M I N U T E S

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

Mississippi State University
State College, Mississippi

July 16-17, 1968

AGENDA
S-9 TECHNICAL COMMITTEE MEETING
State College, Mississippi
July 16-17, 1968

1. Registration

2. Roll Call

3. Introduction of visitors

4. Welcome

5. Additions to and approval of agenda

6. Appointment of committees
   (a) Nominating
   (b) Time and place of next meeting
   (c) Resolutions

7. Regional Station report

8. State reports

Alabama	North Carolina
Arkansas	Oklahoma
Florida	Puerto Rico
Georgia	South Carolina
Kentucky	Tennessee
Louisiana	Texas
Mississippi	

   Special state reports: Illinois

9. Federal reports
   Soil Conservation Service
   Utilization Research & Development Division
   New Crops Research Branch
   Cooperative States Research Service

10. Administrative Advisor

11. Status of project outline and supporting projects

12. Plans for New Crops research in 1969

13. Requests for new plant explorations

14. Regional publications (five-year cooperative publications)

15. Committee reports

16. Tour of S-9 work at Mississippi State University

Call to Order and Introduction

The meeting of the S-9 Technical Committee was called to order by Dr. G. B. Killinger at 8:30 a.m., July 16, 1968. Dr. Grover Sowell, Jr. was appointed Acting Secretary for the meeting replacing Dr. George Tereshkovich who was unable to attend the meeting. Each person introduced himself. Those in attendance were:

S-9 Committee Members

R. L. Lovvorn	Administrative Advisor North Carolina
W. R. Langford	Regional Coordinator, Georgia
C. S. Hoveland	Alabama
J. L. Bowers	Arkansas
G. B. Killinger	Florida
George Tereshkovich (absent)	Georgia
N. L. Taylor	Kentucky
E. N. O'Rourke (absent)	Louisiana
H. W. Bennett	Mississippi
W. T. Fike	North Carolina
R. M. Oswalt	Oklahoma
J. Velez Fortuno	Puerto Rico
J. A. Martin	South Carolina
W. E. Roever (absent)	Tennessee
E. L. Whiteley	Texas
T. J. Smith (absent)	Virginia
C. I. Harris	Cooperative State Research Service Washington, D. C.
Quentin Jones	New Crops Research Branch, ARS Beltsville, Maryland
I. A. Wolff	Northern Utilization Research and Development Division, ARS Peoria, Illinois
W. C. Young	Soil Conservation Service Fort Worth, Texas

Visitors

G. A. White	New Crops Research Branch, Beltsville, Md.
T. A. Bown	Soil Conservation Service, Jackson, Miss.
Grover Sowell, Jr.	Regional Plant Introduction Station, Experiment, Ga.
P. L. Roth	Southern Illinois University, Carbondale, Ill.
C. Dale Hoover	Mississippi State University
Byron L. Burson	Mississippi State University
Gene L. Bieber	Mississippi State University
Vance H. Watson	Mississippi State University
Jean P. Overcash	Mississippi State University
James R. McCluskey	Mississippi State University

Welcome

President Giles of Mississippi State University welcomed the group and predicted an increasing international exchange of plant material in the future.

Minutes and agenda

Minutes of the 1967 meeting at College Station, Texas were approved and the agenda shown on page 1 was adopted for the 1968 meeting.

Appointment of Committees

The following committees were named by Chairman Killinger:

Nominating Committee

E. L. Whiteley, Chm.
J. A. Martin
W. T. Fike

Resolutions Committee

J. L. Bowers
C. S. Hoveland

Time and Place of Next Meeting

W. C. Young
H. W. Bennett

State and Federal Agency Reports

Committee members and visitors presented reports on New Plants research in the following order. These reports are appended hereto as Appendix B:

Regional Station	W. R. Langford and Grover Sowell, Jr.
Texas	E. L. Whiteley
Puerto Rico	J. Velez Fortuno
Oklahoma	R. M. Oswalt
North Carolina	W. T. Fike
Mississippi	H. W. Bennett
South Carolina	J. A. Martin
Kentucky	N. L. Taylor
Georgia	W. R. Langford
Arkansas	J. L. Bowers
Alabama	C. S. Hoveland
Florida	G. B. Killinger
Dept. of Forestry - Sou. Illinois University	P. L. Roth
Soil Conservation Service	W. C. Young

Committee on Special Resolutions

Chairman Killinger appointed the following Committee to prepare a resolution on the use of P.I. numbers

H. W. Bennett
W. T. Fike

Tour of Field Plots and Facilities

In the afternoon the committee toured the field plots of the departments of agronomy and horticulture. At the conclusion of the field tour the group toured the laboratories and offices of the agronomy department.

Banquet

The group met at 6:30 p.m. for dinner at the Mississippi State University Union. Following the dinner Dr. Ed Martin of the Department of Landscape Architecture spoke to the group and showed his slides of the architecture and gardens of Europe.

Continuation of Reports

Chairman Killinger re-opened the meeting at 8:00 a.m. on July 17, 1968, and the following reports were presented (see Appendix A):

Northern Utilization and Development Division	I. A. Wolff
New Crops Research Branch	Quentin Jones

3) Petroselenic acid - Approximately 12 umbelliferae species that are recommended for testing based on agronomic traits and high content of petroselenic and based on the 1968 SIPE program.

4) Glycolinids

Briza spicata - any lines available

5) Tung-like oil

The chemo-taxonomic-agronomic assessment of species that contain these tung-like oils.

6) Tephrosia vogelii - It is hoped that sufficient seed of this species will be available for agronomic studies.

7) Other lines found during the 1969 season.

c. Descriptions of these lines available for plantings during the two growing seasons along with recommended uniform test procedures will be circulated to all interested S-9 members.

d. Efforts should be made by all cooperators to report their results to Drs. White and Langford prior to December 15 to facilitate preparation of New Crop Summaries and the S-9 Annual Report.

Plant Explorations

Dr. Langford presented a request from Dr. Tereshkovich for support for the domestic peach rootstock collection. This project was approved by the S-9 committee in 1967, but it was not funded by NCRB because of the blueberry exploration now in progress. Dr. Fike reported that all of the funds designated for use in collecting blueberries had not been used. He suggested that the excess might be used on other domestic collections.

Dr. Fike made the following motion seconded by Whiteley: "Any surplus funds from the blueberry collection should be used in the collection of peach rootstocks as approved at the 1967 meeting of the S-9 Technical Committee." The motion passed unanimously.

Other new plant materials requested by research workers in the Southern Region since the last S-9 meeting are listed in Appendix A. Most of these requests resulted from a survey made in planning the peanut exploration concluded in South America during April-June 1968.

Five-year Report

The committee instructed Drs. Langford and Bennett to have the preliminary drafts of the 5-year report completed by November 1, 1968.

Use of P.I. Numbers

The special resolutions committee consisting of Drs. Bennett and Fike read the following resolution: "All lines of small grains, cotton, sugar crops, tobacco, and soybeans introduced into the U.S. are assigned P.I. numbers upon

entry, then are sent to the respective USDA Crop Branches for maintenance and distribution using their individual accessioning systems. It is at this stage that the P.I. number of the line is often lost to the plant breeder.

All lines introduced into this country through the New Crops Research Branch are accessioned by P.I. number and documented in the published Plant Inventories as to date of entry, area of collection, collector and pertinent plant description.

It is therefore recommended by the S-9 Technical Committee that all publications, registrations or release notices of crop varieties newly released in the U.S. with plant introductions in their pedigree should make reference to the P.I. number assigned by the New Crops Research Branch so that this valuable source of information is not lost."

The committee requested that this resolution be forwarded to appropriate persons in USDA and State Experiment Stations by our Administrative Advisor, Dr. R. L. Lovvorn.

Dr. Hoveland moved that the resolution be adopted by the committee. Dr. Whiteley seconded the motion. The motion passed unanimously.

Time of 1969 Meeting

The Puerto Rico Agricultural Experiment Station was selected as the place for the 1969 meeting at the 1967 S-9 Meeting. No date was selected at that time. After a discussion of the matter the committee voted to hold the next meeting in Puerto Rico during July 1969.

Meeting Place 1970

Drs. Bennett and Young recommended that "the 1970 meeting be held at the Plant Materials Center, Americus, Ga." It was moved by Dr. Whiteley and seconded by Dr. Fike that this recommendation be accepted. The motion passed unanimously. In the discussion which followed Chairman Killinger suggested that the committee consider the possibility of meeting one day at the regional station following the meeting at Americus.

Report of Nominating Committee

The nominating committee nominated Dr. John L. Bowers for Secretary and Dr. Carl S. Hoveland for Chairman. It was moved by Dr. Whiteley and seconded by Dr. Fike that "the nominees be elected." The motinn passed unanimously.

Report of Resolutions Committee

The resolutions committee presented the following resolutions:

1. "Be it resolved that S-9 Technical Committee members wish to express their gratitude to our host, Dr. H. W. Bennett and his local staff, for the efficient planning of transportation, meeting facilities and field tour."

2. The S-9 Technical Committee members also wish to express their appreciation to our host and his fellow associates for a well planned banquet and program.

3. The S-9 Technical Committee also wishes to convey to the management of the Alumni House their sincere appreciation for the courtesies extended to our group."

Respectfully submitted,

C. S. Hoveland
J. L. Bowers

Dr. Whiteley moved that the resolutions be adopted and Dr. Velez Fortuno seconded the motion. The motion passed unanimously.

The meeting was adjourned July 17, 1968 at 11:00 a.m.

APPENDIX A

New Plant Materials Requested by Research Workers in the Southern Region

New Plant Materials requested by
Research Workers in the
Southern Region

The New Crops Research Branch announced plans for the following plant exploration of interest to plant scientists in the Southern Region:

Brazil, Uruguay, and Argentina - 2-month exploration by Dr. R. O. Hammons and Dr. W. R. Langford to collect Arachis spp.

Following is a list of plant materials that research workers in the South requested plant explorers to collect on this trip:

Florida

A. E. Kretschmer	Stylosanthes

Louisiana

E. P. Barrios, Jr.	Capsicum annuum and C. frutescens with CMV and TEV resistance
Lynn Hawthorne	Frageria spp. - sizeable fruit
E. N. O'Rourke	Amaryllidaceae or any flowering bulbs

Mississippi

T. A. Bown	Adesmia bicolor, A. herteri, A. latifolia, A. muricata
	Desmodium - all kinds
	Paspalum nicorae - large collection

North Carolina

G. J. Galletta	Frageria spp. - promising or disease resistant - clones or seeds
	Vaccinum spp. - promising or disease resistant - clones or seeds
Karl E. Graetz	Paspalum spp. - good forage production - grow in temperate zone similar to North Carolina
	Viney perennials - grow on poor, dry sites for erosion control on very steep areas
	Wet land perennials - good seeder - wild duck food

North Carolina con't.	
J. M. Jenkins	Gladiolus - corms or seeds
W. B. Nesbitt	Vitis spp. - breeding program
D. H. Timothy	Tripsacum australe
Oklahoma	
R. S. Matlock	Cowpeas, mungbean, urd bean, Adzuki bean, pigeon pea, chick pea, Dolichos
Texas	
A. G. Davis	Adesmia bicolor, A. herteri, A. latifolia, A. muricata
	Calopagonium - with known forage potential
	Centrosema spp.
	Desmanthus spp. - herbaceous types
	Inga - any
	Ixophorus unisetus - perennial, cold hardy, vigorous
	Leucaena - herbaceous forms
	Panicum bulbosum - any
	Stylosanthes - perennials with cold tolerance
	Teramus - forage types
A. L. Harrison	Arachis spp. - leaf rust resistance
Virginia	
John Miller	Trefoils - especially birdsfoot
Soil Conservation Service	
W. C. Young	Andropogon, Dicanthium, etc. - rhizomatous or stoloniferous
	Arachis spp. - cold hardy perennials - bulbous types - adapted to wet sites

Soil Conservation Service con't.

W. C. Young	*Araucaria* spp. - cold tolerant spp. and ecotypes
	Glycine spp. - wild or introduced perennials
	Paspalum minus - large collection - pasture, lawn, turf
	Paspalum plicatulum - large collection

APPENDIX B

State & Federal Reports

Southern Regional Plant
Introduction Station

Alabama
Arkansas
Florida
Georgia
Kentucky
Louisiana
Mississippi
North Carolina
Oklahoma
Puerto Rico
South Carolina
Tennessee
Texas

Soil Conservation Service
Utilization Research &
Development Divisions
New Crops Research Branch

REGIONAL STATION REPORT

S-9 Technical Committee Meeting
1968

Plant Introduction

The Regional Station received seed or vegetative stocks of 887 new accessions from foreign sources last year. Most of the new introductions are assorted grasses and legumes. This is somewhat less than is usually received during a 12-month period, but in addition to the new material two other large collections of seed were received. Several hundred accessions of species that S-9 is responsible for maintaining were transferred from W-6. Much of the material from W-6 consisted of peppers, melons, and vetches that were introduced during the early fifties before each of the regional stations was assigned responsibility for maintaining certain species. Also in the transfer from W-6 was a large collection of cantaloupes introduced even before regional stations were established. Dr. Dietz, Coordinator of W-6, obtained them from the Horticultural Field Station, Cheyenne. Mr. R. B. Thornton, S.C.S. National Plant Materials Center, Beltsville, transferred to S-9 a large collection of grasses. Some of these materials were already on our inventory, but we were glad to receive them to supplement our seedstocks. Most of the cantaloupes from Cheyenne and some of the peppers and vetches have never been on the S-9 inventory.

Dr. Galletta collected additional stocks of Vaccinium spp. in Florida, southern Georgia, and Arkansas. He obtained six spp. from New Jersey and reported that all but 3 spp. native to Arkansas were collected. Most of the material he needs to complete the Vaccinium collection fruits after July 1, and collection trips have been planned or are now in progress to obtain them.

Dr. R. O. Hammons, Coastal Plain Station, Tifton, Georgia, and I recently returned from South America where we collected 690 accessions of peanuts, grasses, legumes, and misc. spp. in Brazil, Uruguay, and Argentina.

Seed Increase and Evaluation

Accessions planted for seed increase this year, including winter legumes planted last fall, are summarized below:

Materials grown for seed increase 1968

Crop	Number of accessions
Grasses	356
Sorghum and millet	276
Summer legumes	438
Winter legumes	691
Solanum	401
Vine crops	101
Brassica	137
Misc. legumes	66
Carry-over of perennial grasses	917
TOTAL	3383

The entire collection of Solanum spp. maintained at the regional station is being grown for seed increase. Small samples of these seed were sent to the National Seed Storage Laboratory early in 1967, but germination tests showed that seed viability was quite low.

Seed Inventory

The seed catalogue issued this year was prepared from IBM cards. It lists only the introductions for which the seed supply is adequate for distribution. It contains 11,774 accessions. The section of the catalogue listing winter legumes and grasses is now being prepared. It will contain about 2000 items making a total of 13,700 introductions available for distribution. In addition to those listed in the catalogue we now have 7000 accessions that need immediate attention. Some of these are new materials, but there are about 3500 introductions that have been catalogued previously. These need to be increased again because the seed supply has diminished to a low level or their viability is low. The ever-increasing "backlog" of old introductions is not a new problem, but it has progressed to the point where additional funds are needed for labor to produce, harvest and process seed. Otherwise, it appears some of this material may be lost.

Distribution of Seed

Following is a summary of plant introductions distributed in the Southern Region from July 1, 1967 to June 30, 1968.

Distribution of seed in the Southern Region

State	S-9	NE-9	NC-7	W-6	Miami	Glenn Dale	Savannah	Chico	Total
Alabama	568	6	549	---	---	---	---	---	1123
Arkansas	147	6	6	48	---	---	---	---	207
Florida	669	20	64	191	838	---	17	---	1799
Georgia	2827	195	337	156	18	---	31	1	3565
Kentucky	8	70	37	96	1	---	---	---	212
Louisiana	35	23	---	1	---	---	---	---	59
Mississippi	40	1	110	---	19	---	1	---	171
North Carolina	27	10	560	3	3	---	14	---	617
Oklahoma	74	1	6	78	1	---	---	---	160
Puerto Rico	148	18	---	---	---	---	---	---	166
South Carolina	524	80	810	23	---	---	12	---	1449
Tennessee	7	---	24	---	---	---	---	---	31
Texas	325	14	94	---	15	---	6	---	454
Virginia	---	8	2	---	---	---	1	---	11
Total	5399	452	2599	596	895	---	82	1	10024

NE-9	258
NC-7	651
W-6	710
Foreign	1956
Total	3575
NSSL	948

Screening for Disease Resistance

Resistance of sorghum to anthracnose: The performatce of the introductions in the 1967 field test was consistent between the two replications. There were 268 introductions which had a disease index of 1 or less on the leaves (as resistant as 'Wiley'). Stalk and head resistance was also excellent for the majority but not all of the introductions with leaf resistance. Six introductions were selected from previous tests and planted in 4 replications. These were again highly resistant to the leaf and stalk phases of the disease. Head resistance was not consistent between replications of all introductions except P.I. 164447. This work is cooperative with Dr. H. B. Harris.

Resistance of squash to watermelon mosaic virus-2: In cooperation with Dr. James Demski the 260 introductions of Cucurbita pepo maintained by the North Central Plant Introduction Station, Ames, Iowa, were screened for resistance. No resistance was found.

Resistance of watermelon to WMV-2: In preliminary screening tests a few of the 65 varieties screened were apparently resistant. Replicated tests are now in progress to confirm this resistance.

Resistance of squash and pumpkin to powdery mildew: All available Cucurbita pepo and Cucurbita moschata introductions were screened for resistance to a local isolate of the powdery mildew fungus. None of the C. pepo introductions was resistant. Four C. moschata introductions were resistant in preliminary screening tests and in replicated greenhouse tests. A field test to confirm this resistance is in progress.

Resistance of lima bean to anthracnose: The collection of Phaseolus lunatus (131 introductions) maintained by the Western Regional Plant Introduction Station, Pullman, Washington, was screened for resistance to Colletotrichum dematium f. truncata (Schw.) v. Arx. An introduction from India was resistant in the preliminary and replicated screening tests. This introduction is being tested in the field this summer.

Resistance of peanut to leafspot: In cooperation with Dr. Donald Smith various factors affecting the severity of leafspot, caused by Cercospora arachadicola were investigated. Adequate inoculum was produced using a modification of the technique used by Abdou (1) of North Carolina. Preliminary tests indicate that a satisfactory technique for screening peanuts for resistance can be developed.

New Equipment and Personnel

New equipment purchased last year: Constant temperature incubator
Row-crop sprayer

The addition of an agricultural research technician to our staff has resulted in a doubling of our productivity in screening for disease resistance. The lack of sufficient laboratory space and especially greenhouse space are now limiting our program.

Literature Cited

1. Abdou, Yousef Abdel-Magid. The source and nature of resistance in Arachis L. species to Mycosphaerella arachidicola Jenk. and Mycosphaerella berkeleyii Jenk. and factors influencing sporulation of these fungi. Thesis. Dept. Plant Pathology, North Carolina State University, Raleigh, N. C.

Publications

Corley, W. L. Selected Evaluations of Ornamental Pepper Plant Introductions and Accessions. Ga. Agr. Exp. Stas. Research Report 3. Sept. 1967

Kuhn, C. W., Grover Sowell, Jr., J. H. Chalkley, and H. F. Stubbs. Screening for Immunity to Peanut Mottle Virus. Pl. Dis. Reptr. 52:467-468. June 1968.

ALABAMA S-9 (NEW CROP) ACTIVITIES

July 1967 - July 1968

C. S. Hoveland, Agronomy and Soils Department

Auburn University

A total of 1002 new plant introductions were received during the past year. Of these introductions, 155 were vegetable crops and 832 forage crops. Most of the forage introductions were received by private breeding stations in the state.

PEANUTS (Report from Dr. A. C. Mixon)

Since 1962, 821 peanut accessions (that fall in the classification of Virginia peanuts) have been tested in replicated yield trials at the Wiregrass Substation in southeastern Alabama. A summary of yield and market grade data for 16 of the most promising introductions tested during 1964-67 are given (Table 1). The 4-year average yield ranged from 103 to 123% of the check varieties. Similar data for 21 of 102 introductions tested for the first time in 1967 are given in Table 2. Quality and additional performance tests will be carried out on those yielding 10% more than the check varieties.

FORAGE CROPS

Dr. E. D. Donnelly reports that Vicia serratifolia P.I. 170017 was crossed with V. sativa (Ala. 1894 and 1906). Selected plants from this interspecific cross have excellent vigor, seed production, and a high percentage of hard seed. P.I. 170017 furnished genes for hard seedcoat and high seed production. He is also studying variability in 10 Lespedeza

cuneata introductions for use in broadening the gene base of new sericea varieties.

Several warm season grass introductions had higher dry matter digestibility than Coastal bermuda or Pensacola bahiagrass (Table 3). Unfortunately, Chloris gayana and Digitaria accessions winter killed at Auburn and Camden. Several Paspalums (310128, 304004, 304003, and 310131) are leafy, vigorous, and have excellent rhizomes. Setaria sphaceolata 307726 made outstanding growth but is only moderately winter hardy.

Trifolium alexandrinum 251213 has much more winter hardiness than present berseem clovers, but forage yields are not outstanding when compared to later maturing clovers. Trifolium vesiculosum 279948 is a fine stemmed leafy plant, but in yield trials at several locations, it has produced little forage until late spring. T. hirtum 287973 is a productive clover and merits further testing. Dolichos bifloris 179688, which looked like a promising annual legume in several years of testing, did poorly this past summer.

A polycross made up of 10 selections from Phalaris tuberosa introductions has performed well in yield trials at several locations. Selections from a large number of Phalaris tuberosa introductions are currently under test. Winter forage production of the better Phalaris selections is much superior to Ky 31 tall fescue.

Yuchi arrowleaf clover (increased from P.I. 233816) is being well received by farmers. A recent county agent survey showed over 10,000 acres planted to this new clover in Alabama. Demand for seed in other states has been strong.

Certified seed supplies should be good this fall, as an excellent seed crop is being harvested in central Alabama.

Goar tall fescue (introduced from Hungary as T.O. 899 and later numbered P-13847), grown in the far West for a number of years, has performed well in Alabama tests since 1960. Certified seed is now being grown in Alabama and pasture acreage is increasing. Winter production of Goar is considerably greater than Ky 31 tall fescue.

CHEMURGIC CROPS

A replicated kenaf variety test is under way at Tallassee in central Alabama. No data are available.

HORTICULTURAL CROPS

No reports could be obtained from any of the cooperators this year.

PUBLICATIONS ISSUED DURING THE YEAR

1. Hoveland, C. S. 1967. Goar tall fescue. Auburn Univ. Agr. Exp. Sta. Leaflet 75.
2. Hoveland, C. S. and E. E. Mikkelsen. 1967. Flooding tolerance of ladino white, intermediate white, persian, and strawberry clovers. Agron. J. 59:307-308.
3. Minton, N. A. and E. D. Donnelly. 1967. Additional Vicia species resistant to root-knot nematodes. Plant Disease Reptr. 51:614-616. (July).

HORTICULTURE SUPPLEMENT (Dr. W. H. Greenleaf)

Valuable foreign tomato accessions that entered the machine harvest tomato breeding program at the Alabama Agricultural Experiment Station, Auburn, Alabama in 1967 were:

1. P.I. 298633, the earliest of all tomatoes in our cultures, ripening June 6, 1967.
2. P.I. 273444, a "Birdsnest" type dwarf tomato with the extremely concentrated set and concentrated maturity which we feel is required in Alabama for successful machine harvesting.
3. Maliutka, a machine harvest type introduction from the U.S.S.R. 280597

These 3 introductions were obtained from Desmond D. Dolan, Primary Plant Introduction Station, Geneva, New York.

Earlier pepper introductions of Capsicum sinense P.I. 152225 and P.I. 159236, both resistant to the tobacco-etch virus were used to breed an etch resistant Tabasco pepper which has reached the release state. The extreme susceptibility to tobacco-etch virus of the original commercial Tabasco variety which is killed by the virus emphasizes the value of these introductions for breeding.

Table 1. Performance of Peanut Introductions

Wiregrass Substation, Headland, Alabama

Tested During 1964-1967

P.I. No.	Yield Lbs/A	Yield As % of Check*	Shelling Pct. %	Seed riding 15/64" screen Prop. %	Seed/ 100g No.	Ext. Damage %
277188	2781	110	74.1	90.9	199	0.6
288171	2744	123	73.6	91.3	176	0.6
288179	2714	109	74.6	89.7	216	0.4
277187	2708	112	74.0	90.0	211	0.6
268993	2686	111	73.1	87.4	210	0.9
269701	2686	106	72.0	91.6	124	1.2
290651	2679	107	74.7	90.4	213	1.1
288185	2633	111	72.6	91.2	187	0.7
290628	2599	108	73.2	88.2	221	0.7
269023	2563	111	74.1	89.3	205	0.7
277186	2527	106	74.2	88.9	209	0.7
290589	2526	112	71.6	92.2	190	0.6
259581	2526	103	70.5	91.4	167	1.3
290650	2505	107	73.6	91.1	195	0.9
SH 16	2461	106	76.8	91.9	205	0.8
290569	2410	107	73.1	90.8	203	0.8

* Yield of P.I. peanuts expressed as % of check varieties 'Early Runner' and 'Florigiant'.

Table 2. Performance of Peanut Introductions

Wiregrass Substation, Headland, Alabama

Tested in 1967

P.I. No.	Yield Lbs/A	Yield As % of Check	Shelling Pct. %	Seed riding 15/64" screen Prop. %	Seed riding 15/64" screen Seed/ 100g No.	Seed riding 15/64" screen Ext. Damage %
295715	3020	106*	75.5	95.1	216	0.5
295728	3020	125*	69.5	92.3	227	0.9
300591	2846	109**	77.5	96.4	163	1.9
298844	2788	107**	72.9	97.0	156	1.3
295721	2759	114*	69.3	91.5	231	0.9
298843	2730	104**	75.0	97.2	139	2.2
298847	2672	115*	73.4	97.5	168	1.2
298869	2643	112*	74.9	95.1	197	1.0
298643	2643	100**	74.7	97.4	144	0.4
295310	2614	118**	76.6	97.1	163	0.4
298832	2614	111*	73.3	96.1	187	0.9
295734	2585	107*	73.5	88.1	239	2.0
298826	2555	116**	74.0	97.6	147	0.9
295178	2526	114**	74.2	97.0	141	0.9
295181	2526	103*	75.9	90.2	217	1.2
298846	2497	106*	77.4	97.4	160	0.7
295719	2410	100*	74.9	93.6	223	0.6
298854	2381	102*	75.0	98.1	133	1.8
295251	2236	104**	72.2	98.9	132	1.1
295756	2178	101**	72.1	96.4	140	2.5
298862	2120	104*	70.7	96.9	157	1.5

* Early Runner check
** Florigiant check

Table 3. In Vivo Dry Matter Digestibility of Forage From Plant Introductions Grown at Auburn, Alabama in 1967

Plant Species	P.I. Number	Percent digestible dry matter in forage* June 12	August 8
Setaria sphaceolata	307726	74	51
Chloris gayana	299547	71	59
Chloris gayana	299554	72	63
Chloris gayana	307624	--	54
Chloris gayana	307630	72	53
Chloris gayana	308596	68	54
Chloris gayana	309962	74	55
Chloris polydactyla	309963	64	--
Chloris polydactyla	309964	61	48
Chloris myriostachya	207979	72	49
Elusine indica	226270	78	56
Digitaria milanjiana	299061	70	--
Digitaria milanjiana	299675	57	63
Digitaria milanjiana	299690	82	--
Digitaria milanjiana	307722	77	59
Digitaria pentzii	299743	84	--
Digitaria setivalva	299795	74	63
Digitaria setivalva	299802	73	59
Digitaria valida	299850	78	69
Paspalum mandiocanum	303996	79	55
Paspalum mandiocanum	303997	79	53
Paspalum mandiocanum	310120	--	58
Paspalum mandiocanum	304001	73	53
Paspalum mandiocanum	304002	--	59
Paspalum mandiocanum	310121	72	55
Paspalum notatum	310180	--	64
Clitoria ternata	311506	--	76
Phaseolus atropurpureum	296959	--	60
Indigofera tetelensis	209193	--	76
Coast Cross-1 bermuda	------	74	--
Coastal bermuda	------	54	--
Pensacola bahia	------	57	--
Coastal bermuda hay (standard)	------	42	45

* Nylon bags of forage were placed in rumen of a steer for 24 hours. Each digestibility value is based on 2 samples of each forage in each of 2 steers.

S-9 Technical Committee Report
Arkansas Agricultural Experiment Station
Fayetteville, Arkansas
Period: July, 1967 to July, 1968

Dr. John Paul Jones, Associate Plant Pathologist, screened some 23 plant accessions of lupine against the organism that causes phytophthora rot of soybeans (Phytophthora megasperma var sojae). Seedlings were inoculated by stem puncture with half-spear needle dipped in the fungus inoculum. The seedlings were then placed into a moist chamber for 24 hours then shifted to a greenhouse for observation and the final rating.

The ratings were made on the following material presented in tabular form.

Lupine Species	P.I. Accession Number	Reaction
L. pachylobus	284-725	S
L. humicolor	232-575	S
L. sericens	232-581	S
L. adsurgens	284-704	S
L. rothmaleri	244-461	R
L. elegans	185-099	R
L. sp.	241-271	S
L. sp.	284-729	S
L. sp.	284-728	S
L. sp.	284-727	S
L. argentens	232-570	S
L. bicolor	232-513	S
L. hirsutissinus	284-719	S
L. polyphyllus	232-580	R
L. mutabilis	206-508	S
L. mutabilis	206-509	S
L. cruckshanskii	255-474	S
L. concinnus	284-716	S
L. luteolus	284-721	S
L. albicaulis	284-706	S
L. albicaulis	284-705	S
L. albifrons	284-707	S
L. albifrons	284-708	S

From this group of 23 plant accessions, only three showed resistance to Phytopthora rot.

Dr. James N. Moore, Associate horticulturist, has evaluated nine different accessions of Vitis vinifera L. and has made these notations about the material.

Plant Accession Number	Remarks
P.I. 231353	Very early ripening, seedless grape. Very small fruit, very tight cluster, susceptible to powdery mildew but very hardy.
P.I. 247551	Very susceptible to black rot and powdery mildew.

P.I. 247567	Extremely susceptible to black rot.
P.I. 247592	Vigorous, healthy plant. Fruit of wine type.
P.I. 255911	Very susceptible to black rot.
P.I. 296419	Very large tight attractive cluster. Plant is hardy and only moderately susceptible to powdery mildew.
P.I. 233790	Plants all killed to ground during winter - not hardy.
P.I. 247590	Healthy vine, clusters and fruit small. Berries are black. Wine quality only.
P.I. 296421	Plants killed to ground during winter - not hardy.

The two species of the genus Rubus that Dr. Moore planted (P.I. 307353, R. elipticus and P.I. 298628, R. rigidus) failed to survive the winter of 1967-68.

Dr. Joe McFerran, horticulturist and leader of the tomato breeding program in Arkansas, is using P.I. 273011 in his program. This accession was selected because of its high soluble solids content and it is being used in several crosses with several of the canning type lines.

Thirty-eight accessions of Vigna sinensis were planted in the spring of 1967 at Fayetteville. The southern pea mosaic symptoms were not present in this planting and consequently no ratings were made on the virus infection but the following general notes were recorded.

P.I. Accession Number	Remarks
P.I. 255811	Trailing type, highly pigmented pods. Pods touch soil.
P.I. 147562	Trailing type; most pods do not touch soil, slightly later than 255811.
P.I. 293490	Much more erect than 255811.
P.I. 293466	Extremely vigorous and erect but twining of central axis and long basal branches.
P.I. 293457	Trailing type.
P.I. 293453	Some tendency of trailing; long basal runners and elongation of central axis.
P.I. 293489	Tends to be semi-erect, long basal branches.
P.I. 293487	Semi-erect, long basal branches.
P.I. 293488	Long basal branches.
P.I. 154134	Long basal branches.
P.I. 205139	Long basal branches.
P.I. 167024	Long basal branches.
P.I. 255788	Trailing type.
P.I. 162924	Trailing type.
P.I. 193506	Trailing type.
FC-31739 (307559)	Trailing type.
FC-31738 (307558)	Extremely long basal branches, large pod, good quality in shelled pea.
P.I. 297562	Trailing type.
P.I. 293567	Semi-erect but long basal branches.
P.I. 293542	Extremely viney type, long basal runners.
P.I. 293522	Semi-erect, long basal runners.
P.I. 293514	Long basal branches, very fruitful.

P.I. 293507	Semi-erect, long basal branches.
P.I. 297561	Procumbent growth, long basal branches.
P.I. 293584	Semi-erect, long basal runners.
P.I. 293582	Semi-erect, long basal runners.
P.I. 293581	Semi-erect, long basal runners.
P.I. 293568	Very long basal branches.
P.I. 293491	Extremely long basal branches.
P.I. 293472	Seed in pod are extremely crowded.
P.I. 293473	Erect plant form, but long basal branches.
P.I. 293468	Extremely vigorous and productive, long basal branches.
P.I. 293467	No emergence.
P.I. 194203	Trailing type.
P.I. 186465	Trailing type.
P.I. 186458	Trailing type.
P.I. 177101	Semi-erect, but plants tend to lodge.
P.I. 175962	Semi-erect but long basal branches.

A selection out of the P.I. accession 221731 of Vigna sinensis L. was crossed with two bush station selections in 1962 and one progeny from the cross has been increased because it possesses these desirable characters for mechanized harvest: concentration of pod set and good bush plant form. Progenies from this cross have not exhibited the typical virus symptoms in the foliage. There has been one very pronounced weakness in the selections from these crosses and this is split seed coat. However, several selections of types free from split seed coats indicates that some progress has been made in the development of a true breeding line which will be free of this defect.

A cucumber accession (P.I. 330628) has been obtained through the efforts of Dr. M. J. Goode, plant pathologist. Dr. Beta Dutta, Indian botanist, informed us about the cucumber that grows on a bush very similar to a pepper plant. This introduction is being grown in the field this year.

Dr. J. L. Dale, plant pathologist, has checked plant accessions: P.I. 202410, P.I. 208702, and P.I. 240966 of Sorghum alum for susceptibility to strain H of sugar cane mosaic virus in the greenhouse and found each accession to be susceptible. Due to poor growing conditions, it was not possible to make a good quantitative determination of infection.

FLORIDA REPORT S-9 'NEW PLANTS'

JULY 16-17, 1968

MISSISSIPPI STATE UNIVERSITY

G. B. KILLINGER

Florida researchers and others received a wide variety of seeds and plant material during the past year for testing and evaluation.

From recent introductions, Mr. Noel Lake, Superintendent of Grounds at the University of Florida, reports P.I.307371 Tritonia sp. as having beautiful cup-shaped yellow flowers 20" high over 18" foliage. 307307 Polygonum capitatum a promising ground cover, 275800 and 276085 Ilex sugerokii two of the most promising Ilex introductions, and P.I.265262 Ligustrum ovalifolium 'Argenteum' as a promising addition to a host of new varigated ligustrum. Mr. Lake notes P.I.237916 Cleyera japonica as a plant similar or the same as Eurya ochnacea and has thirty rooted cuttings.

E. C. Roberts and T. J. Sheehan report the Ornamental Horticulture Department at Gainesville have thirteen ornamental P.I.s being evaluated for adaptation.

From P.I.300954 (cantaloupe) a single plant segregate was selected for resistance to powdery mildew and good fruit characters as noted by L. H. Halsey of the Vegetable Crops Department at Gainesville. A cross with a short internode type gave an intermediate plant size type with promise for high plant population use.

A.A. Cook of the Plant Pathology Department, reports the screening of a considerable number of P.I.s for cucumber mosaic virus resistance with no promising introductions.

From the Central Florida Experiment Station at Sanford, Philip J. Westgate notes a Naranjilla (Solanum quitoense, Lum) introduced from Panama, produces a delicious fruit. A yam bean or jicama (Pachyrhizus tuberosus, Spreng.) introduced from Mexico, produced flowers, viable seed, and edible roots. The crisp, white fleshy root is being used as a substitute for water chestnuts in Chinese food receipes. Both of these introductions came from private sources and have no P.I. numbers.

James M. Crall at the Watermelon and Grape Investigations Laboratory, Leesburg, reports that the search continues for cytoplasmic male sterility in the genus Citrullus, and for watermelon mosaic virus resistance.

R. A. Conover and S. E. Malo note the receipt of avocado budwood material which has not been evaluated.

From the Department of Fruit Crops at Gainesville, W. B. Sherman notes the receipt of six plum P.I.s which have been established on peach rootstock but as yet have not fruited. Several blackberry P.I.s are also being evaluated.

A. J. Norden, Agronomy Department, Gainesville notes that one hundred and sixty-six P.I.s of Arachis hypogaea were received in 1967, with selections made from twenty-eight of the introductions and the entire plot harvested from five of the accessions.

J. E. McCaleb and E. M. Hodges, Range Cattle Station, Ona, report the following under grazing trial: Digitaria decumbens P.I. 111110, Digitaria sp. P.I.300935, Cynodon plectostachyus P.I.224152, and Paraguay 22 bahiagrass P.I.158822. This indicates these grasses were superior in clipping trials and will now be evaluated by using cattle. Clipping trials are being continued with Digitaria decumbens P.I.111110, D. sp.300935, D. pentzii 299602, 299828, 299753, D. decembens 299601, D. gayensis 299637, D. valida 299810, Hemarthria altissima 299993, 299994 and Bracharia humidicola 257678. The Hemarthria plantings will be expanded in 1968.

From the West Florida Experiment Station at Jay, L. S. Dunavin has eight Digitaria remaining out of thirty-eight originally under test, - these include: D. smutsii 299828, D. valida 299863, D. pentzii 299743, D. milanjiana 299731, D. decumbens 299837, D. diversinervis 299610, D. longiflora 299643, and D. milanjiana 299655. Thirteen accessions of Dactylis glomerata, seven of Festuca arundinacea, four of F. elatior, two F. ampla, two Phalaris arundinacea, and two phalaris tuberosa along with a few other genera and species are presently on trial. Fifty-two Trifolium species are being tested. Trifolium rueppellianum P.I.234411 has exhibited outstanding reseeding qualities while growing in a common bermuda sod.

Over 100 out-of-state visitors representing 39 companies attended the Kenaf Conference held at Gainesville on October 31 and November 1, 1967. The only recently introduced accession in the kenaf plantings was P.I.305080 from Russia. This introduction started to flower at six weeks and was dead at 12 weeks having reached a height of eight to ten feet. Seventeen sunflower varieties were evaluated including the high oil Russian varieties, Peredovik and VNIIMK. Yields were generally 1500 to 2000 pounds of seed per acre. Pigeon pea (Cajanus cajan) 'Norman' variety, received from Bill Fike, was increased and 1500 pounds of clean seed were combined from an area of approximately 1½ acres. It was estimated that another 1500 pounds of seed passed through the combine on to the ground. These peas were planted May 31, started blooming on August 25 and were seven feet in height at combine time, or early December after several frosts. Several Pasapalum notatum introductions from Brazil appeared outstanding on a one year basis and are being increased. P.I.310149 was a vigorous broadleaf type plant, growing to a height of 18 inches with a 24 inch spread in a single season, and produced excellent, viable seed, easy to germinate. South American marigolds, Tegates minuta, make excellent growth and seed profusely in the Gainesville area. Data are not available on the effect or control of nematodes where this marigold grows. The marigold reaches a height of 8 to 10 feet and produces 12,000 to 16,000 pounds of oven dry plant material per acre, excluding the roots. Coastcross-1 bermudagrass, a hybrid between Coastal bermudagrass and P.I.255445 bermuda from Kenya, Africa, shows some promise on the more moist to wet soils.

Two popular publications on forage crops were released during the past year. Pangolagrass, Bulletin 718, Florida Agricultural Experiment Station, and Circular S-184 Stylosanthes Humilis, Florida Agricultural Experiment Station.

GEORGIA S-9 ACTIVITIES (NEW CROPS)

July 1967 - June 1968

George Tereshkovich
Department of Horticulture
Georgia Experiment Station
Experiment, Georgia 30212

State and Federal scientists, and private individuals in Georgia received a total of 3610 introductions during the past year. The requests included grasses, legumes, fruits, vegetables, and ornamentals. Research with new crops and plants is being conducted at the Georgia Experiment Station by three contributing projects: Hatch 172 (S-9), Hatch 173 (S-9) and Hatch 174 (S-9).

Hatch-172 (S-9)

Agronomic Evaluation of New Plants for the Production of Oils, Gums, Drugs, and Insecticides

Project Leader: John H. Massey
Plant Introduction Department
Georgia Experiment Station
Experiment, Georgia 30212

The following plant species were grown in nursery rows for preliminary evaluation or tested in a replicated experiment. This report is a summary of the results.

Briza spp.

Fall plantings of B. spicata P.I. 279704, and B. subaristata P.I. 312336, did not make promising seed yields.

Crambe abyssinica

Eleven introductions of Crambe abyssinica were planted in early spring, but poor stands were obtained. All P.I.'s appeared to be very similar, and a good seed set indicated a good seed yield.

Euphorbia spp.

Euphorbia lagascae, P.I. 296064, was planted in the fall, and a good stand was obtained. The plants survived low temperature of 9° F. The first flowers appeared about mid-March. When seed began to ripen, and at 2-week intervals thereafter, plants were cut from equal-area plots and allowed to dry. After threshing, the average seed yield per plot was determined. The following table gives potential seed yield, weight, and present germination.

Harvest date	Yield lbs./A.*	Seed wt. gm./1000	Germination %
April 29	720	9.23	31
May 13	848	9.17	29
June 9	640	8.25	26
July 2	304	9.52	69

* Based on 18-inch rows

In a similar planting of E. lathyrus, P.I. 296042, only a few of the plants bore seed and no harvest was made.

Helianthus annuus

A nitrogen x spacing test was planted with 'Russian Mammoth' sunflower. Nitrogen was applied at a rate of 0, 50, 100, and 150 pounds per acre and the plants were spaced 6, 12, and 18 inches apart within 42-inch rows.

1. The highest seed yields, 2,365 pounds per acre, were obtained with 150 pounds of N per acre. The lowest yields, 1,402 pounds per acre, were grown in no-nitrogen check plots.

2. The tallest plants, 99 inches, were grown with intermediate N rates.

3. Stem diameters and number of leaves per plant were not affected by nitrogen level.

4. Seed yields and plant heights were not affected by within-row spacing.

5. Each 6-inch increase in within-row spacing increased stem diameter and number of leaves per plant significantly over that of the next lower spacing.

Lesquerella spp.

Forty accessions, including ten species of Lesquerella spp. were planted in the field in mid-October. Observations in the spring revealed that no plants lived due to either lack of germination and/or winter killing.

Vernonia anthelmintica

Plantings of six Vernonia anthelmintica P.I.'s were made at 1-month intervals beginning April 1. The objective was to make a preliminary study of the relative flowering time and seed production of the P.I.'s as affected by planting date. On the days the first florets opened, heads were tagged on selected plants of each P.I.

During July an unidentified virus-like disease attacked the plants, and most of them were diseased by the end of the growing season. The tagged plants in the April and May plantings survived the flowering season, but plants in the June and July plantings were infected with the disease at early bloom stage or before.

As an average of the six P.I.'s, the number of flower heads per plant was 261 for the April and the May plantings. The total number of heads per plant, as an average of April and May plantings, was highest for P.I. 283729 and lowest for P.I. 225351, or 352 and 126 heads per plant, respectively. In general, the P.I.'s maintained the same ranking order for number of heads for both April and May plantings. In each planting the first flowers opened one month after planting, with peak blooming six weeks later. No seed were harvested from any planting.

Work in Progress 1968-69

1. Continuation of sunflower experiment on the effects of nitrogen level and within-row spacing on seed yield and plant characteristics.

2. A planting of selected accessions of Anethum graveolens, Brassica spp., and Crambe abyssinica.

3. An evaluation of new plant introductions that may yield valuable oils, gums, drugs, or insecticides, for industrial or urban-rural uses.

4. A performance trial of Vernonia anthelmintica breeding lines.

Publications

Massey, J. H. 1968. Response of Vernonia anthelmintica (L.) Willd. to Spacing Arrangement. Agron. J. (accepted for publication in July).

S-9 Committee Report 1968
H-173. Evaluation of New Crops for Pulp, Fiber and Forage.
D.G. Cummins
Georgia Experiment Station
Experiment, Georgia

1. Evaluation of kenaf (Hisbiscus cannibinus) for pulp.

A. Varieties.

Grown on Cecil sandy loam. Fertilized with 600 pounds 6-12-12 per acre. In 1964 plots were 6 rows, 20 feet long with 7 inches apart in the rows. Plants were spaced about 6 inches apart in the rows. In 1967, plots were 4 rows, 16 feet long, spaced 38 inches apart. Plants were spaced 3 inches apart in the rows. Weeds were controlled by conventional cultivation.

Table 1. Dry matter Yields of various kenaf varieties at Experiment, Georgia 1964, 1967.

Variety	Yield, Tons DM/A 1964	1967
BG-52-52	4.6	-
Cubano	4.3	-
Everglades 41	3.8	8.1
Everglades 71	3.6	8.2
BG 52-75	3.4	-
BG 58-10	3.2	-
C-108	-	8.1
G-45	-	6.8
C-2032	-	5.2
G-4	-	5.1
Average	3.8	6.9
LSD (5%)	0.9	1.2
CV	17.1	11.2

B. Planting date.

Everglades 71 kenaf was planted on May 2, May 19, June 8, and June 28, 1967. The test was on a Cecil sandy clay loam fertilized with 600 pounds per acre 10-10-10 broadcast before planting and an additional 100 pounds of N were applied when the plants were about 2 feet tall. Plots were 4, 38 inch wide rows, 16 feet long. Weeds were controlled by machine and hand cultivation. The test was harvested November 24.

Table 2. Planting date on the dry matter production of kenaf. Experiment, Ga. 1967.

Planting Date	Dry Matter Yields, Tons/ A
May 2	7.5
May 19	6.6
June 8	4.8
June 26	2.3
Avg.	5.3
LSD (5%) = 1.2	CV = 14.0

C. Plant Population and row spacing.

Kenaf (Everglades 71) was grown at 2 and 4 plants per foot of row in rows spaced 12, 18, and 36 inches apart in 1966 and 1967. The tests were located on a Cecil sandy loam. Six hundred pounds per acre of fertilizer (6-12-12 in 1966, 10-10-10 in 1967, N,P_2O_5,K_2O) were applied broadcast before planting. When the plants were about 3 feet tall, 100 pounds per acre of N was applied as sidedressing. The tests were planted June 23, 1966, and June 7, 1967; harvested January 6, 1967, and November 24, 1967, respectively. Weeds were controlled by hand cultivation.

Table 3. Influence of plant population and row spacing on kenaf production. Experiment, Georgia. 1966-1967.

Plants/ft of row	DM Yields, tons/A, 1966 Row Spacing, Inches 12	24	36	Avg.
2	8.0	7.9	5.6	7.2
4	7.5	6.2	5.5	6.4
Avg.	7.8	7.1	5.6	

LSD (5%) Row Spacing = 0.8, population = NS
CV = 5.2

Plants/ft of row	DM Yields, tons/A, 1967 Row Spacing, Inches 12	24	36	Avg.
2	8.0	12.3	7.7	9.3
4	7.7	8.5	7.3	7.8
Avg.	7.9	10.4	7.5	

LSD (5%) Row Spacing = 3.4, Population = NS
CV = 20.7

Plants/ft of row	DM Yields, tons/A, 1966-67 Average Row Spacing, Inches 12	24	36	Avg.
2	8.0	10.1	6.6	8.2
4	7.6	7.4	6.4	7.1
Avg.	7.8	8.8	6.5	

LSD (5%) Row Spacing = 1.6, Population = NS
CV = 11.3

D. Lime, N.P. and K.

This test was located on a Cecil sandy loam with an initial pH of 5.6, P 15 pounds per acre (low), and K 140 pounds per acre (medium). A split plot experiment with 4 replications was used. The main plots were 0 and 1,000 pounds per acre of dolomitic limestone. The sub plots had the following N-P-K variables: 1.0-0-0, 2.50-50-100, 3.100-50-100, 4.200-0-100, 5.200-25-100, 6.200-50-50, 7.200-50-50, and 8.200-50-100. The lime was broadcast and disked in previous to planting in 1966. Fertilizer treatments were broadcast and disked in previous to planting in 1966 and 1967. The tests were planted June 21, 1966, and May 26, 1967; and harvested January 6, 1967, and November 24, 1967, respectively.

Table 4. Influence of lime, N,P, and K on Yield of kenaf, Experiment, Georgia, 1966-67.

	Fertilizer treatment								
	1	2	3	4	5	6	7	8	Average
Lime 1966	10.4	10.9	12.3	9.2	11.6	11.1	11.4	11.4	11.0
1967	5.7	6.3	6.6	4.5	6.7	5.5	6.0	4.6	
Average	8.1	8.6	9.5	6.9	9.2	8.3	8.7	8.0	
No lime 1966	11.3	11.1	11.2	11.1	10.9	10.7	11.4	11.3	11.1
1967	5.9	6.1	6.6	7.2	5.8	6.6	7.7	7.2	
Average	8.6	8.6	8.9	9.2	8.4	8.7	9.6	9.3	
Overall Average	8.4	8.6	9.2	8.1	8.8	8.5	9.2	8.7	

1966-67 LSD = NS Lime and N,P,K.

II. Trefoil selection.

Work was continued in 1967 in the selection of a trefoil (Lotus corniculatus) variety that would be adapted to Georgia. The original material came from F_2 seed from crosses made by Dr. Paul Henson, USDA, utilizing a Brazilian introduction and some U.S. varieties and lines. These F_2 seed were planted and seed collected from the better plants in 1966. In 1967 these seed were space planted. Plans are in 1968 to select the better plants and put them in a crossing block. At the present time there are some vigorous plants of both prostrate and upright growth habits that appear to be relatively disease free and well adapted to our climate.

III. Sunflower evaluation.

Some limited work is being done on sunflower for oil. This is coordinated with Dr. John Massey's work and is largely directed by Dr. Robert E. Burns. Mainly our concern is with the influence of origin and management practices on oil content and quality.

Over 250 introductions were grown in 1967. Total oil was determined and 34 varieties selected that were near or over 40% oil. These will be further evaluated for adaptability, oil content, oil quality and total production.

Publications:

1. Cummins, D.G., J.E. Marion, J.P. Craigmiles, and R.E. Burns. 1967. Oil content, fatty acid composition, and other agronomic characteristics of sunflower introductions. J. Amer. Oil Chem. Soc. 44 (10): 581-582.

2. Burns, R.E. and D.G. Cummins. 1967. Stem characteristics of kenaf as affected by cultural practices. Bull. Ga. Acad. Sci. XXV:62.

3. Cummins, D.G. 1967. Panel discussion, kenaf cultual practices. Kenaf conference. Tech. Assoc. Pulp and Paper Ind. Gainesville, Fla. Oct. 31- Nov. 1.

4. Cummins, D.G. 1967. Panel discussion, harvesting, handling, and storage of kenaf. Kenaf Conference, Tech. Assoc. Pulp and Paper Ind. Gainesville, Fla. Oct. 31- Nov. 1.

5. Jellum, M.D., R.E. Burns, and D.G. Cummins, 1968. Seed oil composition of high amylose corn, lupines, and sunflowers, Ga. Sect. Amer. Soc. agron., Ga. Agron. Abst. 11:16.

Hatch-174 (S-9)

EVALUATION OF NEW ORNAMENTAL PLANTS

Project Leader: George Tereshkovich
Department of Horticulture and Forestry
University of Georgia College of Agriculture
Georgia Station, Experiment, Georgia

Since the last annual report, several rooted plants, vegetative cuttings, seed, and rhizomes were obtained from the U.S. National Arboretum, Washington, D.C., SCS-Plant Materials Center, Coffeeville, Mississippi, and the U.S. Plant Introduction Stations at Glenn Dale, Maryland, and Savannah, Georgia.

The materials obtained are as follows: Pyracantha 'Shawnee' (P.I. 315887); Quercus myrsinaefolia (P.I. 74222); Lagerstroemia indica, (crape-myrtle) 'Catawba' (P.I. 316671), 'Conestoga' (P.I. 316672), 'Potomac' (P.I. 316673), and 'Powhatan' (P.I. 316674); Viburnum cultivars: Viburnum lantana L. 'Mohican' (P.I. 316679), Viburnum X 'Oneida' (P.I. 316676), and Viburnum Sargentii Koehue 'Susquehanna' (P.I. 316681); Pistachia chinensis (P.I. 21970); Malus hupehensis (P.I. 122586), and Ornamental bamboo, (P.I.'s 195284, 77257, 77258, 77259, and 40842. In addition, 38 various N.A. and P.I. selections representing several different species were obtained for cultural and climatic adaptation studies.

To date, only a few P.I. and N.A. plant introductions are worthy of usage by the rural-urban homeowner and nurseryman. These selections are reported on in the 1967 Ga. S-9 Report.

The performance of new selections will be evaluated, and continued observation of previously obtained plant material also will be made.

Several research papers on the ornamental material evaluated at this Station and the Georgia Mountain Experiment Station are being prepared for distribution during 1968-69.

KENTUCKY REPORT TO TECHNICAL COMMITTEE S-9 "New Plants"

State College, Mississippi

July 16, 17, 1968

Norman L. Taylor

Since January 1, 1968, workers in Kentucky have received 51 accessions. These may be broken down as follows:

Vegetables:

Cucumis melo, 6 accessions

Zea mays, 34 accessions

Lycopersicon, 2 accessions

Ornamentals:

4 species, 7 accessions

Grasses:

Festuca, 1 accession

Legumes:

2 *Trifolium* sp., 2 accessions

These accessions have been on hand such a short time, no report of performance was possible.

Since January 1, a considerable file of new introductions, seed available and other material relating to "New Plants" was maintained and distributed to interested personnel in the Departments of Horticulture and Agronomy. The above two activities comprise the objectives of the Kentucky project which is operated as a supporting project to Regional Project S-9 "New Plants."

Research on the development of a chemotaxonomic classification of the genus *Trifolium* has continued. Later phases have centered on the use of phenolic glycosides and aglycones. This technique has been perfected so that the classification is well underway. The collection of species now numbers about 150 most of which have come to Kentucky through the Plant Introduction program.

No papers reporting use of P.I. Materials were published in late 1967 or early 1968.

ANNUAL REPORT TO S-9 TECHNICAL COMMITTEE

"NEW PLANTS"

Louisiana. July, 1968

Vegetable Crops.

James F. Fontenot. Phaseolus vulgaris selections following were obtained for trials: 199041, 226875, 262163, 264241, 278672, 309707. Nematode resistance is the chief criterion in evaluating these.

Hibiscus esculentus. The following selections were obtained:

138508	India	183012	India
164694	India	204670	Turkey
164800	India	206936	Turkey
164925	Turkey	217930	Pakistan
169695	Turkey	222027	Iran
169699	Turkey	222697	Iran
169701	Turkey	249007	Nigeria
171660	Turkey	249620	India
175567	Turkey	274340	China
176852	Turkey	274342	India
177238	Turkey	274344	India
180406	India	280063	Ghana
181853	Syria		

Earl P. Barrios. 344 of Capsicum annuum and 43 C. frutescens selections were obtained for screening in a program seeking resistance to viruses, both TEV and CMV. These are presently being screened. Pungency ratings and determinations have been obtained for several of these and a hybrid. This work is preliminary to large scale screening, contingent upon obtaining a student to work on the project. Results of this work are included below:

	P.I. 152225 (Capsicum chinense)	P.I. 159278 (Capsicum annuum)	P.I. 159278 x C. frutescens	C.frutescens x P.I. 152225
Percent Oleoresin	8.58	5.67	-	-
Percent Capsaicin, in Oleoresin	2.32	4.92	5.09	4.90
Percent Dry Matter	27.3	19.8	-	-
Percent Capsaicin, Dry Weight	.198	.279	.374	.867
Percent Capsaicin, Fresh Weight	.054	.056	-	-
Pungency Classification	Mildly pungent	Pungent	Pungent	Extremely pungent

Ornamental Crops.

R. J. Stadtherr. A wide range of ornamental plants were obtained from Glenn Dale this spring for planting into trial garden locations. These included:

P. I. Number	Name
316959	Actinidia polygama
270534	Agapanthus sp.
317356	Alnus mayrii
357	Amelanchier asiatica
316961	Betula ermanii
317209	" "
210	" "
211	" platyphylla var. japonica
318520	Campanula takesimana
521	Carex fusanensis
261066	Chrysanthemum arcticum
318524	" sibiricum
525	" Zawadskii
316616	Cornus controversa
317223	" kousa
313962	Cotoneaster lucida
964	" racemiflora
317364	Disporum sessile
365	Firmiana simplex
316967	Forsythia ovata
285357	Gaultheria fragrantissima
318540	Hedera rhombea
316702	Hemerocallis coreana
617	" sp.
307270	Hypericum hookerianum
271	" "
272	" "
316053	Iris ensata var. spontanea
648	" rossii
265262	Ligustrum ovalifolium 'Argenteum'
316409	Lonicera insularis
314263	Lonicera sp.
316650	Malus baccata
316711	" sieboldii
307303	Pentapterygium serpens
316977	Pinus koraiensis
317256	" "
257	" parviflora
259	Pittosporum tobira
314474	Potentilla recta
289939	Prunus cerasoides
307323	" "

P. I. Number	Name
317371	Pyrus calleryana var. fauriei
227998	Rapanea neriifolia 'Taimintachibana'
316528	Rosa x fortuneana
317381	" maximowicziana
265572	" sp.
314317	" "
317276	Rosa wichuraiana
316631	Sambucus williamsii
712	Schisandra chinensis
988	Styrax japonica
317293	Syringa velutina
297426	Ulmus pumila var. arborea
296028	Viburnum dilatatum

1967 - 1968 Report

Regional Project S-9 New Plants

Contributing Project 470

Mississippi

Workers with the Agricultural Experiment Station, U. S. Department of Agriculture, and private individuals obtained 117 plant accessions during the year. The majority of these were obtained by the Plant Materials Center of the Soil Conservation Service. Four hundred nineteen (419) Paspalum introductions are being studied for adaptability, seed fertility, and cytogenetic behavior. Special attention is being given to chromosome pairing relationships and embryo sac development. The cytology and mode of reproduction of the 201 intra- and interspecific hybrids made from some of these species is being determined.

Domestic fruit plant explorations have been made throughout a number of counties in south Mississippi. In addition to sending budwood to the Horticulture Department of the Louisiana State University, some were propagated and placed in experimental orchards at State College. The Mississippi numbers assigned to these fruits and the numbers of trees now being grown are as follows:

Apples - 2(2), 4(3), 7(3), 9(3), 12(2), 13(1), 14(2), 18(3), 19(3), 22(2), 23(2), 24(1), 25(4), 26(4), 27(3), 29(3), 30(3), 31(3), 32(3), 35(4),.36(3), 39(1), 42(3), 43(2), 47(1), 48(4).

Crabapples - 1(2), 2(2).

Pears - 3(1), 5(2), 6(3), 7(1), 9(1), 10(4), 14(3), 19(3), 24(3), 25(3).

Plums - 1(2), 2(5), 9(2), 10(3), 12(1), 15(1), 16(2), 22(3), 23(3), 24(2), 30(1), 31(2), 32(3), 37(3).

Brandes, a new sweet sorghum variety with superior lodging resistance was released during the year.

North Carolina - New Plants Project

Report to S-9 Technical Committee, State College, Mississippi, July 16-17, 1968.

Five cooperators received 626 plant introductions from July 1, 1967 to July 1, 1968. These introductions, along with others received in prior years are being evaluated. Many recent introductions have been incorporated into the many breeding programs and are now in various stages of advanced testing.

I. Varieties or Strains Released by the North Carolina Experiment Station.

NORMAN PIGEON PEA

Norman is a seed increase of a USDA seed introduction PI 218066, collected in 1954 at Bannu, Pakistan. The evaluation of this introduction was done in North Carolina by W. T. Fike of the North Carolina Agricultural Experiment Station. Additional seed supplies were produced by G. B. Killinger of the Florida Experiment Station. Norman has also shown promise in Georgia, Oklahoma, South Carolina and Texas in cooperation with Regional Project S-9, "New Crops."

The pigeon pea, Cajanus cajan, is a perennial legume cultivated in tropical countries for the edible small seeds which often are known simply as "peas". The variety, Norman, is suggested as a replacement green manure crop for the banned Crotalarias and is grown as an annual from seeds, reaches a height of from five to seven feet, flowers in late August, and if planted early produces a fair seed crop in slender pods which are from 3/4 to 1 1/2 inches long. The seed are larger than common vetch and smaller than soybean seed. The preliminary evaluation of pigeon pea was done at the Sandhills Research Station, located near Norman, North Carolina.

The following data provide a comparison of the Norman pigeon pea with other green manure crops grown at Lewiston, North Carolina, 1964-67.

Topgrowth yield of various green manure crops grown at Lewiston, North Carolina, 1964-67.

Crop	Dry matter yield				
	1964	1965	1966	1967	Average
	tons per acre				
Norman pigeon pea	4.05	3.91	2.76	3.20	3.48
Crotalaria striata	2.03	4.03	2.54	2.41	2.75
Hairy indigo	2.26	3.02	2.40	2.12	2.45

Norman is resistant to the two main North Carolina root knot nematodes, Meloidogyne: Southern, M. incognita and Northern, M. hapla. It also shows some resistance to two other root knot nematodes M. javanica and M. arenaria. It is, however, susceptable to the lesion nematode, Pratylenchus.

The Norman pigeon pea shows more promise in North Carolina as a green manure crop than other crop species because the plants emerge quicker and grow faster, are more resistant to nematodes and the seed are nontoxic.

A dependable supply of seed cannot be produced in North Carolina due to early frosts. Seed can, however, be produced in Florida and seed of Norman is presently being increased for sale to farmers in 1969.

II. Domestic Plant Exploration.

The domestic collection of Eastern Vaccinium species for use in the Southeast, funded by S-9, is continuing. A summary of nine trips made by Dr. Galletta and cooperators during the two year period ending June 30, 1968 appears on pages 6-8.

These trips have provided many accessions that will enhance the Vaccinium breeding programs in the Southeast. In addition, cytological research in the separation of the various species is being conducted by Dr. Mueller in conjunction with the program.

III. Foreign Plant Explorations.

Dr. Phillips collected accessions of wild cottons in Mexico during October 1967.

Dr. Timothy collected accessions of Tripsacum and Euchlaena in Venezuela and Colombia during January of 1968.

IV. Requests for Plant Materials to be Collected on the Collecting Trip to South America.

Dr. Timothy requested seed or clones of Tripsacum australe.

Karl Graetz requested a dry land viney perennial for erosion control, wet land perennial with seed for duck food and forage Paspalums.

Dr. Galletta requested clones or seed of disease resistant Fragaria or Vaccinium species.

Dr. Nesbitt requested hybrid seed to be collected from Dr. Santos Neto's collection at Compinas - St. Paulo, Brazil. (Grapes)

Dr. Jenkins wanted corms or seed of any gladiolus that were seen in the area.

V. Evaluation of Potential Industrial Crops, Pulp Crops and Other Crops.

A. Kenaf - paper pulp.

Seed of six kenaf varieties were received from Beltsville on May 8, 1967.

These varieties were planted on June 7 at Plymouth in 21-inch rows and all plots were replicated four times. Abundant moisture was present

throughout the growing season. Data for this test appears in the following table.

Yield and agronomic data for kenaf varieties grown at Plymouth, North Carolina - 1967.

Variety	Flowering	Plant Spacing	Yield Dry Matter	Ht.	Dia.
		row ft.		ft.	mm.
Cuba 108		2.6	3.00	7.9	14
Cuba 2032	Yes	2.6	2.90	7.4	14
Everglade 41		2.6	3.82	8.0	16
Everglade 71		3.8	3.81	7.2	13
Guatemala 4	Yes	2.2	2.96	7.7	16
Guatemala 45		3.2	3.08	7.3	12

Summary

1. Yields were low due to the late planting.

2. Everglades 41 and 71 are still the best yielding kenaf varieties for our area.

1967 Meetings - A kenaf report on plant spacings was given at the Kenaf Conference, Gainsville, Florida in November 1967.

1968 tests - A small planting was made on the Weyerhaeuser farm in Camden County and looked well when last seen. Plantings were also made at the Plymouth Experiment Station.

B. Tephrosia vogelii

Seed of the following Tephrosia vogelii introductions were received from Beltsville on May 18, 1967.

Lines 656, 657, 659, 6285, 6286
PI's 257533, 305346, 305347

Plant Spacing Experiment - Plymouth

A plant spacing experiment, similar to the 1966 test, was planted June 7, 1967 where individual seeds of BL 6285 were planted at 12, 24, 36 and 48 inch spacings in 12, 24 and 36 inch rows giving square foot spacings per plant of 1, 2, 3 and 4 square feet.

The soil conditions were ideal, but germination was very poor in this test and the experiment was plowed up.

Breeding Line Evaluation - Rocky Mount

Four row replicated plots of the eight breeding lines were space seeded in 36 inch rows on June 9. Soil conditions were good. Spotty

stands developed but the test was carried through and plants were harvested October 25, prior to a killing frost. Hand separations were made of the plants and sent to Dr. W. H. Tallent at Peoria, Illinois for analyses. The agronomic data for these plots appear in the following table.

Breeding Line	Dry Matter Yield Potential	Plant height	Plant Components Leaflets	Petioles	Stems	Leaf Stem Ratio
	tons/acre					
656	1.99	38"	48	10	42	1.38
657	3.10	46"	41	8	51	.96
659	1.94	37"	46	7	47	1.13
6285	2.25	40"	47	8	45	1.22
6286	1.48	47"	37	7	56	.79
257533	2.39	42"	44	8	48	1.08
305346	1.70	39"	41	6	53	.89
305347	2.86	34"	46	7	47	1.13

1968 test - No tests were planted in 1968. Seed of tephrosia lines harvested in the greenhouse are being delivered to Dr. Whiteley for planting at Weslaco.

C. Brassica and Lesquerella Introductions

The Lesquerella and Brassica Introductions were seeded at the Rocky Mount Station on November 10 during a very dry period. Crambe was also seeded. The rows were watered and most seed germinated. The Crambe, and all of the Lesquerellas were winter killed and had to be reseeded on March 21. A summary of the agronomic data on the Brassica lines follows:

	PI	Feb. 6 % Stand	Feb. 6 Ht.	March 21 Ht.	March 21 Flowering	Comments*
B. camp.	179641	98	2"	10"	Yes	---
	183391	65**	1"	3"	Yes	Most of plots winter killed
	305275	95	2"	8"	Yes	---
B. napus	305279	88	1"	3"	No	---
	305280	72	1"	2"	No	---
	305281	98	1 1/2"	6"	No	---

* Plants of B. camp. were pale green, those of B. napus. dark green

** Many leaves frozen

The pods on the three lines of B. compestris shattered as they matured. The seed was harvested early but very little was saved.

The three lines of B. napus produced many pods which will give a fair yield for our area. These samples have not yet been threshed.

The March 21 planting of the six lines of Brassica did not flower.

PI 293034 Lesquerella grandiflora was the only line of the 23 PI's of Lesquerella that showed promise from the March 21 planting. Plants of this line grew to 15 inches in height and produced many pods approximately 3/8 inch in diameter. Seed, however, are very small in all of the Lesquerellas.

D. Mentha arvensis

Seven strains of M. arvensis var. piperascens were tested in 1967 and are being grown in 1968. This year's stand is yielding well and looking good.

E. Sunflowers - oil and wild birdseed

The regional variety test comparing 18 varieties, nine of them high oil varieties from Canada and Russia are being grown at Rocky Mount. This year's crop looks excellent. The 1967 oil seed crop was eaten by the birds while the plants were still green and could not be harvested for seed.

VI. S-9 Six-year Progress Report.

A revised summary with pictures of crop varieties released by the North Carolina Experiment Station during this period was sent to Bob Langford.

VII. Work for 1968

All of the above crops are being evaluated again this year with the exception of Tephrosia. Any new species from the screening program will be planted on receipt of seed.

Summary - S-9 Regional Blueberry Species Collecting Project - G. J. Galletta, North Carolina State University, and C. Ritchie Bell, University of North Carolina, July 1, 1966 - June 30, 1968.

Trip 1: Western Virginia and Eastern West Virginia, July 25-29, 1966
(codes 18452-18476)

herbarium specimens - 23, C.R.B. Accession #'s 18452-18476 not inclusive
clonal propagations attempted - 9, # surviving - 9
seed samples extracted - 10
seedlings placed in field - 361

Trip 2: Florida and Southern Georgia, May 20-25, 1967
(codes 7-1 to 7-20-7)

herbarium specimens - 60, coded 7-1 to 7-20-7
clonal propagations attempted - 59, # surviving - 48
seed samples collected - 6
seedlings placed in field - 99

Trip 3: 2nd to Florida and Southern Georgia, June 24-30, 1967
(codes 7-15-4, 7-17-11 through 19, and 7-21-1 through 7-36-3)

herbarium specimens - 42
clonal propagations attempted -36, # surviving - 33
seed samples collected* - 16

*germinated seedlings are being transplanted from seedling pots

Trip 4: New Jersey, July 18-19, 1967
(codes 7-37-1 to 7-41-4)

herbarium specimens - 14
clonal propagations attempted - 11, # surviving - 9
seed samples collected* - 7

*germinated seedlings are being transplanted from seedling pots

Trip 5: Eastern North Carolina, July 27, 1967
(codes 7-42-1 to 7-43)

herbarium specimens - 4
clonal propagations attempted - 4, # surviving - 4
seed samples collected - 4*

*germinated seedlings are being transplanted from seedling flats

Trip 6: Western and Central Arkansas, July 31 - August 4, 1967
(codes 7-44-1 to 7-52-2)

herbarium specimens - 24
clonal propagations attempted - 23, # surviving - 14
seed samples collected - 10*

*germinated seedlings are being transplanted from seedling flats

Trip 7: Western North Carolina-Tennessee, August 14-18, 1967
(codes 7-53-1 to 7-65-2)

herbarium specimens - 37
clonal propagations attempted - 40, # surviving - 27
seed samples collected - 21*

*germinated seedlings are being transplanted from seedling flats

Other Incidental Collections and Items Sent to the Project

1. 27 wild V. australe and atrococcum selections made by Drs. Stretch and Galletta during the winters of 1964 and 1965.

2. 4 clones of V. amoenum collected by G. J. Galletta and A. S. Fish near Greencut, Georgia - 1962.

3. 7 clones (4 surviving) of highbush Vaccinium sent by Cecil Stushnoff of Rutgers University from New Jersey - March, 1966.

4. O.P. seed of V. constablaei collected by G. J. Galletta from Professor Meader's planting in New Hampshire - 1960.

5. O.P. seed of V. darrowii collected by G. J. Galletta from Professor Sharpe's planting near Gainesville, Florida - 1962.

6. Cuttings of V. brittonii secured from Professor Bailey's planting of University of Maine - 1965.

7. O.P. seed of V. angustifolium from Washington and Yorke Counties in Maine was sent by Professor Abdalla of the University of Maine in 1966.

8. Dr. A. D. Draper of the U.S.D.A., Beltsville, Maryland, sent clonal propagations of V. corymbosum which already had P.I. numbers and representatives of two Central American Vaccinium species - 1968.

9. Collection of fruit from V. australe population in Johnston County, N. C., 1967.

10. V. myrsinites collected as 8-1 near Vero Beach, Florida, February, 1968, by G. J. Galletta while vacationing.

11. V. crassifolium (8-2-1) and V. tenellum (8-2-2) plants dug in Beaufort County, N. C., by G. J. Galletta and J. R. Ballington, May 16, 1968.

12. V. elliottii cuttings (5/24/68) and fruit (6/6/68) coded as 8-3 and taken from Sampson County, N. C., by G. J. Galletta, J. R. Ballington and A. D. Draper.

13. V. crassifolium plants dug from western Pender County, June, 1968, by J. R. Ballington.

14. Coastal Plain South Carolina collection of wild Vaccinium donated by J. R. Ballington - 1968.

    # clonal propagations attempted - 76
    # clonal propagations surviving - 68

    Collecting locales were Batesburg, Lexington and Horsepasture, S. C. These cuttings are still in the rooting bed.

15. Seed of a variety of local V. arboreum sites and some clonal propagations, 1965-66.

    Trip 8: Sandhill area - North and South Carolina, June 18, 1968
    (codes 8-4-1 to 8-6-9)

    # herbarium specimens - 18
    # clonal propagations attempted - 19
    # seed samples collected - 11

    Trip 9: Coastal Plain - Southeastern Virginia and Northeastern North Carolina, June 24, 1968
    (codes 8-7-1 to 8-9-9)

    # herbarium specimens - 21
    # clonal propagations attempted - 20
    # seed samples collected - 7

NEW AND SPECIAL CROPS

Oklahoma Report 1968
Roy M. Oswalt and Ralph S. Matlock

Pulse Crops

Field Bean *Phaseolus vulgaris*

Field bean plant introductions were grown at two locations in 1967 for increase and further selection of types. Those grown included P.I. Nos. 226928, 226929, 288016, 288017, 304819, 304832, and 304834.

Field bean tests were conducted at two locations near Perkins and Goodwell, Oklahoma in 1967. The ten strains grown on the Perkins station had a mean yield of 879 pound per acre, and ranged from 280 to 2042 pounds per acre.

The two Adzuki bean strains Sp-168 (Japan) and Sp-313 (Korean) *P. angularis* and Sp-222 Indian bean *P. latifolus* had the highest means yield at Perkins. The yield at Goodwell ranged from 175 pounds to 943 pounds per acre with a mean yield of 439 pounds in 1967.

Mungbean *Phaseolus aureus*

Eighteen strains and selections ranged in yield from 400 to 1058 pounds per acre. M-732 (P.I. 271401) and M-731 (P.I. 167356) averaged 908 and 478 pounds per acre, respectively. M-3 (Okla 12) and M-660 (OAEM 59-9-65) averaged 1058 and 1025 pounds per acre, respectively.

Phaseolus mungo

The black mungbean (P. mungo) had a mean yield of 353 pounds per acre at Perkins (dryland) and a mean yield of 710 pounds per acre at Goodwell (irrigated).

The yields and weight per 100 seed (for the Perkins test) are shown in the following table:

Okla. M-No.	P.I. No	Yield lbs/A	gram wt. 100 seed	Okla. M-No.	P.I. No	Yield lbs/A	gram wt. 100 seed
130	212909	340	5.1	784	288599	510	4.6
744	174907	230	4.9	785	288600	570	4.5
745	269522	265	3.0	786	288601	383	4.9
747	269528	202	5.2	787	288602	330	4.3
748	270058	307	4.8	788	288603	140	4.0
749	271497	328	5.0	831	288834	465	4.1
750	271498	360	4.9	832	288835	515	4.1
					Mean	353	

The above data were from the Perkins station in 1967 under dryland conditions. This test was planted May 10 and the maturity date ranged from Sept. 21 to Oct. 20.

Cowpea Vigna sinensis

Cowpea yield tests grown in 1967 on the Perkins, Stratford and Mangum Stations. Twenty-four strains were grown in replicated tests at Perkins, 12 at Stratford and 12 at Mangum. The mean yields at Perkins ranged from 415 to 1328 pounds per acre. At Stratford the mean yields ranged from 408 to 1187 and at Mangum from 220 to 1100 pounds per acre.

Plant introductions were not included in the mentioned variety tests, but 38 P.I.'s were grown in a fusuriam wilt infested soil near Stillwater for disease readings and increase. Personnel from the Botany and Plant Pathology Department helped with this test. The following introductions were grown in 1967:

Okla. C-No.	P.I. No.	Okla. C-NO.	P.I. No.	Okla. C-No.	P.I. No.
369	189378	747	165486	760	255765
629	124609	748	170844	761	271259
633	276102	749	170849	762	277786
699	190191	750	170859	763	292899
700	194202	751	170861	764	293463
701	194207	752	175327	765	293477
704	221731	753	204647	766	293524
712	293522	754	205141	767	293552
742	124608	755	208771	768	293585
743	122779	756	212930	769	315750
744	147563	757	220851	*Vigna cylindrica*	
745	148678	758	244517	770	304164
746	152197	759	250416	771	304298

Cicer arietinum

Chickpea P.I.'s grown in 1967

Test Planted: 4/4/67

Okla. Cp-No.	P.I. No.	Yield lbs/A	Gram wt. 100 seed	Maturity Date
93	250142	773	13.1	8/2
94	250143	1092	23.1	8/2
127	193481	638	11.2	7/9
128	203142	863	20.8	8/1
129	211722	1012	17.4	8/2
130	212026	550	15.9	7/29
131	212091	1162	17.4	8/2
132	212891	765	14.8	7/30
133	212892	653	13.7	7/29
134	215702	930	28.3	7/31
135	239859	1133	11.5	8/1
136	249981	1015	25.5	8/1
137	251024	1080	33.9	7/31
138	251026	1053	32.5	7/31
139	251027	1012	36.9	8/1
140	251783	1080	19.9	8/4
141	253226	712	39.0	8/4
142	253227	460	46.0	8/4
143	253228	1075	17.3	8/2
144	254547	835	37.7	8/1
145	254548	945	20.6	7/31
146	273879	808	15.4	8/2
147	273880	615	11.5	7/28
	Mean	886		

Pisum sativum

Field pea P.I.'s planted 3/15/67

Okla. Sp-No	P.I. No.
114	203475
125	257594
126	257592
134	257593

The above field pea introductions and 7 named varieties were grown in a replicated test in 1967 but 60 to 70 percent hail damage reduced the yields to less than 100 pounds per acre. The mean yield for ten strains was only 42.5 lbs/A.

Pigeon Pea Cajanus Cajan

Okla. Sp-No.	P.I. No.
46	218066

About 12 pounds of seed was harvested from a small increase in 1967. This seed is being grown at 3 locations in Oklahoma in 1968.

218066 is one of the better seed producers of the pigeon peas that we have in Oklahoma.

Oilseed Crops

Emphorbia lagascea — Planted 4/4/67

The following six introductions were planted April 4, 1967.

Okla. Sp-No.	P.I. No.	Yield lbs/A	Okla. Sp-No.	P.I. No.	Yield lbs/A
543	296064	117	561	308130	115
559	308128	105	562	308131	25
560	308129	14	563	308132	38

This test had heavy hail damage on May 18. The plants came back out and produced a fair to good seed crop but 1/2 to 2/3 of the seed shattered out on the ground.

Fennel

Foeniculum vulgare

Sp-401 P.I. 268383 produced a high seed crop but shattering was heavy.

Crambe

Okla. Sp-No.	P.I. No.	
76	247310	C. abyssinica
554	281728	" "
555	281729	" "
556	281733	" "
558	281735	" "
557	279345	C. hespanica

The yields of crambe were reduced to 25 pounds per acre by hail and stink bug damage in 1967.

Sunflower

The Regional Sunflower test was damaged 95 to 100 percent by hail in 1967.

Peanuts: *Arachis hypogaea*

The program on peanut germ plasm evaluation was continued. Replicated tests including 74 plant introductions were conducted at Ft. Cobb and Perkins in 1965 and 1966. The Genetic, Agronomic Botanical, Physical, Chemical and Organoleptic evaluation of the peanut accessions in these tests was summarized in a thesis by Eric G. Stone.

Seed of about 400 peanut accessions was shipped to the regional station this summer.

Gum and Mucilage Crops

Regional Guar variety tests were grown at three locations in Oklahoma in 1967. Ten strains at Tipton, 16 strains at Mangum and 34 strains and selections at Perkins, Oklahoma. The yield range was from 400 to 1500 pounds per acre.

The mean yield at Perkins was 666 pounds per acre, at Mangum 1422 lbs/A and at Tipton the guar test was not harvested.

University of Puerto Rico
Mayaguez Campus
AGRICULTURAL EXPERIMENT STATION
Plant Breeding Department
Rio Piedras, Puerto Rico

ANNUAL REPORT
NEW CROPS RESEARCH IN PUERTO RICO
July 1967 to June 1968
S-9 Technical Committee Meeting at State College, Mississippi
July 16-17, 1968

The drowth that prevailed during the year was even worse than in 1966-67, seriously affecting the development of the new crops program.

A total of 691 introductions were received during this period, including 514 sugar crops (sugarcane and sugar beets), 55 forages, 87 vegetables and other food crops, 3 fruits, 23 ornamentals and 9 miscellaneous.

Sugar Crops:

Sugar beet variety Maribo-Resista-Poly, introduced from Denmark, outyielded 5 other varieties in 2 regional trials.

Fruits:

Grape varieties under trial at Fortuna developed very well in spite of the dry spell, and judging from the fruit load, they are expected to yield very high.

Some of the promising varieties, Rivier, Exotic and Tamiami are being increased vegetatively.

Dates started blooming in February, but yield is expected to be low on account of the drowth that prevailed during the year. The identification of trees as to sex has continued.

Some of the macadamia trees bloomed and a fair yield is expected. Seedlings obtained from last year's crop are now developing in the nursery until ready for trasplanting.

The Lecythis also bloomed but the yield will most probably be low due to the drowth.

Some of the sapodilla and soursoup trees started bearing fruit, so individual tree selections will be made on the basis of fruit characters.

At the Adjuntas Substation, the pineapple guava (Feijoa sp.), are developing very well and have bloomed profusely, as in contrast with last year when the bloom was sparse with very few or no fruit set.

The third crop of three promising annato selections is being harvested. Two of them produce a high yield of seed with the advantage that their pods are indehiscent.

Last December a new macadamia planting for evaluation of 4 strains was established, and so far they are developing well. Conditions of Adjuntas are expected to suit macadamia better than those at Fortuna.

Forage grasses:

A large number of grass introductions are being evaluated at Lajas, Gurabo, and Corozal.

Among a group of Cynodons observed at Gurabo, C. coursii 288218, looks most promising.

In a yield trial for comparison of 16 Panicum introductions, P. maximum 259553, has outyielded the others so far when 9 cuttings have already being completed.

Preliminary observations indicate that Digitaria pentzii 299752, D. decumbens 299601, and 299837, and D. setivalva 299798, are the most promising among others for that area. During the observation period these grasses were f free from aphids.

This group of Digitarias has been evaluated at Corozal Substation and U.S.D.A. P.I's. 299892, 299828, 299754, 299731, 279651and A-23 look as most promising.

At the Lajas Substation and at two locations in the southwestern region preliminary observations of a large number of grasses were made. Panicum coloratum var. makarikariense 203520, Chloris gayana "mpwapwa" from Kenya, Hemarthria altissima 299993, Digitaria milanjiana 299730, and D. setivalva 299800, look as the most promising.

Chloris gayana "mpwapwa" from Kenya, and P. maximum 208399 are about the best at Las Arenas, a section of Cabo Rojo, where no irrigation is available, and where annual rainfall is less than at Lajas.

At "El Combate", a section of Cbo Rojo, about the driest area of Puerto Rico Digitaria milanjiana 299688, D. milanjiana subsp. eyelsiana 301141, Chloris sp. 299551, D. valida 299846, and P. maximum 208943, seem to be the most promising for extreme dry conditions.

Miscellaneous crops:

At the Corozal Substation, Russian confrey, of interest for its protein, is under observation.

There also 6 kenaf introductions were seed increased for the Southern Region.

Manioc clones obtained from St. Croix were established in the root crops collection for vegetative propagation for further evaluation.

Annual Report
New Crops Research in South Carolina
July 1967 to June 1968
S-9 Technical Committee Meeting at State College, Miss.
July 16-17, 1968

There were 1,251 accessions of seeds and plants distributed to cooperators in South Carolina since July 1, 1967. These accessions included ornamentals, vegetables, clover species, and a few miscellaneous accessions.

Reports from various cooperators are presented as follows:

Dr. W. C. Barnes, Superintendent, Truck Station, Charleston, South Carolina 29407

Accession of cucumber from a Canadian worker and Japanese varieties reported to have superior powdery mildew resistance proved to be as susceptible as S. C. material when grown in the greenhouse. All S. C. material has good field tolerance in the U.S. but not in the offshore winter production areas or in the greenhouse.

The release of S.C. 25 as Chipper and the gynoecious hybrid 105 as Explorer was announced last winter. These pickles include P.I. 197087, 196289 and 220860 in their parentage. Both have good resistance to downy mildew, powdery mildew, anthracnose and angular leafspot plus tolerance to CMV and WMV.

Yield tests with the downy mildew resistant cabbage lines are scheduled to begin this fall. The broccoli was entered in the Southern Co-op Observation Trials in 1967 and advanced to the yield trials for 1968. P.I. 189028 was used in the broccoli development and 261774 in the cabbage.

Dr. J. R. Deakin, Geneticist, U.S.D.A.-A.R.S., U.S. Vegetable Breeding Laboratory, Charleston, S. C. 29407

This spring we grew more then 600 lines of Phaseolus vulgaris obtained from Plant Introduction in an effort to find lines with an early, concentrated pod set. We were also looking for plant types which would be suitable for mechanical harvest. Disease reactions seemed erratic and no notes were taken.

The following list of P.I. lines was selected for further observation:

109541	136702	142885	151014
109859	136703	142900	151017
136676	136736	142903	161953
136679	136741	146790	162565
136683	136744	150414	162566
136691	136745	150417	163116
136699	140305	150948	164613

J. A. Martin, Associate Professor, Clemson University, Clemson, South Carolina 29631

Brassica species: Two species of Brassica were planted on October 12, 1967 on 100 feet of row spaced 42 inches apart. The following data were recorded:

Species	P.I. Accessions No.	Height (Inches)	Seed Harvested (Grams)	Stand
B. campestris	179641	24	30	poor
B. campestris	183391	20	26	poor
B. campestris	305275	18	100	poor
B. napus	305279	38	475	fair
B. napus	305280	40	157	poor
B. napus	305281	40	1020	good

The above crop was harvested by hand on June 13, 1968. It is felt that it will be possible to produce higher yields as more is learned about the crop.

A spring planting was made of the above accessions, but production will be poor. Fall planting appears to be desirable for high yields and with a minimum of insect problems.

Kenaf - A Kenaf varietal test was conducted in 1967. The following table gives the results of the yields, spacing of plants in the row, and heights of plants - all based on the mean of four replications:

Name of Varieties	Yield in Pounds* (per acre)	Height of Plants (Feet)	Plant Spacing (Inches)
Everglades 71	4994	7.6	4.2
Everglades 41	6470	8.3	3.4
C-108	5505	8.5	4.7
C-2032	5108	7.9	4.2
G-4	3746	8.0	4.1
G-45	4710	7.8	4.1
Cubano	3462	8.5	6.8
BG-52-75	4937	7.9	7.0
BG-58-10	5278	8.5	3.9
P.I. 305080	3632	9.4	4.4

*Air Dry Weight

The Kenaf was planted on June 13, 1967. It was a wet May and this late date of planting was the best we could do. Also we had a light frost on the morning of September 30 which killed the upper one-fourth of the terminal growth. The late planting date, short growing season and the early frost were all responsible for low yields. Row width was 21 inches. A fertilizer (5-10-10) was applied broadcast at the rate of 1,000 pounds per acre prior to planting. Nitrogen (from ammonium nitrate) was applied at the rate of 200 pounds per acre on July 24 and August 22. The crop was harvested on November 8, 1967. Treflan used at rate of one pound active ingredient per acre and good weed control was obtained.

At this time an error has been found on Page S.C.-8 of the 1967 minutes of the meeting of the S-9 Technical Committee. The yields of Kenaf should be corrected as follows:

Treatment No.	Yield (in error)	Yield (corrected)
1	23,724	7,908
2	26,071	8,690
3	35,509	11,836

Lesquerella seed: The following accessions of Lesquerella seed were planted at Clemson on October 12, 1967:

Species	P.I. Number	Germination (Nov. 8, 1967)	Stand (Jan. 9, 1968)
L. lasiocarpa	293036	poor	none
L. lyrata	275769	poor	none
L. palmeri	306129	fair	none
L. palmeri	307830 GA*	fair	none
L. pinetorum	293037	fair	none
L. sp.	302490	good	none
L. sp.	(no number)	good	none
L. stonenensis	275771	poor	none
L. densipili	292577	poor	none
L. densipili	309661	fair	none
L. fendleri	279649	poor	none
L. fendleri	279650 GA*	fair	none
L. fendleri	293016	good	none
L. gordonii	293017	good	none
L. gordonii	293018	good	none
L. gordonii	293019	good	none
L. gordonii	299142	good	none
L. gordonii	307829	good	none
L. grandiflora	293034	good	none

*GA = Gibberillic acid treated

It appears from this test that Lesquerella species germinate well at minimum temperatures of 30 to 60 degrees F. However, after germination the plants do not stand minimum temperatures of 18 to 24 degrees F. There is suspicion that heaving may have caused the plants to die. More work is needed in order to test for more suitable climate, especially in the mild coastal areas of S. C.

Okra - 218 P.I. accessions of okra were grown in 1967 for testing and evaluating for pod and plant types which may be adapted to mechanical harvesting. Three P.I. accessions (274344, 305400 and 310473) were selected for further study and they are now planted at Clemson for use in mechanical harvesting studies by the Clemson Agricultural Engineering Department. The engineers have developed a machine for harvesting fresh okra pods from the plant. At this time they are making some changes and modifications which will be more suitable and efficient in harvesting present types of okra.

Tephrosia vogelii - An experiment was initiated in 1967 to study the effects of a special legume inoculation of the seeds and various rates of nitrogen on the yield and other factors. The following table is presented to show the yields of the various treatments obtained from the use of P.I. accession 257533.

Tephrosia vogelii - Yields in Pounds per Acre

Treatment No.	Inoculation	Amt. of Nitrogen*	Yield - lbs/acre Mean of 4 reps.
1	No	None	5,937
2	Yes	None	5,210
3	No	50 lbs/A	7,108
4	Yes	50 lbs/A	7.058
5	No	50 lbs/A (S)	6,432
6	Yes	50 lbs/A (S)	7,454
7	No	100 lbs/A	7,456
8	Yes	100 lbs/A	6,848
9	No	100 lbs/A (S)	7,302
10	Yes	100 lbs/A (S)	7,304
11	No	200 lbs/A	7,463
12	Yes	200 lbs/A	5,853

S = Split application - 1/2 at planting time on June 13, 1967 and other 1/2 on July 17, 1967. All plots were harvested on October 23, 1967.

*Ammonium nitrate

In another experiment leaflets, stems, and petioles from six treatments (No. 1, 2, 7, 8, 11, and 12) were separated. A portion of these samples were sent to Northern Utilization Laboratory and a portion used for determining dry weights.

The results of this work are summarized as follows:

1967 TEPHROSIA VOGELII SAMPLES

Not Inoculated

	Leaves			Stems		
Treatment No.	Fresh Weight (Grams)	Dry Weight (Grams)	Dry Matter (Percent)	Fresh Weight (Grams)	Dry Weight (Grams)	Dry Matter (Percent)
1	354.1	109.8	31.0	599.3	155.3	25.9
7	372.3	116.8	31.4	672.0	197.8	29.4
11	349.6	116.8	33.4	649.2	191.8	29.5

Inoculated

2	340.5	99.8	29.3	517.6	127.3	24.6
8	404.1	129.8	32.1	726.4	199.3	27.4
12	413.1	131.8	31.9	758.1	209.3	27.6

Zero Nitrogen - Not

	Fresh Weight	Dry Weight	Dry Matter	Plant Composition
Stems	403.8	116.6	28.9%	65.7%
Leaflets	162.2	62.3	38.4%	26.4%
Petioles plus rachises	48.6	14.1	29.0%	7.9%
				100.00

Since more emphasis is being placed on Kenaf varietal studies this year, it was decided to drop Tephrosia vogelii for the time being. Therefore, we do not have any plantings of this crop this year.

Dr. D. M. McLean, Research Plant Pathologist, U.S.D.A.-A.R.S., U. S. Vegetable Breeding Laboratory, Charleston, S. C. 29407

Tested about 1/3 of the 300 P.I. watermelon accessions for resistance to race II of the anthracnose organism. No resistance found in the screening test. The remainder of these accessions will be tested during the fall and winter.

J. P. Fulmer, Assistant Professor, Clemson University, Department of Horticulture, Clemson, South Carolina 29631

Many woody ornamental plant introductions have been evaluated since 1956. Several accessions have been introduced to the nursery trade in South Carolina. Container grown plants of some have been distributed to interested nurserymen.

Eurya ochracea, P.I. 235502, was introduced at Clemson in 1958. Since that time the species has been grown in shade and open with excellent results. Summer foliage color is dull green with a purple cast in the fall. It is an evergreen which produces a small insignificant bloom and resulting fruit. Loose growing in shade and compact in open. May be a replacement for Ligustrum or Cleyera.

Osmarea burkwoodi, P.I. 242241, bloomed without damage for the first time in 1968. An excellent dark green semi-dwarf plant - apparently very hardy and beautiful in bloom.

Of the many Ilex crenata radicans accessions, P.I. 275854 and P.I. 276080 are promising. Both are spreading types. Ilex x makinoi P.I. 275797 possesses interesting foliage. Foliage of small plants available are similar to Euonymus japonica. Ilex latifolia, P.I. 274834, grows more upright than the selection in commercial production. Also the petiole is reddish with a purplish cast to the foliage.

Plant Introduction 241304, Ligustrum sempervirens, should be of interest to the landscape architect. It is semi-dwarf, dark green; has a loose habit of growth and very showy blooms. This may be a welcome change from "Roundleaf" holly.

The variegated Osmanthus, P.I. 242291, apparently is superior to the variety being grown commercially in South Carolina. Accession P.I. 236241 is a yellow leaf specie which is slow growing and appears to be more difficult to propagate.

Many Trachelospermum species have been evaluated at Clemson but P.I. 236250 is the most interesting. The foliage is variegated with a hint of rose-pink. The accession has been planted outside for one winter. No injury was noted during the winter of 1967-68.

1968 Annual Report From Tennessee To S-9 Technical Committee on New Plant Introduction Regional Project

Dr. B. N. Duck, on the Martin Campus, increased some 400 Cynodon introductions in the greenhouse during the winter of 1966-67 and subsequently transplanted these to field plots under a fertility program considered practical for forage production. Clipping treatments and management practices were uniform for all plots. The varieties "Coastal," Midland," and a local strain of "Common" were used as standards for comparison. Introductions were evaluated for general growth type, rapidity of spread, stand density, foliage texture, disease resistance, date and extent of flowering, forage production at each cutting, late season (October) production, and tolerance to frosts. Many of the introductions exceeded "Common" and "Midland" in forage production. Preliminary evaluations for winter hardiness, which is of primary importance, was made in the spring of 1968 and about 40% of the total introductions survived and will be evaluated during the present growing season. Accessions found promising but not winter hardy will be observed for their possible inclusion as sources of vigor and forage production potential in a breeding program.

Rosa rugosa, 227432 set in the spring of 1966 is now a clone 8 feet in diameter by 3 1/2 feet tall. As in 1967 it continues to be characterized by dense, glossy, leathery, rugose foliage; stout bristle-thorny stems with scattered orange-red hips about 1/2 inch in diameter. Absence of insect and disease pests of the foliage is noteworthy and of probable value in breeding roses for the South or other areas where foliage is disease-prone. Flowers are pink and single. Spread is by underground rhizomes. Considered worthy of evaluation for roadside and bank mass planting. Has been propagated and small amounts are available.

Ilex altaclarensis, Wilsoni, 241325 which had new growth killed during the winter of 1965-66 shows promise. Plants are now 4 - 4 1/2 feet tall by 3 - 3 1/2 diameter with very dark green foliage of the multi-prickled type densely aggregate on short, stubby, ascending branches with stout ascending main stems that give the plant "character." Autumnal foliage of current growth turns dark, burgundy-red.

Thirty-one new accessions of Zea and Cynodon were obtained to date during 1968.

ANNUAL REPORT ON NEW CROPS RESEARCH IN TEXAS
Hatch 2091-Contributing to Southern Regional Project S-9
Prepared by Eli L. Whiteley
July 16 and 17, 1968

Introduction

Researchers in Texas received about 550 accessions in the period since the last report. These materials went to 20 individuals for use in their research programs. This is the smallest number of accessions ordered by Texas researchers in the past 10 years. Many of these researchers have a back-log of accessions that they have been evaluating over a number of years and must discard some of these materials before attempting to evaluate a large number of new accessions.

Weather conditions have been adverse for field tests in most of Texas in 1967-68. Rainfall is about 20 inches above normal for this time of the year. Average annual rainfall at College Station is 38.88 inches, as of June 30 we have received 37.33 inches of rainfall. During June we received more than 13 inches of rain. Cool nights and cloudy days have reduced gorwth rates and seedling diseases have been more damaging than normal.

Plants for Pulp

A major effort is being made in Texas to accumulate the information necessary for the production of pulp from annual plants. Information on the factors involved in crop production are being investigated as thoroughly as a limited budget will allow. Studies being carries out involve dates of planting, herbicides, seed treatment, fertiltiy, spacing, nematode

control, and variety tests. In addition to the above tests, 110 lines and varieties of kenaf are being evaluated for resistance to nematodes. There are six duplication in the lines and varieties leaving a net of 104 different lines and varieties collected from various parts of the world. Several of these accessions looked very promising in 1967 and if they are resistant to nematodes seed will be increased for yield tests in 1969.

Results from a spacing study involving two varieties is presented in Table 1. The 12 inch spacing produced about 1 ton more per acre than the 20 and 40 inch spacings. The real difference in the amount of pulp produced per acre is not known.

Greenhouse and field studies indicates that Ceresan, Delasan, Captan, and Semasan will do a good job of controlling most seedling diseases in the areas where these materials were tested.

Table 1. Row Spacing Study* - 1967

Row Width	Everglade 71					Everglade 41				
	RepI	RepII	RepIII	RepIV	Ave.	RepI	RepII	RepIII	RepIV	Ave.
40 inches	4.26	5.73	4.26	2.87	4.28	4.73	4.73	5.20	3.80	4.62
20 inches	4.26	4.33	4.26	4.80	4.41	3.33	4.73	3.80	5.20	4.27
12 inches	6.44	4.11	4.89	6.44	5.47	4.89	5.67	4.11	5.67	5.09
Average	4.99	4.72	4.47	4.70	4.72	4.32	5.04	4.37	4.89	4.66

*Grown at College Station, Texas, planted April 25, 1968, harvested December 11, 1967. Dyland, fertilized with 400 lbs. per acre of 16-20-0.

Oilseed

Ten Brassica accessions were received for testing and increase, five were to be increased under isolation. These materials were planted in mid-October and emerged to a good stand. P. I.'s 305275, 305281, 305280, and 312847 produced some seed which were hand harvested on May 30, 1968. P. I.'s 179641, 183391, and 305276 produced seed, but the seed shattered before it could be harvested. P. I.'s 312845 and 312846 did not set seed at College Station, Texas. Seed yields are shown in Table 2.

A two acre planting of Target rape was lost due to rainy weather. After the rape matured, the field was never dry enough to support a combine until after the rape seed had shattered and the plants lodged.

Twenty-four Lesquerella accessions were planted October 23, 1967, of these, very few emerged to a good stand. Due to the prolonged wet weather (from November to June inclusive) all of these plants were lost from drowning out of diseases.

Table 2. Brassica seed yields 1968*

P. I. Number	Yield in Grams
312847	4.3
305275	781.9
305279	338.2
305280	364.5
305281	270.0

*Grown in isolated 40 inch rows 40 feet long.

Vegetables

Seven carrot accessions were grown and analized for carotent and xanthophyll at Weslaco, Texas by F. I. Meredith. These materials contained large amounts of carotene but none contained enough xanthophyll to be of commercial value. The results of the chemical analyses are shown on Table 3.

Table 3. Carotene and Xanthophyll content of carrot (Daccus carota) accessions.

P. I. Number	Source	Mg.g Wet Material	
		Carotene	Xanthophyll
163239	India	74.8	4.6
225868	Denmark	122.3	1.5
225871	Denmark	88.9	3.7
261647	Netherlands	78.2	1.7
264236	France	74.7	1.5
277711	Netherlands	82.0	2.3
306810	New Zealand	87.2	2.1

The tomato accessions grown at Yoakum by Dr. A. L. Harrison this year indicate that P. I. 280597 has the ability to germinate at low temperatures. This character may be valuable if it can be transferred to standard early varieties.

Publications

Several articles are in various stages of preparation and one has been submitted for publication. Three radio programs have been taped for distribution over the state. Numerous newspaper stories have been written on the kenaf work and some farm magazines have printed these stories.

Work Planned for Next Year

Work in Texas will be concentrated on pulp crops in 1969. With some work on other materials.

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Fort Worth, Texas

THE SOIL CONSERVATION SERVICE REPORT ON S-9 New Crops for 1967 in Its Southern Region

By
W. C. Young, Regional Plant Materials Specialist - South

During the fiscal year 1968, the Soil Conservation Service in its South Region was engaged in testing approximately 1,144 plant introductions in its centers and in soil conservation districts (Table I).

This large number was carried in spite of the fact that we were in the process of moving one center and lost considerable time in doing so. Our center that was at Arcadia, Fla., has been moved to a new permanent location at Brooksville, Fla.

In our testing process, we make studies of assemblies; increase for further testing those plants that show promise; make further tests and increase seed supplies for testing on-site in soil conservation districts; and finally encourage commercial seed production of those plants that prove suitable for treating conservation problems through district cooperators, commercial seedsmen, and cooperators of the crop inprovement associations.

Table II shows a listing of the plant introductions that are in the initial increase stage, and lists 62 accessions. Table III shows that 25 plant introductions are being increased for testing in the districts. Table IV shows that the Service is maintaining foundation seed of three released varieties originating from plant introductions. Finally, Table V shows that at least 18 accessions of newer items are in commercial production in the South with at least 118,300 pounds of seed and 1,302,200 plants produced last year.

No new releases or certifications were made during the year, but one article dealing with a plant introduction was published, co-authoried by a Soil Conservation Service worker. The grass covered was Digitaria eriantha, PI-106663. The article: NEW GRASS FOR EROSION CONTROL by D. C. McClurkin and V. E. Ahlrich in Crops and Soils Vol. 20(3), pp 18-19, December 1967.

Observations from the Centers

The following are brief descriptions of some of the more promising plants under observation at our centers. The comments were supplied by the center managers and field plant materials specialists as follows: Americus, Ga., John D. Powell; Brooksville, Fla., Robert D. Roush; Coffeeville, Miss., V. E. Ahlrich; Knox City, Tex., Arnold G. Davis and Howard Carleton; and Mayaguez, P.R., Aurelio Sierra-Bracero.

USDA-SCS-FORT WORTH, TEX. 1968

Arachis sp. - PI-263392. This annual forage peanut produces excellent forage all season long. It can be increased by seed and grows in a grass sod. (Americus)

Arachis burkartii - PI-262851
Arachis glabrata - PI-1722223 and PI-262794
Arachis glabrata v hagenbeckii - PI-172224
Arachis sp. - PI-262819 and PI-262826
The above forage peanuts and perennials show considerable promise as forage plants at our latitude. Those listed appear to be the best of around fifty screened, and they will be further screened. (Americus)

Brachiaria brizantha - PI-292183, PI-292187, and PI-292182
Strong and very strong South African plants. Produce abundant usable forage. Rapid and abundant regrowth after mowing or frost. Fair volunteering on bare ground or sod. (Brooksville)

Castanea mollissima - PI-58602. A many stemmed Chinese chestnut that produces nuts of better than average quality. (Americus)

Cenchrus sp. - PI-271603. This warm-season perennial grass came from India. It is rhizomatous and makes good growth. There are many thin stems and many leaves. The most cold hardy at Coffeeville. Seed production is low. May be possible to propagate economically by rhizomes. (Coffeeville)

Cenchrus ciliaris - PI-271198. This accession from India exhibits real good vigor and aggressiveness. Produces moderately abundant rhizomes. Flowering as well as in other accessions is not uniform. A good stand is obtained in a fairly short period. Maturity height is 45 inches. (Mayaguez)

Cenchrus ciliaris - PI-253725 'Bioela'. Bioela's origin is Tanganyika. This accession produces very strong seedlings. Its aggressiveness is very marked, starting to produce abundant rhizomes at a very early stage. Blooming is abundant but ripening is un-uniform. A 52-inch height was reached in a four month growing period. (Mayaguez)

Cenchrus ciliaris - PI-243199 'Grasslands'. Grasslands comes from South Rhodesia. It is an early tillering, rhizomatous accession. Seeds produce very strong seedlings which in a fairly short period produce abundant stems, forming a good stand which reveals its strong aggressiveness. It blooms profusely, producing abundant spikes of un-uniform ripening. Plants attaned a 50-inch height in a four month period of growth. Rhizomes production is abundant. (Mayaguez)

Cenchrus ciliaris - PI-284835. From Morocco to Australia to Beltsville to the Arcadia Plant Materials Center, Florida, then to Puerto Rico. Exhibits good vigor and aggressiveness. Produces moderately abundant rhizomes. As the rest of the assembled group, blooming is un-uniform, but produces a reasonable amount of heads. A 45-inch height was reached in a four month period of growth. (Mayaguez)

Cenchrus ciliaris - PI-210693. Origin for this accession is Marandellas, South Rhodesia. Is very similar to that from El Salvador. A real good vigor and aggressiveness is exhibited by its seedlings. Rhizome production is evident even at an early age, but is not as profuse as in Grasslands. Plants reached a 45 inch height when mature. (Mayaguez)

Desmodium cinerascens - PI-282691. A very strong, 12-foot tall, bunch type, perennial legume with few strong, soft, gradually-hardening stems. Produces an abundance of large pilose leaves. Seedlings compete very well in grass. Seed production is good in both spring and fall with excellent quality. (Brooksville)

Digitaria milanjiana - PI-299655. This accession is a perennial, stoloniferous, of a strong to weak aggressiveness. Produces abundant medium-thick stems with abundant medium-broad leaves. Stolon formation is scarce and confined to a short period through the year. It attains a considerable height surpassing common pangolagrass by more than one foot. It continues to grow during cold days when other accessions seem to become dormant. It ranks among the best yellow aphid resistant accessions. (Mayaguez)

Digitaria milanjiana - PI-299695. Perennial, stoloniferous, having good emergence of strong seedlings. Even though it is a short grower, it forms a good stand of medium-fine stems with abundant, well distributed leaves. Aggressiveness is moderately strong. It shows good resistance to aphid injury and behaves acceptably during dry season. (Mayaguez)

Digitaria pentzii - PI-299749. Tall plant exhibiting strong vigor. Produces abundant stems bearing abundant, broad, long leaves. Stolon production is moderate to scarce. Has demonstrated good resistance to yellow aphid injury. (Mayaguez)

Digitaria pentzii - PI-299752. Perennial, stoloniferous, of intense bluish-green color which produces a compact mat in a relatively short period of time. Possesses very abundant, soft, fine, sub-erect stems, bearing abundant medium soft, well distributed leaves. Produces abundant stolons practically through the whole year, which root at their nodes as soon as they come in contact with the soil. Blooming is moderately abundant occurring from May to October. Aggressiveness and ground covering are very marked. High resistance to yellow aphid injury has been observed. (Mayaguez)

Digitaria setivalva - PI-299798. Strong aggressiveness, stoloniferous plant. Exhibits an intensive bluish-green color. Bears abundant fine stems with well distributed leaves which form a good mat. Stolons are produced profusely practically the whole year through. Covering potential is marked. Demonstrates good yellow aphid injury resistance. (Mayaguez)

Digitaria smutzii - PI-299826. Intense bluish-green accession, turning yellowish as maturity is attained. Produces abundant fine stems with abundant short leaves which form a compact mat. Stolon production is abundant through the whole year. Rooting occurs shortly after the stolon comes in contact with the soil. Soil covering potential is very marked. Exhibits very good resistance to yellow aphid injury. (Mayaguez)

Digitaria swazilandensis - PI-299632. This is a very aggressive bluish-green accession which produces abundant rhizomes practically the whole year through. Stems are medium fine bearing abundant, well distributed short leaves. Its aggressiveness and ground covering potentials are unquestionable. Exhibits real good yellow aphid injury resistance. (Mayaguez)

Digitaria smutzii - PI-299819
Digitaria smutzii - PI-299828
Digitaria valida - PI-299878
Digitaria eriantha - PI-106663
Digitaria setivalva - PI-299795
From 32 accessions of fingergrass in the original planting, the above five have been winter-hardy at Americus. Further screening will be done. These have potential for forage in this area. (Americus)

Echinochloa holubii - PI-207924. A warm-season, perennial grass from South Africa with rhizomatous root system. Makes good quantity of seed but quality is low. It is a leafy plant, making growth early in the spring. It has promise for streambank and reservoir fill stabilization as well as for forage in wet land. (Coffeeville)

Eragrostis curvula - PI-208994 and PI-232813. Early tests by ARS at Woodward, Oklahoma determined that these two strains had potentially better palatability than the common weeping lovegrass. Seed increase at Knox City is being used to assist in determining if this holds true in field conditions. (Knox City)

Eragrostis curvula - PI-295689. A wide-leafed strain that seems perfectly hardy at Knox City. Average forage and seed production as compared to the commercial Ermelo weeping lovegrass. Will green up in early spring before the other strains and is earlier in producing its seed crop. (Knox City)

Eragrostis curvula - PI-295793. A wide-leafed strain that is weakly hardy at Knox City. Its distinctive form is different from other strains. Our Center at Beltsville reports a germination pecularity but has not stated what it is. This accession has potential for use as a pasture grass in south Texas but this is not proven as only limited seed has been available for field evaluation plantings. (Knox City)

Eragrostis lehmanniana - PI-295698. An unusually productive strain that produces an abundance of leaves and is more upright in growth habit than the commercial lehmanns. Produced a good seed crop at Knox City last year. (Knox City)

Eragrostis lehmanniana - PI-295699. Very similar to PI-295698 in production and growth form but is only weakly hardy at Knox City. We have encountered germination problems with this strain, both in the germinator and in the field. It produced a good seed crop at Knox City last year. (Knox City)

Eragrostis superba - PI-295705. A highly productive plant that grows to a vegetative height of three feet. It produces abundant seed heads that shatter readily. The first two winters at Knox City were relatively

Eragrostis superba - PI-295705 (continued)
mild and the plant proved to be weakly hardy. The third winter was very severe and about 80 percent of each plant failed to recover.
(Knox City)

Festuca arundinaceae - PI-203728. A superior fescue that makes excellent growth, is a good seeder, and has stolons as well as rhizomes.
(Americus)

Hemarthria altissima - PI-299994. A strong perennial with abundant good forage. About 60 percent winter survival at Knox City.
(Brooksville, Knox City)

Indigofera pseudotinctoria - PI-197075. A vigorous grower with a heavy root system. Prostrate vegetation, produces good seed crops, should be useful on roadsides, on sand dunes, and other critical areas.
(Americus)

Lespedeza serpens - PI-297385. This prostrate plant may be the one we have been seeking for planting on roadsides. It is a good seeder.
(Americus)

Malus hupehensis - PI-122596. This crabapple is a decidious tree growing to a height from 15 to 20 feet tall, with a slender trunk. The leaves are dark green on the upper side and light gray on the underside. It flowers in mid April. The blossoms are white, occurring in dense clusters. The fruit, bitter, matures in October with a yellow color. As the weather cools, the color turns somewhat red. This plant will produce fruit in four years. It is adapted to deep, moderately-well drained or well-drained soils. The crabapple has potential use for beautification, and the fruit will provide food for wildlife.
(Coffeeville)

Paspalum cromyorhizon - PI-310059 and PI-310060. These Brazilian introductions are perennial, bunch type, with moderate number of fine, soft, sub-erect stems. They have low yield but no winter kill at 23° F.
(Brooksville)

Paspalum boscianum - PI-310046, PI-310047, and PI-310051. These perennial, bunch-type, moderately-aggressive grasses have stems moderate in number, medium sized, soft, and sub-erect. Main value is in their winter hardiness. Origin - Brazil. (Brooksville)

Paspalum hieronymii - PI-310107 and PI-310108. These perennial, very stoloniferous, very strong, grasses have abundant, prostrate, medium sized stems; abundant, soft, well distributed leaves. It grows two feet per month during growing season. Good, quick ground cover. PI-310108 withstands the cold better than PI-310107. (Brooksville)

Paspalum nicorae - PI-310128-35. These rhizomatous, perennial grasses have abundant moderately soft, sub-erect stems. Leaves are soft and abundant. The plants are strong and are good seed producers. Seed viability is fair to good. They grow with leaves six to eight inches tall, and spread quickly by rhizomes. PI-310128 spreads quickest and generally is more dense. Origin - Brazil. (Brooksville)

Paspalum plicatulum - PI-310227 and PI-310234. These are perennial bunch grasses with moderate numbers of medium sized, medium textured, sub-erect stems. The basal cauline, medium textured leaves occur in moderate numbers. The plants are strong, and produce fair tonnages of cold-tolerant materials. Origin - Brazil. (Brooksville)

Paspalum quadifarium - PI-161886. A large, warm-season perennial. Produces seed, many stems, and leaves. Could be used for forage in its early growth period. (Coffeeville)

Paspalum yaguaronense - PI-310271 and PI-310272. These moderately strong introductions produce an erect to sub-erect growth of moderate numbers of stems, which have an abundance of soft leaves arranged in a basal cauline formation. After cutting, the growth is rapid and abundant. Growth, volunteering, and winter tolerance are all good. (Brooksville)

Paspalum sp. - PI-310287 and PI-310291. These perennials are bunch grasses with moderately abundant, moderately textured, erect to sub-erect stems. Leaves are abundant, almost soft, and of a basal cauline growth type. The plants produce fair tonnages of forage, are fair seed producers, and have good winter frost tolerance. (Brooksville)

Pennisetum pedicellatum - PI-284177 and PI-213527. The PI-284177 accession is a strong annual grass whereas the PI-213527 has lived over one winter and its longevity is not yet fully determined. Both produce moderate numbers of fine, seven-foot-tall stems. Leaves are long and abundant with die-back on lower older leaves. It stands and grows vigorously even on flooded flatwood soils. Tonnage and seed production are good to very good. (Brooksville)

Pennisetum purpureum - PI-304190, PI-304192, and PI-304193. These new introductions from South Rhodesia are very strong perennial, bunch, weakly rhizomatous grasses. They have abundant, medium fine, moderately soft, well distributed leaves. Stems are abundant, coarse, and mostly erect. Recovery is moderately early, and generally in abundance. Grows 10 to 13 feet tall. (Brooksville)

Pennisetum purpureum - PI-300086. A 12-foot tall plant that produces an enormous amount of forage. Our cattle ate the leaves and stem. It was winter-hardy here last year. It did not bloom at Americus. (Americus)

Setaria sphaceolata - PI-165718. This strong plant from Kenya is a bunch type perennial. It has moderate numbers of medium, soft, erect stems. Fair winter tolerance. Good, very early, spring growth. Decumbent stems root at nodes. (Brooksville)

Stizolobium atterimum - PI-311517. A very strong, summer growing, bunch type legume with numerous long, strong vines. Very large alternate leaves occur in abundance. This accession blooms rather early (October 12) with a good quantity of firm seed produced by early November. The seed are large. (Brooksville)

Themeda anathera - PI-218114. A summer perennial with many fine stems and abundant leaves. Stems somewhat weeping. A fine looking forage plant for dry sites. Seed production is low. (Coffeeville)

Vicia sativa - PI-228304, PI-228305, and PI-230362. These three produce excellent volunteering in undisturbed soil, disked soil, and in undisturbed sod. All volunteer in October. They are all annuals, bunch type, heavy seed and forage producers. They produce abundant, fine, soft stems and leaves. PI-230362 produces the most forage while PI-228304 produces the most seed. PI-228304 and PI-228305 are strong while PI-230362 is rated very strong. Size ranges from 10 to 16 inches tall, and from 24 to 48 inches wide. July live over 14 by 14 inches. (Brooksville)

Vicia villosa - PI-229970. This unusual Iranian vetch is rated excellent in nearly every way. It starts blooming January 15 and continues in heavy production of racemes of trumpet-shaped flowers until it completely dies in late June. Forage production is a large mass of vines, leaves, and flowers 24 inches high and 60 inches wide with some vines extending nine feet in length. Seed production is fair to good. (Brooksville)

Vicia villosa - PI-250796. From one year's observation, this vetch with six foot spread produced a large amount of fairly disease-free foliage. (Americus)

Vicia sp. - PI-179122. This plant has abundant, fine, soft leaves and stems. It is a strong, bunch annual. A fair seeder. Overall growth 10 inches tall to 36 inches wide. (Brooksville)

Vigna vexillata - PI-306266. This moderately-strong pea from Brazil is a bunch, vining, leguminous plant with moderately-strong seedling variations. It has abundant, medium soft, prostrate stems. Leaves are abundant, soft, and well distributed. Top growth is subject to frost damage, but new growth is produced during each warm period during the winter. Growth is generally 12 inches high and from four to ten feet wide, depending on how much the vines are permitted to grow. (Brooksville)

Observations from the Field

Field reports from some of our Field Plant Materials Specialists are given below to show how our work develops, and to give an added insight into the potential value in the field of some of the newer materials.

H. J. Haynsworth, Athens, Georgia, reports as follows:

Paspalum nicorae - PI-202044, Amcorae brunswickgrass. An evaluation planting on road backslopes was made in the Piedmont MLRA. A fair stand resulted from seeding with a hydroseeder in the summer of 1967. Some winter kill occurred with a fair to poor stand remaining in the spring of 1968. This grass rated fourth when compared to adjacent plantings of weeping lovegrass, bermudagrass, Wilmington bahiagrass, and King Ranch bluestem planted at the same time by the same method.

It was compared with Pangburn switchgrass and Pensacola bahiagrass for effectiveness in stabilizing ditch berms composed of spoil from newly dug ditches in the Atlantic Coast Flatwoods MLRA. Plantings were fertilized for two years with 500 pounds of 4-12-12 per acre per year. The stand of brunswickgrass plants obtained was fair to poor, about equal to that obtained from Pensacola bahiagrass. Pangburn switchgrass gave best overall stand. Growth and spread of brunswickgrass and Pensacola bahiagrass were about equal. Pangburn switchgrass outstripped Amcorae brunswickgrass and Pensacola bahiagrass on this critical site. However, all three grasses will develop satisfactory cover with two years fertilization.

Two waterways in the Atlantic Coast Flatwoods MLRA were seeded to Amcorae brunswickgrass. An excellent sod developed in one season. One of the waterways had been sprigged to coastal bermudagrass a year earlier resulting in a failure. Some of the bermudagrass had survived on the outer edges and was growing vigorously the second year but was unable to invade the sod of brunswickgrass. The brunswickgrass seedlings on this site have shown more vigor and establish much faster than bahiagrass observed on similar sites and under general conditions.

Lespedeza virgata - PI-218004. A two-acre planting of spreading lespedeza made in the spring of 1966 on a road backslope in the Piedmont MLRA continues to look good and give excellent cover. Some L. virgata plants on fringe areas are mixed with tall fescue and the two plants appear very compatible. Also, some small plots were seeded with lovegrass-L. virgata and common bermudagrass-L. virgata. These plots show these combinations to be as good as common sericea in these grasses in adjoining plots.

L. virgata is being used by the Georgia Highway Department in their vegetative program on highway rights-of-way.

The Georgia Forestry Commission continues to grow approximately 15 acres for seed production for the Highway Department's use. Annual production is about 3,000 pounds from this field.

Oglethorpe County, Georgia Commissioners plan to harvest seed from the two-acre field planting mentioned above this year. Seed will be used on their county road rights-of-way.

Arnold G. Davis, Temple, Texas, says:

Eragrostis superba, PI-295705, Wilman lovegrass will be evaluated for pasture use in the Rio Grande Plain starting this year. Two plantings have been made, more are planned for next year. Preliminary information have been obtained from a field evaluation planting at Prairie View A&M College and indicate this accession had limited potential at this location. Additional field plantings will be made further south and west.

Eragrostis curvula. Three comparison-type plantings containing weeping lovegrass PI-208994, PI-232813, Ermelo and common have not yielded conclusive information on palatability differences. Several additional

plantings of these four strains were made in the spring of 1968. Summaries of the results of these plantings will be furnished ARS, Woodward, Okla. in 1969.

Nineteen of the 37 grasses frequently harvested for seed or vegetative planting stock in Texas are native to the United States. The 18 introduced grasses that have gained sufficient acceptance to justify harvest in quantity are for the most part products of a selection or breeding process, and the PI numbers are not available. Those released with the PI number include:

Name	PI Number
Jose tall wheatgrass	Ex. 150123
Luna pubescent wheatgrass	106831
Gulf ryegrass	193945
kleingrass, selection 75	166400
Angleton bluestem	SPI-34934
Gordo bluestem	190302
Caucasian bluestem	78758

These produced a total of about 31,000 pounds of seed for commercial sale last year. In addition to this, an estimated 130,000 pounds of seed and an undetermined number of sprigs were harvested from varieties that contain material that was originally a product of the Plant Introduction program.

Native grass varieties that were harvested for seed production include all of the strains adapted for use in Texas. Over 2,700 acres of 19 varieties yielded an estimated one million pounds of seed.

And, finally, from Puerto Rico, Aurelio Sierra-Bracero, reports that:

Two promising grass species are being submitted to final evaluation under different site conditions in the Caribbean Area to determine their suitability in solving the conservation problems. These species are Cenchrus ciliaris, buffelgrass T-4464, and Star bermudagrass, Cynodon plectostachyus.

Buffelgrass plantings are under observation at the Caribe, Suroeste, and Noroeste soil conservation districts.

Star bermudagrass field plantings have been established at the Atlantico, Culebrinas, Oeste, and Sudeste soil conservation districts.

Besides field plantings on these two species, a field evaluation planting where 48 accessions of Cenchrus ciliaris and eight Digitarias are being evaluated was established at the Caribe soil conservation district. Initial performance notes are being included under tabulated form.

Digitaria decumbens. The main problem with pangolagrass as a pasture grass in Puerto Rico is its relatively high susceptibility to yellow aphid, Sipha flava, injury. Drought conditions seem to create the ideal condition for insect reproduction, making pangolagrass pastures practically improductive when not properly managed.

As we are dealing with an assembled group of Digitaria accessions belonging to different species, which present the same aphid susceptibility problem, special care was devoted to make the proper evaluation for the selection of those presenting the best resistance to this devastating insect. A 20-month observation study was conducted to determine the insect incidence and degree of infestation observed in individual accessions. Results are not yet complete but several of the new accessions are showing considerable resistence.

Tables attached (5)

Table I--Summary of Plant Introductions under Test by the Soil Conservation Service in the South Region - Fiscal Year 1968

Genera	Total Number under Test	Where Being Tested 1/					
		A	B	C	K	M	F
Agropyron elongatum	3	2			1		
Agropyron intermedium	3	3					
Agropyron junceum	1				1		
Agropyron obtusinaculum	1				1		
Agropyron trachycaulum	2				2		
Agropyron tsukushiense	1				1		
Andropogon condensatus	1		1				
Andropogon caucasious	1				1		1
Andropogon distachys	2	1			1		
Andropogon glabra	1	1					
Andropogon scoparius	13	6		9			
Andropogon sp.	1	1					
Anthoxanthum amarum	1	1					
Arachis burkartii	2	1	1				
Arachis glabrata	12	11	8			1	1
Arachis sp.	14	13	7	1	1		1
Arachis duranensis	1	1					
Arachis hypogaea	1	1					
Arachis villosa	4	1	3				
Arachis villosulicarpa	1	1					
Arachis monticola	1	1	1	1			1
Arrhenatherum elatius	1	1					
Arundinella hirta	1	1					
Astragalus sinicus	1		1				
Axonopus affinis	1	1					
Bothrichloa intermedia	1			1			
Bothrichloa ischaemum	8	2	2	2	5		
Brachiaria brizantha	5		5				
Brachiaria dictyoneura	1		1			1	1
Brachiaria dura	1		1				
Brachiaria erucaeformis	1		1				
Brachiaria humidocola	1		1				
Brachiaria lata	1		1				
Brachiaria nigropedata	1		1				
Brachiaria ruziziensis	1		1			1	
Brachiaria sp.	1		1				
Brachypodium mucronatum	1	1		1	1		
Brachypodium phoenicoides	3	3	1				
Brachypodium pinnatum	1				1		

Table I (continued)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Bromus erectus	5	1		4			
Bromus papovii	1			1			
Bromus sitchensis	1			1			
Bromus unioloides	1			1			
Bromus uruguayensis	1	1	1				
Bromus willdenowii	7	1	1	7	1		
Castanea mollissima	1						1
Castinopsis schlerophylla	1	1					
Cenchrus ciliaris	40	3	35	1		33	2
Cenchrus setigerus	5	3				5	
Chloris canterai	1			1			
Chloris caribaea	1			1			
Chloris castilloniana	1	1					
Chloris disticophylla	1	1					
Chloris gayana	11		9	1	8		
Chloris truncata	1				1		
Chloris sp.	1	1					
Chloris virgata	1	1					
Chrysopogon fulvus	3	1		3	2		
Chrysopogon gryllus	2				2		
Chrysopogon montanus	2			2			
Clitoria ternata	1				1		
Coelorhachis selloana	1	1					
Coronilla varia	9			9			
Coronilla sp.	2			2			
Crotalaria sp.	1	1					
Cryptomeria japonica	2	2					
Cymbopogon distans	1	1			1		
Cynodon dactylon	1	1					
Cynodon plectostachyum	1	1	1				
Dactyloctenium australe	1	1					
Desmostachys bipinnata	1				1		
Desmodium cinerascens	1		1				
Desmodium angustifolium	1				1		
Dichanthium annulatum	1	1					
Dichanthium aristatum	1				1		

Table I (continued-2)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Dichanthium sericeum	4				4		
Digitaria decumbens	1			1			
Digitaria diversinervis	2	1		2			
Digitaria eriantha	1	1		1			1
Digitaria macroglossa	1		1				
Digitaria milanjiana		2		3		26	
Digitaria milanjiana eylesiana	31	1	1	3		31	
Digitaria pentzii	29	2	3	4		26	
Digitaria scalarum	1		1				
Digitaria setivalva	17	1		2		17	
Digitaria smutzii	13	3				13	
Digitaria swazilandensis	3	1		1		1	
Digitaria sp.	2		1	1			
Digitaria valida	30	4		6		29	
Digitaria vestita	1		1				
Digitaria violascens	1		1				
Dolichos lablab	2					2	
Dombeya sp.			1				
Echinochloa colonum	1		1				
Echinochloa crusgalli				1			
Echinochloa holubii	2			2			1
Elymus giganteus	1				1		
Elymus sabulosus	1				1		
Elyonurus hirsutus	2				2		
Enneapogon cenchroides	5		5				
Eragrostis atherstonii	3	1	1	1	3		
Eragrostis bahiensis	1		1				
Eragrostis bicolor	1			1			
Eragrostis chloromelas	15	10	13		2		
Eragrostis curvula	21	1	9	14	10		2
Eragrostis curvula v. conferta	3		3	3			
Eragrostis japonica	1	1					
Eragrostis lehmanniana	11		7	7	10		
Eragrostis obtusa	3		3	3	3		
Eragrostis oxylepis	1				1		
Eragrostis porosa	1				1		
Eragrostis rigidor	1				1		
Eragrostis robusta	1	1		1			
Eragrostis sarmentosa	2			2			
Eragrostis superba	13		1	2	13		
Eragrostis sp.	1	1	1		1		
Euonymus fortunea	1			1			

Table I (continued-3)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Festuca ampla	4	3		1	2		
Festuca arundinacea	8	2		3	6		1
Festuca elatior	1	1		1			
Festuca orientalis	1				1		
Festuca psammophila	1	1					
Festuca uechtritziana	1				1		
Glycine flacata	1			1			
Glycine javanica	1	1					
Glycine koidzumii	1	1					
Glycine ussuriensis	1			1			1
Helianthemum variable	1				1		
Hemarthria altissima	4		4	1	1	1	1
Hordeum bulbosum	3	1			2		
Indigofera echinata	1	1					
Indigofera hirsuta	2	2					
Indigofera pseudotinctoria	1	1					1
Kochia prostrata	1				1		
Lathyrus annuus	1	1					
Lathyrus articulatus	1	1					
Lathyrus hirsutus	3	1	2				
Lathyrus sphaericus	1	1					
Lathyrus sylvestris	1	1					
Lespedeza bicolor	2	2					
Lespedeza cuneata	7	5	1	2			
Lespedeza intermixta	1	1		1			
Lespedeza japonica	1	1					1
Lespedeza penduliflora	1	1					
Lespedeza pilosa	1			1			
Lespedeza serpens	2	1	1	2			
Lespedeza virgata	1	1		1			1
Lespedeza henryii	1	1					
Lolium multiflorum	4			4			
Lolium perenne	55			55			
Lotononis bainesii	2	1	1				
Lotus conimbricensis	2	1	1				
Lotus conjagatus	1				1		
Lotus corniculatus	3	2	1				
Lotus decumbens	1		1				
Lotus hispidus	1		1		1		
Lotus major	1		1				
Lotus mearnsii	1	1	1		1		

Table I (continued-4)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Lotus ornithopodioides	3	3			1		
Lotus pedunculatus	62		62				
Lucina glauca	4					4	
Lupinus albus	1	1					
Lupinus angustifolius	3	3					
Lupinus luteus	4	4					
Lupinus ornatus	1	1					
Malus baccata	1	1		1			1
Malus hupehensis	1	1		1			1
Medicago ciliaris	1		1				
Medicago intertexta	2		1		1		
Medicago lupulina	1		1				
Medicago orbicularis	1		1				
Medicago polymorpha	2		2				
Medicago polymorpha v. vulgaris	8	8					
Medicago scutellata	1		1				
Medicago tornato	1	1					
Medicago tribuloides	1		1				
Medicago truncatula/tribuloides	1	1					
Medicago tuberculata	1	1					
Melilotus alba	1		1				
Melilotus alba v. annus	3	2			1		
Melilotus dentatus	1	1					
Melilotus italicus	1	1					
Olea europea	1		1				
Onobrychis viciaefolia	1	1					
Oryzopsis miliacea	1	1					
Osmanthus heterophyllus var. purpureus	1	1					
Osmanthus (x. fortunei)	2	2					
Osmanthus (x. osmarea)	1	1					
Panicum antidotale	8	7	1	1			
Panicum bisulcatum	1				1		
Panicum coloratum	42	11	4		30		
Panicum coloratum var. makarikariense	1	1					
Panicum makarikariense	2	2					
Panicum maximum	3	1	1			1	
Panicum miliaceum	35	35	1	1			
Panicum stapfianum	10	1	1		10		
Panicum virgatum v. cubense	1	1	1		1		

Table I (continued-5)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Paspalum alumum	1		1				
Paspalum bosciamum	6	4	4				
Paspalum brunneum	1	1					
Paspalum conjagatum	1			1			
Paspalum conspersum	1		1				
Paspalum cromyorhizon	3		2	1			
Paspalum dilatatum	21		1	20			
Paspalum guenoarum	2		1	1			
Paspalum hieronymii	2		2				
Paspalum intermedium	2		2	1			
Paspalum jurgensii	1			1			
Paspalum nicorae	24	24	1				
Paspalum notatum	15	9	2	11			
Paspalum paniculatum	2			2			
Paspalum pauciciliatum	3		3				
Paspalum pedicellatum	1		1				
Paspalum platyphyllum	1			1			
Paspalum plicatulum	6		6				
Paspalum purpureum	5		5				
Paspalum purpureum x. typhoides	1		1				
Paspalum sp.	4		4				
Paspalum quadifarium	2			2			
Paspalum umbrosum	2			2			
Paspalum urvillei	10			10			
Paspalum vaginatum	1			1			
Pennisetum alopecuros	1	1					
Pennisetum ciliare	1	1					
Pennisetum clandestinum	1	1					
Pennisetum purpureum	1	1				1	
Pennisetum unisetum	1	1					
Pennisetum sp.	3	2		1			
Phalaris angusta	1		1				
Phalaris aquatica	5	2			3		
Phalaris aquatica var. arundinacea	5			5			
Phalaris arundinacea	1	1					
Phalaris arundinacea var. tuberosa	1	1					
Phalaris tuberosa	5	5					
Phalaris tuberosa var. stenoptera	1	1					
Phaseolus lathyroides	6				6		
Phyllostachys bambusoides	1	1					
Phyllostachys bissetii	1	1					1
Pistacia atlantica	3	3	3	3	3		

Table I (continued-6)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Pistacia chinensis	1	1	1	1	1		1
Pistacia terebinthus	3	3	3	3	3		
Pistacia vera	2	2	2	2	2		
Poa iridifolia	1				1		
Psolralea bituminosa	2			2			
Quercus acutissima	2	1	1				
Quercus mysinaefolia	1	1		1			
Sanguisorba minor	2			2			
Salix aurita	1			1			
Salix interior	1			1			
Salix purpurea v. amplexicaulis	1			1			
Salix repens v. rosmarinifolia	1			1			
Salix x. chrysostala	1			1			
Salix x. wimmeriana	1			1			
Sasa pygmaea	1	1		1			
Setaria argentina	2	1		1			
Setaria australiensis	1	1					
Setaria flabellata	1	1					
Setaria gerrardi	1			1			
Setaria italica	1			1	1		
Setaria macrostachya	3			3			
Setaria neglecta	1			1			
Setaria sphacelata	3	1	2				
Sorghum sudanense	1	1					
Sporobolus fimbriatus	2	2			1		
Stipa hyalina	1				1		
Stipa nessiana	1	1					
Stipa pennata v. lessingiana	3	1			3		
Stipa splendens	2	2					
Stipa ucrainica	2	1			2		
Stylosanthes gracilis	3					3	
Tetrapogon mosambicensis	1		1				
Themeda anthera	1			1			
Themeda australis	1			1			
Themeda japonica	1	1					
Themeda triandra	4			4			
Thuarea involuta	1		1				

Table I (continued-7)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Trifolium agrarium	1		1				
Trifolium amabile	1		1				
Trifolium ambiguum	1		1				
Trifolium burchellianum	2	1	1				
Trifolium campestre	8		8				
Trifolium cheranganianis	1		1				
Trifolium cherleri	4			4			
Trifolium desvauxii	1		1				
Trifolium diffusum	1		1				
Trifolium globosum	2		2				
Trifolium glomeratum	2		2				
Trifolium hirtum	1		1				
Trifolium incarnatum	3	1	2				
Trifolium isthmocarpum	1		1				
Trifolium lappaceum	1		1				
Trifolium medium	5			5			
Trifolium meneghinianum	2		2				
Trifolium nigrescens	8	3	4	1			
Trifolium ochroleucon	1		1				
Trifolium pallidum	1		1				
Trifolium pratense	1		1				
Trifolium repens	2	2					
Trifolium resupinatum	10	1	9				
Trifolium spumosum	7	1	6				
Trifolium straitum	1	1					
Trifolium strictum	2		2				
Trifolium suffocatum	1	1					
Trifolium tomentosum	4	1	3				
Trifolium vesiculosum	5	2	3	2	1		2
Tripsacum latifolium	1				1		
Urochloa mosambicensis	1		1				
Vibrurnum dilatatum x. lobophyllum	1	1					
Vibrurnum lantana	1	1					
Vicia andicola	1		1				
Vicia angustifolia	3		3				
Vicia atropurpurea	1		1				
Vicia benghalensis	1		1				
Vicia cornigera	2		2				
Vicia cracca	1			1			
Vicia dasycarpa	2		2				
Vicia disperma	1	1					
Vicia fulgens	1		1				
Vicia globosa	1		1				
Vicia hirsuta	2		2				
Vicia lathyroides	1			1			
Vicia ludoviceana	1		1				
Vicia lutea	5		1	4			

Table I (continued-8)

Genera	Total Number under Test	Where Being Tested					
		A	B	C	K	M	F
Vicia macrocarpa	1		1				
Vicia narbonensis	4	1	3				
Vicia onobrychoides	2	1	1				
Vicia pannonica	2	1		1			
Vicia sativa	21		20	1			
Vicia sp.	3		3				
Vicia villosa	2	1	2				
Vigna vexillata	1	1					
Zoysia sp.	1	1					
* Total PI Under Observation	1144	345	394	303	180	196	24

* Total of A+B+C+K+M+F may be more than total for the South due to duplication of an item at two or more places.

1/ A = Americus Plant Materials Center, Americus, Georgia
B = Brooksville Plant Materials Center, Brooksville, Florida
C = Coffeeville Plant Materials Center, Coffeeville, Mississippi
K = James E. 'Bud' Smith, Jr. Plant Materials Center, Knox City, Texas
M = Mayaguez Field Evaluation Station, Mayaguez, Puerto Rico
F = Field locations on Soil Conservation District Cooperators' farms.

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TABLE II. -- Plant Introductions being Initially Increased by the Soil Conservation Service in the South - Fiscal Year 1968

P. I. Number	Species	Where Increased
261 099	Agropyron obtusiusculm	Coffeeville
116 976	Arachis glabrata	Americus
262 286	Arachis glabrata	Americus
262 287	Arachis glabrata	Americus
262 301	Arachis glabrata	Americus
262 794	Arachis glabrata	Americus
262 796	Arachis glabrata	Americus
262 797	Arachis glabrata	Americus
262 798	Arachis glabrata	Americus
262 801	Arachis glabrata	Americus
262 811	Arachis glabrata	Americus
262 814	Arachis glabrata	Americus
262 817	Arachis glabrata	Americus
262 818	Arachis glabrata	Americus
262 819	Arachis glabrata	Americus
262 826	Arachis glabrata	Americus
262 828	Arachis glabrata	Americus
262 834	Arachis glabrata	Americus
262 839	Arachis glabrata	Americus and Mayaguez
262 840	Arachis glabrata	Americus
263 393	Arachis glabrata	Mayaguez
151 982	Arachis glabrata v. hagenbackii	Americus
162 801	Arachis glabrata v. hagenbackii	Americus
262 851	Arachis burkartii	Americus
237 128	Axonopus affinis	Americus
247 404	Bracharia ruziziensis	Mayaguez
95 630	Castanopsis schlerophylla	Americus
215 586	Chrysopogon fulvus	Coffeeville
279 746	Cryptomeria japonica	Americus
279 748	Cryptomeria japonica	Americus
299 648	Digitaria macroglossa	Brooksville
295 689	Eragrostis curvula	Brooksville
295 700	Eragrostis curvula	Brooksville
295 703	Eragrostis curvula	Brooksville
295 698	Eragrostis lehmanniana	Brooksville
295 699	Eragrostis lehmanniana	Brooksville
234 218	Eragrostis robusta	Coffeeville
295 705	Eragrostis superba	Brooksville
299 993	Hemarthria altissima	Mayaguez
246 770	Lespedeza intermixta	Coffeeville
297 385	Lespedeza intermixta	Coffeeville

Table II. -- Plant Introductions being Initially Increased (continued)

P. I. Number	Species	Where Increased
99 907	Malus baccata	Americus
184 776	Panicum coloratum v. makarikariense	Americus
203 520	Panicum coloratum v. makarikariense	Americus
210 692	Panicum coloratum v. makarikariense	Americus
40 842	Phyllostachys bambusoides	Americus
246 337	Pistachia atlantica	Americus
276 702	Pistachia atlantica	Americus
276 703	Pistachia atlantica	Americus
91 608	Pistachia terebinthus	Americus
246 341	Pistachia terebinthus	Americus
246 342	Pistachia terebinthus	Americus
12 815	Pistachia vera (Trabonella)	Americus
17 250	Pistachia vera (Red Aleppo)	Americus
121 776	Pistachia vera (Kerman)	Americus
74 227	Quercus myrsinaefolia	Americus
218 114	Themeda anathera	Coffeeville
241 117	Trifolium medium	Coffeeville
228 301	Vicia sativa	Brooksville
228 305	Vicia sativa	Brooksville
230 362	Vicia sativa	Brooksville
229 970	Vicia villosa	Brooksville

TABLE III. -- Supplemental Seed Increases of Plant Introductions on SCS Plant Materials Centers in the South - Fiscal Year 1968

P. I. Number	Species	Place	Acres	Amount
78 758	Andropogon caucasicus	Knox City	1	100# seed
263 393	Arachis sp.	Americus	2	94# seed
		Coffeeville	1/8	100# seed
262 839	Arachis glabrata	Brooksville	4	1/
153 053	Brachiaria dictyoneura	Brooksville	1	1/
58 602	Castanea mollissima	Americus	6 trees	225# seed
271 198	Cenchrus ciliaris	Brooksville	1-1/4	18# uncleaned seed
215 586	Chrysopogon fulvus	Coffeeville	1/16	11# seed
106 663	Digitaria eriantha	Americus	1/10	1/
		Coffeeville	1/10	35,000 stolons
207 924	Echinochloa holubii	Coffeeville	1/16	27# seed
208 994	Eragrostis curvula	Knox City	1	170# seed
232 813	Eragrostis curvula	Knox City	1	180# seed
203 728	Festuca arundinacea	Americus	1	66# seed
163 453	Glycine ussuriensis	Coffeeville	3	975# seed
299 993	Hemarthria altissima	Brooksville	1	1/
197 075	Indigofera pseudotinctoria	Americus	1/100	4# seed
246 770	Lespedeza intermixta	Coffeeville	1/16	22# seed
218 004	Lespedeza virgata	Americus	3	160# seed
		Coffeeville	1	133# seed
122 586	Malus hupehensis	Coffeeville	1/16	3,300 plants
259 563	Panicum maximum	Brooksville	2	1/
202 044	Paspalum nicorae	Americus	4-1/2	476# seed
		Coffeeville	1/4	133# seed
		Knox City	1	200# seed
143 540	Phyllostachys bissetii	Americus	1	1/
21 970	Pistachia chinensis	Americus	6 trees	40# seed
		Coffeeville	1/16	1,725 plants
233 782	Trifolium vesiculosum	Coffeeville	4	717# seed
234 310	Trifolium vesiculosum	Americus	2	330# seed
249 880	Vicia lutea	Americus	2	89# seed

1/ Established for future production.

TABLE IV. -- Production of Registered and Other Foundation Seed from Plant Introductions on Plant Materials Centers - South, Fiscal Year 1968

P.I. Number	Species	Place	Acres	Amount 1/
Ex.196293	Echinochloa frumentacea (reg. Chiwapa japanesemillet)	Coffeeville	3	1000#
	Trifolium vesiculosum			
233782	(reg. Meechee arrowleaf clover)	Coffeeville	3	600#
234310	(reg. Amclo arrowleaf clover)	Americus	5	700#

1/ Approximate.

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TABLE V. -- Commercial Production of Seed and Plants from Newer Plant Introductions in the South - Fiscal Year 1968

P.I. Number	Name	Area of Production	Approximate Acreage	Approximate Production
Ex.150123	Agropyron elongatum 'Jose' tall wheatgrass	Texas	30	8000# seed
106831	Agropyron trichophorum 'Luna' pubescent wheatgrass	Texas	10	2500# seed
	Andropogon annulatus			
SPI-34934	'Angleton'	Texas	30	2500# seed
190302	'Gordo'	Texas	60	5000# seed
78758	Andropogon caucasicus Caucasian bluestem	Texas	20	2500# seed
	Arachis glabrata			
188457	'Arb' forage peanut	Florida	7	2/
268839	'Arblick' forage peanut	Florida	2	2/
153053	Bracharia dictyoneura netted signalgrass	Florida	2	2/
Ex.196293	Echinochloa frumentacea 'Chiwapa' japanesemillet	Tennessee	1	300# seed
163453	Glycine ussuriensis wild soybean	Miss.,La.,Ark.	10	2000# seed
Ex. 90664	Lespedeza japonica 'Va.70' japonica lespedeza	No.Carolina	nursery	1,300,000 plants
1/	Lespedeza thunbergii Thunberg lespedeza	Florida	nursery	2200 plants
218004	Lespedeza virgata spreading lespedeza	Ga.,Ala.,S.C.	16	3500# seed
193945	Lolium multiflorum 'Gulf' Italian ryegrass	Texas	10	2000# seed
166400	Panicum coloratum 'Selection 75' kleingrass	Texas	70	9000# seed
196292	Panicum miliaceum 'Dove' proso millet	N.C.,Ga.,Ala., S.C.	150	58000# seed
187098	Stylosanthes humilis --	Florida	20	5000# seed
233782	Trifolium vesiculosum 'Meechee' arrowleaf clover	La.,Ark.,Miss.	90	18000# seed

Total production of seed: 118,300 pounds; Total production of plants: 1,302,200; Approximate acreage: 522

1/ Assumed to be Ex. unknown PI number in part.
2/ Established for rhizome production.

Report for 1968 Meetings of Regional Technical Committees on New Crops

I. A. Wolff
Northern Utilization Research and Development Division

COMMENTS ON SELECTED PLANTS

Tephrosia vogelii: Research has been completed on the improved new analytical method for quantitative separation and determination of individual rotenoids by thin-layer densitometry. Application to breeding samples has already led to the interesting finding that one line contains only deguelin, no rotenone. One form of deguelin is at least half as toxic to houseflies as rotenone. In its natural state as it occurs in Tephrosia the efficacy of deguelin as an insecticide may be more nearly equal to that of rotenone. Preliminary leaf-stem separations in the laboratory have been encouraging. The objective is a practical economic process for separating the rotenoid-rich leaf fraction from less valuable stem material. A limiting factor in commercialization of the species would appear to be adequate seed set to make planting seed available at a practical price. In view of the utilization promise, it is hoped that this agronomic problem can be overcome.

Hemarthria altissima (PI 299995) vegetative material was supplied by S-9 representative Gordon Killinger for experimentation as a result of their observations that the grass when harvested emits a tealike odor. Laboratory brews prepared at NU were indeed reminiscent of tea in odor and taste. Preliminary rat experimentation indicates nontoxicity in the extract. Followup research seems warranted.

Sunflower: In view of resurgence of commercial interest in sunflower as a U.S. crop, especially in Minnesota and the Dakotas, some chemical research has been initiated at the Northern Division on this crop.

Briza spicata: Seed lipids from this grass were demonstrated earlier to be most unusual in composition in that they are comprised predominantly of glycolipids. The seed of the species are the richest known plant source of galactosyl glycerides. These glycolipids have been found to be excellent additives for increasing loaf volume in bread-baking. Considerable interest has consequently been demonstrated by industries in possible commercial production of such materials from Briza. Agronomic development is required to capitalize on this industrial interest and promise.

High Erucic Oilseeds: Reports are that there is significant and increasing market demand for oils like that of crambe seed. However, industry must be assured a continuing supply of raw material or they

are reluctant to produce and introduce to consumers products based on erucic oils. There has been some problem in getting a sufficient number of farmers interested in producing enough crambe acreage, even under contract. Rapeseed has become a major Canadian crop. Its potential for the U.S. also seems high but there is little active research to exploit that potential. Selection and breeding of agronomically adapted lines of high erucic acid content in the oil and low thioglucoside percentage in the seed meal are needed and could be rewarding.

Kenaf: On October 31-November 1, 1967, more than 100 individuals representing 29 producers of pulp and paper, nine equipment manufacturers, 20 research and consulting groups from 22 states, and seven nations outside the U.S. met in Gainesville, Florida, to discuss production and utilization of kenaf as a crop for pulp and paper. Keynote speaker, J. L. Gray, chairman of the Forestry Department at the University of Florida, described the increasing demands for cellulosic fibers and their likely shortage, at least regionally, within the next few decades. A demonstration of harvesting of 20-ft. kenaf stalks by a commercial (stock item) forage harvester-chopper was impressive, followed by an equally impressive pulping demonstration in the pilot plant of the Engineering Experiment Station at the University of Florida. Northern Utilization Division results were presented by three of our personnel. Two S-9 representatives took active roles in the meeting and program. The 2-day meeting provided an excellent opportunity for discussing both the potentials and problems of kenaf. Development of strains resistant to root-knot nematodes seems to be critical if the plant is to be commercialized in the United States.

Cuphea: Botanists have discouraged consideration of this genus because of poor agronomic characteristics. If there is any possibility at all of conversion to crop status through research the benefits would be great. Large markets exist for its coconutlike seed oil. All such oils are now imported.

Satureja hortensis: Firm yield and agronomic data on plots of substantial size are required for this species to find out if the linseed-type oil from its seed can be produced at lower cost than that of flaxseed. Many other species that provide oils of this type have also been found in the new crops program. Hopefully one will be adapted in the current flax areas to help farmers already producing such a commodity for industrial use.

Others: Utilization interest continues in other genera previously discussed such as Lesquerella, Limnanthes, Euphorbia (lagascae), and Vernonia but more active research awaits positive agronomic indications. Interesting biological activities are being discovered for

the trivernolin from Vernonia anthelmintica seed oil by General Foods Co. who has undertaken special pilot-plant extractions of several hundred pounds of seed supplied by the Northern Division (and grown by S-9 cooperators with CR).

SCREENING SAMPLES

June 1, 1967-April 30, 1968

	Increase from June 1, 1967	Total
Seed samples received.	685	9,525
Families	3	167
Genera	28	1,611
Species.	212	5,143
Incomplete identification.	24	501
Samples analyzed	585	7,832
(Seed received include 251 Brassica from India)		
(Received earlier 63 " " ")		
Oil samples analyzed		
GLC.	413	2,639
Samples disposed of without screening.	15	189
" deferred (hard to clean; special). . .	0	144
" " (4 replicates analyzed) . . .	6	--
Increase samples received.	506	1,676
" " analyzed.	466	1,231

SOIL CONSERVATION SERVICE

Lists of species available for examination in our chemical program have been received from two regions. The lists contained accessions not previously analyzed and may thus supplement to some extent samples received from the NCRB. However, most samples are in the grass and legume families so the need for a broad base of other samples remains urgent both in kind and number.

SAMPLES RECEIVED FROM REGIONAL COMMITTEES

The Regional Committees and the Regional Stations supplied 52 samples besides the 427 samples from the Indiana contract with CR on Vernonia. These included 14 Cruciferae, 10 Leguminosae, 7 Umbelliferae, 6 Compositae, and representatives of six other families. Two

of the samples, *Briza* and *Echium*, were used to provide oil for industrial studies. Oils from the crucifers ranged from 12 to 55 percent in erucic acid content. The low figure was from a variety of *B. napus*, Bronowski, that was very low in progoitrin and had only one-third to one-half as much total thioglucoside as other *B. napus* or *B. campestris*. *Anethum sowa* and *A. graveolens* from Kansas and Iowa both provide oil with about 80 percent (78-82%) petroselinic acid in the glycerides.

REPORT OF
NEW CROPS RESEARCH BRANCH, ARS, USDA
TO
REGIONAL TECHNICAL COMMITTEES
NE-9, NC-7, S-9, W-6

This report is intended to bring to the TC's a summary of overall research accomplishment by the New Crops Research Branch for the reporting period April 1, 1967-March 31, 1968. It is based on the Multiple Use Report. Although a portion of this report reflects other than regional activities, our entire program is of interest to the technical committees.

USDA AND COOPERATIVE PROGRAM

The nature of this program is to conduct investigations concerned with the introduction, evaluation, and maintenance of plant germ plasm in support of a strong and diversified agriculture for the United States. Both basic and applied research is undertaken in the areas of: economic botanical assessment of the world's plant resources and exploration for diverse germ plasm in the world centers of crop origins; agronomic, horticultural, and pathological evaluation of introductions as breeding stocks through a national cooperative program for sources of natural resistance to crop pests, as potential new crops and for other uses brought about by shifts in agriculture and industrial and medical technologies; and the preservation of important segments of germ plasm either as seed or as vegetative stocks. Leadership for this program is at Beltsville, Maryland.

Four national introduction stations are responsible for evaluation, maintenance, and/or quarantine of new introductions which require special handling: Chico, Calif., Miami, Fla., Savannah, Ga., and Glenn Dale, Md. The responsibility for preservation of seed stocks of national interest lies with the National Seed Storage Laboratory, Fort Collins, Colo. Cooperative new crops studies to determine significant agronomic characteristics of plants having valuable end-products are conducted cooperatively with Experiment Stations of Arizona, North Carolina, and Oregon. Four regional and one inter-regional introduction station deal with the evaluation of crop breeding stocks essential to programs in State Experiment Stations.

A contract has been established at Lafayette, Ind., to investigate the crop developmental problems of Vernonia anthelmintica, a natural source of epoxy acid in the seed oil.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Plant Introduction

1. Breeding Stock Introduction. The total number of accessions for 1967 was 6,403 and below average. These included significant collections of legumes (Brazil), guar (India), Solanums (England), peanuts (Israel), and rhododendrons (England). A breakdown by crop categories included 2,230 cereals, 1,164 forage plants, and 984 ornamentals. By contrast, only 26 cotton and fiber plants and 10 tobacco lots were inventoried. There were no contributions from PL 480 Branch sponsored projects, which cover collecting for utilization screening. There are prospects for sources of desirable vegetable and forage materials from projects in India during the next year or two.

a. International exchange. This program resulted in 2,000 shipments of U.S. plant materials to 102 different countries, covering approximately 36,000 items. There is an increased demand for human food crops (cereals, vegetables, and oilseeds) whereas a few years ago the trend was toward other crop categories. The exchange relationship with the Soviet Bloc continued productive through receipt of 224 accessions, with the Soviet Union (119), Poland (55), and Hungary (52) contributing the most items. Greatest demands for U.S. breeding stocks come from Australia, Brazil, India, Israel, Japan, and South Africa.

b. Foreign exploration. There were five explorations successfully conducted in 1967:
(1) Most significant was the Skrdla-Brooks expedition to the Soviet Union with special emphasis on fruit and forage germ plasm. Approximately 500 collections were returned with the collectors, and an additional 130 received through requests left with cooperating Soviet agencies. Major categories included 288 forage grasses and legumes, 121 fruit and nut crops, and 69 ornamentals.
(2) The last of a series of explorations under the USDA-Longwood Gardens Cooperative Program covering the Orient was conducted by J.L. Creech in Taiwan. No exploration had been undertaken there since 1918. It is considered an excellent source of a broad range of ornamentals for American gardens. Many of the plants normally found there are also representative of Mainland China. Approximately 150 collections were obtained, including rare rhododendrons and unusually graceful conifers.
(3) A most valuable contribution was made to the "world" sorghum germ plasm pool being developed in the United States and India. Through joint cooperation with the Rockefeller Foundation, a three-man team (Leese-Peters-Rachie) went to Ethiopia after detailed planning.

Emphasis was placed on high-elevation and wild endemic types. The collectors found the Kambolcha area most productive for species range, and Nekempti most significant for endemic forms. Millets and legumes were also collected on occasion, and the total accessions approached 1,500. Rather extensive individual head samplings were taken among some of the sorghum colonies. In addition to seed obtained, valuable surveys were made for a future series of explorations in Ethiopia.

(4) Background studies have indicated that Leucaena can be made a valuable tropical forage legume through breeding techniques. The Branch sponsored a special trip for J. L. Brewbaker (Hawaii) to obtain material for taxonomic, cytogenetic, and breeding research. Efforts were concentrated in Mexico, parts of Central America, and Colombia. One hundred and fifty collections, including what is considered the 10 basic species of this genus, were obtained. A survey indicated need for more collections in Central American countries.

(5) The fourth and final phase of Phaseolus collecting was completed in Mexico, concentrating upon wild forms reported earlier as being the best source of specific disease resistance (Gentry). A total of 120 collections were made, and included those located after intensive search closely related to the true progenitor of the common bean. This material will be extremely useful, not only for breeding purposes, but for future evolutionary studies.

c. Domestic exploration. Two major domestic projects were supported in 1967. The first was the collection of native and naturalized forage grasses in Alaska (NC-7). Reports indicate there have been 339 collections made to supplement those made prior to 1967 by the Alaska Experiment Station. The 1967 additions included 129 Poas and 77 Festucas. Additional collections made strictly for taxonomic purposes will be available later for agronomic evaluation. An additional 282 accessions were placedon inventory from the NC-7 project for hardy ornamentals and ground covers (Viehmeyer) completed in 1966.

The collection of wild Vaccinum species (S-9) made considerable progress through special collecting in northern Florida and southern Georgia. This area was covered by two trips, the first providing 60 accessions. These along with the 23 species of softwood cuttings and seed samples of eight species from the West Virginia-Virginia border in 1967 will provide a valuable germ plasm pool for the improvement of native blueberries for the southeast. There were no projects supported for W-6, but the Leucaena collecting in Latin America by Dr. Brewbaker (Hawaii) had the general support of W-6 without prior formal technical committee action. NE-9 prepared an evaluation report covering the Ledums originally collected from various elevations on Mt. Washington in 1965. Preliminary observations for this collection were disappointing in that very little genetic variation was noted.

d. Support for AID missions. Requests for plant material under this special project remained at the 1966 level. Most activity centered in the African Region where 11 countries received stocks. The largest total, however, went to the Near East - South Asia Region. Technical consultation continued at a high level, and the February-May field trip to NESA countries provided an excellent opportunity to improve liaison and ultimate goals in the program.

The cacao and coffee collection in Miami remains in excellent shape. Of the 250 cacao clones 191 have indexed negatively to certain virus and have been released from quarantine. There is a reserve collection at Mayaguez rapidly approaching a similar number. A publication covering descriptions was completed and issuedto interested cooperators. Evaluation of coffee for disease reaction continues. The ultimate value of this germ plasm was greatly enhanced through the recorded outbreak of a new and devastating disease in Kenya affecting the berries.

e. Maintenance of germ plasm. Total accessions in the NSSL have reached 67,000. During 1967 there were 254 requests received for breeding material not available elsewhere. Special effort was made through various forms of publicity to locate genetic stocks, but this resulted in little response to date.

Studies were continued on effects of vacuum, inert gases, storage temperature, and seed moisture content upon longevity of stocks held in sealed storage. Due to slight changes in viability during the first five years of this study, germination tests will be made biennially starting in 1969.

The flexible moisture barrier materials for long-term storage continue to show variation in efficiency among the products being used. Highest viability has always been found with low moisture content at the time of original packaging.

More attention is being given to preservation of valuable collections assembled in foreign countries under PL 480 projects and related technical assistance programs. A good example was the procurement of 400 legume seed samples from a special project closed out in Brazil. Similarly, 226 grasses and legumes were accessioned upon termination of a Forest Service project in Spain. Conversion and classification of the Indian "world" sorghum collection at Mayaguez, Puerto Rico, is progressing satisfactorily. Samples will ultimately go into NSSL.

f. Centers of crop origin. Studies leading to basic information on centers of diversity, biogeographic distribution, and sources of

resistance of cultivated plants were continued. Preliminary bibliographic reviews indicate that alfalfa probably originated in Mongolia, then introduced into the Near East (Iran) which has been considered the center of origin. Studies of gene centers for peanut were utilized for a proposed collecting trip to Argentina and southern Brazil. Three publications appeared in 1967 related to the above studies.

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2. Plant Resources

a. Plant taxonomy and nomenclature. Detailed taxonomic study of species of Vernonia defined the morphological limits of section Stengelia, source of seed oil rich in epoxy oleic acid.

Festuca arundinacea, an important grass for forage and erosion control, is difficult to distinguish from F. pratensis. Field and herbarium studies established that these species can be separated by a combination of four characters.

The text of a comprehensive seed identification manual for 35 native and naturalized vetches was completed. The manual will appear as an Agricultural Handbook.

A total of 217 USDA scientific manuscripts were checked for accuracy in the use of scientific names of plants; 687 plant specimens and 1700 seed samples were identified.

b. Botanical investigations of new crops. Chemico-botanical screening in the carrot family yielded 10 species that combine good crop potential with high percentages of petroselinic acid in the seed oil. Especially promising from both the botanical and chemical standpoints are two species of the genus Bifora from Yugoslavia: B. testiculata (41.5% oil, 81% petroselinate) and B. radians (49.5% oil, 75% petroselinate).

A survey of high iodine value (I.V.) seed oils produced more than 80 species with I.V. 200 or above. The majority of these species are in the families Boraginacea, Euphorbiacea, and Labiatae. Many of their seed oils contain unusual fatty acids which may contribute properties to films and reaction products superior to those in current commerce. The Linseed Oil Technical Committee of the National Flaxseed Producers Association has indicated the acceptability of these oils for industry and their interest if yields higher than flax can be obtained.

Forty seed accessions representing about half the species of Vernonia section Stengelia were analyzed for oil and epoxyoleic acid content. These analyses confirmed the widespread occurrence of high percentages of epoxy acid among the members of section Stengelia. One accession from Kenya was superior to V. anthelmintica in both percent of oil in the seed and percent of epoxy acid in the oil.

PL 480 projects continued to supply practically all of the samples entering the seed screening program during the reporting year. India supplied 358 samples, Korea 45, Pakistan 7, and Sweden 6, for a total of 416 samples. Budgetary limitations and foreign travel restrictions

have drastically curtailed the intensive follow-up botanical studies essential to evaluate the crop potential in selected plant groups. Past experience has demonstrated that only staff botanists can handle these investigations effectively.

Joint botanical and chemical evaluation resulted in the selection of 30 species for further agronomic and chemical study. These leads from the seed screening program were recommended to Chemurgic Crops Investigations for increase at Federal and regional stations.

c. Anticancer screening. A total of 1722 plant samples were supplied to laboratories designated by the Cancer Chemotherapy National Service Center for preparation of extracts for anticancer screening. This number includes 1584 samples for preliminary screening, 6 recollections of preliminary actives for completion of screening, and 132 recollections of confirmed actives. An additional 1617 collections were made and identified and are now ready for shipment. These include 1583 samples for general screening and 34 recollections of confirmed actives. The total field effort to date has yielded more than 160% of the year's quota.

Camptothecin, the active constituent of Camptotheca acuminata, successfully passed pre-clinical pharmacological evaluation and was cleared for clinical trial in human patients. The drug is expected to reach clinical trial by late summer 1968.

Two active agents were isolated in crystalline form from bark of Taxus brevifolia. One is a new alkaloid, "taxol" that has a broader spectrum of anticancer activity than camptothecin. Taxol is active in five tumor systems including the highly regarded Lymphoid Leukemia L-1210.

The roots of Thalictrum dasycarpum are the source of the anticancer agent thalicarpine. The supply of roots from natural stands is very limited. Chemical analyses of samples collected in 1967 indicate that seeds are a much better source of the active agent. Field studies of natural stands suggest that T. dasycarpum has good crop potential. Thalicarpine is ready for pre-clinical pharmacological evaluation in preparation for testing in human patients.

A plant from Utah has shown very high activity in the Walker 256 Intramuscular cancer in rats. Fractionation of this plant to isolate the active agent is still at an early stage; yet, in some assays, tumor growth was reduced to as little as 4% of that in control animals. (A Test/Control value of 44% indicates significant anticancer activity.)

This and preceding reports have mentioned only the more spectacular plants in the cancer screening program. Screening, since 1960, has detected significant activity in samples representing 1018 species in 620 genera and 133 families. Chemical research, including identification of active constituents, has been completed on about 300 species. Sixty species were rejected because activity was due to tannins. Fractionation is now proceeding on more than 225 species.

d. Plant sources of gums, resins, and waxes. A manuscript was completed on Balata, a gum obtained from South American species of Manilkara. This valuable gum has been imported in appreciable quantities for more than 100 years. It has a wide variety of industrial uses. The manuscript contains information, previously unavailable, on the extraction and processing of the gum.

e. Vegetation studies of tropical regions. Considerable time was devoted to completion of a comprehensive report, fully illustrated with maps, photographs, and drawings, on "Forests of Southeast Asia, Puerto Rico, and Texas." This report compares the forest formations of Southeast Asia, in terms of similarities and dissimilarities, with those of tropical America as represented by Texas and Puerto Rico. Through detailed descriptions of vegetation types, set against background discussions of climate and soils, the report becomes a critical tool in guiding and interpreting research on the effect of herbicides on woody plants. This research, conducted in Puerto Rico and Texas, must be interpreted in terms of its application to problems in Southeast Asia.

A summary of the above report was published as Chapter I of Publication CR-13-67 (Crops Protection Research Branch), "Research Report ..... Response of Tropical and Subtropical Woody Plants to Chemical Treatments."

New Crops Research Branch activity on this project (under ARPA Order 424) terminated with publication of this report.

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B. New Crop Evaluation

1. Horticultural Crops

a. Fruits and nuts. Interest in planting the Chinese Gooseberry (Actinidia chinensis) continues because of publicity given this new crop by local California television stations and newspapers. Part of this publicity was stimulated by a cooperator at Paradise, California, who produced 1,600 pounds of fruit from one-fourth acre. The fruit sold wholesale for seventy-five cents per pound.

In a propagation experiment with leafy cuttings of Chinese Gooseberry under intermittent mist and with bottom heat, tip cuttings rooted 100% while cuttings from lower positions on the stem gave 70-80% rooting. The tip cuttings had a higher mortality rate after transplanting, however. Wounding the stem base and hormone treatment favored rooting.

The wasp Megastigmus pistaceae was discovered in pistachio nuts at Chico, California, for the first time last year. This is a serious pest of pistachio nuts in Iran and the Mediterranean area. It is frequently intercepted in commercial shipments of nuts. California State authorities are attempting to eradicate the pest before it spreads to commercial orchards.

In an experiment at Chico, Pistacia vera budded on rootstocks of P. integerrima produced superior growth. The latter species is subject to winter injury at Chico when young and is difficult to establish. The next best combination from all respects was Pistachio on P. terebinthus.

Fruit research at Glenn Dale Station is concerned both with techniques for virus detection and identification and the indexing of clonal introductions of apple, pear, and grape. Results to date indicate that apple introductions are more likely to be infected than the other fruits. Older apple introductions were about 70% infected. Most of the viruses detected are already common in the United States.

Weather conditions at Glenn Dale during mid-March 1967 provided an opportunity to evaluate several F_2 populations of peach for bud and blossom hardiness. These populations were obtained by crossing a hardy peach from the northern Caucasus with several American varieties.

During the critical period the minimum daily temperatures recorded were 30°, 26°, 17°, and 8° F. This followed a week of maximum temperatures in the 60's and 70's. Blossoms were completely killed on nearby Elberta trees while among the seedling populations survival varied from zero to 79%.

At Miami, evaluation of three monoembryonic mango seedling populations for anthracnose resistance, season of fruiting, and fruit quality was terminated after seven years. By that time about 87% of the trees had flowered and 76% had fruited. Thirty-nine seedlings were retained for further study. In the progeny of polyembryonic variety 'Ono', 18% had flowered and 8% fruited in eight years. Contrary to previous reports, none of the progeny that have fruited to date resemble the parent variety. Thus they are gametic, not nucellar seedlings.

A laboratory technique has been developed at the Miami Station to screen avocado introductions for cold hardiness. As a result, 27 seedlings have been selected for further testing in the field.

b. Vegetables. Emphasis during the year was placed on cooperative screening of vegetable collections for diseases and insect resistance. Much valuable data has been obtained and will be published by those performing the tests. Continuation of the bean collection program in Mexico resulted in a considerable number of new accessions representing wild species and primitive cultivated varieties.

In the Regional Plant Introduction Program the four cooperative stations grew Vegetable Plant Introductions as follows for evaluation and seed increase:

NC-7, Ames, Iowa - 679 introductions
NE-9, Geneva, New York - 1,000 introductions
S-9, Experiment, Georgia - 508 introductions
W-6, Pullman, Washington - 1,115 introductions

At Ames, Iowa, extensive screening tests continued for resistance to diseases and pests in vegetable introductions. Out of 200 carrot introductions screened, five were resistant to the northern root knot nematode; from 104 introductions representing six Capsicum species screened for green peach aphid resistance, one introduction of C. sinense amd two of C. pendulum were resistant; and seven tomato introductions out of 180 showed resistance to Rhizoctonia soil rot of the fruits.

Workers at the New York State Experiment Station reported that bean P.I. 181954 from Syria, may carry one or two recessive genes for resistance to halo blight.

Plant breeders at Clemson University released 'Ranger', a virus-resistant summer squash variety. Virus resistance came from P.I. 172,870, an introduction from Turkey.

'Atkinson', a new root knot nematode and Fusarium wilt resistant tomato of the Rutgers type, was developed and released by Auburn University. The root knot resistance was obtained from P.I. 128,657, Lycopersicon peruvianum, collected in Chile.

The gynoecious cucumber character first identified at the Plant Introduction Station, Geneva, New York, has now been utilized by commercial seed companies to produce the varieties: 'Crusader', 'Dutchess', 'Hiyield', 'Piccadilly', 'Hybrid 6758', 'Big Ten', and 'Princess'.

The Washington Agricultural Experiment Station has selected a turnip with bright red roots from P.I. 179863.

A non-bitter cucumber introduced from the Netherlands as P.I. 265887 has now been used in Japan to produce 'Burpless Hybrid No. 26'. The hybrid is now cataloged by several firms in the United States.

The USDA, Beltsville, Maryland, released lima bean variety 'Green Seeded Fordhook', the first green-seeded Fordhook-type in the trade. The new variety obtained resistance to downy mildew strain A from P.I. 164155 which was introduced from India.

c. Ornamentals. At Glenn Dale five final selections, three female and two male, have been made from 354 seedlings of the cross Ilex cornuta X I. ciliospinosa. The five selections are being tested by cooperators as potential new varieties.

Since 1960, approximately 4,000 intergeneric and interspecific crosses with the genus Camellia have been made at Glenn Dale resulting in 29 successful hybrids.

Selection from a dwarf pomegranate introduction, P.I. 300096, obtained as seed from South Africa, shows considerable promise for home landscape planting as well as for florist pot plants.

At the Miami Station the 'Rosemound' Dombeya was officially named and released as a cultivar. It originated as a seedling selection from P.I. 205654 which is believed to have originated in Reunion Island.

Two individuals in a seedling population from P.I. 194507, Lagerstroemia tomentosa, show an excellent non-fading flower character. At Miami this species flowers in the early autumn when few other trees are in bloom. Propagation studies are in progress.

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2. Agronomic Crops.

a. Forage crops.

(1) Grasses.

(a) Southern region. Three accessions of Hemarthria altissima (P.I. 299993-95) exhibit tolerance of cold and frost. They produce early spring and late fall growth, remaining green throughout the winter at certain locations in Florida. Drought tolerance is exhibited by plantings made on a dry site in Puerto Rico. All of these accessions are palatable to livestock and are undergoing advanced evaluation in fertility, production, and grazing trials. These accessions are also being evaluated in Hawaii.

Soil Conservation Service reports the superiority of certain grass introductions for seed and forage yield, palatability, rapid recovery following mowing and grazing, cold tolerance, and desirable growth characteristics.

Certain selected warm-season pasture grasses have been established on a dry site in Puerto Rico to evaluate drought tolerance. Materials included in this test include introductions of Cynodon, Digitaria, and Hemarthria. Cold tolerance in Digitarias is reported in an article published in the Agronomy Journal. Investigations involving cold and drought tolerance in Digitarias involve coordination and cooperation among State, Commonwealth (Puerto Rico), and Federal workers from other agencies; i.e., Soil Conservation Service. The coordinated approach in these investigations is producing results which have widespread significance when utilized by researchers and farmers alike.

(b) North-central region. One cultivar each of bluestem and switchgrass, released by Nebraska, was derived from domestic plant exploration.

Domestic exploration for grasses continues in Alaska. During the interim of this report, 225 accessions were collected, representing six genera.

(c) Western region. The Arizona Experiment Station and SCS PMC at Tuscon tested 292 lines of forage crops, including grasses and browse plants. Of these, 254 lines were increased for further evaluation.

Montana reports field evaluation and feed analyses of 20 Carex species.

(2) Legumes.

(a) Southern region. A pigeonpea (Cajanus cajan, P.I. 201066) from Pakistan has been increased for release as a green manure crop in North Carolina. This crop is more productive than Crotalaria in North Carolina; in addition, it is non-toxic to livestock. Soil Conservation Service reports certain introductions of Arachis species are outstanding as ground cover, and as legume crops in pastures; one accession, P.I. 151982, is especially promising in a grass-legume combination for lawns.

(b) North-central region. Introduced Medicago germ plasm contributed to a breeding line from Nebraska and three varieties--one from Maryland and two from Arizona.

(c) Northeastern region. Winter hardiness and good spring recovery is reported for Medicago sativa from Turkey and U.S.S.R.

Winter hardiness is exhibited by birdsfoot trefoil, Lotus corniculatus, germ plasm from South Africa (P.I. 300014) and Uruguay (P.I. 304280).

White clovers from the Netherlands, South Africa, and U.S.S.R. exhibit vigor, leafiness, excellent growth rate, and good fall recovery.

b. Field crops.

North-central region. Corn germ plasm from U.S.S.R. contributed to a hybrid released by a commercial seed company.

The transfer of corn germ plasm to NSSL continues, limited by the number of lines which may be increased each growing season.

c. Pathological screening.

(1) Southern region. Pathological investigations continue on peanut and sorghum--two main crops of the southeastern U.S. Field plantings of sorghum were used in an advanced screening program in cooperation with the University of Georgia. Research on peanut diseases involves investigations on peanut mottle virus and Cercospora leaf spots.

(2) North-central region. Over 300 corn introductions were screened from field plantings for multiple disease resistance. Current results indicate Diplodia stalk rot resistance in six accessions, rust resistance in seven introductions, northern leaf blight resistance in three introductions and smut resistance in 12 accessions. Of 301 corn accessions tested for European corn borer, 20 introductions are reported resistant.

Resistance to Pseudoplea leafspot is reported for eight alfalfa introductions from 300 accessions screened. Introduced Medicago germ plasm is being screened on a national scale by private, State, and Federal researchers in the search for insect resistance.

The placement of an entomologist at NC-7 should provide a much-needed contribution in an area of research which is becoming increasingly significant in the search for insect resistance in agronomic crops of major economic importance.

(3) Northeastern region. White clover germ plasm from Algeria, Finland Spain, South Africa, and U.S.S.R. demonstrates resistance to leaf hopper damage.

Powdery mildew resistance occurs in 17 red clover introductions.

Screening tall oatgrass in search of resistance to crown rust has been completed. A summary report of this research is included in the literature cited. Current research includes screening meadow fescue, Festuca pratensis, for resistance to this disease. A new race of Puccinia coronata var. avenae is reported to attack Arrhenatherum.

(4) Western region. The Regional PlantIntroduction Station at Pullman is admirably located for field evaluation of certain plant diseases because it lies outside the production area of many agronomic crops. Safflower may be used as an example to demonstrate the continued cooperation with a state (California) in pathological investigations. Field plantings of safflower for pathological investigations may be safely made at Pullman, as it lies outside the production area of this crop. These plantings represent a major adjunct to the pathological investigations of this crop in California. High Fusarium wilt resistance in safflower is reported from California for germ plasm from Afghanistan,

Iran, Israel, Jordan and Syria. California reports that one safflower accession, P.I. 262440, is resistant to Verticillium wilt.

Arizona reports insect resistance for one safflower accession and resistance to rust, Puccinia carthaini, for 18 accessions.

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3. Chemurgic Crops.

a. Oilseeds

Vernonia anthelmintica - Seed yields and oil and epoxy acid content were generally higher in 1966 and 1967 for several selected breeding lines at the Southern Indiana Forage Farm than at Lafayette. Oil content was low in 1966 at both locations but was better in 1967 with some lines containing 27 to 29% oil. F_3 seed is being produced in 1968 from crosses in an inheritance study involving three characteristics and in a flower color inheritance study. Approximately 12 of the better breeding lines are being increased in 1968. Germination of seed from which the pericarp and seed coat were removed was excellent within six days. Some increase in germination resulted from removal of the pericarp, but the response may have been due to damage of the seed coat during dehulling.

At Glenn Dale, Md., a Purdue breeding line yielded 1,250 pounds of seed compared to a yield of 808 pounds for P.I. 283729, an unimproved, later maturing accession. Yields from both lines were very low from a post-frost harvest on October 24. According to tetrazolium tests, seed harvested after frost had less than 50% viability. VS 65-224, a Purdue selection, is shorter and more determinate than most Vernonia lines. It appears to have a very good yield potential especially if grown in narrow rows, but its seed is lighter in weight and somewhat lower in oil content as compared to other promising selections.

Attempts to increase seed of several Vernonia accessions from Africa under greenhouse conditions in Georgia have not been overly successful. Many species did not bloom during the short days of winter perhaps because of their perennial nature. Seed has been sent to Mayaguez, Puerto Rico, for increase and evaluation under field conditions.

Lesquerella species - Performance of Lesquerella at Tucson, Arizona, in 1966-67 was poor compared to the preceding year. Prospects in 1967-68 are good. There is an abundance of wild stands in the desert of L. gordonii, L. palmerii, and other species. Some stand of highly upright types have been located and seed collection and individual plant selection will be carried out.

Fall plantings at Tucson were made on November 18, 1967. More than 50 accessions representing 14 species and progeny rows from individual plant selections of L. gordonii and L. palmerii were planted for increase, observation, and selection.

Several accessions were treated with gibberellic acid (for improved germination) and planted at several locations. In general, these plants have not been successful perhaps because of soil acidity, seedling diseases, late planting, and a cold winter with relatively little snow cover.

Limnanthes species - Thirteen accessions of Limnanthes were fall (1966) and spring (1967) seeded at Corvallis, Oregon. Yields from the spring seeding were negligible. From the fall (October 18) planting, yields of L. douglasii, L. alba (2 accessions), L. alba versicolor, and L. gracilis exceeded 1,000 pounds per acre in wide rows (30 inches). The use of narrower rows should result in substantial yield increases. L. macounii was prostrate in habit. L. striata, while fairly prostrate in habit, had better seed retention characteristics than other species.

Although problems of seed retention, plant uprightness, weed control, and harvesting exist, Limnanthes continues to show promise in Alaska. The suggestion has been made that future research there be largely limited to L. douglasii, L. douglasii var. rosea, L. alba, and L. alba versicolor. The first two species are very productive; L. alba, while low yielding, has better seed retention and more uprightness than other species; and L. alba versicolor is more productive than L. alba.

An intensive breeding program is needed to develop varieties with good seed retention, upright habit, and which are more amenable to machine harvesting.

b. Annual pulp crops.

Kenaf (Hibiscus cannabinus L.) - The experimental acreage of kenaf for pulp in the United States in 1967 was just under 200 acres. Considerable acreage (1500-1800) is used for bean pole production in southern Florida. Industrial interest continues to rise both here and abroad. Nematode damage was observed in plantings in Texas, Mississippi, Florida, and Georgia. Much effort is needed in breeding and screening breeding lines for nematode resistance. There is also an interest in broadening the range of adaptability of kenaf especially in the Midwest and Northeast. Some Russian lines developed for northerly latitudes are being tested.

There were about 100 attendants representing the pulp and paper industry, equipment manufacturers, and State and Federal research institutions at the Kenaf Conference on October 31-November 1, 1967, at Gainesville, Florida. Various aspects of production, harvesting, handling, and pulping were discussed. Demonstrations included a varietal trial, a harvesting operation with a one-row forage chopper and a laboratory pulping run. The group concluded that, while kenaf has a good potential and problems confronting its commercialization are not insurmountable, the research effort should be expanded. The specific areas of research recommended included production to maximize yield, utilization to seek optimum processing procedures and engineering to develop improved procedures for harvesting, handling, and storage. Considerable emphasis was placed on the need for a concerted breeding program to develop nematode resistant and distinct pulp varieties.

Ten varieties were grown in 38- and 19-inch rows at Gainesville, Florida, in 1967. Rows were bedded in the wide spacing. Excellent yields of 8 to 10 tons per acre were obtained for several varieties for both row widths. Generally, comparable yields were obtained with 50 to 60,000 plants in 38-inch rows and 90 to 100,000 plants in 19-inch rows. The varieties BG 52-75 and Cubano yielded very well in both spacings with low plant density. For example, the yield of BG 52-75 was 9.98 tons/acre in 19-inch rows with a population of only 21,500 plants per acre. A variety-population test which included these two varieties has been arranged at three locations in 1968. Yields were low at Clemson, South Carolina, and Plymouth, North Carolina, partially because of a late planting date. At Glenn Dale, Everglades 71 was the top yielder (6.06 tons/acre) but this yield was not significantly greater than yields from the varieties G-45, Everglades 41, G-4, C-108, P.I. 305080, and C-2032. The best yield of Everglades 71 from eastern Maryland (Wye Institute) was 5.4 tons/acre (nonirrigated) from an October 25 harvest. Yields of about 8 tons/acre were obtained for Everglades 71, Everglades 41, and C-108 in Georgia. Delayed planting in Georgia resulted in drastic yield decreases. The yield from a May 2 planting was 7.5 tons/acre as compared to yields of 4.8 and 2.3 tons for June 8 and June 26 planting dates, respectively. There was no difference in yield from either 2 or 4 plants per foot of row regardless of row width in 1966 and 1967 trials in Georgia. Yields from 12- and 24-inch rows were greater but not always significantly so than from 36-inch rows.

c. Promising species undergoing preliminary evaluation.

Interest in Briza spicata as a source of glycolipids is being expressed by industry and research groups. This species has performed well at Glenn Dale, Md., and Chico, Calif. It is a short, upright plant that has excellent fruit retention and is best grown as a winter annual. It is fairly intolerant to hot summer conditions. A yield of approximately 800 lbs/A was obtained at Glenn Dale. Individual plants are not overly productive but yield improvement through selection may be possible. The species is probably self-pollinated. Direct combining appears feasible.

Satureja hortensis (P.I. 226649) plantings have been very successful in Washington, Iowa, and New York. This species flowers indeterminately but seed retention is good. Its major drawback is slow early development. A few plantings up to ½ acre in size are planned for 1968.

Several species of Brassica, especially B. campestris, B. hirta, and B. napus are very productive and have high oil content and medium to high content of erucic acid in the oil. B. napus is probably best grown as a winter annual; B. campestris varies; and B. hirta as a spring annual. Breeding activity, especially in B. campestris for vigor, should be very fruitful. With the development of distinctive winter and spring varieties, wide adaptability and versatility appears obtainable.

Other species that are promising include Chrysanthemum viscidi-hirtum, Picris echioides, and Saussurea candicans as seed oil sources of crepenynic acid, Daucus aureus, a seed oil source of petroselinic acid, and Isatis tinctoria, a seed oil source of erucic and triene acids.

For the most promising species in the preliminary stage of evaluation, a selection program is needed to assess the degreee of improvement that can be attained in a short period with minimum effort. If good improvement is possible and utilization aspects remain favorable, these species should be advanced to the developmental phase of the new crops program.

Tephrosia vogelii - Poor stands of breeding lines were obtained in North Carolina, but samples were provided to the Northern Utiliaztion Laboratory for analysis. A classification process based on air flow and some drying, being studied at the Utilization Laboratory, shows Promise; and a somewhat larger trial with plant material provided from LaFayette, Indiana, is being planned in 1968. A nitrogen-inoculation study was conducted at Clemson, S. C., and Glenn Dale, Md., in 1967. Although the Clemson data has not been analyzed, it appears that there was a slight response to nitrogen up to 100 pounds, and no response (perhaps a light yield depression) to seed inoculation. None of these differences are expected to be statistically significant.

Considerable data on inheritance of rotenoids and flowering and seed production characteristics have been collected and analyzed. These are critical areas in the ultimate success of Tephrosia as a new crop.

The inheritance data indicate a higher rotenoid content in progeny of some crosses than in either parental line. Cultural research will continue at a low level until seed is available of high rotenoid lines. Weed control and nematode and disease problems need more consideration.

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C. Tropical Crops (Mayaguez, Puerto Rico)

1. Insecticidal Crops. Seed yields of several Tephrosia vogelii breeding lines varied in response to different environmental conditions, but fertility of all lines remained low under all conditions. The location with the lowest temperature gave highest seed yield per flower in one test. Several tests indicated that hot, dry climates depress seed yields. Several deficiencies (poor pollen production, failure of anthers to dehisce, failure of self-pollination, failure of insect activity to accomplish fertilization, and premature abortion) act cumulatively, to restrict yields. No method has been found to improve significantly the seed production capability of the species.

Studies with several herbicides indicated that some can be used successfully for controlling weeds in plantings of T. vogelii. Trifluralin produced less crop injury than eptam or diphenamid.

A method was developed for extraction of rotenoids in much smaller solvent volumes than used previously. Several tests confirmed that complete extraction occurs in 15 hours or less when green leaf samples of 200 milligrams are shaken constantly in 5 milliliters of acetone. a thin-layer chromatography method was adapted as a standard procedure for quantitative determination of totenone and deguelin in acetone extracts. The combined extraction and assay procedures are suitable for analyzing large numbers of plant samples.

2. Drug Crops. Further studies with various species have not indicated a fully reliable method for determining virus infection in plants of Dioscorea floribunda or D. composita. Dark-treatment of host plants, before inoculation with sap from infected Dioscorea plants, did not improve results. Freeze-dried leaf tissue from infected plants, when stored three months at -15 degrees centigrade, showed little loss of potency.

Some herbicides have severely retarded development of Dioscorea tubers even when applied at low rates which do not inhibit top growth. Others, particularly eptam and diphenamid, have not restricted tuber growth. None of the non-injurious herbicides has controlled weeds for the time required to establish a good stand of Dioscorea plants. In recent tests flame cultivation in combination with herbicides has given best weed control.

Studies of old planting sites, after tubers have been harvested, revealed that large numbers of new plants develop from broken tuber pieces left in the soil. Where plant counts were made, the numbers of new plants exceeded the number of plants originally established. In some circumstances, Dioscorea fields probably can be reestablished after tuber harvest, without replanting new tubers.

3. Plant Introduction, Distribution, and Evaluation. The permanent cacao collection was increased by addition of new clones from several locations. The field plantings now contain 235 clones. An additional group of 52 clones is established in isolation greenhouses for virus indexing.

Many varied treatments of sweet potato stigmas failed to change the reaction preventing germination of pollen on incompatible stigmas. Intact and ruptured pollen grains gave positive reactions to several tests for various types of enzyme activity. Positive reactions were obtained from ruptured, but not from intact, stigmas. The results imply a passive role for the stigma in incompatibility reactions.

Seed plants from the sweet potato investigations program at Tifton, Georgia, were grown again to produce seeds for variety development programs at various locations in the States.

The sterility of the tomato variety Tiny Tim was shown to be influenced by genetic background. There is apparently an interaction between genic and cytoplasmic effects. A series of tests developed further information about the genetic system controlling self-incompatibility and self-fertility of Lycopersicon species. Results from several experiments suggest the possibility that the self-fertility allele does not function in the tomato; that the initial product of the incompatibility reaction may be inactive, and that cross-fertility results from interaction between two different S. alleles.

4. Spice and Special Crops. Various additives did not improve the effect of 2, 4-D sprays for inducing parthenocarpic development of vanilla pods. A non-aqueous carrier has been necessary in all studies, to obtain maximum fruit development.

Experiments demonstrated direct penetration of vanilla roots by hyphae of Fusarium, and showed that root injury is not necessary for fungus infection. Hyphae of a Rhizoctonia species were found in many vanilla roots. First observations indicate that in some instances a mycorrhizal relationship exists between the host cell and the Rhizoctonia fungus. Rhizoctonia is now believed to be a serious pathogen under some conditions.

Black pepper cultivars which have grown without apparent injury from Phytophthora were highly susceptible when direct stem inoculations were made. There is no evidence that any variety of Piper nigrum introduced into Puerto Rico is resistant to the disease.

A species from South America, Piper colubrinum, has been used as a rootstock in further grafting tests with black pepper. This species, found compatible as a rootstock and resistant to Phytophthora in Brazil, has been used as a replacement for other species on which P. nigrum scions failed to grow satisfactorily.

5. Plant Diseases. Oat and wheat rust nurseries were grown in the 1967-68 winter season for evaluation of rust resistance. Two isolated oats stem rust nurseries were used for testing 3750 entries. Low intensity light breaks for three hours each night shortened the time required for heading and increased the number of adult-plant reactions observed in the nurseries. Supplementary lighting was used also in a crown rust nursery for testing resistance of 1148 oats entries to race 264 crown rust.

In three separate nurseries, 5916 wheat entries were tested against three stem rust races. The group included 131 durum wheats in one nursery. These headed satisfactorily under supplemental lights, so that adult plant reactions were obtained in all cases.

6. Winter-season Breeding and Seed-increase. Cooperative winter plantings of seed increase, disease resistance screening and breeding line selection included sorghum, sweet potatoes, beans, lima beans, tomatoes, cantaloupes, soybeans, Vigna sinensis varieties and other Vigna species. Selections and seed increases were supplied for further ARS work in Maryland, Georgia, Texas, California, and North Carolina.

In the sorghum program 593 recovered F_3 dwarf lines were grown for further backcrossing to alien parents. Seeds were produced from about 1100 alien lines from the world sorghum collection.

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