses between Solanum acaule and Solanum tuberosum were made and their progeny tested. Early generation progeny were poor in horticultural type and backcrosses were made to Solanum tuberosum. A number of clonal selections we now have are six generations away from these original crosses. Some of these lines are 91-237, 01-201, 11-24, 12-34, 12-36, 22-51, 22-78, and 21-103.

Twenty-four clones were selected at Rhinelander, Wisconsin, in 1974 that are related to Solanum acaule.

Of all these clones 11-24 is the most promising and we are contemplating entering it in the regional trial.

Okra - James F. Fontenot

Plant introductions are still being used in our okra breeding program to accomplish our objectives which include yield, earliness, plant height, leaf shape, pod color, pod spininess, wilt resistance, nematode resistance, improved fresh and processing quality as well as improved pod shelf-life.

Gold Coast is still a popular variety in the New Orleans area.

The most promising plant introduction material at this time includes P.I. 311106, P.I. 306379, and P.I. 204546.

Ornamental - Richard J. Stadtherr

A listing of the P.I. and N.A. numbered plants which have been tested at Louisiana State University is attached to this report. Included are the date received, numbers, plants living, growth, and comments for plants received from 1967 to 1970. Only surviving plants are given for these years since last year's report was a complete listing. For the 1971 accessions, a complete listing of all plants which were received was made.

In 1972, the following accessions were obtained: 1 seed, 30 herbaceous, and 41 woody plants. In 1973, 4 seeds and 56 woody plants were added. In the future those accessions which we have had for 5 years or more will only be included.

Louisiana State University
Annual Report - August, 1974 - S-9 Committee
Ornamentals, R. J. Stadtherr

NAME Surviving plants only. See 1973 report for total tested.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
Received 10/9/67					
Pyracantha 'Shawnee'	PI 315887, NA 28179-c	1	1	7½' x 6'	Well adapted
Received 10/11/67					
Lagerstroemia indica 'Catawba'	PI 316671, NA 28861-c	1	1	6' x 6'	Relocated; good bloom; well adapted
Lagerstroemia indica 'Conestoga'	PI 316672, NA 28862-c	1	1	5' x 3'	Relocated; good bloom; well adapted
Lagerstroemia indica 'Powhatan'	PI 316674, NA 28864-c	1	1	6' x 5'	Well adapted; relocated
Received 2/15/68					
Rhododendron molle	PI 159034	6	5	30" x 20"	Relocated; leaf curl; lack of enough cold
Rhododendron mucronulatum	PI 317378	3	2	17" x 6"	Relocated; numbers mixed up with PI 317269
Rhododendron mucronulatum	PI 317379	2	1	27" x 6"	Relocated
Rhododendron weyrichii	PI 317273	3	3	50" x 24"	Relocated
Received 3/5/68					
Ardisia japonica	NA 18686	1	1	6"	Loses lower leaves; have divisions
Bambusa multiplex var. riviereorum	PI 77014, NA 29842	1	1	24" x 10"	Well adapted
Cedrela fissilis	PI 316932, NA 28921	2	1		Kills to ground; relocated
Pyrrosia lingua	PI 235271, NA 26379-d	1	1	8" mat	Doing well
Rhododendron decandrum	PI 318656, NA 29131	5	2	4' x 1'	
Rhododendron japonicum	PI 318657, NA 29132	5	3	24" x 25"	Lack of cold
Rhododendron kiusianum	PI 318658, NA 29133	5	1	23" x 30"	
Received 4/4/68					
Amelanchier asiatica	PI 317357	2	2	9' x 6'	Well adapted
Betula platyphylla var. japonica	PI 317211	3	2		Relocated; well adapted
Cornus controversa	PI 316616	2	2	5'	Well adapted

NAME Surviving plants only. See 1973 report for total tested.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
(Received 4/4/68 continued)					
Cotoneaster lucida	PI 313962	1	1		Bad insect infestation; relocated
Cotoneaster racemiflora	PI 313964	4	2		Relocated
Firmiana simplex	PI 317365	1	1		Relocated; well adapted
Hedera rhombea	PI 318540	2	1	3'	
Iris rossii	PI 316648	3	3	3'	
Ligustrum ovalifolium 'Argenteum'	PI 265262	3	1		Relocated; mutates to full green
Lonicera insularis	PI 316409	4	1	3' x 2'	Not enough cold
Lonicera sp.	PI 314263	6	4		Relocated
Pittosporum tobira	PI 317259	1	3		Relocated
Prunus cerasoides	PI 307323	2	1		
Pyrus calleryana var. fauriei	PI 317371	1	1		Bloom; relocated
Rapanea neriifolia 'Taimintachibana'	PI 227998	1	1	1' x 1'	Die back; lost
Rosa x fortuneana	PI 316528	1	1		Have cuttings
Schisandra chinensis	PI 316712	1	1		Have cuttings
Styrax japonica	PI 316988	2	1	6' x 6'	Good bloom
Syringa velutina	PI 317293	6	1	1' x 6"	
Ulmus pumila var. arborea	PI 297426	1	1		Relocated
Received 9/9/68					
Magnolia x 'Ann'	PI 326570, NA 28344-c	1	1	85" x 55"	Everbloom since Nov.; slow growth
Magnolia x 'Betty'	PI 326574, NA 28348-c	1	1	72" x 40"	Slow growth
Magnolia x 'Jane'	PI 326576, NA 28349-c	1	1	80" x 45"	Slow growth
Magnolia x 'Judy'	PI 326571, NA 28345-c	1	0		Stolen; have cuttings
Magnolia x 'Pinkie'	PI 326577, NA 28351-c	1	1	88" x 45"	Slow growth
Magnolia x 'Randy'	PI 326572, NA 28346-c	1	0		Stolen; have cuttings
Magnolia x 'Ricki'	PI 326573, NA 28347-c	1	1	78" x 25"	
Magnolia x 'Susan'	PI 326575, NA 28350-c	1	1	75" x 45"	Slow growth
Received 9/16/68					
Ilex x 'Tanager'	PI 329155, NA 28322-c	1	1	60" x 30"	Well adapted fruiting; relocated

NAME Surviving plants only. See 1973 report for total tested.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
Received 2/4/69					
Acer morrisonense	PI 324941	3	1	65" x 27"	Cultivation damage
Alnus hirsuta	PI 317354	1	1	25' x 12'	Well adapted; fast growth
Callicarpa formosana	PI 324954	5	5		Kills to ground yearly; relocated
Carpinus kawakamii	PI 324959	1	1		Slow growth; relocated
Cunninghamia lanceolata	PI 324969	3	2	6' x 4'	Cultivation injury
Gordonia axillaris	PI 324982	2	2		Well adapted; relocated
Hedera helix var. poetica	PI 239247	5	5	2'	Slow growth
Hydrangea chinensis	PI 324984	2	2	2' x 2'	Kills to ground yearly
Keteleeria davidiana	PI 324993	1	1	3' x 2'	Doing well
Lagerstroemia subcostata	PI 324994	3	2	12' x 10'	
Lilium philippinense var. formosanum	PI 325000	3	3	3'	Reseeds
Lindera erythrocarpa	PI 317240	3	1		Relocated
Photinia sp.	PI 325008	5	5		Have seedlings
Pinus densiflora	PI 317254	2	2	2 1/2' x 2'	
Pinus thunbergii	PI 317258	4	3	5' x 3'	One lost in moving; one relocated
Taiwania cryptomerioides	PI 325071	4	1	6' x 4'	3 dead; cultivation injury
Ilex cassine	PI 254592	1	1		Well adapted; relocated
Ilex crenata f. microphylla	PI 317234	1	1	9" x 6"	Slow growth; black fruit
Ilex crenata f. microphylla	PI 317235	2	2	10" x 8"	Fruit
Ilex montana var. macropoda	PI 316704	1	1		Have cuttings
Ilex 'Albert Close'	PI 331202	2	2	3' x 1'	
Ilex 'William Cowgill'	PI 331203	2	1	3' x 2'	Fruit
Ilex 'Howard Dorsett'	PI 331204	1	1	2 1/2' x 1'	
Ilex 'Edward Goucher'	PI 331205	1	1	8" x 6"	
Ilex 'Harry Gunning'	PI 331206	2	2	3' x 2'	
Rhododendron indicum	PI 235758	3	1	33" x 50"	
Rhododendron mucronulatum var. ciliatum	PI 317270	3	2		Barely alive
Rhododendron kiusianum	PI 226542	3	2		Dieback
Rhododendron tschonoskii	PI 228004	1	1	4' x 3'	
Rhododendron 'Ben Morrison'	PI 337618	1	1	3' x 2'	Excellent plant
Received 3/3/69					
Cryptomeria japonica	NA 29008	2	2	10' x 5'	
Cunninghamia konishii	NA 28521	1	1	12' x 4'	Cuttings do not form

NAME Surviving plants only. See 1973 report for total tested.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
(Received 3/3/69 continued)					
Quercus chenii 'Nakai'	NA 827-s	5	5		Spreading growth; variations within; relocated
Received 10/6/69 (Moved to Burden 2/3/71)					
Callistemon citrinus	PI 330375, NA 30282	3	2	5' x 5'	1 lost in moving; relocated
Callistemon sieberi	NA 30284	4	4	6' x 7'	Flower; 2 relocated
Rhaphithamnus venustus	NA 27899-c	2	2		Dieback to ground
Received 1/28/70					
Glyptostrobus lineatus	NA 31291	2	1	6' x 3'	Slow growth; well adapted
Ilex glabra 'Ivory Queen'	NA 14278-c	1	1		Well adapted; relocated
Ilex x koehneana 'Wirt L. Winn'	NA 23214-c	4	4		Well adapted; relocated
Quercus robur 'Salicifolia'	NA 15313-1-s	1	1		Well adapted; relocated
Rhododendron 'Koromo Shikibu'	NA 16012-c	1	1	30" x 66"	Well adapted
Vaccinium cylindraceum	PI 317614, NA 29045-c	3	3	2' x 2'	Flowering; 2 relocated
Received 4/14/70					
Rhododendron 'Ben Morrison'	PI 337618	4	4	30" x 27"	Well adapted
Rhododendron 'Mrs. LBJ'	PI 337619	4	4	36" x 54"	Well adapted
Rhododendron ellipticum	PI 325023	1	0		Dead 4/74
Rhododendron ellipticum	PI 325024	2	0		Dead 4/74
Rhododendron kanehirai	PI 325026	4	3	30" x 50"	Tip dieback
Rhododendron obtusum var. kaempferi	PI 275032	1	1	3'	
Rhododendron oldhamii	PI 325036	4	4	24" x 36"	One barely alive
Rhododendron oldhamii	PI 325037	4	3	24" x 10"	One dead 4/74
Rhododendron oldhamii	PI 325038	4	4	24" x 30"	
Rhododendron oldhamii	PI 325039	4	3	10" x 12"	Relocated; one dead 4/74
Rhododendron rubropilosum	PI 325043	4	1		Relocated
Rhododendron rubropilosum	PI 325045	4	0		Dead 4/74
Rhododendron rubropilosum	PI 325048	4	3	20" x 24"	One dead 4/74
Rhododendron rubropilosum	PI 325582	4	3	20" x 12"	One dead 4/74
Ilex x 'Elegance'	NA 28261-c	1	1		Doing well; relocated
Ilex x 'Oriole'	NA 28322-c	1	1		Relocated

NAME Surviving plants only. See 1973 report for total tested.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
Received 8/28/70					
Rhododendron oldhamii	PI 325036	3	2		Well adapted; bloom sporadically throughout entire year; relocated
Rhododendron oldhamii	PI 325037	3	3		Relocated
Rhododendron oldhamii	PI 325038	3	3		Relocated
Rhododendron oldhamii	PI 325039	3	3		Relocated
Rhododendron rubropilosum	PI 325043	3	2		Relocated
Rhododendron rubropilosum	PI 325045	3	3		Relocated
Rhododendron rubropilosum	PI 325048	3	3		Relocated
Rhododendron rubropilosum	PI 325582	3	3		Relocated
Rhododendron arboreum	PI 237484	1	1		Main stem split

NAME Reporting for the first time.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
Received 3/1/71					
Viburnum dilatatum 'Iroquois'	PI 316678, NA 28867-c	1	0		Dead; not enough cold
Viburnum x 'Mohawk'	PI 315889, NA 28181-c	1	1	45" x 23"	Fruiting
Viburnum sieboldii 'Seneca'	PI 316682, NA 28871-c	1	1	36" x 28"	
Received 3/8/71					
Abies bornmuelleriana	NA 30158	1	0		Dead
Abies holophylla	NA 30050	1	0		Dead
Abies koreana	NA 30051	1	0		Dead
Acer distylum	NA 31120	1	1	6' x 3'	
Alnus hirsuta var. sibirica	NA 31688	1	0		Dead
Alnus pendula	NA 31689	1	1		Relocated
Alnus sieboldiana	PI 342923, NA 31687	1	1		Relocated
Arbutus texana	NA 30030	3	0		Dead
Camellia 'Fragrant Pink'	NA 29184-c	1	0		Dead
Cassia (hybrid)	NA 31741	2	0		Dropped
Chamaecyparis obtusa	NA 31690	1	1	4.5' x 3.5'	
Clematis orientalis	NA 30383-c	1	0		Dead
Cryptomeria japonica 'Yoshino'	NA 13454-c	1	0		Dead
Cryptomeria japonica 'Bandai-Sugi'	NA 20068-c	1	1	18" x 20"	Have cuttings
Cryptomeria japonica 'Globosa Nana'	NA 18295-c	1	1	10" x 6"	Have cuttings
Gardenia spatulifolia	NA 31452	2	2		Relocated
Hedera canariensis 'Gloire de Marengo'	NA 30347-c	1	1	18"	
Hedera colchica var. dentata 'Aurea Striata'	NA 30349-c	1	1	8"	
Hedera helix 'Jubilee'	NA 8103-c	1	0		Dead
Hedera colchica	NA 30348	2	1	8"	
Juniperus ashei	NA 31250	1	0		Dead
Kirengeshoma palmata	NA 31171	5	0		Dead
Myrceugenia apiculata	NA 32218-c	1	1	12" x 12"	Cold damage
Pinus densiflora	NA 31693	1	1	30" x 30"	
Pinus thunbergii	NA 31694	2	2	45" x 30"	One relocated
Rhododendron bakeri 'Camp's Red'	NA 7829-c	1	0		Dead
Rhododendron 'Bowie'	NA 32966-c	1	0		Dead 4/74
Rhododendron indicum balsaminae-florum	NA 11996-c-c	1	1	10" x 12"	Relocated

NAME Reporting for the first time.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
(Received 3/8/71 continued)					
Rhododendron prunifolium 'Hohman'	NA 14086-c	1	0		Dead
Prunus x icam 'Okame'	NA 18355-c	1	1	6' x 3'	Early bloom
Sycopsis sinensis	NA 13038-c	1	0		Dead
Viburnum setigerum 'Aurantiacum'	NA 29609-c-c	3	1	20"	Not enough cold
Received 3/16/71					
Abies kawakamii	PI 324940	2	0		Dead
Abies koreana	PI 317188	3	0		Dead
Abies nephrolepis	PI 317189	1	0		Dead
Cotinus coggygria	PI 323962	2	2	16" x 16"	Cut back
Juniperus chinensis var. sargentii	PI 317238	2	2	9" x 7"	Spray damage
Received 8/1/71					
Cupressocyparis leylandii 'Leighton Green'	NA 4464-c-c-c	25	6	5' x 3'	Others distributed

North Carolina - New Plants Project

Report to S-9 Technical Committee, El Paso, Texas, October 30 to November 1, 1974.

Of the 31 campus research personnel who receive P.I. catalogues and information through my office, and others who receive information direct, five cooperators received 171 introductions, 91 of which were Cucumis sativus. Many of the others are being used in cytological experiments in the Department of Botany.

A. New Varieties Released

No new varieties were released during the 1973-74 reporting period with plant introductions in their pedigree.

B. Plant Introductions of Special Interest

1. Dr. D. C. Zeiger is attempting to use Cotoneaster lucida P.I. 384451 and C. sp. P.I. 358790 as rootstock in apple grafts.

2. Dr. P. A. Miller is using four soybean PI's 229358, 171, 451, 229321 and 227687 in his breeding program for resistance to leaf feeding insects.

3. S. M. Worthington and Franklin Correll report on the following fruit introductions tested in their program.

Peaches: 237 680, 25597, 277703 - unattractive peaches, too soft and poor in quality - discarded.

Almond: 230624 - blooms too early for North Carolina - discarded.

Pears: 295093, 255610, 287162, 292373 killed by fire blight.

231798, 215325 suffered severe damage from fire blight

280031, 295088, 292509 - So far, doing well at Salisbury

4. Dr. J. C. Wynn and Dr. D. A. Emery - Over 2000 peanut lines (many P.I.'s) were screened for resistance to the peanut disease, Cylindrocladium crotalarium, in 1973-74. Only one cross made by Dr. Cooper in the 50's was found to carry resistance to this disease.

5. Dr. William Fike has turned in cards on all ornamental introductions that show promise under North Carolina conditions.

C. Requests for Foreign Explorations

1. Eight cooperators requested the following crop species from the Mediterrean area.

a. Cottons
b. Cucumis sativas
c. Cucumbita sp.
d. Citrullus vulgaris
e. Citrullus cucamus
f. Lycopersicon esculentum
g. Trifolium sp.
h. Vaccinium spp.
i. Fragaria alpina
j. Medicago sativa and M. falcata

2. Three cooperators requested the following crop species from South America.

a. Fragaria hiloensis
b. Lycopersicon esculentum
c. Cucumis sp.

D. Vaccinium Species Collection - Dr. Gene Galletta, cooperating

1. This collection,229 P.I.'s is being maintained at the Castle Hayne Experiment Station.

2. Over 300 selections grown from seed are being maintained along with the original collection.

3. Of the 35 P.I.'s tested in 1973 for ornamental value, propagating stocks are being increased for nine evergreen blueberries which have outstanding ornamental potential.

P.I. 346655 V. myrsinites
P.I. 346657 V. myrsinites
P.I. 346617 V. virgatum - semi-persistent

NC 1114
NC 1131
NC 1132
NC 1133
NC 1136
NC 1137

V. darrowi - fruits from collection of Professor Ralph H. Sharpe - collected at Gainsville in 1967 from earlier collections made in the 50's.

4. The history of the Blueberry collection will be published in the spring of 1975 with an Appendix listing all distinguishing characteristics of each P.I.

5. Doctoral candidate J. R. Ballington is presently working on the inter-specific breeding problems associated with Vaccinium diploid species.

E. Work Planned for 1975

Kenaf, sunn hemp, jute and fiber-flax will be evaluated in 1975 for use as an alternative source of cigarette paper pulp.

1974 S-9 Report, Oklahoma Agricultural Experiment Station

Charles Galeotti, James Kirby and Ralph S. Matlock

PULSE CROPS

Cowpeas (Vigna unguiculata)

Twenty cowpea varieties and strains were yield tested near Perkins and eighteen were tested near Stratford in 1974.

Forty-two cowpea varieties, P.I.'s and selections were planted in a Fusarium wilt study near Stillwater in 1973 (Table 1) and 1974.

Mean dry seed yields per acre for 16 cowpea varieties common to three locations in Oklahoma in 1973 were 444 pounds at Perkins, 533 pounds at Stratford and 670 pounds at Mangum.

Mean dry seed yields per acre for 18 cowpea varieties common to two locations in 1974 were 407 pounds at Perkins and 543 at Stratford.

Mungbeans (Vigna radiata)

Twenty mungbean varieties and selections were grown in yield tests near Perkins, Mangum and Lahoma, eighteen near Stratford and thirty-two near Stillwater in 1974. Mean dry seed yields per acre were 597 pounds at Perkins, 657 pounds at Mangum, 1120 pounds at Stratford, 1121 pounds at Lahoma and 1168 pounds at Stillwater.

Twenty mungbean varieties and strains grown in a preliminary yield test near Perkins produced a mean dry seed yield of 412 pounds per acre.

Thirty mungbean varieties and P.I.'s in a cooperative International Mungbean Nursery yield test grown near Perkins produced dry seed yields of 1232 pounds per acre in 1973 and 691 pounds per acre in 1974.

The Asian Vegetable Research and Development Center in Taiwan offered seed of 34 parent breeding lines and 37 bulk hybrid segregating seed populations. We accepted this material which performed very well at Perkins this year. Several hundred individual plant selections have been made.

Mungos (Vigna mungo)

Ten mungo P.I.'s were grown in a yield test near Perkins. Mean dry seed yields were 296 pounds per acre when planted in 40 rows. These accessions need to be planted in narrow row spacings to increase yields.

Chickpeas (Cicer arietinum)

Three chickpea accessions, P.I.'s 269881, 297275 and 315784 were planted March 27, 1974 near Stillwater in a 10, 20, 30 and 40-inch row spacing study. The yield, seed size and other data are shown in Table 2.

Twelve accessions were also planted in a yield test. Each plot consisted of four 20-inch rows 10 feet long. Dry seed yields in pounds per acre and other data are shown in Table 3.

Adzuki Beans (Vigna angularis)

Three Adzuki bean accessions were grown in a 10, 20, 30, and 40-inch row spacing study near Stillwater in 1974 (Table 4). Eleven accessions were yield tested at this same location and produced a mean dry seed yield of 484 pounds per acre.

Fifteen Adzuki bean accessions were yield tested following small grains at Stillwater and produced a mean dry seed yield of 850 pounds per acre.

Lentils (Lens esculenta)

Twenty-two lentil accessions were grown in a scarce seed nursery in 1974 near Perkins in 40-inch single row plots 20 feet long. Dry seed yields ranged from a low of 7 pounds per acre for P.I. 193548 to 230 pounds per acre for P.I. 176994. These accessions need to be grown in narrow row spacings to produce higher yields per acre.

OILSEED CROPS

Brassica Spp.

Eleven P.I.'s and one commercial yellow mustard strain were grown near Stillwater and Tipton in 1973 and 1974. Dry seed yields in pounds per acre and other data are shown in Table 5.

Three Brassica strains, P.I. 243913, a white blossom selection from P.I. 243913 and P.I. 175602 were grown in a 10, 20, 30 and 40-inch row spacing test near Stillwater in 1974. Yields and other data are shown in Table 6.

MUCILAGE CROPS

Guar (Cyamopsis tetragonoloba)

The 1974 Regional Guar tests containing four replications of twenty-four varieties and strains are planted near Perkins, Chickasha, Ft. Cobb, Tipton, and Mangum. The 1974 data are not yet available.

Mean yields in pounds per acre for the 24 entries in 1973 were 1068 pounds at Perkins, 531 pounds at Chickasha, 1112 pounds at Ft. Cobb, 1742 pounds at Mangum and 2034 pounds at Tipton.

Mean yields and other data for three strains grown in a 10, 20, 30 and 40-inch row spacing test in 1973 near Stillwater are shown in Table 7.

Two guar strains are being increased in 1974 for potential release cooperatively by the Agricultural Experiment Stations in Texas and Oklahoma and the U.S.D.A. The two varieties represent 10 to 20% yield advantages over the present varieties. Publicity release for the two varieties is scheduled for January 1, 1975.

FORAGE CROPS

Hardie Bermudagrass

Hardie bermudagrass is a vegetatively propagated hybrid from the three way cross 9945A x (8153 x 9953).[1/] This cross was made in 1967 by W. L. Richardson. Accession 9945A belongs to the taxon, Cynodon dactylon var. dactylon and comes from Elazig, Turkey. Accessions 8153 and 9953 both belong to the taxon C. dactylon var. afghanus and both come from Kanahad, Afghanistan.

Hardie is adapted throughout Oklahoma, but was released with the suggestion that it be used in the northern 1/2 of the state. We expect it to be best adapted to the northeast quarter of the state with its high rainfall and to other areas in northern Oklahoma under irrigation.

Oklan Bermudagrass

Oklan bermudagrass is an F_1 hybrid whose exact pedigree cannot be determined. It was first selected in 1968 from an abandoned bermudagrass nursery whose many genotypes had grown together making positive identification impossible. We feel confident that the male parent of Oklan is 9945A and the female parent is either accession 10429 or 10325.[2/] Accessions 10429 and 10325 both belong to the taxon C. dactylon var. coursii and both were collected in Malagasy.

Oklan has a winterhardiness level somewhere between that of Midland and Coastal. It survived at Stillwater but does begin spring growth a few days later than Midland, and makes slower spring growth. Consequently, we suggest that Oklan be used in the southern 1/2 of Oklahoma, roughly south of Interstate Hwy. 40.

[1/] 9945A = P.I. 206427
8153 = P.I. 223248) Same P.I. but definitely different types
9953 = P.I. 223248)

[2/] 10429 = P.I. 288221
10325 = P.I. 288222

Notes on Tomato and Cucumber Accessions

LeVern Lorenz
Isabella, Oklahoma

The following tomato accessions were tested:

P.I. 262929 - Set at very high temperature but the fruit cracks so badly that it hasn't any commercial value but good for breeding in the heat resistant lines.

P.I. 280595 - Set good fruit but has a green shoulder and isn't early.

P.I. 255847 - Has a pear-shaped fruit, not too large but has a good red color and retains its foliage better than most kinds.

P.I.'s 272751, 272749, 272735, 272750 have indeterminate vines very prolific, pink pear-shaped fruit and good acid taste, and vines are very resistant to most diseases and similar to the Porter tomato.

P.I. 263726 - Would make a good tomato for the early crop and it sets good.

P.I. 309671 - Would make a good tomato for the early crop.

P.I.'s 128733, 128244, 211839, 124039, 126441, 126924 - These were supposed to have resistance to various diseases but they defoliated and set very few fruit, pea-size fruits.

P.I. 262934-CGS2 - Maliutka tomato is one of the most prolific tomatoes, sets at high temperatures, has plum-shaped fruit, has a tendency to have yellow top on shoulder of fruit and is self topping.

Cucumber: P.I. 263046 - Set a few cucumbers before the powdery mildew took it over. It is very susceptible to powdery mildew.

ORNAMENTALS

The Introduction, Growth, Development and Landscape Performance of New Plants for Oklahoma

Carl E. Whitcomb, Paul J. Mitchell,
J. Steve Ownby, R. N. Payne, and W. R. Kays

Objective(s):

To obtain and test new woody plants under Oklahoma conditions for possible general usage in the state.

Methods:

New plants are obtained through the U. S. Department of Agriculture, the National Arboretum in Washington, D. C., and through a variety of public and private sources. All new plants, seeds, seedlings, or cuttings will be grown for 1 to 2 years in containers prior to field planting and general testing. This is done to allow for greater top and root development prior to field planting thus insuring the greatest possible chance for survival. Subjecting small seedlings or young plants propagated from cuttings to adverse field conditions prior to some adjustment period may have eliminated some otherwise successful test plants of the past.

Results:

Several years ago, a popcorn shrub, Xanthocereus sorbifolia, was planted near the entranceway to the Arboretum and Nursery Research farm. This deciduous shrub, 6-7 feet tall, has flowered heavily each spring, slightly later than the white spireas, and rivaling them for a show in the landscape. The popcorn shrub offers an attractive lacy foliage throughout the growing season. Thus far, no disease or insect problems have been observed. The seed pods are slightly larger than a golf ball and mature in early August, splitting into 3 parts and dropping the marble sized black seeds to the ground. In the Arboretum, the popcorn shrub has performed well without special attention or irrigation, showing a great deal of drought resistance and durability.

Another shrub deserving more attention in the future is Zabel's laurel, Prunus laurocerasus 'Zabeliana'. This low spreading broadleaf evergreen has handsome glossy leaves which retain their color well throughout the winter when given some protection. The largest specimen at the Arboretum is about 3 feet tall and 7 feet across. Its performance in sunny locations is unknown at this point. Zabel's laurel shows considerable drought resistance and should be a valuable addition to landscapers on northern or eastern exposures.

Winterberry Euonymus, Euonymus bungeana, has performed well over a wide area of the southwestern great plains. This large shrub or small tree will eventually reach a height of 20-25 feet. The deciduous

foliage remains a medium green throughout the growing season, eventually falling to expose the dense clusters of attractive pink fruit which remain most of the fall and early winter. Winterberry Euonymus is drought resistant, cold hardy and relatively pest free.

Chinese pistache, Pistachia chinensis, is a medium sized deciduous tree reaching a height of 30-40 feet with a 25-30 foot spread. The wood of this deciduous tree is extremely durable. Leaves are once compound with a strong odor when crushed and turn a brilliant orange or red in the fall. Chinese pistache will grow in a wide range of soils and is free of disease and insect problems.

Japanese Zelcova, Zelcova serrata, looks very much like a young American Elm from the standpoint of leaves, bark and overall growth form. It is being used as a replacement for American Elms lost to Dutch Elm disease in parts of the northeast. Zelcova has an extensive root system much like an elm and shows promise as a supplement to the landscape of most of Oklahoma.

Sawtooth Oak, Quercus acutissima, is a rapid growing oak with a chestnut-like leaf and growth form somewhat resembling the growth form of a young Pin Oak. It appears to be resistant to the chlorosis problem which plagues the Pin Oak but is very bland in fall color and holds its leaves far into the winter. Only slight damage by chewing insects has been observed. It appears to transplant well which when combined with the rapid yet durable growth and apparent tolerance to at least a moderate range of soils makes it a good addition to the slowly growing list of suitable trees for Oklahoma.

New plants currently being grown in containers for planting during the spring of 1974 include 2 species of Japanese evergreen oaks thought to be hardy in Zone 7, a new low dwarf selection of Shore Juniper Juniperus conferta and a blue, drooping leaved form of yucca thought to be Yucca gloriosa. Other plants include species of Ilex, Salix, Clematis, Pinus, Cephalotaxus, Zamia, Chamaecyparis and Pyracantha.

The following collection of plants have been obtained during the past year. They will be planted in the O.S.U. Arboretum in the future.

Abelia grandiflora dwarf
Abelia grandiflora 'Ed Goucher'
Abelia grandiflora 'Sherwoodi"
Acer oliverianum
Alnus rhombifolius
Alnus glutinosa
Abies alba
Abies sachalinensis
Bambusa pygmaea Dwarf Bamboo
Berberis hybrid 'William Penn'
Buxus microphylla 'Vardier Valley'
Carpinus caroliniana Amer. Hornbeam
Carpinus betulus Europe Hornbeam
Carpinus orientalis
Camellia japonica 'Rusticana'
Camellia japonica 'Shiro-Botan'
Camellia japonica 'Barbara Morgan'
Cupressocyparis leylandi
Chamaecyparissus nootkatensis 'Glenmore'
Cotoneaster liaking Weeping Cotoneaster
Cassaia bicapsularis
Chilopsis linearis Desert Willow
Castanea mollissima Chinese Chestnut
Cephalotaxus drupacae Jap. Plum Yew
Ceratonia siliqua
Cercis siliquastrum

Erythrina crista-galli (hybrid)

Escallonia organensis

Elaeagnus pungens 'nana'
Dwarf Silverthorn

Firmiana simplex
Chinese Parasol Tree

Fraxinus uhdei

Gardenia jasminoides 'Fortuniana'

Ilex altaclarensis

Ilex aquifolium 'Variegata'

Ilex aquifolium 'Ciliata Major'

Ilex cornuta 'Glossy Leaf'

Ilex hybrid 'John T. Morris'

Ilex hybrid 'Nelly Stevens'

Ilex opaca 'East Palatka'

Ilex opaca 'Hume #1'

Ilex latifolia

Juniperus chinensis 'Blue Vase'

Juniperus davurica 'Parsoni'

Juniperus procumbens 'nana'

Koelreuteria formosana
Formosan Golden Raintree

Koelreuteria elegans

Ligustrum vulgare

Ligustrum lucidum

Mahonia fortunei

Mahonia lomarifolia

Myrica cerifera

Lagerstroemia indica
(Over 30 new or not commonly grown varieties)

Ostrya virginiana
Hophornbeam

Osmanthus heterophyllus

Paulownia tomentosa
Empress Tree

Petteria ramentacea

Pinus canariensis
Canary Island Pine

Pinus densiflora
Japanese Red Pine

Pinus halapensis
Aleppo Pine

Pinus michoacana

Pinus peuce
Macedonian Pine

Pterocarya stenoptera
Caucasian Wing Nut

Punica granatum 'nana'
Dwarf Pomegranate

Punica granatum
'Dwarf Fruitless'

Pyracantha coccinea 'Wateri'

Pyracantha hybrid 'Mohave'

Pyracantha koidzumi 'Victory'

Quercus myrsinaefolia

Raphiolepis indica 'Enchantress'

Rhododendron oldhami

Rhamnus davurica

Sapindus utilis

Sapindus marginata

Tetracentron sinense

Ulmus hybrid
'Shipparo Autumn Gold'

Ulmus parvifolia
'Sempervirens'

Viburnum tinus

Xylosma senticosa

ARBORETUM AND RESEARCH CENTER INDEX

Arboretum Sections:

A1 - Pistacia chinense, Zelcova serrata, Quercus acutissima, Euonymus bungeana, Acer saccharum 'Caddo' and others.

A2 - Plants needing protection: Acer palmatum, Viburnum rhytidophyllum, Liriope muscari, Taxus spp., Cephalotaxus harringtonia and others.

A3 - Euonymus japonica, E. kiautschovica 'Manhattan', 'Jewell', and 'Vincafolia', Pyrus calleryana 'Bradford', Pyracantha spp., and others.

A4 - Juniperus, several species, numerous varieties, and new plantings of deciduous trees and shrubs.

A5 - Junipers and other conifers and new plantings of deciduous trees and shrubs.

B - 1972 plantings of Ilex spp., Aucuba japonica and others.

C - Conifer peninsula; Arborvitae, Pines, Taxus and others.

D - Area to be developed in the future.

Research Area:

1. - Field Research

2. - Container research and production bed.

3. - Shade house

4. - Nursery barn, laboratory, storage and cold room, etc.

5. - Tractor and equipment storage

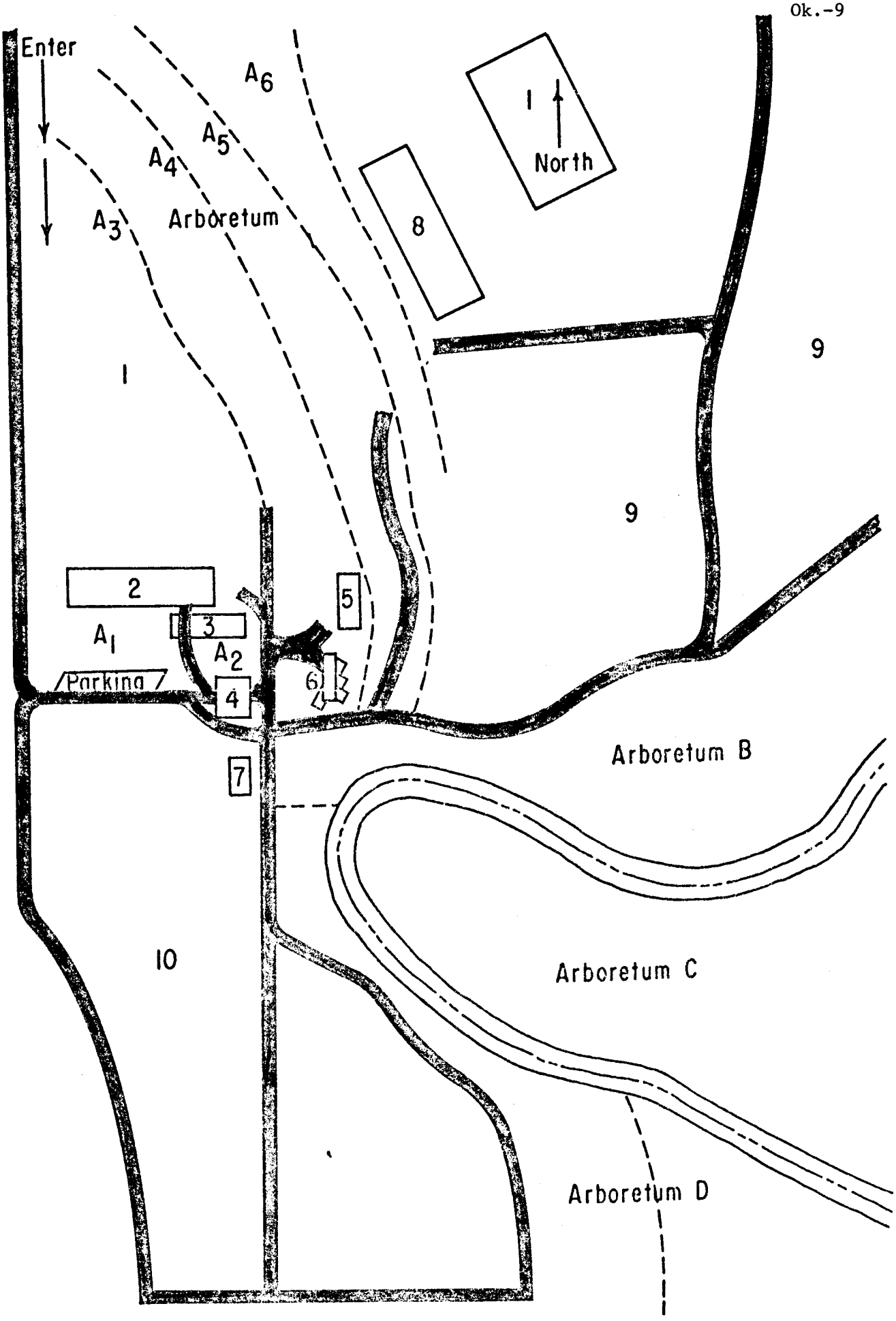
6. - Mixer and bins for holding media.

7. - Plastic greenhouse (under construction)

8. - Rose research - control of black spot. By Dr. Lou Morrison, Department of Plant Pathology.

9. - Nursery stock belonging to the campus landscape maintenance section of the Physical Plant.

10. - Nursery stock belonging to campus landscape to be removed to allow for expansion of research dealing with use, establishment, and maintenance of landscape plants in Oklahoma.


Enter
A6
A5
A4
A3
Arboretum
1
North
8
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A2
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Parking
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7
Arboretum B
10
Arboretum C
Arboretum D

Table 1. 1973 Fusarium Wilt of Cowpea Data (2 Rep. Mean)
D. F. Wadsworth

Okla. C-No.	Identity	Stand Count	Number with wilt	Percent Diseased
22	Black Autry	218	3	1.3
87	Early Red	207	17	8.2
122	P.I. 194268	221	8	3.6
133	New Era x C.R.	364	5	1.3
142	Victor x C.R.-B.E.	322	7	2.1
182A	OAEC-58-1	242	34	14.0
233	P.I. 197019	168	78	46.4
315	P.I. 194210	285	19	6.6
323	OAEC-57-15	368	14	3.8
338	B71-B-44 x C.R. x I.	479	14	2.9
363	OAEC-59-3	183	1	0.5
393	OAEC-59-33	59	2	3.3
403	B71-B44A2 x I.	502	31	6.1
408	OAEC-59-24	163	0	0
521	P.I. 126925	71	2	2.8
532	P.I. 115679-A	134	1	0.7
534	P.I. 167024-A	136	0	0
535	P.I. 194210	67	4	5.9
538	P.I. 164337	99	0	0
541	P.I. 194211	24	3	12.5
547	P.I. 194203-A	34	0	0
560	P.I. 124600	108	1	0.9
564	F.C. 31661	221	7	3.1
599	P.I. 238110	146	3	2.0
625	Mississippi Crowder	118	0	0
634	Black Seeded Cowpea	80	14	17.5
654	P.I. 288658	59	4	6.7
655	P.I. 288659	121	43	35.5
659	P.I. 288663	71	0	0
677	Ligon	74	7	9.4
689	Stokes Red	30	1	3.3
696	P.I. 186459	34	0	0
701	P.I. 194207	59	0	0
702	P.I. 200867	5	0	0
738	X-12-C23-8 x C24 B.E.	42	0	0
745	P.I. 148678	9	0	0
750	P.I. 170859	21	5	23.8
759	P.I. 250416	27	2	7.4
766	P.I. 293524	261	10	3.8
768	P.I. 293585	29	0	0
785	Mississippi Rurple	263	2	0.7
786	Colossus	65	0	0

Table 2. 1974 Chickpea Row Spacing Y.T.
Agronomy Research Station - Stillwater
Soil Type - Kirkland Silt Loam

Okla. CP-No.	Identity	Row Spacing	Rows Harvested	Yield lbs/A	GM/100 Seed	Plant ht. Inches	First Bloom	First Post	Maturity
196	P.I. 297275	10"	8	1643	18.73	11.0	5-15	5-20	7-4
200	" 315784	10"	8	1734	12.87	9.0	5-14	5-19	7-7
177	" 269881	10"	8	1660	12.33	13.0	5-16	5-21	7-7
		10"	Mean	1679	14.64	11.0	5-15	5-20	7-6
196	P.I. 297275	20"	4	1315	16.93	10.0	5-15	5-20	7-6
200	" 315784	20"	4	1449	13.27	8.0	5-14	5-19	7-6
177	" 269881	20"	4	1601	12.73	12.0	5-15	5-19	7-7
		20"	Mean	1455	1431	10.0	5-15	5-19	5-6
196	P.I. 297275	30"	3	1159	19.05	11.0	5-15	5-20	7-7
200	" 315784	30"	3	1409	13.87	10.0	5-13	5-18	7-6
177	" 269881	30"	3	1415	13.20	11.0	5-15	5-20	7-6
		30"	Mean	1328	15.36	10.7	5-14	5-19	7-6
196	P.I. 297275	40"	2	766	17.70	8.0	5-16	5-21	7-7
200	" 315784	40"	2	804	13.73	7.0	5-15	5-20	7-7
177	" 269881	40"	2	913	13.60	10.0	5-16	5-21	7-7
		40"	Mean	828	15.01	8.3	5-16	5-21	7-7

Table 3. 1974 Chickpea Yield Test
Agronomy Research Station - Stillwater
Soil Type - Kirkland Silt Loam

Okla. CP-No.	Identity	Yield lbs/A	GM/100 Seed	Plant ht. Inches	First Bloom	First Pod	Maturity
54	P.I. 257583	1425	15.33	10.0	5-12	5-17	7-6
196	" 297275	1015	16.93	8.3	5-14	5-20	7-5
200	" 315784	1341	13.47	8.0	5-13	5-18	7-5
214	" 315798	913	13.33	13.7	5-8	5-13	7-6
216	" 315800	1347	12.53	9.3	5-14	5-20	7-4
217	" 315801	1127	11.47	9.0	5-16	5-21	7-4
219	" 315803	1513	12.93	9.3	5-16	5-21	7-5
229	" 315813	1164	17.33	9.0	5-15	5-20	7-6
231	" 315815	1500	20.53	8.3	5-9	5-14	7-6
235	" 315819	1580	12.27	8.7	5-13	5-18	7-4
246	" 315830	1503	20.00	12.0	5-12	5-17	7-3
251	" 331381	888	10.93	9.0	5-9	5-14	7-4
	Mean	1277	14.75	9.6	5-13	5-18	7-5

Table 4. 1974 Adzuki Bean Row-Spacing Study
Agronomy Research Station, Stillwater
Soil Type Kirkland Silt Loam

Okla. Sp-No.	Row Spacing (Inches)	Rows Harvested	Mean Yield lbs/A	G/100 Seed	Plant ht. Inches	First Bloom	First Pod
416	10	8	292	5.7	16.0	6-14	6-16
786	10	8	1502	11.4	16.0	6-19	6-21
787	10	8	837	12.2	13.7	6-15	6-17
		10"Mean	877	9.8	15.2	6-16	6-18
416	20	4	100	6.1	15.7	6-14	6-16
786	20	4	1299	11.1	17.0	6-21	6-23
787	20	4	1271	11.2	14.3	6-15	6-17
		20"Mean	860	9.5	15.7	6-17	6-19
416	30	3	74	5.6	16.3	6-14	6-16
786	30	3	1008	12.9	14.5	6-21	6-23
787	30	3	1156	11.9	12.3	6-16	6-18
		30"Mean	746	10.1	14.4	6-17	6-19
416	40	2	46	5.6	17.0	6-16	6-18
786	40	2	1229	11.4	15.3	6-19	6-21
787	40	2	1391	11.3	15.0	6-16	6-18
		40"Mean	889	9.4	15.8	6-17	6-19

Table 5. Brassica Yield Tests, Stillwater and Tipton, 1973-1974
Yield in lbs/A--3 Rep Mean

Okla. Sp-No	Identity	Stillwater 1973	Stillwater 1974	Tipton 1973	Tipton 1974	4 Test Mean
628	P.I. 48051	412	140	235	79	217
632	P.I. 48060	512	111	297	145	266
634	P.I. 48063	388	127	313	115	236
652	P.I. 48091	347	160	203	84	199
653	P.I. 48099	323	260	265	244	273
703	P.I. 243913	573	231	1108	199	528
704	P.I. 243913 Sel.	355	340	839	169	426
704-1	P.I. 243913 W.B. Sel.	640	327	1009	208	546
721	P.I. 175602	787	120	411	291	402
751	P.I. 173641	537	280	1063	240	530
761	P.I. 211734	495	127	605	155	346
766	Yellow Mustard	340	73	284	235	233

Table 6.

1974 Brassica Row Spacing Y.T.
Agronomy Research Station - Stillwater
Soil Type - Kirkland Silt Loam

Okla. SP-110	Identity	Row Spacing	Rows Harvested	Yield Lbs/A	Plant ht. Inches	First Bloom	First Pod	Maturity	Seed 1/ Quality
703	P.I. 243913	10"	8	293	42.3	5-17	5-21	7-13	2.0
704-1	" 243913 W.B. Sel	10"	8	324	41.7	5-16	5-20	7-11	2.0
721	" 175602	10"	8	80	34.3	5-15	5-19	7-7	2.0
		10"	Mean	232	39.4	5-16	5-20	7-10	2.0
703	P.I. 243913	20"	4	257	43.3	5-18	5-21	7-12	2.0
704-1	" 243913 W.B. Sel	20"	4	300	38.3	5-17	5-21	7-11	2.0
721	" 175602	20"	4	117	33.7	5-17	5-21	7-8	2.0
		20"	Mean	224	38.4	5-17	5-21	7-10	2.0
703	P.I. 243913	30"	3	170	33.3	5-17	5-21	7-10	1.0
7011-1	" 243913 W.B. Sel	30"	3	253	35.0	5-18	5-22	7-10	2.0
721	" 175602	30"	3	85	33.7	5-17	5-21	7-9	2.0
		30"	Mean	170	34.0	5-17	5-21	7-10	1.7
703	P.I. 243913	40"	2	170	36.7	5-17	5-21	7-11	1.0
704-1	" 243913 W.B. Sel	40"	2	142	37.7	5-17	5-21	7-11	1.0
721	" 175602	40"	2	95	34.7	5-17	5-21	7-9	1.0
		40"	Mean	136	36.4	5-17	5-21	7-10	1.0

1/ Seed quality based on wrinkling, growth cracks, color and mold damage with a rating of 1 for very good seed to 5 for very poor seed.

Table 7. 1973 Guar Row Spacing Study
Agronomy Research Station, Stillwater
Soil Type - Kirkland Silt Loam

Variety or Strain	Row Spacing (inches)	Rows Harvested	Yield Lbs/A	G/100 Seed	Plant ht. Inches	First Bloom	First Pod	Seed Quality
Mills	10	8	1345	3.80	16.3	6-21	6-23	2.3
T64002-1-1-B-1-1-B	10	8	1586	3.73	16.3	6-22	6-24	1.7
Brooks	10	8	1764	3.47	20.0	6-24	6-25	1.7
	10"	Mean	1565	3.66	17.5	6-22	6-24	1.9
Mills	20	4	1103	3.87	20.7	6-20	6-22	2.7
T64002-1-1-B-1-1-B	20	4	1640	3.83	20.0	6-21	6-23	1.7
Brooks	20	4	1820	3.47	21.0	6-25	6-28	1.3
	20"	Mean	1520	3.72	20.5	6-22	6-24	1.9
Mills	30	3	1073	3.83	21.3	6-20	6-22	2.3
T64002-1-1-B-1-1-B	30	3	1418	3.73	25.7	6-24	6-26	1.7
Brooks	30	3	1658	3.33	24.7	6-21	6-23	1.7
	30"	Mean	1383	3.63	23.9	6-22	6-24	1.9
Mills	40	2	918	3.77	20.3	6-22	6-24	3.0
T64002-1-1-B-1-1-B	40	2	1217	3.73	23.3	6-20	6-22	2.0
Brooks	40	2	1356	3.27	22.0	6-24	6-26	1.7
	40"	Mean	1163	3.59	22.2	6-22	6-24	2.2

1/ Seed quality based on wrinkling, color and mold damage with a rating of 1 for very good seed to 5 for very poor seed.

NEW CROPS RESEARCH IN PUERTO RICO
Annual Report July 1973- Nov. 1974

J. Vélez Fortuño, Plant Breeding Department
Agricultural Experiment Station
University of Puerto Rico
Río Piedras, Puerto Rico 00928

FRUITS
(A. Torres and L. B. Ortiz)

Sapodilla (Manilkara sapota) cultivars in tests at Fortuna and Isabela are showing good growth and a few of them have already started producing a few fruits. Cultivars Henna, Méjico, and one of the Jamaican varieties produced large, almost 1-pound in weight, attractive, tasty fruits.

Three new avocados were added to our collection at Fortuna Substation. One of them, supposedly a hybrid, produces good sized and quality fruit. Moreover, the farmer who supplied the bud wood reported that it yields two crops in the year. Another of these is M-4 obtained from Dr. Malo (Florida) described as a promissing dwarf stock. The third is also a supposed hybrid. It is a late type and yields large, good quality fruit.

The citrus collection at Fortuna has been almost completely (95%) transferred to Adjuntas as they were under stress due to dry conditions prevailing at Fortuna. All clones have been grafted on Cleopatra and sour orange stocks.

Macadamias at Adjuntas have not shown much progress and work on them has been discontinued.

COFFEE
(C. J. Torres)

The coffee collection was renovated by pruning and improvement in development is already evident. Seed of the coffee hybrid "Pacas" (P.R. P.1. 13006) was obtained from San Salvador. This variety has been reported to produce very high yields, about 1500 kgs. (34 cwt.) per acre.

ORNAMENTALS
(O. D. Ramírez)

Since recent years, the public interest in new ornamentals has increased amazingly. Consistent with public demand, one hundred twenty-five ornamental plants were introduced during the year for evaluation in addition to others introduced previously.

The Bougainvillea introductions bloomed showing a great variety of colors. Among the twenty-six cultivars, the most outstanding are:

Cultivar Jennifer Fernie (P.1. 380549) which blooms profusely, white in color, and has a bushy growth habit.

Lady Mary Maxwell (P.1. 380551) with old rose flowers and bushy growth.

Golden Glow (P.1. 380547) a climber with attractive yellowish orange flowers.

Sanderiana (P.1. 380556) of bushy growth medium purple flowers.

Cyphery (P.1. 380542) of bushy growth and crimson flowers.

These are being propagated by cuttings for further evaluation and subsequent distribution to public agencies and commercial nurseries.

Besides the above mentioned, there are several other new cultivars of very attractive blossoms which will be propagated for further evaluation and increase of propagating material.

The New Guinea creeper, Mucuna bennettii (P.R. P.I. No. 11590), a leguminous species from New Guinea was introduced in 1969 from the Singapore Botanical Garden. It bloomed in October 1974, and constitutes a most beautiful sight with long axillary pendant racemes of sickle shaped, claw like, waxy fiery scarlet flowers. It is considered the most showy of Tropical climbers.

Twenty-nine accessions of Coleus were received, of which 26 survived and are being propagated for evaluation. Two of them, cultivars Lord Falmough (P.I. 249788) and Picturatum (P. I. 249792) are very promissing for hanging baskets.

Sedum sp. (P.I. 376940) es being evaluated for hanging baskets. It has shown to be very sensitive to excess of water, preferring rather dry conditions.

Accessions Salix fragilis (P.I. 370126), Ilex verticillata "Caparon" (P.I. 377678), and "Fairfax" (P.I. 377679), Buxus microphylla var. Intermedia (P.I. 326543) and Clematis spp. (P.I. 358787 and P.I. 358788) seem to suffer in our environment and are consequently being discarded.

BANANAS AND PLANTAINS

(H. Irizarry, G. Colom Covas and J. A. Green)

Clonal selection of plantains continued based on number of fingers of commercial size per bunch and disease freeness. Those selections considered best were increased using Hamilton's accelerated propagation method but modified by Green (Corozal Substation). Ninety two selections are being increased in order to provide enough planting material for establishing the clonal evaluation field trials.

Annual Report
New Crops Research in South Carolina
R. G. Halfacre
July 1973 to June 1974

Reports from cooperators are presented as follows:

R. E. Schoenike
Department of Forestry
Clemson University
Clemson, S.C. 29631

I can report on the following material received in recent years. Background information on various accessions was given in previous years' reports and are not repeated here.

Accession PI 168939. Quercus acutissima
The plantation is healthy and tallest trees are now 20 feet. Fruiting has begun but so far is light.

Accession PI 293810. Pinus stankewiczii
Bole infestation by bark beetles (?) was noted on one plant. A second plant remains healthy.

Accession NA 827-S. Quercus chenii
This appears a promising introduction. All five plants have survived. The tallest is now 9 ft. and very vigorous.

Accession NA 23214-C. Ilex x 'Kolkneana'
Two plants on an old field site are healthy but growing slowly.

Accession PI 316681. Viburnun sargentii
The five plants are vigorous and growing well.

Accession NA 14089-C. Chionanthus retusus
Plants lost to drought (?) or winter injury.

Accession NA 33031. Pinus brutia
Two of three plants are healthy and growing slowly.

Accession NA 31740. Pinus koraiensis
Two of three plants are healthy and growing slowly.

Accession NA 33517. Alnus japonica
All three plants are healthy and vigorous.

Accession NA 3352. Betula platyphylla
Three plants survived on an old field site but have yellow foliage and do not appear healthy.

A. R. Mazur
Department of Horticulture
Clemson University
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The work on tall fescue in reference to varietal selection are in comparison tests as follows:

TALL FESCUE VARIETY TRIAL

Variety	Turf Scores			
	8/73	10/73	12/73	2/74
1. K-31	4.5	5.3	7.5	8.3
2. GOARS	3.2	2.7	5.0	6.0
3. P. I. 237 559	4.2	5.0	7.2	8.5
4. P. I. 234 747	3.5	4.3	7.2	8.0
5. Kenwell	5.2	5.7	7.5	8.2
6. Kenhy	4.3	5.0	8.2	9.5
LSD .05	1.5	1.6	1.7	1.5

These data indicate that under the upper Piedmont conditions in South Carolina, the plant introductions responded quite favorably when compared to varieties that are commercially available. The introductions were not

significantly better than the standard set by K-31, which would make further development in South Carolina questionable. Although these grasses show some desirable attributes, commercial production is warranted only when varieties are superior at least in some sense to currently available commercial varieties.

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All Plant Materials evaluated at the Horticultural Gardens.

Scientific Name: Stachyurus praecox P.I. 296026
Common Name:
Size Group: 4-6 ft.; deciduous
Habit of Growth: Vase-shaped; upright
Texture: Medium to coarse
Foliage Color: Light green
Fall Color: Brownish-red
Stem Color: Brownish-red
Fruit: Green panicles Effective: Early April
Flower: Yellow panicles Duration: Summer
Light Requirement: Sun to part shade
Insect and Disease: None to date
Notes: Prefers well-drained soil; herbicide injury from combination of Dowpon Paraquat; distinct male and female plant; mist propagation difficult; outstanding feature is flowers.
Landscape Uses: Accent, grouping and oriental effect

Scientific Name: Ilex x 'Lydia Morris' P.I. 267824
Common Name: Lydia Morris Holly
Size Group: 6-10 ft.; evergreen
Habit of Growth: Pyramidal
Texture: Medium
Foliage Color: Glossy, Dark green
Stem Color: Greenish
Fruit: Red berry Duration: Fall and winter

Flower: White Effective: Inconspicuous
Light Requirement: Sun or part shade
Insect and Disease: Tea scale
Notes: Very spiny holly; heavy fruiter but needs male plant Ilex x 'John T. Morris' for pollination. We have one grower propagating this in Georgia.
Landscape Uses: Foundation, hedge, winter accent, and barrier.

Scientific Name: Hedera helix 'Poetica' P.I. 239247
Common Name: Poetica Ivy
Size Group: Vine; evergreen
Habit of Growth: Trailing
Texture: Medium
Foliage Color: Light green
Stem Color: Brownish-green
Fruit: None Duration:
Flower: None Effective:
Light Requirement: Part shade to shade
Insect and Disease: None
Notes: Exceptional vigor and cold hardiness. We have one grower propagating this in South Carolina.
Landscape Uses: Topiary work, ground cover, and vine for training.

Scientific Name: Rhamnus alaternus P.I. 241910
Common Name:
Size Group: 6-10 ft.; evergreen
Habit of Growth: Rounded and regular
Texture: Medium fine
Foliage Color: Light yellowish-green
Stem Color: Greenish-yellow
Fruit: Blue berry (Inconspicuous) Duration: Winter
Flower: Cream White Effective: Inconspicuous
Light Requirement: Sun or part shade
Insect and Disease: None to date
Notes: Good stable evergreen that is relatively slow growing.
Landscape Uses: Excellent background, sheared or unsheared hedge, foundation, and specimen.

Scientific Name: Punica granatum nana G-13168
Common Name: Dwarf Pomegranate
Size group: Less than 4 ft; semi-evergreen
Habit of Growth: Irregular
Texture: Fine
Foliage Color: Green
Fall Color: Yellow
Stem Color: Blackish-gray
Fruit: Brownish-red
Flower: Orange
Light Requirement: Part shade to full sun
Insect and Disease: None
Notes: Not cold-hardy in Piedmont, S.C., but excellent for potted plants. We are examining this plant from the standpoint of floricultural production.
Landscape Uses: Containerized planting, courtyard, and small accent.

Scientific Name: Trachelospermum asiaticum var. oblanceolatum P.I. 235331
Common Name:
Size Group: Vine; evergreen
Habit of Growth: Trailing
Texture: Fine
Foliage Color: Medium Green
Stem Color: Brown
Fruit: None
Flower: None (in Clemson, S.C.)
Light Requirement: Sun or shade
Insect and Disease: None
Note: Exception vigor and cold hardiness; easily propagated. We have one grower propagating this in Georgia.
Landscape Uses: Topiary work, ground cover, and vine for training.

Publications

Floyd, John Alex, Jr. Jan., 1974. New Ornamental Plants For South Carolina. S. C. Experiment Station Bulletin. Dept. of Horticulture, Clemson University, Clemson, S.C. Station Bulletin #571.

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Floyd, John Alex, Jr. Feb., 1974. Holly Evaluation at the Horticultural Gardens of Clemson University. Technical Bulletin #1050. Department of Horticulture, S. C. Experiment Station. Clemson University, Clemson, S.C.

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A new paprika type pepper developed in Spain has been evaluated at Clemson for the past 3 years. Evaluations here at Clemson are in respect to color quality, The result of the color tests are as follows:

	Pod Color	Ground Color
1. L-6-1-3-3	631	188
2. L-6-1-3-5		385
3. L-6-2-1-4	713	319
4. L-6-2-1-5		319
5. L-6-2-5-2	631	227
6. L-6-2-5-5		373
7. L-6-6-5-2	672	265
8. L-6-6-5-3		319
9. L-6-6-5-4		328
10. L-6-6-5-5		303
11. L-6-8-1-3-1	740	
12. L-6-8-1-3-2		442
13. L-6-8-1-3-3		377
14. L-6-8-1-6-3		328
15. L-6-8-1-6-4		360
16. L-6-8-1-6-5	746	
17. L-6-8-1-8-1	623	328
18. L-6-8-1-8-5		318
19. L-6-8-1-1		344
20. L-6-8-1-12-2		375

21.	L-6-8-1-12-5	729	282
22.	L-6-8-2-1-1		304
23.	L-6-8-2-1-2	656	262
24.	L-6-8-2-1-4		377
25.	L-6-8-2-1-5		318
26.	L-6-8-4-9-1		319
27.	L-6-8-4-9-2	616	277
28.	L-6-8-4-9-5		382
29.	L-6-8-5-10-1	631	344
30.	L-6-8-5-10-4		300
31.	L-6-8-5-11-1	616	283
32.	L-6-8-5-11-2		331
33.	L-6-8-6-3-3	647	254
34.	L-6-8-6-3-5		391
35.	L-6-9-1-2-3	623	270
36.	L-6-9-1-2-4		331
37.	L-6-9-1-7-5	662	377
38.	L-6-9-1-8-4	606	246
39.	L-6-9-1-8-5		328
40.	L-6-2-2-5		410
41.	L-6-8-3-1-1		424
42.	L-6-8-3-2-1		457
43.	L-6-8-5-1-1		424
44.	L-6-8-5-1-5		475
45.	L-6-9-3-3-4		396
46.	L-6-14-7-6-1		396
47.	L-6-14-7-6-2		388
48.	L-6-14-7-6-5		441
49.	L-6-2-3-4	598	319
50.	L-6-6-7-1	541	360
51.	L-6-14-7-6-1	516	396
52.	L-6-8-3-2-2		364

L- denotes pod length
First number - denotes cross selection
Second number - first year selection
Third number - Second year selection
Fourth number - Third year selection

These lines are being grown this year at Clemson as a means of further segregation in respect to color.

TENNESSEE REPORT ON PLANT INTRODUCTIONS TO
S-9 TECHNICAL COMMITTEE
July 1973 to November 1974

Milton J. Constantin

My records show five new accessions of PI material by cooperators during the reporting period.

Cooperators at the University of Tennessee and the Tennessee Valley Authority have reported on three continuing programs involving PI materials as follows:

1. *Corn Earworm Resistance.* L. M. Josephson of the Plant and Soil Science Department, University of Tennessee, has found Zapalote Chico (PI 217413) to have a fine silk with a low-moisture content on which the corn earworm larvae is unable to survive. Zapalote Chico ears, however, have a very tight, tough husk which is incompatible with commercial corn production. Resistance to corn earworms is being transferred to inbred lines used in Tennessee hybrids and the selection of resistant synthetic lines is being continued.

2. *Wildlife Food Development.* D. H. Scanlon of the Division of Forestry, Fisheries, and Wildlife Development, Tennessee Valley Authority, has a program underway which involves the evaluation of a wide range of plants as a source of food for wildlife. His observations are as follows:

Lespedeza introductions, *L. bicolor* (PI 286477), *L. japonica* (PI 90664), *L. cyrtobotrya* (PI 286480), *L. cyrtobotrya* (PI 295323), *L. hedysaroides* (PI 193950), and *L. thunbergii* (BN-3532-68) have grown well two years in the field with minimal maintenance.

Quercus acutissima (PI 78658) shows less vigorous growth than *Q. acutissima* (PI 168939) in the first two years in the field planting. *Q. pumila* (BN-10352-71) shows variable growth after two years and has not been tested by a cold winter.

Cornus mas (PI 323959) has grown slowly in the field after two years with minimum maintenance.

Elaeagnus umbellata (NA 31662) and *E. pungens* (NA 30128) are growing well in the field. The *E. pungens* (NA 30128) performed best when well established (30-36") plants from rooted cuttings were outplanted. Smaller plants have grown much slower.

3. The evaluation of various ornamental plants on the University of Tennessee Knoxville Campus is continuing under the direction of H. Van de Werken.

Annual Report on New Crops Research in Texas
Hatch 2091 - Contributing to Regional Project S-9
El Paso, Texas, October 30 to November 1, 1974
Prepared by Eli L. Whiteley

The 1973-74 crop year followed the usual pattern in Texas, some areas were extremely dry and others very wet. Temperatures followed the usual patern except for the southern half of the state which had a very mild winter.

Researchers received 2970 accessions in 1973-74. The major genera were Arachis, Capsicum, Sorghum, Coronilla, Astragalus, Brachiaria, and Allium. Most of these accessions are being evaluated in the field at the present time.

Sorghum

Mr. Fred Miller reports that several sorghum plant introductions were used in developing materials for release to sorghum breeders. The Texas Agricultural Experiment Station released four TAM bulks for use in developing downy mildew resistant yellow endosperm pollinators. These TAM bulks are: TAM Bulk 45 derived from PI257599 (SC0110), TAM Bulk 46 and 47 derived from PI276837 (SC0170), and TAM Bulk 48 derived from PI 276840 (SC0173).

Dr. D. T. Rosenow and Fred Miller released a male parent as TAM 428. TAM 428 is an inbred male parent derived from PI257599. This inbred line is the male parent of two grain sorghum hybrids - TAM 680 and TAM 670 released by the Texas Agriculutral Experiment Station in 1973-74.

Dr. J. W. Johnson developed sorghum midge resistant material utilizing PI276842 (SC0175). A greenbug resistant material was released as TAM Bulk 42 which was derived from PI264453.

Pepper

Dr. Ben Villalon screened 410 peper P.I.'s in the field and greenhouse for resistance to Valley Mosaic Complex (TEV, TMV, TRSV, CMV, and PVY). All accessions were susceptable when inoculated in the greenhouse. Some accesssions exhibited tolerance to VMC in field plots and are listed in the following table. These materials are being used in the pepper breeding program at Weslaco, Texas.

Grapes

Dr. W. N. Lipe is growing 11 grape accessions in a feasibility study in the South Plains area east of Abernathy, Texas. The study began in 1968 and the first five years of work was summarized in a Progress Report (No. 3258) - Grape Cultivar Evaluation for the Texas High Plains, 1972-73.

Many of the younger vines began production in 1973 and yield data are not available on all of the materials. P.I.'s 279509, 305477, 279503, 259077, 287731, 302611, and 279058 exhibited no symptoms of black rot and powdery mildew.

Kenaf

Interest in kenaf is still high. Several groups have spent one to two days discussing kenaf production with the writer. One group has planted several acres for seed production in the Rio Grande Valley. This group is interested in kenaf for fiber board and paper.

As predicted by some members of S-9 kenaf is being utilized for paper outside the U.S. prior to its use in the U.S. Eastern Paper Mills Corporation of Colombo, Ceylon is starting kenaf production for blending with straw to make both "writing" and "printing" paper. They plan on using 50%

PEPPER PLANT INTRODUCTIONS

High Field Tolerance to VMC
1973 - 1974, TAES, Weslaco, Texas
Dr. Ben Villalon

	P.I. No.	Genus	Species	Cultivar	Source
1.	105262	Capsicum	annuum		Turkey
2.	105444	"	"		"
3.	123166	"	"		India
4.	135874	"	"	W. Mirch	Pakistan
5.	159234	"	"		USA
6.	159236	"	"		"
7.	159258	"	"		"
8.	159274	"	"		"
9.	264281	"	"	P 11	"
10.	342946	"	"	Agronomico-8	Brazil
11.	342948	"	"	Avelar	"
12.	342949	"	"	Casca Dura	USA
13.	152222	"	chinen		Peru
14.	152225	"	"		Peru
15.	342947	"	prtms	ACC 2120	USA
16.	342947	"	"	ACC 2207	"

kenaf and 50% straw in the mill. They plan to plant 5,000 acres of kenaf in the first stage and 20,000 acres in the 2nd stage.

Sweet Sorghum

A sweet sorghum variety test and nursery were grown at College Station in 1974. Yields were good and brix readings ranged from 15 to 18 for the variety test. The nursery has in it a number of advanced breeding lines that look promising as far as yield and disease resistance are concerned.

Sesame

Several lines of sesame were planted late in the season to increase seed of these lines. Stands were not established in some of the lines due to very high temperatures and drying winds after irrigation to germinate the seed. Several companies are interested in sesame oil and protein.

Mustard

Two varieties of mustard, Oriental Yellow and Montana Yellow, were grown at College Station in a yield test. Yields were quite low, ranging from 550 to 800 lbs. per acre.

Plants Released

Sorghum

P.I.264453 - greenbug resistance TAM Bulk 42.
P.I.276842 - midge resistance.
P.I.257599 - mildew resistance, yellow endosperm, male parent, TAM Bulk 45.
P.I.276837 - mildew resistance, yellow endosperm, male parent, TAM Bulk 46.
P.I.276837 - mildew resistance, yellow endosperm, male parent, TAM Bulk 47.
P.I.276840 - mildew resistance, yellow endosperm, male parent, TAM Bulk 48.
P.I.257599 - mildew resistance, yellow endosperm, inbred, TAM 428.
P.I.257599 (TAM 428) - male parent of two varieties - TAM 670 and TAM 680.

Work Planned for Next Year

Work with sweet sorghum varieties and breeding lines will be continued. Some work on sesame will be initiated. Several lines and varieties of sesame will be evaluated. If seed are available a kenaf test will be planted.

10-21-74

NRRC-1

Report for 1974 Meetings of Regional Technical Committees on New Crops

Northern Regional Research Center

Dr. W. H. Tallent has been named Assistant Director of the Northern Regional Research Center. In his new assignment he will have responsibility for oilseed crops, in addition to new crops, and will continue to work closely with the Regional Committees on New Crops. Mr. F. R. Earle has been named Acting Chief of the Industrial Crops Laboratory; a permanent replacement is being sought to take over before he retires.

Our experience with glucosinolates in crambe and rapeseed is now being utilized in a broader area, cruciferous vegetables. Recent regulations on permitted variation in composition of new cultivars requires information on the range of composition found in materials now grown for food in various areas and under various conditions. Our methods are being modified to apply to these materials. Repeated purchases will be made in local markets of such things as cabbage, cauliflower, kohl-rabi, broccoli, turnips, rutabaga, radishes, mustard greens, etc. Arrangements have been made with Professor Paul H. Williams, University of Wisconsin, to provide us with samples of known varieties of cabbage grown at Madison. We anticipate expansion of this cooperation in horticultural areas.

Hydrogenated *Limnanthes* oil has been found of interest in use as wax by a company that is now supporting production studies at Corvallis.

Screening. Samples for the screening program increased during the past year, 427 versus 274 for the previous year. Of these, 193 were from Ghana, 67 from India, and 147 from collections by Dr. C. R. Gunn mostly in Colorado. The number of new species increased by 251 whereas there had been only 118 in the year before. Samples other than for screening included 20 samples of crambe, 4 *Brassica*, and 150 safflower from Montana, 12 *Kochia* from Pullman, Washington, and 2 *Brassica* from Maine. Of the 898 *Brassica* samples from Oregon, 692 were analyzed for oil, erucic acid, and glucosinolates in support of our cooperative search for high-oil, high-erucic, low-glucosinolate lines. Also from Oregon, 112 samples of *Limnanthes* were analyzed for oil content, oil composition and glucosinolate content. We were asked to analyze for atropine and scopolamine 15 samples of Jimsonweed (*Datura stramonium*) seed provided by USDA grain inspectors. The total of these two alkaloids varied from 0.23 to 0.48 percent. *Salvia nilotica* oil was shown to contain three C_{18} α-hydroxy acids totalling 10 percent; two of these had not been previously known in seed oils. The benzoic acid long known to be present in *Celastrus orbiculatus* oil was found to be combined with cyclic sesquiterpenoid alcohols rather than with glycerine. *Carduus nigrescens* oil is also unusual in that more than half of it consists of esters of triterpenoid alcohols, primarily erythrodiol and oleanolic acid.

Antitumor agents. Conversion of cephalotaxine to deoxyharringtonine, one of the active alkaloids of *Cephalotaxus*, has been achieved by partial synthesis. Since cephalotaxine, the parent alkaloid of this series and the most abundant by far, is inactive, this breakthrough is expected to considerably augment the supply of active alkaloids for clinical testing. NIH has asked a contractor to synthesize 25 grams of cephalotaxine by a combination of two recently published methods for use in preparing the active compound.

Extraction of 19 pounds of *Sesbania vesicaria* seed with alcohol provided 320 grams of extract. On fractionation, an 8-gram portion was obtained that contained the active principle. Activity in the 3PS experimental leukemia system has been confirmed in two other species of *Sesbania--S. punicea* and *S. drummondii*. These *Sesbania* species belong to a group in this genus which are toxic weeds in the southern coastal regions. A number of other *Sesbania* species which are not toxic to livestock have been screened for antitumor activity, and have been found inactive. Thus, there appears to be a correlation between toxicity of *Sesbania* species and antitumor activity.

Extracts of approximately 100 additional plants were submitted for testing during the past year. Of these, six are possible actives which are under further testing to determine whether they will become "confirmed actives." Retesting of *Astragalus calycenus* from Pullman, Washington, failed to confirm activity.

Sperm oil replacements. Estimated domestic stocks of sperm whale oil are expected to satisfy minimal demand until 1977, but consumption of the oil is running above the level reached in 1973, which was considered the minimal practical level. Consumers reportedly prefer the natural product over commercial replacements, which began appearing shortly after the ban on sperm oil imports. Quality replacements are needed as intensely as ever, but the use of reserve oil is providing additional time for development of suitable products, which must combine readily with sulfur and then perform well as extreme pressure (EP) additives for lubricants, the most critical use for sulfurized sperm oil.

In current evaluations, synthetic waxes prepared chemically from crambe and *Limnanthes* fatty acids and the natural wax from *Simmondsia* (jojoba) have surpassed sulfurized sperm oil in EP characteristics but need improvement in certain ancillary properties. For example, first samples of the new crops products, like most of the other candidates under evaluation, suffer from poor oxidative stability and/or bad foaming characteristics. These shortcomings are probably not inherent to the synthetic crambe or *Limnanthes* waxes but, more likely arise from impurities generated during synthesis or, in the case of jojoba, from natural contaminants not removed during processing of the oil. Needed improvements have indeed been gained with at least one candidate by eliminating a resinous byproduct to improve stability without severely reducing EP properties. In brief, problems not uncommon to such developmental work are being encountered and solved.

In addition to wax esters, sperm whale oil consists of some 25 percent triglycerides, which apparently contribute most of the constituent fatty acids having more than 20 carbon atoms. Analogous triglycerides, readily obtained from selected new crop seeds, are also being considered in terms of EP lubricants potential. Thus far, triglyceride-like materials have tended to polymerize during sulfurization, and it remains to be seen whether this polymerization should be eliminated through alternative methodology or whether such polymers might be beneficial if formed in a sulfurized mixture of wax esters and triglycerides.

Pest control agents. Studies seeking new leads on natural products suitable for use in pest control are underway. The first nine extracts prepared and tested were from species for which there is already evidence in the literature of insecticidal activity. In short-term tests at the Stored-Product Insects Research and Development Laboratory, three of these showed a different kind of anti-insect activity; they repelled the confused flour beetle (*Tribolium confusum*) more than did a pure pyrethrin reference standard. The extracts also showed promise as clothes moth repellants, which is significant because DDT is no longer used as a wool preservative and any chemical added to wool in treatment baths during processing must now be biodegradable.

The test results with this first group of extracts are highly encouraging: (1) Some extracts show activity, (2) the same ones suggest a broad-range repellancy since they were active against both a beetle (Coleoptera) and a moth (Lepidoptera), and (3) the crude unfractionated extracts surpassed pyrethrin.

Crambe. NRRC has contracted with Agricom International, San Francisco, to study processing of crambe seed in commercial facilities to produce high-quality oil and meal. The 4-year contract will test the production-processing-use cycle for crambe. Agricom is completing a new extraction plant in Grimes, California. Agricom crushed 450 tons of seed in August in the Culbertson, Montana, plant of P. J. Anderson and Sons, Inc., using prepress solvent extraction methods and is currently involved in marketing the products. Oil and meal samples from the run are being evaluated at NRRC. A third domestic oil seed processor has expressed interest in crambe seed production to supplement its rapeseed crushes.

Planting seed is in short supply and seed increase may be the thrust of Agricom's program next summer. Two commercial plantings of crambe in 1974 are known. P. J. Anderson and Sons, Inc., harvested 25 acres near Culbertson, Montana, yield about 1500 lb/acre. Ken Meyer, Vincennes, Indiana, planted 20 acres of crambe in early July and anticipates harvesting about 500 lb/acre in late October. Unfavorable weather adversely affected the 1974 plantings.

In 1974 feeding trials at Purdue AES, under a cooperative agreement with NRRC (experimental protocol approved by FDA), steer calves were fed a basal 9 percent protein ration supplied by corn and urea while others were fed rations with crambe meal providing 9.6, 10.3, and 11.0 percent protein. At essentially constant feed consumption per day, weight gains (feed efficiency)

increased with increasing protein levels as supplied by crambe. This indicates that there is no difference in acceptability of the rations due to differing levels of crambe meal and protein, and that crambe meal with intact glucosinolates efficiently supplies supplemental protein for beef cattle. Further, carcass residues analyses found no glucosinolate-derived products in the tissues (down to 1 ppm). FY 1975 feeding studies, using Culbertson meal, will duplicate the FY 1974 experiments to supply confirmatory evidence of the suitability of crambe meal for beef rations. A formal petition to FDA will probably be made this FY.

In April 1975, under a Memorandum of Understanding between NRRC and the Metropolitan Sanitary District of Greater Chicago, crambe will be planted on about 20 acres of strip-mine land (near Canton, Illinois) to which aqueous disgested sewage sludge has been applied. Seed yield, quality and quantity of the seed oil, and possible unusual heavy metal contamination in the oil and meal will be examined.

Canadian interest in producing high-erucic rapeseed for industrial uses has been noted. Polyurethane technology developing in Canada, and based on high-erucic rapeseed oil, could have a marked effect on further demand for this type of oil.

Kenaf. Results of extended application of the NRRC wet-scouring pretreatment continue to show that it affords uniform fibrous substrates from kenaf of diverse history. Mill operators should be able to achieve consistant pulping characteristics and uniform product quality from kenaf raw material, fresh or aged, foliated or defoliated, high or low moisture. Studies of long-term storage are continuing; during the last year additional studies were initiated that should ultimately reveal the relative effects of variables such as moisture content at initial storage, chemical preservatives, coverings, and chopping schedule. Effects of alkali concentration and cooking time at 170°C. have been determined for the two portions of the kenaf stalk, the bark (bast fiber) and the woody core. When the study of temperature effects has been completed, the relative contribution of the two fractions can be assessed and preferred cooking conditions for unfractionated kenaf can be established. The Herty Foundation contract research has resulted in the production of several furnishes containing experimental kenaf bleached soda pulp. Desired properties in an experimental publication-grade paper to be used as an insert in a trade journal seem on the verge of being attained. Dr. W. C. Adamson, Geneticist of the U.S. Plant Introduction Station, Savannah, Georgia, continues to make progress toward development of nematode resistant or tolerant varieties. Dr. J. L. Butler, Agricultural Engineer, Georgia-South Carolina Area, Tifton, Georgia, cooperated in harvesting and storage tests this past season. As additional experience is gained, he will develop preferred harvesting technology.

A program has been initiated to explore potential economic and ecological benefits of growing kenaf on strip-mine spoils treated with municipal sewage sludge. Crops scientists, soil scientists, and agricultural engineers met at NRRC with chemists and engineers and with public and private cooperators to plan for growth tests under controlled conditions. NRRC chemists and chemical engineers will evaluate the chemical and physical consequences of growing the crop under unusual cultural conditions. Because of unfavorable weather in 1974, studies will be extended to 1975.

July 1974

Report of
Germplasm Resources Laboratory
to the
Regional Technical Committees on Plant Germplasm

Our last report referred to certain administrative changes resulting from the ARS reorganization July 1, 1972. It has been difficult to readjust staff functions from a national to regional viewpoint, especially when the program of introduction utilization, and preservation of plant germplasm is inherently national and international in scope. A few changes in operations have occured at the Laboratory headquarters. J. E. Bear, formerly with Peanut Investigations, has been assigned as a full-time Research Assistant to Dr. G. A. White for field and greenhouse activities with new oilseed crops. Dr. A. J. Oakes has assumed leadership for introduction, quarantine propagation, distribution, and preservation of rice germplasm formerly supervised by C. Roy Adair, of the former Cereal Crops Research Branch. Dr. Oakes and H. F. Winters have become more involed in research in lieu of direct liaison with the Regional Plant Introduction Stations that utilized their time prior to reqrganization. The Glenn Dale station has been placed under operational supervision of the National Arboretum in view of major emphasis on ornamentals research. Plant quarantine activities will function as in the past, and also, the research with chemurgic crops.

Fortunately, creation of the ARS Plant Germplasm Coordinating Committee now provides an excellent forum for determining the priority needs in plant exploration, recommending the expansion of facilities at the four Regional Plant Introduction Stations, and bolstering support for preservation of germplasm at the National Seed Storage Laboratory. The first meeting of the Committee was held in Fort Collins late October 1973 and exploration proposals recommended were:

Foreign

FY 1974

1. Annual species of Crambe from Mediterranean area. (White-Lessman, Apr.-June 1974).

FY 1975

1. Primitive cultivars of tomato (Lycopersicon esculentum) and related species from northwestern South America. (Winters-Clark, July-Aug. 1974).

2. Paspalum species (forage types) from southern South America. (Bashaw-Burson, Dec. 1974-Feb. 1975).

3. Kenaf (Hibiscus cannabinus) from East Africa. (Wilson, Apr.-June 1975).

4. Turfgrasses, primarily tall fescue, from southern France, Spain, Portugal, and Morocco. (Powell, May-June 1975).

FY 1976

1. Perennial forage grasses (Agropyron, Elymus, and Hordeum) from southern Russia. (Dewey-Bleak, July-Sept. 1975).

Domestic

1. Study and collection of Avena fatua (wild oats) in the North Central and Northwestern States. (Briggle-Halstead, July-Aug. 1974; May-June 1975).

2. Superior forms of wild juniper from East Central Montana. (Evans-Thornburg, Fall 1974).

3. Wild-growing pecans in the North Central region. (Hibbard, Fall 1974).

A total of 6,873 new crop germplasm accessions were acquired through direct exploration and/or international exchange, including 3,305 small grain cereals, 1,135 forage and range plants, and 1,282 vegetables. 1,300 barley and wheat samples collected from Ethiopia originally in 1971, and 763 range plant samples from Iran and Turkey were significant additions to existing stocks. Public Law 480 Projects in India, Israel, and Yugoslavia contributed 2,362 cereals, vegetables and fruits. Direct field exploration in Portugal, Spain, Tunisia, and Morocco resulted in 431 accessions of Lupinus, Ornithopus and Trifolium. 1,706 shipments covering 10 major crops categories were sent to 115 countries to encorage international exchange and included 105,283 items. An additional 91 shipments covering 4,380 items went to AID technical missions in 28 countries. Phytogeographic studies were implemented on gene centers and world distribution of Crambe, a prospective seed oil crop, as well as similar study of diseases on Crambe.

Five international, three uniform, and two special wheat and oat nurseries (Puerto Rico) were prepared in 1973 and sent to cooperators in 40 countries. Ten reports listing the disease reacation of entries in different countries were prepared and distributed. The seedling reaction of 300 winter, 750 spring, and 2,400 wheat plant introductions was determined in the greenhouse to five cultures of Puccinia graminis tritici. Approximately 12,000 wheats have been tested in the International Rust Nursery since 1950. New wheat selections were added to the "elite bank of rust resistant germplasm"; susceptible entries were eliminated. An "elite bank of rust resistant oat germplasm" was established for general distribution. New wheat accessions totaled 336 entries: 274 were introduced from foreign countries and 62 obtained from domestic sources. Entries in the USDA Wheat Germplasm Collection now total 31,589 accessions. A total of 53,005 wheat samples were distributed: 30,594 samples were sent to 70 researchers in 29 countries, and 22,411 to 73 domestic researchers in 30 states. In order to replenish the seed stocks, 7,520 wheat rows were harvested from the fall sown nursery at the Mesa Experimental Farm, University of Arizona, Mesa, Arizona and 1,782 rows were harvested from the spring sown nursery at the Aberdeen Branch Experiment Station, University of Idaho, Aberdeen, Idaho. The greenhouse at Beltsville was used to increase 998 pods of wheat. New barley accessions totaled 42 entries: 21 were introduced from foreign sources and 21 from domestic sources. Entries in the USDA

Barley Germplasm Collection now total 16,799 accessions. A total of 46,542 barley samples were distributed: 27,150 samples were sent to 61 researchers in 25 countries, and 19,392 to 34 domestic researchers in 17 states. In order to replenish the seed stocks, there were 2,216 barley rows harvested from the fall sown nursery at the Mesa Experimental Farm, University of ARizona, Mesa, Arizona and 3,785 rows harvested from the spring sown nursery at the Aberdeen Branch Experiment Station, University of Idaho, Aberdeen, Idaho. The greenhouse at Beltsville was used to increase 9 pots of barley. New oat accessions totaled 1,091 entries: 1,078 were introduced from foreign countries and 13 from domestic sources. Entries in the USDA Oat Germplasm Collection now total 13,289 accessions. A total of 29,349 oat samples were distributed: 16,489 samples were sent to 20 researchers in 15 countries, and 12,860 to 35 domestic researchers in 21 states. In order to replenish the seed stocks, there were 376 oat rows harvested from the fall sown nursery at the Mesa Experimental Farm, University of ARizona, Mesa, Arizona. The greenhouse at Beltsville was used to increase 153 pots of oats.

A.P.L. 480 Project is operative in Pakistan for improved resistance in grain crops to rusts and smuts. Isolations from trap plots revealed no new biotypes of stem rust in 1973. The disease reaction of wheat varieties and selections to leaf and stem rust, flag smut, loose smut, and partial bunt was determined with virulent cultures. Rice varieties were evaluated for reaction to kernel smut. The reaction of barley selections was determined with virulent cultures of the stem rust pathogen. Sorghum selections were evaluated for reaction to kernel and long smut. Selections, resistant to all diseases, were further evaluated in the field and desirable types were incorporated into local breeding programs.

Screening of vegetable crop germplasm collections was continued in cooperation with personnel of the Vegetable Laboratory. Out of 360 eggplant introductions tested for field resistance to the Colorado potato beetle and eggplant flea beetle, 40 introductions were highly tolerant. New Guinea Impatiens progenies were grown for evaluation. Progenies from crosses between white flowered rosemallow hibiscus selections indicate that flower color is controlled by several pairs of genes. New accessions of horticultural crops were distributed according to priority among the four Regional Projects and three Federal Plant Introduction Stations. Considerable activity resulted from P.L. 480 Projects in Yugoslavia. Since 1968 a survey of wild fruit flora was conducted in Macedonia. Each location was visited several times to record (1) morphological data on the fruit plants at different growth stages, (2) ecological data, and (3) dates of flowering and fruit ripening. Collecting activities included herbarium specimens at flowering, full leaf and fruit maturity. Fruit was collected at maturity for measurement and quality data and for seed. Germination and growth of the seedlings was studied under cultivation. Morphological descriptions are included in the final report for 22 species of tree fruits, including relatives of the cultivated apple, pear, and cherry, and 27 species of small fruits. The latter includes species of Rubus, Ribes, and Vaccinium. This work terminated March 1974.

Research with agronomic crops was expanded during 1973. The Hemarthria altissima collection was characterized and evaluated in field plantings and

chromosome counts made on 20 accessions. Cooperative germination trials with SCS were begun on selected species for highway beautification. The Digitaria collection was screened in greenhouse trials for resistance to Sipha flava. Cooperative winter hardiness trials were established at four selected sites in Southeastern U.S. Over 200 accessions of perennial ryegrass were established in field trials for agronomic characterization and assessment for winter hardiness. Preliminary assessment of the germplasm needs of rice was made and over 500 rice accessions were grown in isolation for seed increase and distribution. The entire Arachis seed collection held at Beltsville by the Oilseed and Industrial Crops Research Branch prior to reorganization, was transferred to SRPIS, Experiment, Georgia.

Research with new chemurgic crops was supervised from Beltsville, but included both local activities and those under contractual agreements elsewhere. A collection of 23 wild Stokesia laevis accessions was made from areas in North Carolina (probably garden escape), Georgia, Florida, Alabama, and Mississippi. These varied greatly in maturity, plant size, seed retention, and leaf shape. Seed yields, from cultivated plantings, which were similar to 1972 (130-1009 kg/ha), must be increased through appropriate cultural practices and selection of superior yielding lines. Twenty-seven single plant selections were made, from field plantings, that included differences in maturity, flower color, leaf shape, and types with ornamental potential, especially for late summer flowering. Ploidy levels of n=15 and 30 in Crambe hispanica and n=30 and 45 in C. kralikii have been determined. The latter should be valuable in interspecific crosses with C. abyssinica (n=45). Yields of dry kenaf stalks harvested at Glenn DAle, Md., prior to killing frost increased from 9,500 to 12,850 kg/ha as populations increased from 80,000 to 200,000 plants per ha. Average stem diameter and height decreased with increasing populations.

At Corvallis, Oregon, continued intensive slections for erect growth habit has resulted in 15 promising lines of Limnanthes. Progeny of these and selections from Maryland are undergoing further evaluation. PI 283703 with significantly better seed retention and erectness than other test entries, shows promise as a possible cultivar release. Mean seed yields increased with increased seeding rates of 3.5 to 22.5 lb/A. Dense populations tended to keep plants erect and hence more amenable to harvesting than thin populations. Residual nitrogen from a 2-year alfalfa crop was adequate to maximize seed yield of Limnanthes. Experimental plots of sweet corn, bush beans, and cucumbers produced harvestable yields with planting after a June harvest. Initial field experiments were started in the fall of 1973 at the University of Maryland. These included yield (involving 14 new accessions), nitrogen fertility, herbicide, and date-of-harvest studies. Mode of pollination in Limnanthes is also being determined. Progeny from over 150 plants selected for erectness in 1973 from a cooperative planting were hill spaced for further selection for erectness and seed retention. Hot, dry weather after planting induced seed dormancy and caused erratic stands in the earliest plantings. Studies at the University of Arizona showed a large number of selections of Lesquerella fendleri from PI 331165 did not require seed treatment with gibberellic acid for good stand establishment. Severe seed shattering from late-season rains occurred. L. gordonii should be planted no later than November 1. New collections of L. fendleri from southern Arizona, east of Sonita, showed excellent uprightness and good plant height.

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