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 Germ Plasm

University of Puerto Rico
Rio Piedras, Puerto Rico

July 11-12, 1969

AGENDA
S-9 TECHNICAL COMMITTEE MEETING
RIO PIEDRAS, PUERTO RICO

July 11-12, 1969

1. Registration
2. Roll call
3. Introduction of visitors
4. Welcome
5. Additions/deletions to and approval of agenda
6. Appointment of committees
7. Regional Station report
8. State reports:

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

9. Federal reports:

   Soil Conservation Service
   Utilization Research & Development Division
   New Crops Research Branch
   Cooperative States Research Service

10. Administrative Advisor
11. Disposition of seedstocks that are of no apparent interest to research workers; maintaining vegetatively propagated introductions.
12. Regional Station budget
13. Status of project outline and supporting projects
14. Plans for new crops research in 1970
15. Requests for new plant explorations
16. Regional publications (five-year cooperative publication)
17. Committee reports

Call to Order and Introduction

The S-9 Technical Committee Meeting was held in the Biological Science Building on the campus of the Agricultural Experiment Station, University of Puerto Rico, Rio Piedras, Puerto Rico on July 11, 1969. The meeting was called to order by the Chairman, Dr. C. S. Hoveland, at 8:30 a.m. Those attending the 1969 meeting were as follows:

S-9 Committee Members

C. R. Jackson	Administrative Advisor Georgia
W. R. Langford	Regional Coordinator Georgia
C. S. Hoveland, Chairman	Alabama
J. L. Bowers, Secretary	Arkansas
G. B. Killinger	Florida
H. W. Bennett	Mississippi
W. T. Fike	North Carolina
J. Velez Fortuno	Puerto Rico
J. A. Martin	South Carolina
C. I. Harris	Cooperative State Research Service Washington, D, C.
I. A. Wolff	Northern Utilization Research and Development Division, ARS Peoria, Illinois
J. L. Creech	New Crops Research Branch Beltsville, Maryland
W. C. Young	Soil Conservation Service Fort Worth, Texas

Others in attendance

G. A. White	New Crops Research Branch Beltsville, Maryland
S. M. Dietz	Coordinator, Regional Project W-6
D. D. Dolan	Coordinator, Regional Project NE-9
W. H. Skrdla	Coordinator, Regional Project NC-7

D. W. Barton	Administrative Advisor, NE-9
D. S. Douglas	Soil Conservation Service
Edwin James	National Seed Storage Laboratory
Peter Sweere	University of Puerto Rico
R. G. Creech	Pennsylvania State University
W. H. Gabelman	University of Wisconsin
W. H. Hardas	Delhi, India

The Chairman called for additions or corrections of the 1968 minutes which had been distributed. There were no additions or corrections so he declared the Minutes of the 1968 meeting approved.

Appointment of Committees

The following committees were named by Chairman Hoveland:

Nominating Committee	Resolutions Committee
W. T. Fike, Chm.	G. B. Killinger, Chm.
H. W. Bennett	J. A. Martin

Time and Place of Next Meeting

The place of the 1970 meeting was determined last year. It will be held at the Plant Materials Center, Americus, Ga., and the Regional Station, Experiment, Ga. The date will be set around the third week in July, to be determined by C. R. Jackson, S-9 Administrative Advisor, and our host state committee.

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 D.

Regional Station	W. R. Langford
Alabama	C. S. Hoveland
Arkansas	J. L. Bowers
Florida	G. B. Killinger
Georgia	W. R. Langford
Louisiana	E. N. O'Rourke
Mississippi	H. W. Bennett
North Carolina	W. T. Fike

Oklahoma	W. R. Langford
Puerto Rico	J. Velez Fortuno
South Carolina	J. A. Martin
Tennessee	W. E. Roever
Soil Conservation Service	W. C. Young
Northern Utilization Research & Development Division	I. A. Wolff
New Crops Research Branch	J. L. Creech G. A. White
Cooperative State Research Service	C. I. Harris

Regional Station

W. R. Langford, Regional Coordinator, gave a complete report on the activities of the Southern Regional Plant Introduction Station for the period of July 1, 1968 through June 30, 1969. He stated that 1280 new accessions were received during the last year, and the inventory of material maintained at the regional station exceeds 22,000 accessions. The work of Dr. Galletta on the domestic collection of Vaccinium, covering 235 accessions, was pointed out and the fact that Dr. Galletta's report had been circulated was mentioned. It was also brought out that Dr. Galletta feels the need for the continuation of this domestic collection. The coordinator pointed out the difficulty of maintaining certain stocks which do not flower and set seed at Experiment, Georgia.

The disease screening work on the watermelon mosaic virus was reviewed. The initial test showed some resistance found in 12 accessions but later tests proved these to be susceptible. The laboratory screening test for anthracnose in lima beans indicated some resistance but these lots did not manifest this same resistance in the field trials.

The regional station distributed 8354 packages of seed within the region and sent 4142 packages outside the region. Eight-thousand-three-hundred-thirty-six packets came into the southern region from other regional stations. Accessions sent to the National Seed Storage Laboratory amounted to 381. Herbarium specimens of 105 accessions were sent to Beltsville for identification. Although the inventory shows 22,000 accessions at the station only around 15,000 of them are available for distribution. Other materials must be increased again before further distribution can be made.

Florida

Gordon Killinger presented a very complete report on the participation in the program by his fellow staff members in Florida:

The 'Walter' variety of tomato named in honor of the late Dr. Jim Walter was released by the University of Florida. P.I. 126915 made a significant contribution in the development of 'Walter' and other varieties as the source of resistance to race 2 of fusarium. The tomato work is now under the leadership of Dr. J. W. Strobel.

Killinger's report covered the work being done by his fellow staff members on the following crops: ornamentals, yams, beans, water chestnuts, cantaloupes, a number of Dactylis glomerata accessions, two Festuca arundinacea accessions, numerous species of grasses, alfalfa, and several accessions of peanuts.

Dr. Killinger's work on Paspalum showed three accessions have promise but seed quality is poor. 'Norman' pigeonpea (P.I. 218066) shows promise as a cover, wind break, hay, and other uses. The plant accession P.I. 299995 (Hemarthria altissima) is being evaluated as a possible substitute for tea.

Rhodes in Florida reported pigeon pea was a host to both the sting and stubby-root nematodes.

Mississippi

H. W. Bennett reported that a program with 14 Junior Colleges within Mississippi is developing and this affords a new opportunity to look at many of the new plant introductions. He has been conducting cytogenetic investigations on 436 Paspalum introductions in an attempt to determine just what a species is. Considerable progress has been made in evaluating the domestic collection of apples, pears, and peaches.

Alabama

Hoveland reported that plans are being made to release a tabasco pepper variety to which P.I. 152225 and P.I. 159236 contributed resistance to tobacco etch virus and fruit rot. P.I. 140471 has contributed rootknot nematode resistance in the cantaloupe.

'Yuchi' arrowleaf clover (P.I. 233816) is becoming more widely used in Alabama. In-vivo dry matter digestibility of 'Yuchi' was found to remain high, above 65% throughout the growing season.

It was pointed out that 35 years of studies on bamboo have been summarized in a bulletin by Dr. D. G. Sturkie. Copies of the bulletin were distributed to committee members.

Georgia

W. R. Langford made the report for the Georgia Agricultural Experiment Stations. In studies by J. H. Massey on Helianthus annus the increasing of nitrogen rate above 50# per acre did not increase the seed yield. Each nitrogen treatment was better than check (No. N) on a yield basis. The work of H. B. Harris showed that three sorghum accessions, P.I.'s 248309, 250750, and 267367, possessed a good level of resistance to anthracnose on the basis of freedom of the disease on leaf, stem and heads. 'Tiflate' pearlmillet, developed from several African introductions, was released cooperatively by ARS and the Georgia Agricultural Experiment Stations.

Puerto Rico

Dr. Velez Fortuno pointed out that two clonal grape collections at the Fortuno Substation appear to be well adapted. These are Ponce-Blanca and S-3, a

local selection. Starchy root crops are being collected and tested with special emphasis on the true yam (Dioscorea). Digitaria decumbens (P.I. 299601) and D. swazilandensis (P.I. 299837) exhibited a high degree of resistance to rust. Panicum maximum (P.I. 259553) outyielded 15 other Panicum selections and it will be released for Puerto Rico. A total of 73 chick pea varieties have been obtained from the U.S. and foreign countries for testing in Puerto Rico according to Mr. Peter C. Sweere.

Arkansas

The Arkansas station reported that 34 ornamental accessions and 26 Vitis accessions were obtained for planting and evaluation since July 1968. The Southern Pea lines which had P.I. 221731 as one of the parents is outstanding from the standpoint of concentrated pod set.

North Carolina

Dr. W. T. Fike reported that staff members Strider and Konsler have found that Lycopersicum hirsutum P.I. 251305 exhibited a high level of resistance to bacterial canker. Several accessions of Pennisetum flaccidum showed considerable promise and were superior to orchard grass and fescue. These are P.I.'s 220606, 338714, 338715, 338716 and 338717. The domestic collection of Vaccinium has been summarized by Dr. Galletta. A request has been made to continue this program. 'Norman' pigeonpea will be used widely when seed become available. Oil-seed varieties of sunflower yield less in North Carolina than the bird-feed types. Yields of 20-28 tons of sugar beets per acre makes this a promising crop for the area. Higher yields of kenaf were obtained from close row spacings. The Brassica planting was killed out by one of the most severe winters on record.

Oklahoma

The Oklahoma station report was made by W. R. Langford. In a sorghum screening program, a selection was found that possesses good resistance to green bugs. Although the resistant line is a weedy type sorghum, it has already been used in crosses with sorghums that possess good agronomic characters. Several cowpea lines are being screened for resistance to fusarium wilt. Mung beans are being evaluated for use in Chinese foods. Twenty-eight accessions of mung beans grown at Perkins in 1968 ranged in seed yield from 387 to 777 pounds per acre.

Seed yield of 23 Cicer introductions and 6 selections from crosses ranged from 73 to 633 pounds per acre in a test near Stillwater in 1968. Leaf rust was severe on some Cicer strains causing them to ripen prematurely. The entire collection of Cicer introductions is being grown this year to replenish seedstocks at the regional station.

A selection from Cajanus P.I. 218066 was grown at Stillwater and Fort Cobb in 1968. Good seed yields were obtained at both locations. About 400 pounds of seed were harvested from the 2 small plantings.

Results from screening peanut introductions during the last 3 years indicate that resistance to thrips may be available in some accessions. Additional research is needed to determine the mode of inheritance. Sufficient seed of 466 peanut introductions were produced in 1968 to supply the regional station with shelled seed.

Results from plantings of Crambe, Euphorbia lagascea, and Brassica spp. were not encouraging. None of the Lesquerella introductions germinated. In the regional sunflower test of 18 strains seed yields averaged 911 pounds per acre. Thirteen Cynodon introductions were listed in the Oklahoma report as being used in a breeding program to develop better varieties of bermudagrass.

Plant breeders at Oklahoma State University now have a well designed and equipped space for storing seed of plant breeding stocks. The seed storage facility is in the recent addition to the agronomy building.

South Carolina

J. A. Martin reported that 87 accessions of seeds and plants were distributed in South Carolina since July 1968. The range of plants being tested in S. C. included many species of Trifolium. Work is also being carried out on screening for resistance to cucumber mosaic in melon accessions as well as to alternaria resistance.

Brassica accessions were lost during the winter and the loss was believed to be associated with soil heaving rather than low temperature effects. Some 200 accessions of okra are being studied from the standpoint of useable characters in a type suitable for mechanized harvest. Twenty-eight accessions of sweet potatoes are being used in a breeding program. The workers are especially looking for a type which would be adaptable to piece root propagation in the field. Western types of sunflower appear to be superior to the eastern types on a yield basis. Several species of trees and shrubs are being evaluated from the standpoint of adaptation and possible use for the area.

Texas

W. R. Langford presented three slides on the work with perennial peanuts at the West Cross Timbers Experiment Station. This crop has potential both as a forage and hay crop.

Soil Conservation Service

W. C. Young presented a very comprehensive report on the Soil Conservation Service work on S-9 new crops in the Southern region in both written form and with slides. This group has selected Arachis sp. (P.I. 263393) as a good potential for wild life food plant and perhaps for forage production. Six other accessions of Arachis have been selected from 50 accessions to be superior as possible perennial forage crops for growing in grass sods. Other genera included in the SCS report included the following: Castanea, Cynodon, Desmodium, Digitaria, Eragrostis, Festuca, Hemarthria, Indigofera, Lespedeza, Lotus, Malus, Paspalum, Pennisetum, Pistachia, Quercus, Stizolobium and Vicia. 'Kliengrass 75' was released and accepted as a variety for certification in 1968. This report also gave an estimate of seed produced on twelve different P.I. accessions which indicates the value of the program. The report also lists the plant accessions that have been observed by SCS groups in the South, presenting the status, increase centers and district seed increase fields.

In the SCS program it was noted that Lespedeza virgata was shorter growing on road banks than L. sericea and L. serpens is evan shorter than L. virgata.

Proso millet supplied very good food to attract doves for the hunters. Paspalum nicorea (P.I. 202044) is giving good protection to the waterways in the lower coastal plain.

Northern Utilization Research & Development Division, ARS

I. A. Wolff gave the report on the work being done at the Northern Utilization Research and Development Division. It was pointed out that there is a need for the search of Tephrosia species with higher rotenone content, as well as with better seed set. Cooperating with Florida workers in the testing of Hemarthria altissima for the possibility of its use as a replacement for tea. The panel was biased against green tea so there is a need to replace the panel with an unbiased group. In cooperation with N. I. H's Cancer Chemotheraphy National Service Center (CCNSC) studies are continuing in the search for antitumor compounds in plants. The laboratory has isolated and structurally characterized an alkaloid from Cephalotaxers harringtonia that is active in small doses against an experimental leukemia in mice. There is a good demand for crambe oil but no suppliers of the oil. Indiana and Louisiana plantings will help alleviate some of the shortage. Some indication that some selection in the Brassicas for high erucic content would be promising.

New Crops Research Branch, CRD, ARS

Dr. John Creech circulated a very comprehensive report of the New Crops Research Branch, ARS, USDA, which was prepared for all 4 regional new plants technical committees. He pointed out that during the year, 14,300 plant introductions were accessioned. This was an all time high annual figure. There were 10,500 small grain cereals from PL 480 projects in Israel. Other crops included 1200 forage, 780 vegetables, 700 oil seed, 680 ornamentals, and 160 fruits. In domestic explorations two projects were covered: (1) Vaccinium species (S-9), and (2) lupines and fescue (W-6). Excellent summary reports have been prepared.

Dr. George White, with the use of slides, discussed progress made on chemurgic crops. The need for breeding efforts on these crops was emphasized: Tephrosia, Vernonia, Lesquerella, Limnanthes, Briza, Crepis, Xeranthemum, Bifora and Chamaepence.

Cooperative State Research Service

Dr. Clare I. Harris, CSRS, Department of Agriculture, pointed out that the CRIS system should be quite helpful to the research worker searching for the work that is being done on a specific crop or problem.

Administrative Advisor

Dr. C. R. Jackson, S-9 Technical Advisor, reviewed some of the changes made in the regional plant introduction station, principally the shifting of personnel and relocation of some of the facilities. He also pointed out that the $65,000 allocated for construction of facilities by the directors three years ago was not adequate to meet the cost of construction currently underway.

Maintenance of Late Maturing and Vegetatively Propagated Plants

The next topic discussed was the disposition of plant introductions that do not produce seed at Experiment, Georgia. Langford distributed a list of 36 genera in which there are 1162 accessions on the S-9 inventory that have failed to produce seed. These are mainly introductions of grasses and legumes from the tropics, and they require short days to flower (Appendix A). He also distributed a list of introductions that are maintained vegetatively at the regional station. This material also represents many genera, but large collections of Arachis, Cynodon, and Digitaria constitute a major portion of the vegetatively propagated stocks (Appendix B). It was pointed out that in addition to the labor required to maintain this material, it occupies much of the greenhouse space which is badly needed for propagating other plant introductions. Several members of the committee expressed the opinion that these materials should not be discarded, but neither did they offer any alternatives. Dr. Creech suggested that the material be maintained through the next winter during which time perhaps some of it can be transferred to Mayaguez.

Regional Station Budget

Copies of the 1969-70 budget for the regional station were distributed (Appendix C). It was pointed out that while the number of introductions maintained at the regional station has increased from approximately 11,000 in 1960 to twice that number in 1969 the financial support from the Southern Region has remained at $30,000 annually. In addition to doubling the workload, rising costs of labor, equipment, and supplies has made it difficult to meet responsibilities of the regional station under the present budget.

Dr. Fike moved that the Administrative Advisor present this problem to the Southern Directors and ask them for an increase of pooled funds to operate the regional station. This motion was seconded by Bowers and approved by the committee.

Fike also moved that in order to meet federal travel regulations the proposed budget for 1969-70 be approved by the committee. Motion seconded by Langford and approved by the committee.

Contributing Projects

Dr. Harris reviewed briefly the procedures for regional project outlines with particular emphasis on supporting projects. Crawford Young raised the question about SCS developing a project for the S-9 group which could be filed with the CRIS system. The group strongly endorsed this proposal.

Industrial Crops Sub-Committee

The Sub-Committee report on plans for New Crops Research in the S-9 region for 1969-70 was as follows: (1) Major emphasis will continue on Kenaf and Tephrosia vogelii (2) The following new species are recommended for evaluation at interested locations: Umbelliferae Biforia radians and selected species from SIPE tests in early spring plantings, Briza spicata in small fall plantings, Crepis alpeni in spring plantings, Brassicas in spring and fall plantings, Chamaepeuce afra in plantings from August until late fall, Xeranthemum annum for fall planting.

Dr. White is preparing a summary on each of the other species that showed agronomic promise from the 1968 SIPE program. These summaries will be made available through Dr. Langford for cooperators to select out plants which show superior vigor, productivity and other characteristics.

Requests for New Plant Explorations

W. T. Fike made a strong appeal for support of the peach rootstock exploration in Persia. Gordon Killinger filed a request for plums which have low chilling requirements and also the need for Kenaf with large stem diameter. A visitor from the Northcentral Region, W. H. Gabelman, stated that they are interested in hardy pecans. Crawford Young expressed interest and need for cool season grasses from the lower latitudes and also for a warm season legume, especially Glycines. Dr. Hoveland would like to see explorations on Phalaris aquatica and Festuca arundinacea probably from Moracco with good winter growth. Dr. Wolff moved that, in view of the impending shortage of new seed samples for chemical screening, the New Crops Research Branch undertake North American collections of new species specifically for the chemical program, to the maximum extend permitted by their budget and program. Motion seconded and approved. Dr. Creech suggested that these requests be filed with Mr. H. L. Hyland before the minutes come out.

S-9 Publications

W. R. Langford distributed copies of a manuscript summarizing the Evaluation and Use of Plant Introductions in the Southern Region 1960-68 for our review and criticisms. The group agreed to get their criticisms returned to Dr. Langford by August 15. The committee agreed to dedicate this volume to Dr. Julian C. Miller, Louisiana State University.

A manuscript prepared by Dr. H. B. Harris and Dr. Grover Sowell, Jr. summarizing sorghum introductions resistant to anthracnose was discussed. The manuscript has been submitted to Plant Disease Reporter and to the Georgia Agricultural Experiment Stations for publication. Neither agency accepted it for publication because of the lengthy tables. Dr. Creech suggested revising the manuscript and resubmitting it to Plant Disease Reporter.

Langford discussed a manuscript prepared by W. L. Corley on Evaluation of Capsicum introductions. He moved that the manuscript be published as a Southern Cooperative Series Bulletin. The motion was seconded by Bowers and approved by the committee.

Report of Committees

W. T. Fike, Chairman of the Nominating Committee gave this report. John Bowers, Chairman, Eli Whiteley, Secretary. A motion was made by Langford that the nominations be closed and these two men be declared elected by acclamation. It was seconded and the group voted approval.

The Resolutions Committee report was given by Gordon Killinger as follows:

The S-9 New Crops Technical Committee wishes to acknowledge the arrangements and hospitalities of a number of Puerto Ricans as most gracious and informative

hosts to this committee while visiting this beautiful Isle.

Special thanks go to:

Dr. J. Velez Fortuno of the University and his staff, Dr. O. D. Ramirez, Mr. William Pennock, Mr. Peter C. Sweere, Mr. Gandia and Miss Victoria Gonzalez for making all arrangements and looking after our wants and to Mr. J. Vincente Chandler, Director for extending the invitation.

Mrs. Maria C. Fernandez and Mrs. Socorro Gaztambide for their programs, entertainment and arrangements for the wives of our committee members.

Mr. Roy Woodbury for his running commentary of things and places of interest and identification of hundreds of plants while touring the Isle.

Dr. A. Sotomayor-Rios, Director of the Corozal Substation for the tour of his station and the excellent refreshments served to us.

Mr. E. Boneta at the Adjunta Substation for his directing an infromative tour of the station in the absence of Mr. R. Bosque Lugo.

Dean Salvador Alemany and Dr. M. A. Lugo for their excellent hospitalities, an enjoyable social hour and dinner.

Dr. Ovidio Garcia Molinary for showing us his experimental plants at the College of Agriculture and Mechanical Arts at Mayaguez.

Dr. Murray Gaskins, Director, Mr. Narciso Almeida, and Mr. E. Cabanillas of the Federal Experiment Station at Mayaguez for the program and tours of the station.

Mr. Anibal Tores, Horticulturist in charge of the Fortuna Substation and Mr. Rafel Perez and Mr. Victor Godreau for the informative tour of this station.

Mr. Tifo Wilshing and other officials of "La Esperanza" property of the Serralles family for their hospitality hour and most enjoyable lunch. Also Mrs. Gonzalez and Mr. Papi Cabaza and Mr. Casanova, officers of the Empresas Serralles.

The S-9 Committee also appreciated the opportunity to meet with the National Coordinating Committee and look forward in the future to another joint meeting.

Thanks to all staff and assistants in Puerto Rico for taking good care of all of us and to the University for furnishing the facilities

It is further recommended that a copy of these resolutions be forwarded to each of the Puerto Rico hosts.

C. S. Hoveland entertained the motion that we adjourn. This was made, seconded, and the group adjourned.

Appendix A

LATE MATURING PLANT INTRODUCTIONS
Experiment, Georgia

Genus	Accessions
Andropogon (11)*	40
Beckeropsis (1)	1
Bothriochloa (20)	224
Cajanus (1)	98
Capillipedium (4)	34
Capsicum (3)	62
Cenchrus (1)	1
Chloris (2)	3
Chrysopogon (2)	4
Crotalaria (7)	61
Cymbopogon (5)	8
Desmodium (7)	32
Dichanthium (13)	57
Dolichos (2)	12
Eleusine (1)	11
Eromopogon (1)	1
Eualalia (1)	2
Fingerhuthia (1)	1
Hilaria (1)	1
Hyparrhenia (4)	11
Indigofera (6)	27
Indochloa (1)	2
Ischaemum (4)	5
Melinis (1)	3
Miscanthidium (1)	2
Ottachloa (1)	1
Panicum (3)	8
Paspalum (7)	11
Pennisetum (8)	11
Rhynchelytrum (1)	1
Setaria (1)	1
Sorghum (18)	383
Stylosanthes (3)	13
Thelopogon (2)	2
Tricholaena (1)	1
Vigna (7)	27
TOTAL	1162

* Indicates number of species

PLANT MATERIALS MAINTAINED VEGETATIVELY
REGIONAL PROJECT S-9

Genus	Accessions
Acroceras (1)*	3
Arachis (9)	52
Bothriochloa (1)	1
Brachiaria (3)	6
Capillipedium (1)	1
Chloris (1)	1
Cymbopogon (1)	1
Cynodon (14)	440
Dactyloctenium (1)	1
Digitaria (44)	335
Erianthus (1)	1
Hemarthria (1)	4
Panicum (2)	10
Paspalum (6)	8
Pennisetum (5)	7
Setaria (1)	2
Sporobolus (1)	1
Stenataphrum (1)	6
Thuarea (1)	1
Tripsacum (3)	9
Urochloa (1)	1
Zoysia (3)	7
TOTAL	898

* Indicates number of species

BUDGETS

Regional Station Budget 1968-69

Source of Funds		
Regional Research Funds (Pooled)		$30,000
Regional Research Funds (Ga. Sta.)		17,000*
State Funds (Georgia)		4,446
USDA, New Crops Research Branch		
Salaries		35,517
Operations		4,000
Domestic Exploration		1,500
Georgia Station (Equipment)		3,158
	TOTAL	$95,621
Expenditures		
Personal Services		$83,243
Equipment		4,157
Operating Supplies		5,153
Travel		1,301
Domestic Exploration		494
	TOTAL	$94,348

Regional Station Budget 1969-70

Source of Funds		
Regional Research Funds (Pooled)		$ 30,000
Regional Research Funds (Ga. Sta.)		26,048**
USDA, New Crops Research Funds (Estimated		45,145
	TOTAL	$101,189
Proposed Expenditures		
Salaries and labor		$ 91,139
Equipment		0
Operating Supplies		7,000
Travel		1,550
Domestic Exploration		1,500
	TOTAL	$101,189

* Excluding land and office space furnished by the Georgia Station

** For support of 2 Georgia Station Projects contributing to Regional Project S-9

APPENDIX D

State & Federal Reports

Southern Regional Plant
Introduction Station

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

Soil Conservation Service
Northern Utilization Research
and Development Division
New Crops Research Branch
Cooperative State Researxh
Service

Report of Regional Station Activities
to S-9 Technical Committee, 1969

New Material Received

Seed or plants of 1280 new accessions were received last year. The new material represents 86 plant genera, but introductions of Arachis, Capsicum, and Cicer constitute more than 1/2 of the total received. Other sizeable collections received last year are Vigna, Vicia, Pennisetum, and Paspalum.

Domestic Exploration

Dr. G. J. Galletta, North Carolina, completed the third year of the project to collect native species of Vaccinium. About 235 accessions have been collected. Original plans were to complete the project in 3 years, but because of other duties Dr. Galletta was unable to schedule trips during the season most appropriate for collecting certain species. He has asked that financial support from ARS be continued so the collection can be completed.

Seed Increase and Preliminary Evaluation

Material planted for seed increase this year including winter legumes are listed below:

	No. of accessions
Peanuts	763
Grasses	773
Legumes & misc. spp.	800
Sorghum & millet	481
Melons	486
Okra	49
Vigna	150
Pepper	398
Winter legumes	780
TOTAL	4680

Each year we have a large number of introductions that fail to produce seed at Experiment. This is largely due to day-length requirement of materials introduced from the tropics and winter injury of Trifolium and Vicia introductions. Funds should be made available to have these increased under more favorable climatic conditions.

Screening for Disease Resistance

Resistance of watermelon to WMV-2:

In cooperation with Dr. J. W. Demski, Georgia Experiment Station, 374 watermelon introductions were screened for resistance to watermelon mosaic virus-2. In preliminary tests 12 introductions appeared to be resistant, but upon further testing they proved susceptible.

Resistance of cucurbits to powdery mildew:

A local culture of a powdery mildew fungus on cucurbits was tentatively identified as Sphaerotheca fuliginea (Schlecht.) Poll. race 2. The conidia contained a few structures identified as fibrosin bodies and forked germ tubes were frequently produced on host leaves. These characters, as well as the failure of the conidia to germinate except when the relative humidity approached 100%, indicate that the pathogen is S. fuliginea rather than the more-commonly-reported Erysiphe cichoracearum D. C. Our culture was pathogenic on Cucumis melo 'PMR 45 SJ' but not on 'PMR 6'. Cucurbita maxima, P.I. 181011, was free of the disease in greenhouse and field tests. Cucurbita moschata, P.I.'s 179925, 201254, and 211977 had a disease index of 1 as compared to 4 for 'Butternut' in the field. All plant introductions of Cucumis melo and several varieties which had been reported as resistant previously were tested in the field. Eighteen plant introductions and 2 varieties were free of the disease. An additional 36 introductions and 2 varieties received a disease index of 1 (less than 20% of leaf area covered by fungus). The remaining 21 introductions which were previously reported as resistant were susceptible to race 2 in this test. A replicated greenhouse test confirmed the results of the field tests except for a few introductions.

Resistance of lima bean to anthracnose:

The introduction from India, P.I. 164155, which was previously reported as resistant to anthracnose in greenhouse tests showed severe pod infection in a field test. Consequently this introduction is of doubtful value as a source of resistance.

Resistance of peanut to leafspot:

In cooperation with Dr. Smith 454 peanut introductions have been screened for resistance to Cercospora arachidicola in preliminary greenhouse tests. Seven introductions were selected as apparently resistant for inclusion in a field test this summer.

Resistance of peanut to southern blight and Rhizoctonia solani:

Sclerotium rolfsii Sacc. was highly pathogenic on germinating seed of all 277 introductions tested. Rhizoctonia solani Kuhn was highly pathogenic on all except one introduction. This introduction will be tested in replicated tests.

New Diseases

No new diseases were observed in the regional station nursery this year. In cooperation with Dr. H. B. Harris, Sclerospora sorghi (Kulk.) Weston and Uppal was identified in a commercial field. This is the first report (1) of the disease in Georgia.

Distribution of Plant Materials

Distribution of seeds and plants in the Southern Region is summarized in the following table. Plant scientists in the South were supplied with 8354 lots of seed from Experiment, and they received 8336 from other regional and

federal stations, making a total of 16,690 packets distributed in the South. We supplied 4142 packets to personnel outside the region.

Distribution of Seed in the Southern Region

State	S-9	NE-9	NC-7	W-6	Miami	Savannah	Beltsville	TOTAL
Alabama	37	21	25	385	---	1	18	487
Arkansas	--	--	--	--	---	--	--	--
Florida	238	2	4448	24	176	6	46	4940
Georgia	2987	195	99	30	1	16	42	3370
Kentucky	34	--	57	26	---	--	--	117
Louisiana	52	--	--	--	---	--	--	52
Mississippi	151	2	11	35	---	--	1	200
North Carolina	156	--	61	--	---	--	8	289
Oklahoma	1578	--	--	1	---	--	187	1766
Puerto Rico	281	--	--	104	---	--	--	382
South Carolina	89	24	15	--	---	--	2	130
Tennessee	25	11	--	--	---	--	--	26
Texas	2726	--	232	1357	1	15	664	4995
Virginia	--	--	--	--	---	--	--	--
TOTAL	8354	245	4948	1959	178	38	1032	16,690

NE-9	155
NC-7	700
W-6	1201
Beltsville	89
Foreign	1997
TOTAL	4142
NSSL	381

Transfer of Seed to the National Seed Storage Laboratory

Since last July seed of 371 accessions were placed in NSSL. Most of these were introductions of Solanum.

Plant Identification

Herbarium specimens of 105 accessions were submitted to NCRB taxonomists for species identification. Many of these were tropical legumes and grasses.

Samples for Chemical Analysis

Seed of a local ecotype of Lamium and fruits from 12 accessions of Solanum spp. were sent to Dr. Wolff for chemical assay. Lamium was of interest as a possible source of oil and the Solanum fruits were for enzyme analysis.

Automatic Data Processing

Cards have been punched for all accessions that were on the regional station inventory last October. At that time we had seed or plants of 21,268. Since then we have received several hundred new accessions increasing the inventory to about 22,000. The punch cards were used in preparing the seed catalogue issued in 1968 and the supplements added to it in 1969. The catalogue lists only the introductions for which the seed supply is adequate for distribution.

Physical Facilities

Construction of new greenhouse and laboratory facilities was initiated last month. The initial request for these facilities to provide space for disease and insect screening and additional space for propagating plants was approved by the Southern Directors in 1967, but during the 2 years delay in construction the cost of building increased so much that we are getting only 2/3 of the greenhouse space that we requested.

The nursery is being moved to an area nearer the campus. The new site is less favorable from the standpoint of soil type; but it is much more convenient with respect to greenhouse, seed storage, and other regional station work.

Director Jackson made available approximately $4,000 additional funds to repair the seed storage room, to replace one of the pick-up trucks, to pruchase a calculator and 2 air conditioning units.

Personnel

During the last year we lost one technician to industry because of the low salary he was paid. The vacant position was filled by a man who was then employed as a day-laborer and paid an hourly wage. In order to avoid further losses to industry we used most of the funds budgeted for seasonal labor in the past to supplement the salaries of field and greenhouse technicians. Consequently, we have one less man on the nursery crew.

There was also a reassignment of responsibilities to 2 members of the professional staff. Dr. J. H. Massey, Agronomist, and Mr. W. L. Corley, Horticulturist, are University of Georgia employees assigned to the Regional Station. These men are now leaders of Georgia Station Projects contributing to S-9. Although these men are still on the Regional Station staff, we lost much of their services toward meeting the responsibilities of the Regional Station.

Publications

1. Sowell, Grover, Jr. and H. B. Harris. 1969. Downy mildew of sorghum in Georgia. Pl. Dis. Reptr. 53:4.

2. Sowell, Grover, Jr. and James W. Demski. 1969. Susceptibility of watermelon cultivars to watermelon mosaic virus-2. Pl. Dis. Reptr. 53:209.

ALABAMA S-9 (NEW CROPS) ACTIVITIES

July 1968 - July 1969

Carl S. Hoveland, Agronomy and Soils Department

Auburn University, Auburn, Alabama 36830

The number of new plant introductions received was down sharply from preceding years. Only 63 introductions were received during the past year. Most of the plant introductions received over the past few years are currently being used in breeding programs.

HORTICULTURAL CROPS

Dr. W. H. Greenleaf plans to release a tobacco etch virus and rot resistant Tabasco pepper variety this year. The two etch-resistant and ripe rot resistant P.I. peppers used in this program were P.I. 152225 and P.I. 159236, both from Peru. The new variety should fill a real need as Tabasco pepper growers have had disastrous crop failures from these diseases in recent years.

Dr. Greenleaf is using a number of P.I.'s in his tomato breeding program. P.I. 273444 promises to provide the germ plasm for concentrated set and maturity which is necessary before machine harvested tomato yield in the Southeast can become competitive with those from California. P.I. 298633 offers earliness and P.I. 280597 has higher acidity which is important to processors.

Dr. J. D. Norton, in his cantaloupe breeding program, made an interspecific cross of P.I. 140471 (Cucumis melo) x Cucumis metuliferus which incorporates resistance to the root knot nematode (Meloidgyne incognita acrita). High quality marketable melons have been produced although release of a variety is several years in the future.

Dr. H. P. Orr reports on the following ornamental introductions:

PI 238030 Osmanthus X fortunei - upright in habit of growth, dark green foliage. Received in 1963; now approximately 7' in height.

PI 277664 Raphiolepis umbellata 'Mertensii' - spreading in habit of growth, seemingly dwarf, 18-24" in height and 3-4' in spread. Excellent for small, home landscape. Thrives under neglect.

PI 265030 NA 16154 - Cotoneaster praecox 'Hessei' - upright, arching in habit of growth. Good color of foliage. Seemingly dwarf. Good rock garden plant.

PI 249466 Gardenia leuida - single flowers but attractive. Seemingly cold hardy. Received in 1959; now 4-5' in height. Flowers heavily.

PI 213308 Osmanthus ilicifolius 'Gulftide' - very picturesque plant. Grows in tiers. Excellent for stylized landscape.

FORAGE CROPS

At the Gulf Coast Substation near Mobile, Chloris gayana P.I. 39962 made excellent growth and persisted well the second year. This is the only rhodesgrass introduction in recent years to offer much promise. Setaria sphaceolata P.I. 307726 was outstanding the first year but did not persist well in succeeding years.

Some valuable P.I.'s have been obtained from the large number of Phalaris aquatica introductions tested. In a 4-year trial, several P.I.'s have produced 50% more winter forage growth than hardinggrass and over 100% more winter growth than Kentucky 31 fall fescue. Total annual yields range from 2.5 to over 4 tons of dry forage per acre annually. Forage quality is high. Persistance of these P. aquatica accessions is much better than hardinggrass. P.I. 240261, 240280, and 240282 are especially productive in winter. These, and other P.I.'s are being used in a new Phalaris breeding program started at Auburn by Dr. C. D. Berry.

Perennial peanuts, after 2 years in bermuda and bahiagrass sods at locations in central and south Alabama, are doing poorly. Most P.I.'s are dead or have made little growth. P.I. 262839 is the only accession that is spreading and making fair growth.

Yuchi arrowleaf clover (P.I. 233816) acreage is increasing rapidly. Certified seed production in Alabama will be between 1600 and 2000 acres in 1969. High forage yields and a long productive season account for the increasing interest in this clover. At Prattville Experiment Field in central Alabama over a 6-year period, oven dry forage yields of Yuchi arrowleaf averaged 4800 lb/acre as compared to 3160 lbs/acre for crimsom clover. In a grazing experiment on droughty clay hills at the Piedmont Substation, Camp Hill, Alabama, steers grazing rye and Yuchi arrowleaf continually from November to June gained 483 lbs/acre and averaged 2.4 lbs/day gain per steer for the entire season. In-vivo dry matter digestibility of Yuchi was found to remain high (above 65%, DDM) throughout the entire growing season, according to a 2-year study. Stems of Yuchi were higher in DDM than crimson clover at the same stage of maturity.

CHEMURGIC CROPS

Autumn plantings of Briza spicata made poor growth and produced little seed.

Kenaf varieties at the Plant Breeding Unit in central Alabama made relatively low yields, because of a prolonged severe drought in 1968 (Table 1). Kenaf planted on Sumter clay (ph 8) at the Black Belt Substation showed considerable iron deficiency on many entries.

Extensive studies with bamboo over 35 years by Dr. D. G. Sturkie were summarized in a bulletin, prior to his retirement.

Table 1. Kenaf variety tests, 1968.

Variety	Plant Breeding Unit Tallassee, Alabama Percent lodged	Dry matter yield in tons per acre	Black Belt Substation Marion Junction, Ala. Iron deficiency
BG 58-10	1	6.86 a*	Medium
Ev 41	0	6.62 ab	Slight
C-2032	0	6.34 abc	Slight
BG 52-75	30	6.32 abc	Slight
G-4	1	6.18 abc	Severe
Ev 71	1	6.01 abc	Medium
Cubano	26	4.94 abcd	Medium
G-45	2	4.80 bcd	Medium
C-108	10	4.34 cd	None
P.I. 196988	50	3.98 d	Medium
P.I. 208832	100	------	Slight

* Least significant range at 5% level.

PUBLICATIONS ISSUED DURING YEAR:

1. Hoveland, C. S. 1968. Yuchi arrowleaf alternative to crimson in Southeast. Crops and Soils Magazine. August-September issue.

2. Hoveland, C. S., E. L. Carden, W. B. Anthony, and J. P. Cunningham. 1968. Management affects yield and quality of Yuchi arrowleaf clover. Auburn Univ. Agr. Exp. Sta. Highlights of Agr. Res. Vol. 15, No. 4.

3 Hoveland, C. S., E. L. Carden, W. B. Anthony, and J. P. Cunningham. 1969. Forage production and digestibility of Yuchi arrowleaf clover as affected by management. Agron. J. 61:(in press).

4 Sturkie, D. G., V. L. Brown, and W. J. Watson. 1968. Bamboo growing in Alabama. Auburn Univ. Agr. Exp. Sta. Bul. 387. 30 pp.

S-9 Technical Committee Report
Arkansas Agricultural Experiment Station
Fayetteville, Arkansas
Period of July, 1968 to July, 1969

Ornamentals: - In the spring of 1969, we received thirty-four different plant accessions of ornamental plants through the Plant Introduction Station at Glenn Dale, Maryland. These were received in March and held in a cold frame structure until April 9 when the material was set in the nursery. The plant introductions of rhododendron and holly were set in a soil where efforts had been made to acidify the soil by incorporating peat moss. The other plant introductions were set out at the same time in a Lintonia silt loam soil but no effort was made to acidify the soil.

The notes taken on these introductions are as follows: 1. Rhododendron yedoense 'Pouknanense' (PI 317272): two out of three plants have survived. The central leader of plant died back but a few young branches grew out. 2. R. mucronulatum var. ciliatum (PI 317271): two out of three plants survived. Approximately 3" of new growth has been made on each of the two surviving plants. 3. R. mucronulatum var. ciliatum (PI 317270): three plants set and 3 plants have survived. All plants appear to be doing well, three to four strong branches on each plant. 4. Rhododendron 'Mrs. LBJ' (PI 337619): one very small weak branch, plant in poor condition. 5. Rhododendron "Ben Morrison" (PI 337618): very healthy young plant, approximate height is 6". 6. Rhododendron sp. 'Kome-tsutsuji' (PI 228004): height 17", very healthy new growth. 7. Ilex. 'Wm. Cowgill' (PI 331203): both plants appear to be healthy based on foliage color and the appearance of new shoot growth. 8. Ilex. 'Harry Gunning' (PI 331206): plants of this accession appear to be more vigorous than PI 331203. 9. Ilex 'Howard Dorsett' (PI 331204): no new growth but both plants have retained their foliage and good deep green color. 10. Ilex montana var. macropoda (PI 316704): plant height is 9", and approximately 1" of new growth. 11. Ilex pubescens (PI 324988): entirely different from other species of Ilex plants were approximately 14"-16" in height at time of lining out. Most of original foliage has been lost but new growth has appeared. 12. Ilex crenata f. microphylla (PI 317235): the two plants have not put on new growth but have retained good foliage color and are approximately 7-9 inches in height. 13. Ilex. 'Albert Close' (PI 331202): very small plants were set and both have failed to survive. 14. Ilex. 'Edward Goucher' (PI 331205): one very small plant set that did not survive. 15. Ilex montana var. macropoda (PI 316703): two plants were set that did not survive. 16. Ilex rugosa (PI 276084): one plant, approximately 10" in height, was set and has retained its foliage but has not put out new growth. 17. Hypericum ascyron (PI 317233): two very weak plants were set and these did not survive. 18. Iris sp. (PI 317237): four out of six plants set have survived. The other two plants may have been lost to "hoe blight". 19. Photinia integrifolia (PI 307304): older leaves appear to have a blight but new foliage has a bright green non-blighted appearance. 20. Gardenia augusta (PI 324977): two plants were 18 inches in height when set and both plants have very small amount of weak chlorotic foliage. 21. Ilex pubescens (PI 324988): three plants from 10 to 14 inches in height were set. Tips of branches died back but new growth appeared at base on two plants. One plant has retained its foliage but no new growth has been made. 22. Gordonia axillaris (PI 324982): two plants, height approximately 7 inches, were set. Some cold injury apparent on foliage but new growth has been made. 23. (PI 235003): three plants which had foliage dried up but buds alive were set. Two plants have survived and 1 inch of new growth has been made on one plant. 24. Viburnum harryanum (PI 261219): two plants were set and only one survived. New bud developing in terminal position. 25. Hydrangea chinensis (PI 324984): plant appeared to be in extremely poor condition when set, did not survive. 26. Jasminum odoratissimum (PI 238775): two plants were set and both failed to survive. 27. Pinus densiflora (PI 317254): two very weak seedlings were set and they both failed

to survive. 28. Pinus thunbergii (PI 317258): four plants were set and two have survived. A very small amount of new growth has been made on these two plants. 29. Vaccinium delavayi (PI 242255): branches of the plant had turned brown when plant was set and it did not survive. 30. Photinia sp. (PI 325009): another plant with leaves drying out at time of setting did not survive. 31. Castanopsis carlesii (PI 324961): in poor condition at time of setting. The dried stem is still in the field. 32. Lagerstroemia subcostata (PI 324994): three plants were set and two have survived. These two plants have begun to grow out and have healthy foliage. 33. Clethra barbinervis (PI 316047): one very weak plant set and it did not survive. 34. Iris ensata (PI 317236): four rhizomes were planted and two have grown out.

Southern peas: - Several selections out of the cross from the PI accession 221731 and the bush type station lines were grown and studied for freedom of split seed coat. A few selections were made in 1968 in an effort to get away from this deffective seed coat character. The selections possess several desirable characters such as: (1) concentrated pod set for the once-over harvest operation; (2) good dwarf bush plant form free of basal branch growth; and (3) good pod setting potential.

Cucumbers: - The accession PI 330628 from India did not prove to be a bush type. Carpel separation of fruit from this accession was more severe than we had ever observed before.

Dr. M. J. Goode, plant pathologist, has been using the pyramiding system of breeding to increase the level of anthracnose resistance in cucumber breeding lines that we are working with. Most of the resistance has come from the plant accession PI 197087. These breeding lines which have been attained through this system are showing resistance to race 2 as well as race 1 of anthracnose.

Grapes: - The nine accessions of Vitis under test came through the winter of 1968-69 with no apparent cold damage.

Evaluation of fruit quality and disease resistance of these selections will be continued in the summer of 1969.

An additional 26 Vitis accessions were received from Glenn Dale, Maryland in the spring of 1969 and have been planted in the field for evaluation.

FLORIDA REPORT S-9 'NEW PLANTS'

JULY 11-12, 1969

UNIVERSITY OF PUERTO RICO, RIO PIEDRAS

G. F. KILLINGER

Several thousand accessions of vegetable, forage and pasture, ornamental, and miscelleaneous seeds and/or plants were received in Florida over the past year for evaluation.

J. W. Strobel reports a new tomato 'WALTER' is being released by the Gulf Coast Experiment Station at Bradenton. A most significant contribution in developing the Walter tomato was the incorporation of Fusarium race 2 resistance from P.I. 126915. A release circular is being published on the Walter tomato. Pat Crill at the Gulf Coast Experiment Station has 72 accessions of Lycopersicon received from the NC station at Ames under evaluation as breeding material.

The Plantation Field Laboratory at Fort Lauderdale has been evaluating a number of ornamental plants and W. M. Morton reports P.I. 101452-Wallaceodendron celebicum as a promising potted patio plant. It does well in light shade, has dark green leaves, and few pests. P.I. 205654-Dombeya sp. is another foliage plant making good growth. It is a compact, rounded head plant, deep pea green in color, has a lush visual aspect, and very attractive. Several Bougainvilla, P.I. 292981 (Orange), and P.I. 292982 (Sweetheart) are attractive and different from commercial varieties. Morton recommends also Bougainvilla P.I. 292972 (Isable Greensmith), P.I. 292974 (Mrs. Butt), P.I. 292977 (Poultoni), and P.I. 292980 (Lady Mary Baring).

P.I. Westgate reports from the Central Florida Experiment Station, Sanford, the growing of Pachyrhizus tuberosus spreng, known as Jicama or Yam Beans and used as a substitute for water chestnuts. He also reports the growing of Chinese Water Chestnuts (Eleocharis dulcis) and Chinese Gooseberry (Actinidia chinensis) or Kiwi fruit from seeds received from New Zealand.

From Gainesville, L. H. Halsey reports the use of P.I. 300954 a cantaloupe in his breeding program. From the original lot of seed a segregate was found having a high degree of resistance to downy and powdery mildew. He found a plant from this segregate, smaller in size, but with foliage disease resistance and fruit characters of the first segregate. This second segregate, stabilized by selfing, is being used to produce plants with folige disease resistance.

At the West Florida Station at Jay, L. S. Dunavin has found a number of Dactylis glomerate accessions with promise after two winter seasons, namely; P.I.s 260244; 262459; 262460; 270397; 273738; 273739; 274613 and 278699. The same is true for two Festuca arundinacea accessions, P.I. 264766 and 269894. All of these accessions will be further tested. Some of the warm season accessions, showing promise, and to be further

tested are: Vetivera zizauioides P.I. 302300; Sorgastrum pellitus P.I. 310308; Paspalum nicorae P.I. 310133; Digitaria decumbens P.I. 299837; and Digitaria milanjiana P.I. 299655. Arachis monticola P.I. 263393 shows promise as an ornamental ground cover.

R. J. Allen, Jr., from the Everglades Experiment Station notes that Digitaria pentzii, P.I. 279651 has performed well under grazing, and is better than Pangolgrass, but will have to be proven superior to St. Augustine, Para, and Argentine bahia grasses on the organic soils before it can be recommended.

At the Range Cattle Station, Ona, J. E. McCaleb and E. M. Hodges note the following grasses and legumes in grazing trials; Digitaria decumbens P.I. 111110; Slenderstem digitgrass P.I. 300935. Cynodon plectostachyus P.I. 224152; Paraguay 22 bahia P.I. 158822; Argentine bahia; Pensacola bahia; hairy indigo; Aeschynomene americana; and S. humilis. Clipping trials are continuing with, Pensacola bahiagrass; Digitaria species P.I. 300935; 111110; 299602; 299828; 299753; 299601; 299637, and 299810. Hemarthria altissima 299993; 299994; and 299995. Pracharia humidicola P.I. 257678. All of the Hemarthria accessions will be increased and be subjected to grazing trials.

From Gainesville, S. C. Schank reports the utilization of Digitaria accessions in hybridization to combine winter hardiness and stunt virus resistance. Nurseries have been established in several South American locations. Digitaria P.I. 299858; 299863; 299743; 299655, and 299800 are showing winter hardiness and the ability to produce progeny.

E. S. Horner has released a new alfalfa variety from Gainesville, named "Florida 66 Alfalfa", and described in Florida Circular S-191, February 1969. He reports the germ plasm source for this new alfalfa as coming from 44 F. C. accessions, 20 SPI accessions, and 26 P.I. numbered accessions. He also notes the use of 20 P.I. accessions in an open pollinated planting, with inter-planting and selection to broaden the genetic base of an alfalfa population for persistence.

Perennial peanut hay was harvested twice during 1968 from 11 accessions involving the following P.I. numbers ranked in order of yield, high to low: Gainesville selection No. 1; P.I. 262826; 118457; 262819; 262816; 262794; 262828; 262839; 262840; 262832, and 262797. Yields of dry hay ranged from 11830 to 6130 pounds per acre as reported by G. M. Prine.

Paspalum notatum P.I. 310149; 310143; and 310144 have promise as reported by G. B. Killinger, however, seed quality as measured by germenation has been poor. He also notes pigeonpeas "Norman" Variety P.I. 218066 continues to show promise as a seed crop as well as a cover, windbreak, hay, and other use crop. Insects at flowering and seed set time have been a serious problem and must be solved if satisfactory seed yields are achieved. Stylosanthes humilis P.I. 324249 an upright growing legume and 324250; 324252, and 324253 prostrate types all produce seed and good growth at Gainesville. These S. humilis accessions appear to be 3 to 4 weeks earlier flowering than commercial stylo. The regional sunflower variety test including the Russian high oil and breeders, and commercial seed, was a failure in 1968 due to a deficiency of Calcium and Magnesium in the soil. Kenaf, (Hibiscus cannabinus), varieties Everglades 41 and 71, Cuba 108 and 2032, and Guatemela 4 and 45 all yielded from 7 to 10 tons per acre of dry stem.

Coastcross-1 bermudagrass, a hybrid developed at Tifton involving a plant introduction looks very promising. Hemarthria altissima P.I. 299993; 299994; 299995, and 299039 have considerable frost resistance. P.I. 299994 will be in grazing trials at an early date. Cooperating with Dr. Ivan Wolff at the Peoria Laboratory P.I. 299995, is being evaluated as a possible substitute for tea.

From the Central Florida Station at Sanford, H. L. Rhodes reports pigeonpeas (Cajanus cajan) P.I. 218066 were evaluated as a nematode control crop for vegetables. He found the pigeonpea was a good host for both the sting nematode (Belonolaimus longicaudatus) and the stubby-root nematode (Trichodorus christiei) thus making the crop unsuitable as a control. Where nematode infestations were not heavy, the crop grew well and yielded 1850 pounds of dried peas per acre.

W. B. Sherman, Department of Fruit Crops, Gainesville notes the receipt of P.I. 285531 "Jamuni Plum", and Rubus takesimensis P.I. 316630 which he has tried to cross with R. triviales and "Brazos" variety. He has requested explorations and introductions of other low-chilling types expecially in the Rosaceae family.

Agron 290C
GBK
6-23-69

GEORGIA AGRICULTURAL EXPERIMENT STATIONS
1969 REPORT TO S-9 TECHNICAL COMMITTEE
July 11-12, 1969

W. R. Langford

State and federal scientists and private individuals received propagating stocks of 3370 plant introductions during the last year. Research with this material is now being conducted under two formal projects contributing to S-9. The projects are: (1) Hatch 172 S-9 (revised) Agronomic Evaluation of New Plants for the Production of Oils, Gums, Drugs, and Insecticides, and (2) Hatch 1060 S-9 Evaluation of New Ornamental Plant Introductions.

In addition to these contributing projects introductions are evaluated for use as breeding stocks in most of the plant breeding projects.

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

Helianthus annuus

An experiment was conducted to study the effects of within-row plant spacing (6, 12, and 18 inches) and nitrogen levels (0, 50, 100, and 150 lbs./acre) on seed yield and plant characteristics of the 'Peredovik' variety of sunflower.

1. Seed yields due to 50, 100, and 150 lbs./acre of nitrogen (Ave. 1762 lbs./acre) were not significantly different, but each was significantly higher than the check (572 lbs./acre).

2. Plant height was significantly increased by 50 lbs. of nitrogen, but additional nitrogen increments did not further increase height.

3. Head diameter was increased by each additional 50 lb. increment of nitrogen except the 150 lb./acre.

4. Stem diameter was significantly less for the no nitrogen check than for other nitrogen levels. There was no significant difference among nitrogen levels of 50 lbs. and above.

5. Seed yield was not affected by plant spacing.

6. Plants were significantly taller at 6- than at 18-inch spacing.

7. Head diameter was increased significantly for each 6-inch increase in plant spacing.

8. Stem diameter was significantly greater at 18- than at 6-inch spacing.

New Chemurgic Crop Evaluations

Prospective new chemurgic crop species planted at Experiment, Ga., in 1968 consisted of 58 species in 44 genera. The spring and the fall nurseries contained 66 and 70 accessions, respectively.

The following accessions that produced promising seed yields deserve further study:

Name	P.I. Number
	Spring planting
Anethum graveolens	305463 and 305464
Brassica campestris	209020
Brassica carinata	194251 and 194256
Crambe abyssinica	305285, 305388, and 311740
Vaccaria segetalis	304488
	Fall planting
Daucus aureus	319403
Isatis tinctoria	312816
Ammi majus	325875
Anethum graveolens	305463

Six of 48 fall-planted Brassica spp. accessions were not winter killed. These were B. campestris P.I.'s 179641 and 312845, B. carinata 194251 and 194256, and B. napus 305281 and 311727.

Vernonia anthelmintica

An experiment was planted to compare six breeding lines and P.I. 283729. Seed dormancy caused late emergence of many seedlings. A virus-like infection killed many plants during fruiting period. Consequently, at harvest time the stand was so poor that no seed was gathered.

Work in Progress 1969-70

1. Preliminary evaluation of new chemurgic crops.
2. Effects of planting dates and row widths on seed yield and plant characteristics of Brassica carinata.
3. Seed yield of Helianthus annuus as affected by nitrogen levels and within-row plant spacing.
4. Effects of planting dates and row widths on seed yield and plant characteristics of Crambe abyssinica.
5. Effects of planting dates and row widths on seed yield and plant characteristics of Brassica napus.
6. Experiments with Hibiscus cannabinus (in cooperation with Dr. George White).
    a. Production of two kenaf varieties as affected by plant spacing.
    b. Seed germination of three varieties as affected by chemical treatment of seed.
    c. Test of six varieties and lines of kenaf and roselle.

Publications

1. Burns, Robert E., and John H. Massey. 1969. Sunflowers for Georgia. Ga. Agr. Res. 10(3):9-10.

2. Massey, John H. 1969. Fruiting pattern of Vernonia anthelmintica (L.) Willd. Agron. J. (Accepted for publication in July)

3. Massey, John H., and Grover Sowell, Jr. 1969. Effects of spacing and anthracnose on Cassia occidentalis L.,Agron. J. (Accepted for publication in September).

Hatch 1060 (S-9)

Evaluation of New Ornamental Plant Introductions

Project Leader: W. L. Corley
Plant Introduction Department
Georgia Experiment Station
Experiment, Georgia 30212

This new project continues the work of Hatch 174 S-9, Horticulture Department, Georgia Station, which was terminated due to loss of project leader.

The woody ornamental P.I. collection is being moved to a central location on the main campus. Sixty-four new accessions of woody ornamentals from the National Arboretum and the Glenn Dale Plant Introduction Station are currently being grown in gallon cans in the lathhouse before transplanting to the nursery in 1970.

Sixty potential annual ornamentals are being grown for preliminary evaluation and seed increase. P.I. ornamental grasses, legumes, Solanums, okra, and miscellaneous items comprise this group.

Other cooperators reported the following:

1. Dr. Ian Forbes, Jr. - The most valuable introductions recently used in the breeding of 'Frost' blue lupine is the blue lupine introduction P.I. 168535. This accession came from Portugal. One of the plant lines established from this accession was carried in the breeding program as WH-1 after it was found to be superior for resistance to freezing injury in several tests at Blairsville, Experiment, and Tifton, Georgia. This one line out of P.I. 168535 was the source of the winterhardiness present in 'Frost' blue lupine. The breeding line WH-1 was also found to carry the gl_2 gene for gray leafspot resistance. This gene is present in 'Frost'.

I am presently evaluating as many accessions of Dolichos lablab as I can obtain. I am particularly interested in breeding a robust forage type that flowers early enough to produce seeds well before frost, but that flowers late enough in the summer that forage yields are not depressed by flowering too soon in the season.

2. Dr. Ray O. Hammons - Two peanuts now under final pre-release seed increase have P.I.'s in their pedigrees and this will be reported to you next year (after release). We used the following P.I.'s in recent hybridizations (1965-68) but their value in these specific combinations has yet to be ascertained:

P.I. 121070	(yield)	P.I. 246391	(testa color inheritance)
P.I. 259811	"	P.I. 264549	" " "
P.I. 259820	"	P.I. 268567	" " "
P.I. 259842	"		

In the continuing cooperative program evaluating agronomic suitability of recent peanut introductions, 109 P.I.'s were grown by State agronomists at Tifton in replicated yield trials in 1968. 47 of these P.I.'s exceeded the pod yield production of the standard commercial check varieties and were retained for more rigorous testing. In addition to the above, our Peanut Investigations unit grew seed increase or nursery observation plots for 133 other recent P.I.'s. Pod samples from this latter group are available for your possible use.

3. Dr. Glenn W. Burton - 'Tiflate' pearl millet, approved for official release this spring, involves a number of pearl millet introductions, all of which possess the photoperiod-sensitive characteristic that characterized this variety.

4. Dr. H. B. Harris - Sorghum introductions that showed the best resistance to anthracnose are summarized in the following table:

Sorghum plant introductions (P.I.'s) grouped according to anthracnose symptom index[a] on leaves, stems, and heads at Experiment, Georgia

0-0-0[b]	267595[d]	287684	297224[d]	287641	267343	267428	1-2-3
248309[cd]	267596[d]	289526[d]	297225[d]	287643	267344	267459	257326
250750[c]	267603[d]	291063	297226[d]	287650	267348	267515	287565
267367[d]	267612[d]	291216[d]	297227[d]	287651	267471	284990	287585
	267614[d]	297093[d]	297228[d]	287664	267473	287567	
0-0-1	267622[d]	297094[d]	297229[d]	287670	267519	287594	1-2-3
257298	267628[d]	297095[d]	297230[d]	287679	276786	287595	287601
297177	267631[d]	297096[d]	297231[d]	287680	277541	287596	287616
	267632[d]	297110[d]	297232[d]	291066	284980	287602	
1-0-0	267633	297112[d]	297236[d]	297107	284983	287609	1-2-4
Webster - YE[c]		297113[d]	297237[d]	297132	284984	287614	262568
Wiley[c]	267634[d]	297114[d]	297238[d]	297137	284985	287631	297115
164443[c]	267649[d]	297117[d]	297240[d]	297139	284986	295121	
164447[c]	273961[d]	297118[d]	297241[d]	297149	284988	297101	1-2-5
183002[cd]	276769[d]	297119[d]	297242[d]	297160	284991	297102	297108
217708[cd]	276770[d]	297120[d]	297252[d]	297161	287564	297109	
221571[cd]	276779[d]	297121[d]	300651[d]	297175	287597	297116	1-3-3
221625[cd]	276784	297122[d]	300652[d]	297176	287607	297141	287582
246719[cd]	276787[d]	297123[d]	300653[d]	297183	287611		287591
248266[c]	276788[d]	297124[d]	300654[d]	297185	287613	1-1-3	287663
250232[c]	276792[d]	297125[d]		297186	287617	287612	
267349	276816[d]	297126	1-0-1	297189	287637	287702	1-3-4
267364[d]	276818[d]	297127[d]	255963	297190	287678	291214	267481
267373	276823[d]	297128[d]	257299	297197	287696	291232	287570
267386[d]	276825[d]	297129[d]	257316	297200	287703	297104	287589
267413	276827[d]	297130[d]	257597	297209	291238	297105	
267417[d]	276829[d]	297131	257603	297212	297103	297179	1-3-5
267431[d]	276830[d]	297138	267352		297106	297180	287566
267432[d]	276851[d]	297140	267372	1-1-1	297159	297184	287568
267439[d]	276855[d]	297144	267412	76407[c]	297188	297210	287569
267535[d]	285039[d]	297147	267440	170778[c]	297198		287572
267538[d]	285040[d]	297148	267441	179748[c]		1-1-5	287574
267544[d]	285041[d]	297157	267563	180004[c]	1-0-2	297199	287577
267545[d]	285042[d]	297158	276789	180005[c]	257302		287578
267546[d]	285043[d]	297163	276791	180348[c]		1-2-1	287579
267550[d]	285193[d]	297164	276793	246698[c]	1-0-3	257300	287580
267551[d]	285194[d]	297169	276813	246699[c]	297178	267425	287586
267552[d]	287606[d]	297191[d]	276840	250582[c]			287593
267559[d]	287621	297214[d]	284971	250583[c]	1-1-2	1-2-2	287622
267567[d]	287653	297215[d]	284987	253637[c]	55123[c]	179750[c]	287682
267573[d]	287654	297218[d]	286245	257314	179749[c]	267461	
267585[d]	287660[d]	297219[d]	287562	257598	180002[c]	284993	1-4-4
267592[d]	287668	297220[d]	287629	257599	246702[c]	284997	267465
267593[d]	287674	297221[d]	287630	267340	257318	287583	
267594[d]	287683	297223[d]	287638	267342	267427	287598	

[a]Severity ranging from 0-5 where 0 = no symptoms.

[b]Index on leaves - stems - heads

[c]Introductions with a symptom index of 0 to 0.5 in greenhouse screening tests.

[d]Rating was made at pre-head exsertion stage. These lines generally will not produce mature seed at Griffin, Georgia, before frost.

Annual Report to S-9 Technical Committee

"New Plants"

Louisiana, July, 1969

Ornamentals. Richard Stadtherr

The status of ornamental accessions received in spring, 1968, is as follows:

P. I. Number	Name	
316959	Actinidia polygama	dead 9/20/68
270534	Agapanthus sp.	small to date
317356	Alnus mayrii	2 dead, 1 growing well 7/1/69
357	Amelanchier asiatica	2 growing well 7/1/69
316961	Betula ermanii	1 dead 9/20/68
317209	" "	2 dead 6/27/68 - 2 dead 9/20/68
210	" "	2 dead 6/27/68
211	" platyphylla var. japonica	1 dead 9/20/68 - 2 growing well 7/1/69
318520	Campanula takesimana	dead 9/20/68
521	Carex fusanensis	1 OK 7/1/69 container
261066	Chrysanthemum arcticum	White Daisy. Good increase
318524	" sibiricum	Dead on arrival
525	" Zawadskii	" on "
316616	Cornus controversa	2 OK 7/1/69 growing well 3'
317223	" kousa	dead 6/27/68
313962	Cotoneaster lucida	1 OK 7/1/69 growing well
964	" racemiflora	4 OK 7/1/69
317364	Disporum sessile	All dead 4 9/20/68
365	Firmiana simplex	1 OK 7/1/69 vigorous
316967	Forsythia ovata	4 OK 7/1/69- some dead wood overwinter
285357	Gaultheria fragrantissima	2 dead 9/20/68
318540	Hedera rhombea	1 small plant barely alive 7/1/69
316702	Hemerocallis coreana	1 OK 7/1/69 container
617	" sp.	1 OK 7/1/69 container
307270	Hypericum hookerianum	4 dead 9/20/68
271	" "	2 dead 9/20/68
272	" "	1 dead 9/20/68

P. I. Number	Name			
316053	Iris ensata var. spontanea	2 OK	7/1/69	container
648	" rossii	4 OK	7/1/69	container
265262	Ligustrum ovalifolium 'Argenteum'	1 OK	7/1/69	weak plant
316409	Lonicera insularis	3 OK	7/1/69	growing well
314263	Lonicera sp.	5 OK	7/1/69	growing well
316650	Malus baccata	Dead		
316711	" sieboldii	18" tall		
307303	Pentapterygium serpens	1 dead 9/20/68, 2 dead 7/1/69 1 barely alive 7/1/69		
316977	Pinus koraiensis	dead 9/20/68		
317256	" "	1 OK	7/1/69	slow growth
257	" parviflora	dead 9/20/68		
259	Pittosporum tobira	all OK	7/1/69	vigorous 2½ ' tall
314474	Potentilla recta	dead	9/20/68	
289939	Prunus cerasoides	1 OK	7/1/69	growing well
307323	" "	2 OK	7/1/69	some brown tips
317371	Pyrus calleryana var. fauriei	1 OK	7/1/69	vigorous
227998	Rapanea neriifolia 'Taimin-tachibana'	1 OK	7/1/69	
316528	Rosa x fortuneana	1 OK	7/1/69	container
317381	" maximowicziana	5 OK	7/1/69	container
265572	" sp.	1 OK	7/1/69	container
314317	" " .	2 OK	7/1/69	container
317276	Rosa wichuraiana	4 OK	7/1/69	container
316631	Sambucus williamsii	6 All OK	7/1/69	containers
712	Schisandra chinensis	1 OK	7/1/69	good growth
988	Styrax japonica	2 OK	7/1/69	good growth
317293	Syringa velutina	1 OK	7/1/69	container, 5 died
297426	Ulmus pumila var. arborea	1 OK	7/1/69	vigorous
296028	Viburnum dilatatum	1 OK	7/1/69	good growth

Vegetable Crops:

Earl P. Barrios.

Screening of 344 accessions of Capsicum annuum and 43 of C. frutescens continues. Resistance to tobacco etch and cucumber mosaic viruses and pungency ratings are involved.

A pole lima bean, locally called "Jennings Lima" is being submitted to Dr. Langford for trials.

James F. Fontenot.

25 okra accessions are being screened for nematode resistance and possible incorporation into the LSU breeding program. Six bean (P. vulgaris) accessions were received for trials.

Fruit Crops:

E. N. O'Rourke.

A number of low-chilling apples are in trials at two locations. Some results are already obvious, but most plants are too young. 280400, Anna apple, has grown very vigorously on heavy clay in Baton Rouge, and has fruited well, but shows extreme susceptibility to powdery mildew. 280401, Ein Shemer apple, shows little mildew when planted adjacent to Anna. Vered apple, 267822, has not bloomed in Baton Rouge. 281542, Tropical Beauty, is making excellent growth despite lateness in leafing out. 265302, Hoover apple, is making good growth and fruiting. The apples to date are of good quality.

Agronomic Crops:

No accessions were received in 1968.

1968 - 1969 Report

Regional Project S-9 New Plants

Contributing Project 470

Mississippi

Workers with the Agricultural Experiment Station, U. S. Department of Agriculture, Junior Colleges, and private individuals obtained 108 PI accessions during the year. Seventeen of these accessions were plants. The State Junior Colleges were formally brought into the program during the year.

Cytogenetic investigations on 436 Paspalum introductions are yielding chromosome numbers of 20 - 24 - 40 - 45 - 50 - and 60. Pairing relationships indicate natural hybrids and segmental alloploids. Different ploidy levels are present and even within some species. Fertility ranged from 0 to 98%.

Domestic fruit plant selections will produce fruits in 1969 resulting in performance ratings. Special attention will be given to prolonged dormancy expressions. All materials which are now being grown and which have not received PI excession numbers are being described and named.

Ornamentals are receiving much more attention all over the State. At State College, the Cotoneaster, Cleyera, and the white Crepe Myrtle are receiving state-wide attention and emphasis.

NORTH CAROLINA - NEW PLANTS PROJECT

Report to S-9 Technical Committee, Rio Piedros, Puerto Rico, July 8-12, 1969

Five cooperators from a total of 29 research personnel who receive PI catalogues and information requested a total of 69 ornamental lines, 85 lines of industrial crops, 10 forage PI's and 27 accessions of cucumbers during the past reporting year. These are however, only a small part of the total number of plant introductions under test in North Carolina as many hundreds of PI's are in various stages of advanced testing.

I. Plant Introductions of Special Interest

A. Lycopersicon hirsutum - Dr's Strider and Konsler report that PI 251305 has exhibited a high level of resistance to bacterial canker (causal agent, Corynebacterium michiganense) and is being involved in their breeding program because of this character.

B. Pennisetum spp. - Dr. Timothy reports that five PI's of Pennisetum flaccidum appear promising. They are 220606, 338714, 338715, 338716 and 338717. These are perennial under our conditions and yields are much superior in pilot studies to orchardgrass and fescue. Several PI's of P. orientale are also being further evaluated: PI 271593, 271594, 271595 271596 and 215600.

C. Stylosanthes spp. - Dr. Cope reported that 18 PI's of seven species of Stylosanthes showed no promise under North Carolina conditions. Any potential for forage would appear to depend on either a perennial nature or the ability to reseed. None of the PI's survived the winter and no reseeding was apparent.

II. Domestic Plant Exploration

The domestic collections of Eastern Vaccinuim species for use in the Southeast, approved by S-9 have been summarized. Dr. Galletta and

cooperators from various states collected close to 200 lines from 24 species. The summary report has been forwarded to Bob Langford for assignment of PI numbers prior to publication. Dr. Galletta requests a continuation of this program for the next three to four years at a reduced support of $500 to $600 annually. Copies of this proposal by letter to Bob Langford is attached.

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

A. Norman pigeon pea

The demand for pigeon peas as a summer cover crop will increase as the peas become available. The 100 acre seed increase of Norman in Florida last year was a failure due to damage to the plants by the corn ear worm as well as an insecticide. A number of acres have again been planted in Florida for increase. Plantings are also being evaluated in other countries as possible sources of a seed supply. A copy of a preliminary mimeo appears as page NC-7.

B. Sunflowers

A yield trial testing 18 sunflower varieties was evaluated in 1968 at the Rocky Mount Station. Yields ranged from 440-1800 pounds of clean seed per acre. The oilseed varieties yield the least whereas the birdfood varieties have given us our highest yields. A variety test with 22 entries is being evaluated this year.

C. Sugarbeets

Sugarbeet plantings continue to look good with yields on deeper plowed soil of 20-28 tons of beets per acre with sugar contents in the lower range of acceptibility.

D. Kenaf - paper pulp

Plant spacing tests of past years have shown that highest yields were obtained from 14-inch rows. Herbicides are not available at this

time that will control weeds at this row width because of the organic matter content of the soil where the kenaf is adapted. This past year kenaf was planted on bedded rows with one and two rows per bed. Results from late planted kenaf are as follows:

38 inch rows - one row/bed ---------- 4.9 tons/acre

7-31 inch rows - two rows/bed ---------- 4.6 tons/acre

14-24 inch rows - two rows/bed ---------- 5.3 tons/acre

Added increments of N-P-K reduced yields of kenaf in another experiment where the top yield was obtained at the lowest (but adequate) fertility rate. A pulping company in the state is very much interested in kenaf and is buying 200 tons of the crop from Guatemala for a trial run at their pulping mill in Venezuela. Our early planted kenaf looks excellent at this time - the best ever. Tests consists of varieties of kenaf and rozelle, row spacing and plant spacings, rates of nitrogen, and harvesting and storage techniques. A herbicide test is still to be worked out with the weeds group.

E. Brassica spp.

The six Brassica PI's grown in 1967-68 yielded from 102 to 512 pounds per acre in wide rows. Seed from these six lines were planted in spacing trials in the fall of 1968 along with 49 introductions obtained from Experiment, Georgia. No lines survived the winter which was one of our coldest on record. Plantings at the R. J. Reynolds farm also perished. "It is my unhappy duty to report the death of B. Campestris and B. Napus due to excessive cold weather."

F. Mentha arvensis

Lines continue to survive and look well.

G. Trilisa odoratissima

A planting of deer tongue looks very good at this time. The air dried leaves of this crop are collected in the wild but the demand exceeds

the supply. The leaves contain coumarin used as a flavorant in cigarettes.

H. Nepeta cataria

One North Carolina firm uses over one-half million pounds of green catnip each year. Usually collected in the wild the demand exceeds the supply due to a shortage of pickers. Our plantings look very good at this time.

I. Tephrosia vogelii

A plant spacing test comparing 10, 20, 30-inch rows and three spacings in the row is being carried on at the Lewiston Station. Plants that germinated are looking fair at this time.

J. Briza spicata and Lesquerella spp.

Seed of B. spicata, PI 304981; L. fendleri, PI 337050; and L. grandiflora PI 293034 were planted in the fall of 1968 but did not survive the winter due to drought and cold conditions.

IV. Contributing Project

Our contributing project was revised and forwarded to CSRS for approval.

V. Work for 1969-70

All of the above crops will continue to be evaluated. Any new species from the screening program will be planted on receipt of seed.

S-9 Report, Oklahoma Agricultural Experiment Station

Roy M. Oswalt and Ralph S. Matlock

Regional Project 1057 was revised effective July 1, 1969

PULSE CROPS

Cowpea *Vigna sinensis*

Cowpea yield test were grown on the Perkins, Stratford, and Mangum Research Stations in 1968. Twenty-one strains were grown in replicated tests at Perkins, and 12 at Stratford and Mangum. The mean yields were 468, 1136, and 1223 pounds per acre respectively. These tests were grown under dryland conditions.

Thirty-one cowpea introductions were grown in a fusuriam wilt infected soil near Stillwater for disease readings and increase. These are shown in the following table:

Okla. C-No.	P.I. No.	Okla. C-No.	P.I. No.	Okla. C-No.	P.I. No.
742	124608	752	175327	760	255765
743	142779	700	194202	761	271259
744	147563	753	204647	762	277786
745	148678	754	205141	763	292899
746	152197	755	208771	764	293463
747	165486	756	212930	765	293477
748	170844	757	220851	766	293524
749	170849	704	221731	767	293552
750	170859	758	244571	768	293585
751	170861	759	250416	770	304164
				769	315750

Cicer arietinum

Twenty-three introductions and six cross selections of chickpeas were grown in a replicated yield test in 1968 near Stillwater. The mean yield for the 29 P.I.'s and crosses was 354 pounds per acre, a range in yield from 73 pounds to 633 pounds per acre. Heavy leaf rust infection caused the 1968 cicer strains to ripen early. The yield table below shows comparative yield and seed size for the two years:

Okla. Cp.No.	1968 P. I.	1968 Yield lb/A	1968 G/100 Seed	1967 Yield lb/A	1967 G/100 Seed	Mean Yield 1967-68
93	250142	458	10.9	733	13.1	615
94	250143	478	16.8	1092	23.1	785
127	193481	463	10.4	638	11.2	551
128	203142	278	12.6	863	20.8	570
129	211722	335	11.9	1012	17.4	674
130	212026	265	10.5	550	15.9	408
131	212091	420	11.6	1162	17.4	791
132	212891	433	13.3	765	14.8	599
133	212892	445	13.1	653	13.7	549
134	215702	93	13.5	930	28.3	511
135	239859	363	7.7	1133	11.5	748
136	249981	233	21.3	1015	25.5	624
137	251024	315	20.9	1080	33.9	698
138	251026	148	22.7	1058	32.5	603
139	251027	360	27.0	1012	36.9	686
140	251783	265	11.1	1080	19.9	673
141	253226	123	20.6	712	39.0	418
142	253227	73	21.5	460	46.0	267
143	253228	575	14.1	1075	17.3	825
144	254547	140	19.0	835	37.7	488
145	254548	318	15.9	945	20.6	632
146	273879	440	10.2	808	15.4	624
147	273880	460	10.5	615	11.5	538
	Cross 1	395	13.7	1430	13.4	912
	Cross 2	570	12.5	1565	14.4	1068
	Cross 3	313	10.6	1205	12.7	759
	Cross 4	590	13.5	1555	13.4	1022
	Cross 5	633	13.8	1345	14.9	989
	Cross 6	270	6.9	815	9.4	543
	Mean	354		972		

Field Bean *Phaseolus vulgaris*

Field bean introduction and selections were grown at Stillwater in 1968 for increase and further selection of types. Those grown included plant introductions 226928, 226929, 288017, 304832, and 304834.

Mungbean Phaseolus aureus

Twenty-eight varieties, selections, and introductions were grown in 1968 on the Perkins Research Station. The range in yield was from 387 pounds to 777 pounds per acre.

Phaseolus mungo

Mungo yield tests were grown on the Perkins, Stratford, and Mangum Stations in 1968. The introductions and yield data are shown below:

Okla. M-No.	P. I.	Perkins Yield lbs/A	Perkins G/100 Seed	Stratford Yield lbs/A	Stratford G/100 Seed	Mangum Yield lbs/A	Mangum G/100 Seed	1968 3 test Mean
130	212909	353	5.5	748	5.7	922	5.5	674
745	269522	212	4.3	850	4.5	805	4.3	622
747	269528	172	5.6	577	5.8	565	5.4	438
748	270058	243	4.9	875	5.0	512	4.3	543
750	271498	368	5.1	597	5.3	777	5.1	581
784	288599	340	4.9	987	4.7	675	5.0	667
785	288600	435	4.7	748	4.4	778	4.7	654
786	288601	375	5.3	1078	5.2	883	5.1	779
787	288602	375	4.3	947	4.0	573	4.3	632
788	288603	90	4.5	0		97	5.4	62
	Mean	296		741		659		

Pigeon Pea Cajanus cajan

A selection from P. I. 218066 was grown for increase at Stillwater and on the Peanut Research Station near Ft. Cobb, Oklahoma in 1968. Good seed yields were obtained at both locations. Approximately 400 pounds of seed was harvested from these two small plantings.

OILSEED CROPS

Crambe

Five crambe introductions were grown at Stillwater in 1968. The yield range from the following introductions were 9 to 44 pounds per acre for 279346, 281728, 281729, 281733, and 281735.

Euphorbia lagascea

These seven introductions averaged less than 60 pounds per acre. The following introductions were grown in 1968: P.I. 29604, 308128, 308129, 308130, 308131, 308132, and an Oklahoma plant selection.

Twenty Lesquerella introductions were planted in 1968, but there was no emergence from either of these introductions.

Brassica

A small amount of seed was harvested from six of the fifteen Brassica introductions planted in 1968.

Sunflower

The Regional Sunflower test, (18 strains) averaged 911 pounds per acre in 1968.

Peanuts

Sufficient seed of 465 peanut accessions were produced in 1968 to supply the Regional Plant Introduction Station with shelled seed. Accessions have been screened for resistance to thrips during the past three years. Research indicated that some accessions may have a degree of resistance to thrips but additional research is needed to determine the mode of inheritance.

ORNAMENTAL PLANTS

W. R. Kays

A number of genera and species of plants have been grown in the Horticultural greenhouses and in the nursery area.

The one outstanding herbaceous ornamental, which we have propagated and successfully grown for several years is P. I. 274401 - Begonia rex. It also carried the additional code - NA 18201.

Of the several trees, shrubs, and vines which we have under test we have not recommended any for general planting in the state.

One tree, Zelkova has done very well as has Spiraea japonica var. himaliaca, P.I. 285425 and Buxus sempervirens - P.I. 293877.

Since we do not anticipate a breeding program with the ornamentals research program we must have a horticulturally acceptable plant as a P.I. A number of horticultural forms and varieties appear to have promise with further evaluation.

FORAGE CROPS

Cynodon spp.

An extensive collection of Cynodon accessions is maintained by the Oklahoma Agricultural Experiment Station and is being used for genetic and breeding investigation. Listings of the accessions in the collection and their salient features have been reported (1,2).

At present, elite Cynodon clones are being evaluated for agronomic characteristics and used in hybrid combination in an attempt to develop improved varieties. A few of the better accessions which we are using for breeding purposes are:

P.I. No.	Okla. Acc.No.	Species[1/]	Variety	Origin
220385	8152	C. afghanus	--	Herat, Afghanistan
223248	8153	C. dactylon	dactylon	Khanabad, Afghanistan
269370	8800	C. afghanus	--	Kandhar, Afghanistan
269372	8802	C. afghanus	--	Lashkar Gah, Afghanistan
193267	9943	C. dactylon	dactylon	Lashkar Gah, Afghanistan
206427	9945	C. dactylon	dactylon	Elazig, Turkey
206553	9946	C. dactylon	dactylon	Athens, Greece
211022	9948	C. dactylon	dactylon	Faizabad, Afghanistan
253302	9954	C. dactylon	dactylon	Serbia, Yugoslavia
254890	9960	C. dactylon	dactylon	Mosul, Iraq
255447	9961	C. dactylon	dactylon	Kitale, Kenya
292059	10416	C. aethiopicus	--	Dar Es Salaam, Tanzania
292061	10418	C. coursii	Africanus	Dar Es Salaam, Tanzania

REFERENCES

1. Harlan, Jack R. et al. Biosystematics of the Genus Cynodon (Gramineae). Oklahoma Agricultural Experiment Station Processed Series No. P-499. 1965.

2. Harlan, Jack R. et al. Biosystematics of the Genus Cynodon (Gramineae). Oklahoma Agricultural Experiment Station Processed Series No. P-537. 1966.

Annual Report
New Crops Research in South Carolina
July 1968 to June 1969

S-9 Technical Committee meeting at Agricultural Experiment Station, University of Puerto Rico, Rio Piedras

There were 87 accessions of seeds and plants distributed to cooperators in South Carolina since July 1, 1968. These accessions, along with others received in prior years are being tested and evaluated. Many accessions have been incorporated into the many breeding programs such as cucumbers, sweet potatoes, and tomatoes. Others such as fruits and ornamentals require many years of testing before a complete evaluation may be expected.

Reports from cooperators are presented as follows:

Dr. Pryce B. Gibson, Clover Investigations, Agronomy & Soils, Clemson University, Clemson, South Carolina 29631

We have grown short rows of several P.I.'s of Trifolium nigrescens. These have varied in size of plants, maturity dates, winter hardiness, and susceptibility to diseases. For example, plants of P.I. 233723 are highly susceptible to sooty blotch (Cymadothea trifolii (F.) Wolf) whereas plants of other P.I.'s growing in the adjacent rows were not infected. The variation in this species is great and in our opinion the various P.I. numbers should be evaluated in standard forage plots--clipped, etc.

We now have plants of Trifolium uniflorum P.I. 330361. We are studying this species in cross compatibility studies.

Additional information is presented as follows:

Observations on Trifolium nigrescens Viv. as amended by Hossain to include T. meneghinianum Clem. and T. petrisavii Clem.

We are interested in T. nigrescens because Trimble (Trimble, J. P. 1951. Interspecific hybridization studies in the genus Trifolium. Master's Thesis. Pennsylvania State College.) used this species in the first hybrid with T. repens. This cross has been repeated and studied by Keim, Brewbaker and Hovin (references are listed in Hovin's paper, Interspecific hybridization between Trifolium repens L. and T. nigrescens Viv. and analysis of hybrid Meiosis. Crop Science 2:251-254, 1962).

This species as amended by Hossain includes a wide range of plant sizes. This range is equal to and probably exceeds the range of plant sizes in T. repens. Apparently, hybridization studies have primarily included the sub

species nigrescens with some attention to the sub species petrisavii. Hossain uses the size of stems, size of leaves, hollowness of stems, and geographic distribution to divide Ssp. petrisavii into the varieties petrisavii and meneghinianum. These characteristics are not given for plants that have been used in hybridization studies and therefore classification down to variety is not possible at this time.

In the fall of 1967, we planted 25 accessions of T. nigrescens and observed their growth in the field. These varied in winter hardiness and the characteristics Hossain uses to classify the plants. In the fall of 1968 the accessions planted in 1967 and additional accessions obtained in 1968 were planted. The 1968 planting included 4 or more strains of each of Hossain's classification groups. Records on the 1968 plantings will include cold hardiness and other observations. Some of the plants with large leaves and stems obviously make more growth than the strains of nigrescens that we have seen evaluated for forage. Plants of P.I. 233723 are highly susceptible to sooty blotch. Plants of several other accessions are resistant to natural infections.

Mr. Ronald Dean Oliphant working with us wrote his master's thesis in August 1968 on "Variation in Trifolium nigrescens Viv." The summary and conclusions from his thesis follow:

"Variation in plants of T. nigrescens grown from 20 seedlots consisting of plant introductions and selections was studied in the spring of 1968. Several vegetative and floral characters were measured on each plant and the results compared for plants both within and among the three classes, (a) subspecies nigrescens, (b) subspecies petrisavii, and (c) subspecies petrisavii variety meneghinianum. The results indicate that most characters varied as much within as among classes.

Differences among class means were found to be significant for the following: (a) petiole length, (b) size of leaflets, (c) stem diameter, (d) number of branches, (e) internode length, (f) peduncle length, and (g) number of florets per head. Significant differences were also found for the above characters among seedlots within classes with the exception of subspecies nigrescens. No significant variation was found among seedlots within subspecies nigrescens for petiole length, stem diameter, number of branches, or internode length.

No significant variation was found among seedlots within classes for the relative lengths of the following selected flower parts: (a) bracteole and pedicel, (b) style and pod, (c) corolla and pedicel, and (d) calyx and corolla; however, significant variation among classes for these characters was found.

A wide range of variation was found in several characters among the plants examined in this study. Therefore, the range of variation in these characters in the species as a whole is at least as wide as that found in this study, and possibly even wider. Consequently, it is reasonable to believe that new and improved cultivars, agronomic varieties, of ball clover can be developed by combining in them groups of desirable characters selected from those which are present in the population."

Observations on Trifolium uniflorum L., P.I. 330361.

In May 1968, Dr. R. C. Leffel received seed of this accession which was obtained by Katznelson and Bailey in 1967 in Turkey. He assumed that this accession came from Site 122, as described in Katznelson's 1967 PL-480 Annual Report as: "Between Cesme and Erythria, Hillside near sea. Degraded, heavily grazed Pistacia lentiscus - Poterium batha." An elevation of 10 m. was noted on the accompanying CR Form 33. All seed of this accession were sent to Clemson.

A total of 14 plants were obtained from planting all the seed sent to Clemson. The plants are now in flower and have been verified as T. uniflorum according to the characteristics listed in Synopsis der Mittel-Europäischen Flora by P. Ascherson and P. Graebner. This identification also agrees with the characteristics listed on page 74 and the drawings II. 9-13 of plate 2165 in Icones Florae Germanicae, Reichenbach Vol. 22, Leguminosae, 1867-1903.

We are interested in T. uniflorum because Kamla K. Pandey (A self-compatible hybrid from a cross between two self-incompatible species in Trifolium, Journal of Heredity, 48: 278-281. 1957) reported success in crossing this species with T. repens. He reported that interspecific crosses set 30-50 percent as many seeds as intra-specific crosses. (We notice however, that he only had one clone of T. uniflorum, therefore, he could only have measured seed set of intra-specific crosses in T. repens.)

We have been making inter-specific pollinations (T. repens x T. uniflorum and reciprocal) as flowers come available since November 1968. To date, we have not obtained a viable seed. Hollow seed coats (no embryo) have been obtained from several pollinations. Strangely, these hollow seed remained round and green a month or longer after the pollinations were made. Seed resulting from intra-specific crosses of T. repens are mature and dry at this age. We are making more interspecific crsoses to include more clones of T. repens. We know from our experiences with T. occidentale that cross compatability varies among clones of T. repens, therefore, it is possible that we have not adequately sampled the population of T. repens. Pandey obtained his T. repens from the Welsh Plant Breeding Station, Aberystwyth. Therefore, his plants probably were from or were similar to plants of the variety S100. Most of the plants we have used in crosses are selections from Ladino.

One of the 14 T. uniflorum plants is male sterile. Only about 2% of the pollen is plump and strains with IKI.

We recently have received seed of two T. uniflorum accessions, P.I. 341938 and P.I. 341939, from Australia. These new accessions will broaden the scope of our work with this species.

Differences between seedling plants from reciprocal crosses between Trifolium repens and T. occidentale.

Six unrelated T. repens clones were used as both pollen and seed parents in crosses with colchicine-induced tetraploid of T. occidentale. Crosses using T. repens as the seed parent gave a higher seed set per floret pollianted, a higher percent germination of seed, and fewer chlorophyll-deficient seedlings. Pollinating 611 T. repens florets resulted in 650 seed and 530 seedlings of which only 29 exhibited chlorophyll deficiencies. Chlorophyll deficiencies of these 29 seedlings were limited to sectors of leaflets and in no case appeared to be lethal. Pollinating 671 T. occidentale florets resulted in 321 seed and 243 seedlings of which 210 exhibited chlorophyll deficiencies. Several of these chlorophyll-deficient seedlings died. Some seedlings possessed green cotyledons but only albino true leaves. A few apparently albino seedlings produced green sectors which grew into green plants. Several yellow or light green seedlings grew into mature plants. The chlorophyll deficient seedlings obtained from seed resulting from the use of pollen from one T. repens clone were mostly yellow or light green contrasted to predominantly albinos and plants with albino sectors obtained from seed that resulted from the use of pollen from other T. repens clones. Apparently, cross ability and compatibility with T. occidentale varies among clones of T. repens. These results of reciprocal differences and differences among clones indicaae that in attempting to make a species hybrid involving a highly variable species such as T. repens reciprocal crosses should be made and a large number of clones should be used in the crosses rather than making many pollinations on one clone.

Dr. Morris B. Hughes, Professor of Horticulture, Edisto Experiment Station, Blackville, South Carolina 29817

We have been getting set up to study the resistance to cucumber mosaic which is present in the following P.I.'s - 124440, 116736, 136173, 123681, 123501 and 164825. Apparently these harbor the virus but express it at only a very low, practically imperceptible level in the field. In the greenhouse the virus symptoms do show up more prominently, however.

We also have several P.I.'s which appear to have good resistance to alternaria. They are 124109, 165449, 164551, 145594, 126147, 116915 and 140471. I have F2's of several of these and am trying to get a reliable technique of inoculation to where we can work out the genetics of resistance to this organism.

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

Brassica Species: A total of 49 Brassica species were planted on October 22, 1968, at Clemson. Good stands were obtained, but none of these species survived the winter. The names and number of these species are as follows:

Brassica campestris - 48051, 48052, 48058, 48059, 48060, 48061, 48062, 48063, 48065, 48066, 48067, 48068, 48071, 48072, 48073, 48074, 48075, 48076, 48077, 48078, 48079 and 48147.

Brassica campestris var. toria - 48172, 48173, 48177 and 48180.

Brassica campestris var. sarson - P.I. 319692, 319693 and 319694.

Brassica juncea - 48083, 48087, 48090, 48091, 48097, 48099, 48106, 48110, 48116, 48119, 48121, 48122, 48131, 48133, 48139, 48149, 48151, 48155, 48157 and 48161.

Brassica campestris, P.I. 305279, and B. napus, P.I. 305279 and 305280 were also planted on October 22, 1968. Good stands were obtained. All of these survived the winter. P.I. 305275 is early maturing, and it was harvested on May 27, 1969. P.I. 305280 was harvested on June 10, 1969. P.I. 305279 is late, and it has not been harvested at this date. Brasica P.I. 305275 produced 316 pounds of cleaned seed per acre on rows spaced 3 1/2 feet apart. The height of the plants was 24 inches, and there were 4 plants per foot of row. Brassica P.I. 305280 produced only 66 pounds per acre.

The results of the Brassica studies to date show that P.I. 305275 is far superior to any others we have tested. Increased yields may be obtained by broadcast seedage or closer row spacings and future work will be conducted to obtain highest possible yields by various cultural methods, etc.

Kenaf - Results of the 1968 Kenaf varietal test at Clemson are shown in Table I. The planting was made on May 21 and harvested on November 13. Rows were spaced 21 inches apart.

The entire-leafed, late-maturing variety C-108 significantly out-yielded all other varieties. The South African variety SH/15R was significantly taller than other varieties and was exceeded in yield only by C-108. The varieties SH/15R and ST 11760 would seem to merit further attention because of their height, smoothness of stem, and yield (and plant density) in comparison to other varieties.

Yields in excess of 8 tons per acre have been obtained from Clemson; thus yields from 1968 are considered to be low. Contributing factors may have been a somewhat late planting date and inadequate soil moisture. P.I.'s 208832 and 196988 were included in this experiment, but yields were not taken because of poor stands and disease. These accessions should not be included in subsequent varietal trials, but some selection for superior plants could be made from them.

Okra - The okra harvesting program has been very successful in that a machine has been developed for harvesting fresh okra pods. Of course, most of this work is still in the experimental stage, but results so far show that much remains to be done before themachine will be introduced to the okra growers. All the P.I. okra accessions (over 200) will be ready for mechanical harvesting. Varieties which are found to be adapted to mechanical harvesting will be isolated and improved for this purpose in future years.

Sweet Potatoes - Since July 1, 1966, much emphasis has been placed on the sweet potato breeding program at Clemson. At the present time 28 P.I. accessions of sweet potatoes have been used in the breeding work because they possessed good flowering characters as well as a number of other desirable characteristics. The following P.I.'s are being retained as breeding stocks: 208029, 208806, 208886, 259164, 273496, 277635, 277636, 286619, 286621, 286623, 286629, 304088, 308196, 308199, 308202, 308203, 308208, 315340, 315341, 315342, 315343, 315345, 315346, 315347, 315348, 315349, 315350 and 324887.

The following P.I.'s were lost due to flooding in the field or rotting in storage: 208541, 208796, 267946, 286620, 286631, 286632, 296116, 308198 and 308205.

In recent years there has been a rapid decline in sweet potato acreage in South Carolina as well as other states. Over the past thirty years many fine sweet potato varieties were developed for the fresh market. Processors are now looking for small sweet potato varieties which can be canned whole. It is hoped that a good processing type can be developed which will be profitable to the growers and processors as well as for the markets.

Sunflowers - Commercial sunflower production got underway in S. C. in 1968 with varying degrees of success and failures. Even though the growers were supplied with as much cultural information as was available from Clemson and elsewhere, there were many problems arising from time to time. Cut worms caused severe damage to entire fields. Many fields which survived the insects showed boron deficiency, and before this could be corrected it was too late to apply it. Some fair yields were obtained and there will be a total of 13 growers planting sunflowers in South Carolina in cooperation with Southern Soya in 1969. The total acreage will be 477 in the following 12 counties: Newberry,

Richland, McCormick, Edgefield, Barnwell, Orangeburg, Aiken, Lexington, Dorchester, Jasper, Colleton, and Hampton.

Yield and oil content data for the 1968 Regional Sunflower Yield Test at Clemson are presented in Table 2.

Mr. D. M. McLean, U. S. Vegetable Breeding Laboratory, Agricultural Research Service, Charleston, South Carolina 29407

I have tested the following watermelons (Citrullus lanatus) for resistance to race 2 of anthracnose (Colletotrichum orbiculare) accessions 277979 through 269681-252 accessions, and I have found no resistance in these lots of watermelon.

Mr. H. J. Sefick, Associate Professor of Horticulture, Clemson University, Clemson, South Carolina 29631

Pears - Besides a root-stock study of 3 varieties, Magness, Maxine, and Moonglow on Domestic, French, and Pyrus calleryana, a total of 45 selections and varieties of P.I.'s, U.S.D.A.--Meridian, Mississippi; Tennessee, South Carolina, and Georgia have been top worked into Old Home rootstock to note blight resistance and fruit quality.

R. E. Schoenike, Associate Professor of Forestry, Clemson University, Clemson, South Carolina 29631

Accession P.I. 168939 Quercus acutissima

Recieved germinated seeds in March 1965. Sown in Piedmont Nursery (S. C. Forestry Commission) in May 1965. Field planted in February 1966 as 1-0 stock. A total of 832 trees planted. On May 27, 1969, survival count made - 421 or 51% of trees living. Many in poor shape. Root systems attacked by a small grub and mole damage is evident. Chlordane was sprinkled around each tree. Fertilizer was added. Growth slow - some trees 3 feet tall, most between 1 and 2 feet. Apparently winter hardy. No diseases noted. Appears to have more promise for wildlife or horticulture than for forestry.

Accession PIM 19451 Eucalyptus cinerea

Received seeds from Miami Intro. Center in August 1965. Sowed seeds in greenhouse plots and transferred small seedlings into pots. In April 1966 seedlings were planted in three places, i.e. (1) an open SW exposed hillside, (2) a shady E facing slope, and (3) an open stream bottom location with late afternoon light overhead shade. All plants in sites (1) and (2) died in winter 1966-67. They resprouted and died back in the following winter. All eleven plants in site (3) survived three winters although terminal shoots were killed.

Table 1. Dry-matter yields, plant densities, and plant height of kenaf varieties at Clemson, South Carolina, in 1968.

Variety	Dry-matter yield[1]	Plants/ acre	Plant height[1]
	Tons/acre	1000	Inches
Everglades 41	4.21 bc	85.0	102 efg
Everglades 71	4.83 b	96.7	109 bcd
G-4	4.31 bc	88.3	110 bc
G-45	4.29 bc	92.1	101 fgh
C-108	5.81 a	94.1	109 bcd
C-2032	4.09 bcd	89.2	108 bcde
GR 25/63[2]	3.60 cd	83.6	103 defg
SH/15R[2]	4.90 b	73.1	121 a
ST 11760[2]	4.59 b	66.5	113 b
BG 52-75	3.12 d	53.2	95 h
BG 58-10	4.87 b	53.2	104 cdef
Cubano	3.00 d	61.9	97 gh

[1]Means followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's Multiple Range test.

[2]Introduced varieties from South Africa: P.I.'s 326023, 326024, and 326025, respectively.

Table 2. U. S. Regional Sunflower Yield Test, Clemson, South Carolina, Location No. 37, 1968

Entry No.	Identity	Lbs/Acre Mean	Oil Content Percent*
2	T 56002	1579	26.4
3	TAM-CRD P-21 ms X TAM-CRD HA 60	1505	32.6
4	Valley (Morden I)	1487	32.9
5	Peredovik	1148	34.9
6	Peredovik (66)	1387	38.6
7	VNIIMK 8931	1236	37.0
8	VNIIMK 8931 (66)	1342	36.6
9	Smena	965	36.4
10	Armavirec	863	34.6
11	Drasnodarets	1000	33.8
12	NK HO 1	1287	36.1
13	Mingren	1452	-
14	Commander	1270	-
15	Arrowhead	1185	-
16	Greystripe	2120	-

Analysis of variance, seed yield in pounds per acre

Source of Variation	D/F	SS	MS	F
Total	59	8,323,275		
Replications	3	411,107	137,036	2.080N.S.
Entries	14	5,145,690	367,549	5.580**
Error	42	2,766,478	65,869	

Coefficient of variation = 19.4%
L.S.D. (5%) = 367 pounds per acre
L.S.D. (1%) = 491 pounds per acre

*Oil percentage values obtained by the NMR (Nuclear Magnetic Resonance) method of the U. S. Regional Sunflower Yield Test grown at Clemson, South Carolina.

The tallest plants are now over 20 feet in height and 3 inches in diameter. None of the trees have assumed a straight upright growth habit. There is a strong tendency toward a leaning trunk with drooping foliage. Observation - precariously hardy, may have some ornamental value on protected bottom land sites.

Accession P.I. 285310 Abies spectabilis

Received one small plant from USNA in April 1966. Died in nursery transplant beds during summer 1966.

Accession P.I. 289939 Prunus cerasoides

Received one small plant from USNA in April 1966, Grew well in nursery but died after outplanting in winter of 1966-67.

Accession P.I. 293810 Pinus stankewiczii

Received two small plants from USNA in April 1966. Grew slowly in nursery bed and were outplanted in December 1966. One plant failed to survive the winter. The other is growing slowly.

Received two additional plants from USNA in April 1967. Outplanted into arboretum in January 1968. One plant died in summer 1968. The other is alive and growing slowly.

Accession P.I. 293809 Pinus nigra pallasiana

Received two plants from USNA in April 1966. Grew well in nursery. Outplanted in a shady location in December 1966. Plants failed to live beyond August 1967.

Received two additional plants from USNA in April 1967. Grew well in nursery. Outplanted to a sunny location in arboretum in January 1968. One plant died in summer 1968, one is alive and growing slowly.

Accession NA 26104 Magnolia wilsoni

Received one plant from USNA in April 1966. Died in nursery bed during summer 1966.

Accession NA 26107 Magnolia wilsoni

Received one plant from USNA in April 1966. Died in nursery bed during summer 1968.

Accession P.I. 28655 Abies mariesii

Received one plant from USNA in April 1966. Died in nursery bed during summer 1968.

The following Eucalyptus species were received from Miami Intro. as seeds in August 1965. Plants were raised from each and they were outplanted in an open location along a stream bottom in April 1966. All died in the winter of 1966-1967 as a result of lack of frost hardiness.

PIM 19450	PIM 18494
PIM 18440	PIM 18450
PIM 10876	PIM 19449
PIM 18844	PIM 18454
PIM 18446	PIM 18456
PIM 18448	PIM 12017
PIM 18449	

Accession NA 17413 Abies Kawakamii

Received one plant from USNA in April 1967. Grew well in nursery and transplanted to shady location in February 1968. Died in summer 1968.

Accession NA 26310 Pinus pinaster maghrebiana

Received one plant from USNA in April 1967. Grew well in nursery and transplanted to open hilly site in February 1968. Is alive and growing slowly.

Accession NA 29211 Viburnum obovatum

Received three plants from USNA in April 1967. Grew well in nursery. Transplanted to shady east slope in February 1968. Are alive and growing slowly. Maybe too much shade present.

Accession P.I. 307859 Sambucus kamtschatica

Received two plants via Hort. Dept., Clemson University, in April 1968. Planted in shady location. Died in summer 1968.

Accession P.I. 308781 Sambucus racemosa

Received one plant via Hort. Dept., Clemson University, in April 1968. Planted in shady location. Died in summer 1968.

Accession P.I. 308782 Sambucus siberica

Received two plants via Hort. Dept., Clemson University, in April 1968. Planted in shady location. Survived summer and winter seasons and are growing slowly.

Accession P.I. 307591 Sambucus sieboldiana

Received three plants via Hort. Dept., Clemson University, in April 1968. Planted in shady location. Survived summer and winter seasons and are growing slowly.

Accession P.I. Alnus hirsuta

Received three plants via Hort. Dept., Clemson University, in April 1968. Had grown well but transplanting shock very great. Two died in summer 1968. One is growing vigorously on an exposed SW hill site.

Accession P.I. Alnus inoukumai

Received two plants via Hort. Dept., Clemson University, in April 1968. Had grown well but transplanting shock very great. One died in summer 1968. The other has a new root sprout and is growing vigorously.

Accession NA 26306 Abies pinsapo marocana

Received one plant from USNA in April 1968. Transplanted immediately to shady site in arboretum. Survived summer and winter and is growing slowly.

Accession NA 29284 Acer capilles

Received one plant from USNA in April 1968. Transplanted immediately to shady site in arboretum. Survived summer and winter and is growing slowly.

Accession NA 29285 Acer grosseri

Received one plant from USNA in April 1968. Transplanted immediately to shady site in arboretum. Survived summer and winter and is growling slowly.

Accession NA 28921 Cedrela fissilis

Received two plants from USNA in April 1968. Transplanted immediately to a sunny SW slope in arboretum. Grew well in summer but died in winter 1968-69.

The following items were received from USNA in March 1969 and were placed in a nursery transplant bed to await outplanting in February 1970.

NA 28521	Cunninghamia knoishii	(1 plant)
NA 29841	Pinckneya pubens	(1 plant)
NA 31623	Pithecallobium flexicaule	(1 plant)
NA 827-S	Quercus chenii	(5 plants)
NA 30152	Sophora tetraptera	(3 plants)

Desiderata

Conifers from east Asia
Any species of Alnus, Quercus, Acer, Cornus, Ulmus
Selected species of Magnolia, Betula, Populus, Salix, Castanea
Frost-hardy evergreens of Lithocarpus, Castanopsis

Mr. R. B. Taylor, Greer Nursery Garden Center, Greer, South Carolina 29651

I have the pleasure of reporting on three plants which I have done extensive experimentation with during the past several years which have showed excellent results.

I am glad to report progress on my new Holly which will be patented and developed by Monrovia Nurseries of Azusa, California which they have under a lease agreement with me and will be named Ilex Cornuta Berries Jubilee.

This holly will be probably released either the first part or the last of 1970. This plant was a seedling developed from a Chinese holly (Ilex Cornuta) received from USDA, Glendale, Md. in 1926. This seedling is a dwarf plant with large leaves and large red berries with the same characteristics of an Ilex Rotunda except for berries and four times larger leaves.

I received approximately 80 Ilex Cultivars in August, 1967. They are doing fine and I hope to start propagating these very soon. I believe these will present a great deal of interest to the public when they are put on the market.

Rhododendrons: I have been experimenting in open field planting in full sun. Although some leaf burn has been evident, the blooms are outstandingly beautiful and abundant, even succeeding those in shaded or partial sun-shade areas. We are planting corn or other tall plants in the fields during the hotter months to afford some protection to these plants with very good results. We have approximately 1,000 rhododendrons growing and will start rooting processes on all varieties this summer here at the nursery.

We are also developing some new seedling hollies and camellias and will soon be able to evaluate them.

Mr. E. V. Wann, U. S. Vegetable Breeding Laboratory, Agricultural Research Service, Charleston, South Carolina 29407

I looked through the records on our sweet corn and tomato projects and found that no P.I. materials from S-9 have been used in recent year. Thus my report to your committee is negative.

Dr. Wright S. Jordan, Assistant Professor of Horticulture, Clemson University, Clemson, South Carolina 29631

Progress Report
Peach Rootstock Investigations
June 26, 1969

A peach rootstock collection was started at Clemson University in 1967, as a part of a newly initiated peach breeding program. The initial objective of this phase of the program was to have available desirable germ plasm that may prove useful for rootstocks without further improvement or as a desirable parent for hybridization with some of the currently available rootstocks.

Previous observations by workers in different peach growing areas of the country indicate that rootstock disorders with current stocks may be more serious than had been previously realized. In all probability the ultimate solution to many of the problems with peach production may be obtained through a series of rootstocks whose adaptability is equally as variable as that of the scion variety.

During 1967 a news item requesting information pertaining to the location and availability of Old Indian type peach trees was released through the Agricultural Communications Department at Clemson University. This item appeared in several newspapers whose circulation is primarily within South Carolina. A similar article also appeared in the Farm Journal that covers a much broader geographic circulation.

As a result of this news item, approximately 150 letters were received from all over the United States. In most cases the trees that were described failed to fruit during 1967 due to the late freeze that occurred around the middle of March. The decision was made to collect pits during 1967 only from those trees that produced fruit and disregard the non-bearing trees entirely, even though some of them might have been useful in regards to other characteristics

such as vigor or longevity. In some cases the tree descriptions indicated the age of the trees to be as old as 75 years but without fruit during 1967.

In my opinion, 1967 was a good year for natural selection for cold-hardiness, late-bloom and high chilling requirement, or a combination of these factors all of which would contribute to fruit production under adverse conditions. Since these collections were to be evaluated in the Piedmont area of South Carolina, it was considered important that they be consistent in bearing under the environmental conditions in this area.

During 1967, 35 specimens from nine different states were collected for future rootstock investigations. Seventeen of the specimens were obtained from South Carolina and eight from Georgia. In most cases involving the specimens from South Carolina and Georgia the trees were also observed in regards to vigor, freeness from disease or insect injury and approximate age. Only the fruit was observed for those specimens collected in other states since they were obtained through the mail. Any information pertaining to the tree characteristics for those specimens received through the mail is based on the description given by the individual. Some specimens received by mail were not utilized since it was obvious that they matured too early to be useful as rootstocks through seed propagation.

During 1968 six additional specimens were added to the original collection. Five of the specimens were obtained from South Carolina and one from Utah.

Approximately half of the specimens are representative of the Blood Cling type of peach. Several of the specimens exhibited fruit characteristics that are similar to those of Mountain Naturals. A few of the specimens could possibly be old varieties or at least recent descendents from old varieties since the fruit characteristics are better than would be expected of peaches propagated in the wild.

During 1968 two of the specimens from the Blood Cling group were included as stocks for some budding work in another phase of the breeding program. These two specimens were chosen because they had shown excellent germination ability and seedling uniformity. One of the specimens appeared to possess quite a bit more seedling vigor than the other which was another reason for selecting these two specimens.

The results from this preliminary work were the exact opposite of what was expected. The specimen that exhibited the most seedling vigor failed to unite with a single bud compared to a 60% bud union on the less vigorous specimen. Differences in scions obviously could not have been a factor since only one variety was used. All of the buds were placed by one individual which would eliminate differences in techniques. The two comparisons were

made on approximately 125 seedlings each. Further testing will have to be carried out to determine whether the specimen that failed to unite with any of the buds is truly that much inferior to the other. The results do indicate, however, that phenotypic observations are not the only factors that must be considered in rootstock investigations.

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

Ornamental Introductions

P.I. 274834 , Ilex latifolia, an upright selection with red petioles. The growth rate is much faster than the selection currently being grown in commercial nurseries. Should be an excellent screening plant for narrow spaces.

P.I. 276079, Ilex crenata radicans. An open spreading selection with leaves the size and shape of Ilex crenata roteindifolia. Foliage color dark green. This selection is a female.

P.I. 275790, Ilex crenata radicans. The growth habit of this selection is similar to Ilex crenata compacta. It is a male selection.

P.I. 275854, Ilex crenata radicans. A spreading female selection which is more dense than P.I. 276079. Foliage color is dark green.

P.I. Osmanthus heterophyllus . A variegated from of O. heterophylus with leaves larger than the variety 'ilicifolius'. An excellent selection which should be better than the selections found in nurseries today.

P.I. 242291, Osmanthus heterophyllus purpureus. A variegated form of Osmanthus heterophyllus ilicifolius. Apparently this selection is no improvement on the clone being grown in nurseries.

P.I. 236241, Osmanthus heterophyllus. A form of the O. heterophyllus ilicifolius which has light green to yellow green new foliage. The plants spread is as great as its height. It is apparently a semi-dwarf form. An excellent plant for accent use.

P.I. 236247, Camellia sinensis 'Rosea'. Apparently a semi-dwarf form of tea. The flowers are pink and produced in October. New growth is reddish purple. Good plant to use in shady areas for contrast.

P.I. 277664, Raphiolepis umbellata 'Mertensii'. A more compact growing Yeddo hawthorne. The growth habit is more compact than R. umbellata

and not as tall as P.I. 277654 and 277563. Flowers are more profuse than the above P.I.'s. The Hirado group of azaleas which were received in 1965 have withstood temperatures of 10^{o} and 13^{o} for two winters without injury. The color range is from white to red.

P.I. 228108, Satsuki 'Kikoski'. This is low evergreen azalea which tolerates dense shade and blooms about June 1. It is extremely hardy and has an orchid color bloom of about 2 inches--an excellent variety.

P.I. 226147, Satsuki 'Kagetsu Meyi'. A most unusual Satsuki type. This selection is upright in growth habit and produces variegated white and pink 3 inch blooms on one plant.

P.I. 293848, Pyracantha crenulata. A prostrate pyracantah with thorns. It is an apparent heavy berry producer.

P.I. 313983, Ulmus hollandica. An elm with an upright growth habit. The foliage is a dark green and apparently is not affected by powdery mildew or elm beetle.

P.I. 313551, Ulmus hollandica 'Belgica'. Similar to P.I. 313983 with larger leaves and growth habit vase-shaped.

P.I. 260883, Ulmus laevis. Fast growing elm with dark green foliage. Growth and foliage color much better than Ulmus pumila.

P.I. 296026, Stachyurus praecox. A most unusual shrub. Yellow flowers produced in panacles before foliage in early spring. Good only as an oddity since only a few blooms emerge at a time.

Tennessee Report on S-9 "New Plants"

To Technical Committee (1969)

Fragaria, Actinidia, Cynodon and Pinus accessions were received since the 1968 report.

Tennessee Valley Authority landscape workers have expressed interest in the use of Rosa rugosa (227432) for bank planting. It is expected that trial plantings will be made as soon as adequate propagating materials becomes available.

Blocks of three pine species will incorporated into a pinetum, maintained by Dr. Eyvind Thor, for eventual evaluation in forest tree usage.

Screening of Petunia, Antirrhinum and Gypsophila lines for resistance to Phytopthora parasitica is being carried out by Dr. Howard Reed. This fungus is making substantial inroads into the container plant trade of Petunia - our leading bedding annual. Seed lines of these three genera are solicited by Dr. Reed for these screening studies.

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

THE SOIL CONSERVATION SERVICE REPORT ON S-9 NEW CROPS FOR 1968 IN ITS SOUTHERN REGION

By

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

The Soil Conservation Service continues to carry a heavy program of plant evaluation. Plant introductions are among the most important sources for finding needed materials to solve the important problems in the conservation aspects of the South.

Appended is a total listing of the materials under observation during 1968. A review of this listing will show that we are observing plant materials on our Centers and in the field in a two-step program - initial observations and supplemental observations. If plants are listed as materials in supplemental observations, it means that they have shown some characteristic that make them appear good for some conservation purpose. This may not be explained in all cases in the section on important characteristics of the plant. The staged step increases should be obvious. Plants of promise to be supplementarily tested have to be initially increased and so on. The district seed increase column indicates those plants either already in commercial production or programmed to be.

A resume of some important characteristics of the more promising introductions follows. These comments have been made for the most part by Service workers in the field. They are acknowledged here.

Karl E. Graetz, Plant Materials Specialist, Raleigh, N. C.
H. J. Haynsworth, Plant Materials Specialist, Athens, Ga.
T. A. Bown, Plant Materials Specialist, Jackson, Miss.
A. H. Quintero, Plant Materials Specialist, Gainesville, Fla.
A. G. Davis, Plant Materials Specialist, Temple, Tex.
A. Sierra-Bracero, Plant Materials Specialist, Mayaguez, P. R.
J. D. Powell, Plant Materials Center Manager, Americus, Ga.
B. B. Billingsley, Plant Materials Center Manager, Coffeeville, Miss.
R. D. Roush, Plant Materials Center Manager, Brooksville, Fla.

Important Characteristics of the More Promising Plant Introductions

Arachis sp. - PI-263393. This forage peanut makes good growth all season long and grows well in a sod. Its drawback is the difficulty of seed harvest. (Powell)

It offers considerable potential as a wildlife food plant and possibly for forage. It produces a good quantity of nuts which will germinate the next spring. This occurs as far north as Huntsville, Ala. (Haynsworth)

USDA-SCS-FORT WORTH, TEX. 1969

Arachis burkhartii - PI-262851
Arachis glabrata - PI-172223 and PI-262794
Arachis glabrata var. hagenbeckii- PI-172224
Arachis sp. - PI-262819 and PI-262826
Selected from around 50 accessions, these accessions appear to be superior as possible perennial forage crops for growing in grass sods at our latitude. (Powell)

Castanea mollissima - PI-58602. This Chinese chestnut has better quality than most. (Powell)

Cynodon sp. - x 255455, a selection. Highly aggressive accession. Possesses abundant stems, showing a sub-erect to prostrate growth. Similar to Star bermudagrass but bears finer stems. Mat formed is not as compact as that of Coastcross #1. Basal portion of stems tends to dry but keeps intense green leaves throughout the year. (Sierra-Bracero)

Cynodon sp. - x 255455, a selection. Stoloniferous showing good emergence. Bears abundant sub-erect to prostrate stems. Shows a real good aggressiveness. Similar in appearance to Coastcross #1 bermudagrass. (Sierra-Bracero)

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. A potential wildlife food plant. (Roush)

Digitaria macroglossa - PI-299648. Excellent growth, and has the ability to grow on top of accumulated sand. In a planting at Mayport Beach, it has attained a height of 36 inches on top of a 12-inch sand bank accumulated around the clumps in a 2-year period. It has potential for use in Florida beaches but is winterkilled further north. (Quintero)

Digitaria pentzii - PI-106663
Digitaria smutsii - PI-299819, PI-299826, PI-299828
Digitaria valida - PI-299877 and PI-299878
These giant crabgrasses are potential forage crops. Those listed are proving to be winter hardy at Americus, Ga. (Powell)

Eragrostis curvula - PI-295689. This wide-leafed strain starts growth about three weeks earlier than common. Forage yields are comparable to common weeping lovegrass. (Davis)

Eragrostis lehmanniana - PI-295698. Considerably more robust than the commercial strain presently being used. Adequate seed production under irrigation would prove an advantage for commercial seed growers. (Davis)

Eragrostis robusta - PI-234218, is being tried in mined areas. It has the ability to grow under very poor soil conditions and spreads to adjacent areas. (Quintero)

Festuca arundinacea - PI-203728. This is one of the better performing of our many fescue accessions. It has stolons and rhizomes. (Powell)

Hemarthria altissima - PI-299993. Accessions of strong-to-weak aggressiveness. Stems are abundant and leafy. Leaves tend to become reddish as they attain maturity. Plants continue to produce regrowth of medium-fine tender shoots, which keep growying inbetween mature original stand. In spite of the slow growth shown, it seems to continue growing even under unfavorable conditions. (Sierra-Bracero)

This is making an excellent showing in the 1968 field plantings. Rapid growth, winter hardiness, high yielding, and the ability to retain body and palatability if left standing through the winter months makes us believe that it will have acceptance by farmers in Florida. Information on adaptability and use will be obtained in 1969 and 1970 from statewide plantings planned for this summer. (Quintero)

Hemarthria altissima - PI-299993 and PI-299994. These very stoloniferous, fast growing grasses show promise as forage plants. They remained green from early March until late December at Americus, Ga. (Powell)

Hemarthria altissima - PI-299994. A strong perennial with abundant fine-stemmed forage. Some cold tolerance. (Roush)

Indigofera pseudotinctoria - PI-197075, selection. A plant that is easy to establish, grows vigorously, and has a very heavy root system. It makes good seed crops, and its growth is prostrate. This likely has a place on sand dunes and other critical areas. (Powell)

Lespedeza serpens - PI-297385. This lespedeza appears to be losing its prostrate habit of growth through crossing with sericea. If a new planting can be started from new seed and grown in isolation, it should prove to be a top quality groundcover for use on roadbanks. (Powell)

Lespedeza virgata - PI-218004. A crop that is becoming commercially available to state highway departments for roadbank plantings. It is the best plant now available for this purpose. One official of the Georgia Highway Department said that if seed were available this plant would replace sericea entirely for highway plantings in the state. (Powell)

This plant has proven to be an excellent plant on cut slopes in the Piedmont and lower mountain elevations. It is being tested further in the higher mountain elevations and on the sand ridge and coastal plain soils. It looks excellent in the Southern Appalachian Ridges and Valleys MLRA in north Alabama with no indication of cold damage after two winters. (Haynsworth)

Lotus corniculatus - PI-260013, has perenniated on a sandy soil condition in the upper Coastal Plain MLRA and made good growth. This occurs under high level fertilization. Some disease does occur resulting in the loss of a few plants, but has not appeared serious. (Haynsworth)

Malus hupehensis - PI-122586, appears well adapted throughout Alabama and Georgia with no apparent disease to date. Growth varies with the cultural management given the plants. (Haynsworth)

Panicum miliaceum - PI-196692. "Dove" proso millet has been an outstanding success as a food (grain) producer for dove and bobwhite. It is in volume production, and strong demand has developed because of the heavy use by dove and bobwhite. It is currently being compared with other food-producing plants for waterfowl on locations that will be flooded after the crop is produced. (Haynsworth-Powell)

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. (Roush)

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 2 feet per month during growing season. Good, quick groundcover. PI-310108 withstands the cold better than PI-310107. Origin - Brazil. (Roush)

Paspalum nicorae - PI-202044. A grass with many of the good features of bahia plus having rhizomes. Originally we had considered this crop mainly for planting in waterways but its yield and feed value are close to bahia so possibly this will be grown for forage as well. (Powell)

PI-202044 is giving good protection to waterways in the lower Coastal Plain MLRA. These plantings are in their third year. (Haynsworth)

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 6 to 8 inches tall, and spread quickly by rhizomes. PI-310128 spreads quickest and generally is more dense. Origin - Brazil. (Roush)

Pennisetum pedicellatum - PI-284177 and PI-213527. Both produce moderate numbers of fine 7-foot-tall stems. Leaves are long and abundant with die-back on lower, older leaves. They stand and grow vigorously even on flooded flatwood soils. Tonnage and seed production are good to very good. (Roush)

Pennisetum purpureum - PI-300086. Plant showing real good emergence of very strong seedlings. Forms a very good stand. Bears abundant, erect stems. Aggressiveness is very strong. Blooming has been observed to be scarce. A height of around 20 feet has been attained. (Sierra-Bracero)

Pennisetum purpureum - PI-304188. Accessions showing profuse constant tillering. Culms of different sizes and ages observed at the same stand. Possesses very good aggressiveness. Scarce blooming observed by February. Height of around 20 feet was attained. (Sierra-Bracero)

Pennisetum purpureum - PI-304189. Plant bearing very profuse stems. A sub-erect growth is observed during initial stages of growth. Aggressiveness is strong. Stems are waxy. Recovery after clipping is rapid. Profuse rhizomes observed after clipped. (Sierra-Bracero)

Pennisetum purpureum - PI-304190, PI-304192, and PI-304193. These new introductions from South Rhodesia are very strong perennial, weakly rhizomatous, bunch 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. (Roush)

Pennisetum purpureum - PI-304190. Plant showing good emergence of very strong seedlings. Tillering is so profuse that a sub-erect growth is observed during initial plant growth. New shoots continue to appear constantly. A slight blooming occurred by January. Axillary growth observed after blooming. A height of about 15 feet was attained. (Sierra-Bracero)

Pennisetum purpureum - PI-304192. Accessions showing strong aggressiveness. Bears abundant medium-fine, waxy stems. Growth is sub-erect during initial stages of growth. Profuse rhizomes produced after clipped. Plant is very similar to common napiergrass but seems to grow a little shorter. Profuse blooming observed by November. (Sierra-Bracero)

Pistachia chinensis - PI-21970. One of the most beautiful fall foliage trees grown in our area. This plant is dioecious. Songbirds eat the berries which mature in mid-summer. (Powell)

Plantings of it indicate good adaptation to all areas of Georgia and Alabama. (Haynsworth-Powell)

Quercus acutissima - PI-54433. A fast growing oak that will likely have a place as a timber tree. The large crops of unusually large acorns make this desirable as a mast crop for wildlife. (Powell)

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. (Roush)

Stylosanthes humilis - PI-187098. Circular S-184 of the Florida Agricultural Experiment Station, Institute of Food and Agricultural Sciences, University of Florida, February 1968, mentions our initial work with S. humilis, PI-187098. It is being used for grazing and as a hay crop interplanted with coastal and Pangola. It could also be used as a cover crop in young, bedded, citrus orchards. It is not adapted to northwest Florida. Seed production in 1968 was very poor because of early frosts in south Florida. (Quintero)

Vicia sativa - PI-228301, PI-228305, and PI-230362. These three produce excellent volunteering in undisturbed soil, disced soil, and 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-228301 produces the most seed. PI-228301 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 inch by 14 inch. (Roush)

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 9 feet in length. Seed production is fair to good. (Roush)

New Releases

Selection 75 kleingrass was accepted as a variety eligible for certification by the State Seed and Plant Board in September 1968. Release information was published as follows:

Kleingrass 75 - Ethan Holt - Texas Agricultural Progress, Winter, 1969, Vol. 15, No. 1.

Kleingrass Shows Promise - Dale Allen - Farmer Stockman, April 1969.

An article entitled "Virgata Lespedeza for Erosion Control," by W. C. Young and Harry J. Haynsworth appeared in the Journal of Soil and Water Conservation, Vol. 24, No. 2, page 67, March-April 1969.

Commercial Seed Production

Commercial seed production is one way that indicates the value of the plant introductions. The following table shows that 12 varieties of relatively new introductions were estimated to have produced 302,185 pounds of seed for the commercial market in the South in 1968.

Table I - Estimated Seed Produced in the South

P.I. Number	Name	Amount	State
78758	Andropogon caucasicus Caucasian bluestem	2,000	Tex.
415123	Agropyron elongatum "Jose" tall wheatgrass	2,000	Tex.
106831	Agropyron tricophorum "Luna" pubescent wheatgrass	1,000	Tex.
x196293	Echinochloa frumentacea "Chiwapa" japanese millet	35	N.C.
163453	Glycine ussuriensis	2,400 800	Miss. N.C.
90664	Lespedeza japonica "VA 70"	3,500	N.C.
218004	Lespedeza virgata spreading lespedeza	400 600	S.C. Ga.
166400	Panicum coloratum "Selection 75" kleingrass	30,000	Tex.
196292	Panicum milliaceum "Dove" proso millet	3,400 13,220 10,000 150,000	S.C. N.C. Ala. Ga.
202044	Paspalum nicorae "Amcorae" brunswickgrass	1,030	S.C.
234310	Trifolium vesiculosum "Amclo" arrowleaf clover	800 1,000	S.C. Ga.
233782	Trifolium vesiculosum "Meechee" arrowleaf clover	1,000 20,000 59,000	Ark. La. Miss.
		302,185 pounds	

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
219823	Arachis duranensis					A			
116976	Arachis glabrata						A		
118457	Arachis glabrata		F	B	F	M	B		F
162801	Arachis glabrata						A		
262287	Arachis glabrata					A			
262794	Arachis glabrata					A			
262796	Arachis glabrata					A			
262797	Arachis glabrata					A			
262798	Arachis glabrata					A			
262801	Arachis glabrata					A			
262839	Arachis glabrata		F	B	F		B		F
151982	Arachis glabrata v. hagenbeckii		A			A			
172224	Arachis glabrata v. hagenbeckii					A			
219824	Arachis hypogaea					A			
210553	Arachis pusilla					A			
262286	Arachis sp.					A			
262301	Arachis sp.					A			
262811	Arachis sp.					A			
262814	Arachis sp.					A			
262817	Arachis sp.					A			
262818	Arachis sp.					A			
262819	Arachis sp.					A			
262826	Arachis sp.					A			
262828	Arachis sp.					A			
262832	Arachis sp.					A			
262834	Arachis sp.					A			
262839	Arachis sp.					A,M			
262840	Arachis sp.					A			
263393	Arachis sp.		A,N,S,T, Ar,L	C	A,M		A,C		
261870	Arachis villosa					A			
302847	Argyrolobium linnaeanum	B							
180806	Arrhenatherum elatius					A			
263693	Arundinella hirta					A			
322297	Astragalus sinicus	B							
237128	Axonopus affinis	B							
237128	Axonopus compressus v. australis		A			A			
241498	Bothriochloa intermedia	C							
161669	Bothriochloa ischaemum	K							
171397	Bothriochloa ischaemum	K							
223024	Bothriochloa ischaemum	C							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
253444	Bothriochloa ischaemum	K							
263192	Bothriochloa ischaemum	K							
268361	Bothriochloa ischaemum	C, K							
269364	Bothriochloa ischaemum	C, K				A			
292179	Brachiaria brizantha	M							
292182	Brachiaria brizantha	B, M							
292183	Brachiaria brizantha	M							
292198	Brachiaria brizantha	M							
153053	Brachiaria dictyoneura		F				B		
Lost	Brachiaria dictyoneura					M			
257678	Brachiaria humidicola	B							
316447	Brachiaria mutica	B							
247404	Brachiaria ruziziensis					M			
299499	Brachiaria sp.					M			
89817	Brachypodium mucronulatum	K				A			
186288	Brachypodium phoenicoides	K	A			A			
257680	Brachypodium phoenicoides	B				A			
287785	Brachypodium phoenicoides	C				A			
206545	Brachypodium pinnatum	C, K	N,S,T						
111279	Bromus erectus					A			
251106	Bromus erectus	C							
251107	Bromus erectus	C							
253301	Bromus erectus	C							
254881	Bromus erectus	C							
283197	Bromus papovii	C							
292257	Bromus sitchensis	C							
292258	Bromus unioloides	C							
316176	Bromus unioloides	B				A			
283201	Bromus uruguayensis	B							
164347	Bromus willdenowii	B				A			
195476	Bromus willdenowii		A			A			
284107	Bromus willdenowii	C							
284109	Bromus willdenowii	C							
284110	Bromus willdenowii	C							
284111	Bromus willdenowii	C							
284112	Bromus willdenowii	C							
284788	Bromus willdenowii	C							
315677	Bromus willdenowii	K							
279477	Cajanus cajan					A			
304646	Cajanus indicus	B							
281634	Calopogonium mucunoides	B							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322301	Calopogonium mucunoides	B							
322302	Calopogonium mucunoides	B							
322303	Calopogonium mucunoides	B							
322304	Calopogonium sp.	B							
322305	Calopogonium sp.	B							
209314	Canavalia maritima	B							
322309	Canavalia obtusifolia	B							
200209	Canavalia sp.	B							
305410	Cassia abreviata	B							
164034	Cassia alata	B							
322312	Cassia angulata	B							
322313	Cassia bicapsularis	B							
322314	Cassia bicapsularis	B							
322316	Cassia flexuosa	B							
322317	Cassia flexuosa	B							
322318	Cassia flexuosa	B							
322319	Cassia flexuosa	B							
322320	Cassia latistipula	B							
322321	Cassia latistipula	B							
322322	Cassia latistipula	B							
322323	Cassia rotundifolia	B							
322324	Cassia rotundifolia	B							
322325	Cassia rotundifolia	B							
322326	Cassia sp.	B							
58602	Castanea mollissima	B				A			
58602	Castanea sp.	C							
95630	Castanopsis schlerophylla					A			
244348	Castanopsis chrysophylla					A			
153671	Cenchrus ciliaris			M	C				
210693	Cenchrus ciliaris			M	C				
210696	Cenchrus ciliaris			M	C				
243199	Cenchrus ciliaris			M	C				
253725	Cenchrus ciliaris			M	C				
271198	Cenchrus ciliaris	B	F	M,B	C,F	A	B		
284835	Cenchrus ciliaris			M	C				
298977	Cenchrus ciliaris					A			
299514	Cenchrus ciliaris			M	C				
299517	Cenchrus ciliaris			M	C				
299519	Cenchrus ciliaris			M	C				
299520	Cenchrus ciliaris			M	C				

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
299522	Cenchrus ciliaris			M	C				
299523	Cenchrus ciliaris			M	C				
299524	Cenchrus ciliaris			M	C				
299525	Cenchrus ciliaris			M	C				
299526	Cenchrus ciliaris			M	C				
299527	Cenchrus ciliaris			M	C				
299528	Cenchrus ciliaris			M	C				
299532	Cenchrus ciliaris			M	C				
299533	Cenchrus ciliaris			M	C				
299534	Cenchrus ciliaris			M	C				
299535	Cenchrus ciliaris			M	C				
299536	Cenchrus ciliaris			M	C				
299537	Cenchrus ciliaris			M	C				
299538	Cenchrus ciliaris			M	C				
299539	Cenchrus ciliaris			M	C				
299540	Cenchrus ciliaris			M	C				
299541	Cenchrus ciliaris			M	C				
299542	Cenchrus ciliaris			M	C				
299543	Cenchrus ciliaris			M	C				
299544	Cenchrus ciliaris			M	C				
299545	Cenchrus ciliaris			M	C				
299546	Cenchrus ciliaris			M	C				
271141	Cenchrus setigerus			M	C				
271145	Cenchrus setigerus			M	C				
271528	Cenchrus setigerus			M	C				
271529	Cenchrus setigerus			M	C				
322327	Centrosema arenarium	B							
322328	Centrosema kermesi	B							
322329	Centrosema plumieri	B							
316190	Centrosema pubescens								
316191	Centrosema pubescens	B							
316192	Centrosema pubescens	B							
316193	Centrosema pubescens	B							
316195	Centrosema pubescens	B							
316196	Centrosema pubescens	B							
316197	Centrosema pubescens	B							
316198	Centrosema pubescens	B							
322330	Centrosema pubescens	B							
322331	Centrosema pubescens	B							
322332	Centrosema pubescens	B							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322333	Centrosema pubescens	B							
322334	Centrosema pubescens	B							
322339	Centrosema sp.	B							
322340	Centrosema sp.	B							
322341	Centrosema sp.	B							
322343	Centrosema sp.	B							
322344	Centrosema sp.	B							
322345	Centrosema sp.	B							
322348	Centrosema sp.	B							
322349	Centrosema sp.	B							
322350	Centrosema sp.	B							
322351	Centrosema sp.	B							
322352	Centrosema sp.	B							
322353	Centrosema sp.	B							
322354	Centrosema sp.	B							
322355	Centrosema sp.	B							
322356	Centrosema sp.	B							
322336	Centrosema virginianum	B							
316200	Chloris castilloniana	B				A			
162637	Chloris distichophylla					A			
283226	Chloris gayana	C							
299547	Chloris gayana	M							
299548	Chloris gayana	M							
299549	Chloris gayana	M							
299550	Chloris gayana	M							
299556	Chloris gayana	M							
309962	Chloris gayana	M							
316203	Chloris gayana	C							
316411	Chloris gayana	B							
213885	Chrysopogon fulvus	C,K	A				A		
215586	Chrysopogon fulvus	K	N,S,T	C			C		
217906	Chrysopogon fulvus		N,S,T						
271530	Chrysopogon fulvus	C							
254887	Chrysopogon gryllus	K							
302660	Chrysopogon gryllus	K							
301816	Chrysopogon montanus	C							
301820	Chrysopogon montanus	C							
322357	Clitoria laurifolia	B							
322358	Clitoria laurifolia	B							
275316	Clitoria ternatea	K							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322366	Clitoria ternatea	B							
251808	Coronilla sp.	C							
253435	Coronilla sp.	C							
204871	Coronilla varia	C							
206487	Coronilla varia	C							
210365	Coronilla varia	C							
228411	Coronilla varia	C							
229968	Coronilla varia	C							
238142	Coronilla varia	C							
274040	Coronilla varia	C							
274041	Coronilla varia	C							
278698	Coronilla varia	C							
297597	Cotoneaster racemiflora					A			
279746	Cryptomeria japonica					A			
279748	Cryptomeria japonica					A			
271551	Cymbopogon distans	K				A			
288218	Cynodon coursii	M							
224693	Cynodon dactylon					A			
224152	Cynodon plectostachyus	M		M	C	M,A			
255455	Cynodon sp.	M		M	C				
255459	Cynodon sp.	M		M	C				
284680	Danthonia cirrhata	C							
284681	Danthonia montevidensis	C							
284682	Danthonia montevidensis	C							
284683	Danthonia montevidensis	C							
212237	Danthonia pilosa	C							
237160	Danthonia unarede	C							
322411	Desmanthus virgatus	B							
316210	Desmodium angustifolium	K							
322412	Desmodium barbatum	B							
322413	Desmodium campylocaulon	B							
322415	Desmodium canum	B							
322416	Desmodium canum	B							
282691	Desmodium cinerascens	B, K							
322427	Desmodium cuneatum	B							
322430	Desmodium discolor	B							
322431	Desmodium discolor	B							
322432	Desmodium discolor	B							
322433	Desmodium discolor	B							
322434	Desmodium discolor	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322435	Desmodium discolor	B							
322436	Desmodium discolor	B							
322437	Desmodium discolor	B							
322438	Desmodium discolor	B							
322439	Desmodium discolor	B							
322440	Desmodium discolor	B							
322441	Desmodium discolor	B							
322442	Desmodium discolor	B							
322443	Desmodium discolor	B							
322444	Desmodium discolor	B							
316211	Desmodium distortum	B							
322445	Desmodium distortum	B							
322446	Desmodium distortum	B							
322447	Desmodium gangeticum	B							
217910	Desmodium heterocarpon	B							
295877	Desmodium intortum	B							
316213	Desmodium intortum	B							
322448	Desmodium intortum	B							
322449	Desmodium intortum	B							
322450	Desmodium intortum	B							
322451	Desmodium leiocarpon	B							
322452	Desmodium ovalifolium	B							
322454	Desmodium pabulare	B							
322455	Desmodium pabulare	B							
322456	Desmodium pabulare	B							
322457	Desmodium pabulare	B							
322458	Desmodium pabulare	B							
322459	Desmodium pabulare	B							
322460	Desmodium pabulare	B							
322461	Desmodium pabulare	B							
322462	Desmodium pabulare	B							
322463	Desmodium pabulare	B							
316217	Desmodium sandwicense	B							
316220	Desmodium sandwicense	B							
316221	Desmodium sandwicense	B							
316224	Desmodium sandwicense	B							
322467	Desmodium sandwicense	B							
322468	Desmodium sandwicense	B							
322469	Desmodium sandwicense	B							
322470	Desmodium sandwicense	B							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322474	Desmodium scorpiurus	B							
311104	Desmodium sp.	B							
311105	Desmodium sp.	B							
311122	Desmodium sp.	B							
311129	Desmodium sp.	B							
311130	Desmodium sp.	B							
311169	Desmodium sp.	B							
311170	Desmodium sp.	B							
311171	Desmodium sp.	B							
311172	Desmodium sp.	B							
322500	Desmodium sp.	B							
322501	Desmodium sp.	B							
322502	Desmodium sp.	B							
322504	Desmodium sp.	B							
322505	Desmodium sp.	B							
322511	Desmodium sp.	B							
322512	Desmodium sp.	B							
322513	Desmodium sp.	B							
322514	Desmodium sp.	B							
322520	Desmodium sp.	B							
322475	Desmodium tortuosum	B							
322477	Desmodium tortuosum	B							
322478	Desmodium tortuosum	B							
322479	Desmodium tortuosum	B							
322480	Desmodium tortuosum	B							
322483	Desmodium tortuosum	B							
322484	Desmodium tortuosum	B							
322485	Desmodium tortuosum	B							
322486	Desmodium tortuosum	B							
322487	Desmodium tortuosum	B							
322488	Desmodium tortuosum	B							
322489	Desmodium tortuosum	B							
322490	Desmodium tortuosum	B							
322491	Desmodium tortuosum	B							
322492	Desmodium tortuosum	B							
322493	Desmodium tortuosum	B							
322494	Desmodium tortuosum	B							
322495	Desmodium tortuosum	B							
322496	Desmodium tortuosum	B							
322497	Desmodium tortuosum	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
311123	Dolichos lablab	B							
311124	Dolichos lablab	B							
311155	Dolichos lablab	B							
316232	Dolichos lablab	B							
322529	Dolichos lablab	B							
322530	Dolichos lablab	B							
322531	Dolichos lablab	B							
322532	Dolichos lablab	B							
322533	Dolichos lablab	B							
322534	Dolichos lablab	B							
322535	Dolichos lablab	B							
322536	Dolichos lablab	B							
289650	Doryenopsis gerardii	C							
173754	Echinochloa crusgalli	C							
177389	Echinochloa crusgalli	C							
182304	Echinochloa crusgalli	C							
183332	Echinochloa crusgalli	C							
189611	Echinochloa crusgalli	C							
196291	Echinochloa crusgalli	C							
197272	Echinochloa crusgalli	C							
197854	Echinochloa crusgalli	C							
202368	Echinochloa crusgalli	C							
211025	Echinochloa crusgalli	C							
217911	Echinochloa crusgalli	C							
219606	Echinochloa crusgalli	C							
219608	Echinochloa crusgalli	C							
220518	Echinochloa crusgalli	C							
223254	Echinochloa crusgalli	C							
225568	Echinochloa crusgalli	C							
250096	Echinochloa crusgalli	C							
271563	Echinochloa crusgalli	C							
271911	Echinochloa crusgalli	C							
274913	Echinochloa crusgalli	C							
315091	Echinochloa crusgalli	C							
315694	Echinochloa crusgalli	C							
315697	Echinochloa crusgalli	C		C					
315698	Echinochloa crusgalli	C		C					
315699	Echinochloa crusgalli	C							
196293	Echinochloa frumentacea				N,T				S,T
207924	Echinochloa holubii		Ar	C			C		

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
250392	Echinochloa spiralis			C					
331387	Echinochloa sp.					A			
294098	Elaeagnus umbellata						A		
106274	Eleocharis dulcis	B		C		C			
108491	Elymus giganteus	K				A			
11599	Elymus sabulosus	K							
271565	Elyonurus hirsutus	K							
271566	Elyonurus hirsutus	K							
277797	Enchylaena tomentosa	B							
279185	Enchylaena tomentosa	B							
276033	Eragrostis atherstonei	C,K				A			
299038	Eragrostis atherstonei	K							
299906	Eragrostis atherstonei	K							
295689	Eragrostis bicolor	C							
208087	Eragrostis chloromelas					A			
208088	Eragrostis chloromelas					A			
208160	Eragrostis chloromelas					A			
208225	Eragrostis chloromelas					A			
208226	Eragrostis chloromelas					A			
208284	Eragrostis chloromelas					A			
209184	Eragrostis chloromelas					A			
226070	Eragrostis chloromelas					A			
234206	Eragrostis chloromelas					A			
234209	Eragrostis chloromelas	M				A			
276036	Eragrostis chloromelas	M				A			
299910	Eragrostis chloromelas	K							
299911	Eragrostis chloromelas	C,K							
208285	Eragrostis curvula					A			
208994	Eragrostis curvula	K			Tx		K		
299911	Eragrostis curvula	B							
299913	Eragrostis curvula	C							
299915	Eragrostis curvula	C							
299917	Eragrostis curvula	B,C							
299918	Eragrostis curvula	B,C							
299919	Eragrostis curvula	B,C							
299920	Eragrostis curvula	C							
299923	Eragrostis curvula	C,M							
299924	Eragrostis curvula	C,M							
299925	Eragrostis curvula	C,M							
299926	Eragrostis curvula	C							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
299928	Eragrostis curvula	C							
299929	Eragrostis curvula	C							
299930	Eragrostis curvula	C							
234213	Eragrostis curvula	C							
234558	Eragrostis curvula	C							
232813	Eragrostis curvula	K			Tx		K		
295689	Eragrostis curvula	K	Tx			K			
295690	Eragrostis curvula	K							
295691	Eragrostis curvula	K							
295693	Eragrostis curvula	K							
295694	Eragrostis curvula	K							
295697	Eragrostis curvula	K							
295700	Eragrostis curvula	K, C							
295703	Eragrostis curvula	K, C	Tx			K			
295707	Eragrostis curvula	K, C							
310403	Eragrostis curvula	B							
295696	Eragrostis lehmanniana	K							
295699	Eragrostis lehmanniana	K			Tx	K			
295703	Eragrostis lehmanniana	C							
299936	Eragrostis lehmanniana	C,K							
299937	Eragrostis lehmanniana	C,K							
299938	Eragrostis lehmanniana	C,K							
299939	Eragrostis lehmanniana	C,K							
299940	Eragrostis lehmanniana	C,K							
299941	Eragrostis lehmanniana	C,K							
299942	Eragrostis lehmanniana	C,K							
299944	Eragrostis obtusa	C,K							
299945	Eragrostis obtusa	C,K							
299947	Eragrostis obtusa	C,K							
190317	Eragrostis porosa	B							
209385	Eragrostis robusta				Ar				
234218	Eragrostis robusta		F	B	Ar,F				
295701	Eragrostis sarmentosa	C							
295702	Eragrostis sarmentosa	C							
295704	Eragrostis superba	C,K							
295705	Eragrostis superba	C	Tx		Tx	K			
299959	Eragrostis superba	K							
299963	Eragrostis sp.	K							
299962	Eragrostis truncata	C							
316241	Eriochloa procera	B							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322537	Eriosema floribundum	B							
322538	Eriosema floribundum	B							
322539	Eriosema sp.	B							
322540	Eriosema sp.	B							
275073	Euonymus fortunei	C							
238315	Festuca ampla	C,K							
240156	Festuca ampla					A			
240157	Festuca ampla	C	A			A			
283275	Festuca ampla	K							
203728	Festuca arundinacea	C, K	A	C			A		
264766	Festuca arundinacea	C				A			
292602	Festuca arundinacea	K				A			
292603	Festuca arundinacea	K				A			
302996	Festuca arundinacea	C							
316243	Festuca arundinacea	K							
316245	Festuca arundinacea	K							
316246	Festuca arundinacea	K							
270399	Festuca elatior	C							
283314	Festuca orientalis	K							
293320	Festuca psammophila					A			
283324	Festuca uechtritziana	K							
188883	Galactia acapulcensis	B							
322541	Galactia jussiaeana	B							
246651	Glycine falcata	C	N,S,T						
300996	Glycine kodzumi		N,S,T						
277534	Glycine javanica					A			
304376	Glycine javanica	B							
304377	Glycine javanica	B							
304378	Glycine javanica	B							
200233	Glycine sp.	B							
163453	Glycine ussuriensis		Ar,L,M	C			C	M	
299986	Glycine wightii	B							
299987	Glycine wightii	B							
319474	Glycine wightii	B							
319475	Glycine wightii	B							
319476	Glycine wightii	B							
319477	Glycine wightii	B							
319478	Glycine wightii	B							
319479	Glycine wightii	B							
299039	Hemarthria altissima	C,M				A			

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
299993	Hemarthria altissima	C,M		B	F	M	A, B	F	
299994	Hemarthria altissima	C,M		B			A		
299995	Hemarthria altissima	C,M		B		A			
200399	Hordeum bulbosum		A,N			A			
274910	Hordeum bulbosum	K							
287840	Hordeum bulbosum	K							
292402	Hyparrhenia hirta	B							
254592	Ilex cassine					A			
316703	Ilex montana					A			
112222	Ilex rotunda					A			
225575	Indigofera echinata					A			
311512	Indigofera hirsuta					A			
316258	Indigofera hirsuta	B				A			
316259	Indigofera hirsuta	B							
316260	Indigofera hirsuta	B							
322542	Indigofera hirsuta	B							
197075Sel.	Indigofera pseuditinctoria						A		
319480	Indigofera spicata	B							
322544	Indigofera suffruiticosa	B							
322545	Indigofera sp.	B							
322546	Indigofera sp.	B							
322547	Indigofera sp.	B							
322548	Indigofera sp.	B							
319481	Indigofera subulata	B							
283520	Lathyrus hirsutus	B							
283521	Lathyrus hirsutus	B							
292796	Lathyrus sphaericus					A			
207718	Lespedeza bicolor					A			
286477	Lespedeza bicolor					A			
179699	Lespedeza cuneata					A			
186171	Lespedeza cuneata					A			
195842	Lespedeza cuneata					A			
246769	Lespedeza cuneata	C				A			
310409	Lespedeza cuneata	C				A			
322551	Lespedeza cuneata	B							
246770	Lespedeza intermixta			C		A	C		
90664	Lespedeza japonica	C		C					
286481	Lespedeza penduliflora					A			
246771	Lespedeza pilosa	C				A			
193950	Lespedeza serpens	C					A		

P.I. Number	Scientific Name	Status				Increases - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
297385	Lespedeza serpens	C,K					A		
218004	Lespedeza virgata		A,Ar,L,M,N,S,T	C	A,G,N,S,T		A,C	G,S	
304650	Leucaena leucocephala	B							
316263	Leucaena leucocephala	B							
120651	Lithocarpus henryii					A			
161359	Lolium multiflorum	C							
188732	Lolium multiflorum	C							
196538	Lolium multiflorum	C							
274638	Lolium multiflorum	C							
107071	Lolium perenne	C							
187277	Lolium perenne	C							
189153	Lolium perenne	C							
275660	Lolium perenne	C							
283614	Lolium perenne	C							
284823-26	Lolium perenne	C							
285100	Lolium perenne	C							
290368-74	Lolium perenne	C							
303011-20	Lolium perenne	C							
303024-45	Lolium perenne	C							
303047-49	Lolium perenne	C							
305500	Lolium perenne	C							
311420	Lolium perenne	C							
234409	Lotononis bainesii		A,S			A			
322554	lotononis bainesii	B							
283616	Lotus conimbricensis	B							
260011	Lotus corniculatus					A			
260012	Lotus corniculatus					A			
260013	Lotus corniculatus		A			A			
251148	Lotus decumbens	B							
310412	Lotus frondosus					A			
300015	Lotus major	B							
284761	Lotus mearnsii	B							
269853	Lotus ornithopodioides	K							
180172	Lotus pedunculatus	B							
189113	Lotus pedunculatus	B							
190349	Lotus pedunculatus	B							
202383	Lotus pedunculatus	B							
235115	Lotus pedunculatus	B							
235526-29	Lotus pedunculatus	B							
235531	Lotus pedunculatus	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
239939-40	Lotus pedunculatus	B							
268028	Lotus pedunculatus	B							
185099	Lupinus elegans						B		
99907	Malus baccata						A		
122586	Malus hupehensis	C	A		A,Ar,G,L,M	A	A,C		
292415	Medicago ciliaris					B			
220247	Medicago intertexta	K							
303058	Medicago intertexta	B							
316291	Medicago littoralis	B				A			
170548	Medicago polymorpha	B							
197340	Medicago polymorpha	B							
308060	Medicago polymorpha					A			
189570	Medicago scutellata	B							
230350	Medicago turbinata		S			A			
181438	Melilotus alba annua	C							
308066	Melilotus alba annua	C							
319484	Melinis minutiflora	B							
286608	Metasequoia glyptostroboides	C							
286483	Miscanthus sinensis	C							
300032	Myrica cordifolia	B							
298030	Olea europea	B							
258767	Onobrychis viciaefolia					A			
258774	Onobrychis viciaefolia					A			
284130	Ornithopus compressus	B				A			
230621	Aryzopsis miliacea	B,C				A			
231949	Osmanthus heterophyllus					A			
238030	Osmanthus heterophyllus					A			
242291	Osmanthus heterophyllus					A			
242241	Osmanthus x osmarea burkwoodi					A			
300033	Osterospermum moniliferum	B							
185456-57	Panicum antidotale					A			
196337	Panicum antidotale					A			
213272	Panicum antidotale					A			
215647	Panicum antidotale					A			
235119	Panicum antidotale					A			
268410	Panicum antidotale	K							
271589-90	Panicum antidotale	K							
275096	Panicum antidotale	C							
284150	Panicum antidotale					A			
284151	Panicum antidotale	K							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
300034	Panicum antidotale	C,k							
166400	Panicum coloratum						A	K	Tx
178251	Panicum coloratum					A			
184776	Panicum coloratum		A						
185548	Panicum coloratum	K							
185550-51	Panicum coloratum	K							
185558	Panicum coloratum	K							
188831-32	Panicum coloratum	K							
196360-65	Panicum coloratum	K							
206370	Panicum coloratum	K							
207990	Panicum coloratum					A			
207995	Panicum coloratum					A			
208003	Panicum coloratum	K							
208005	Panicum coloratum					A			
208943	Panicum coloratum	K							
209002	Panicum coloratum	K							
210692	Panicum coloratum					A			
253241	Panicum coloratum	K							
253243	Panicum coloratum	K							
253246-47	Panicum coloratum	K							
253249	Panicum coloratum	K							
253254	Panicum coloratum	K							
253256	Panicum coloratum	K							
255333	Panicum coloratum					A			
255335	Panicum coloratum					A			
263602	Panicum coloratum					A			
263603	Panicum coloratum		B			A			
263605	Panicum coloratum	K							
263607	Panicum coloratum	K							
277963	Panicum coloratum	K							
284152	Panicum coloratum	K							
295645	Panicum coloratum	K							
300039	Panicum coloratum	B							
300041	Panicum coloratum	K							
238344	Panicum cymbiforme	C							
238346	Panicum ianipes	C							
203520	Panicum makarikariense					A			
156080	Panicum maximum		B						
253718	Panicum maximum	C							
316303-05	Panicum maximum	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
170602	Panicum miliaceum					A			
177016-17	Panicum miliaceum					A			
178992	Panicum miliaceum					A			
179383	Panicum miliaceum					A			
179389	Panicum miliaceum					A			
196691	Panicum miliaceum		A		L,N,S,T		A		A,G,N,S
198153	Panicum miliaceum					A			
202294-95	Panicum miliaceum					A			
207501	Panicum miliaceum					A			
220535	Panicum miliaceum					A			
220812	Panicum miliaceum					A			
222811	Panicum miliaceum					A			
223793	Panicum miliaceum					A			
223795	Panicum miliaceum					A			
232929	Panicum miliaceum					A			
250787	Panicum miliaceum					A			
251404-06	Panicum miliaceum					A			
251273	Panicum miliaceum					A			
251389	Panicum miliaceum					A			
251403	Panicum miliaceum					A			
253790	Panicum miliaceum					A			
289320	Panicum miliaceum					A			
289325	Panicum miliaceum					A			
145794	Panicum stapefianum	C,K							
178257	Panicum stapefianum	K				A			
185547	Panicum stapefianum	K							
190326-27	Panicum stapefianum	K							
196368	Panicum stapefianum	K							
198589	Panicum stapefianum	K							
206371	Panicum stapefianum	C,K							
300058	Panicum stapefianum	C							
204907	Panicum virgatum	C							
315728	Panicum virgatum			C			A		
337556	Paspalum alcalinum					A			
310046	Paspalum bosceanum	B				A			
310049	Paspalum bosceanum		A			A			
310051	Paspalum bosceanum	B				A			
310052	Paspalum bosceanum					A			
310047	Paspalum bosceanum	B							
276242	Paspalum cromyorhizon					A			
310059	Paspalum cromyorhizon					A			
310070	Paspalum cromyorhizon					A			

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
303975	Paspalum dilatatum					A			
316306	Paspalum dilatatum	B							
310107-08	Paspalum hieronymii	B							
310112	Paspalum intermedium					A			
202044	Paspalum nicorae	C,K				A			
276248	Paspalum nicorae	K			Tx	A	K		
276249	Paspalum nicorae	K				A			
284171	Paspalum nicorae					A			
209983	Paspalum nicorae					A			
304003-04	Paspalum nicorae					A			
310128-35	Paspalum nicorae	B				A			
161886	Paspalum notatum		S						
162791	Paspalum notatum	C	N,S	C		A			
204247	Paspalum notatum		N,S,T			A			
209393	Paspalum notatum		S						
241878	Paspalum notatum		S			A			
276251	Paspalum notatum	C	N,S,T			A			
282803-04	Paspalum notatum		N,S,T,			A			
284171	Paspalum notatum					A			
284172	Paspalum notatum		N,S			A			
284174	Paspalum notatum		S						
316307	Paspalun pauciciliatum	B							
284520	Paspalum paniculatum		N,S,T						
316308-12	Paspalum plicatulum	B							
161886	Paspalum quadrifarium		N,S,T						
316313	Paspalum quadrifarium	B							
316314	Paspalum scrobiculatum	B							
203755	Paspalum umbrosum		N,S,T						
203882	Paspalum umbrosum		N,S,T						
316318	Paspalum virgatum	B							
269235	Pennisetum alopecuros					A			
165749	Pennisetum ciliare	C							
203366	Pennisetum ciliare	C				A			
284828-29	Pennisetum ciliare	C							
213275	Pennisetum pedicellatum	C							
213527	Pennisetum pedicellatum	B, M							
284177	Pennisetum pedicellatum	B, M							
291392	Pennisetum purpureum	M							
300086	Pennisetum purpureum	B,M				A			
304188-89	Pennisetum purpureum	M							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
304190	Pennisetum purpureum	B,M							
304192-93	Pennisetum purpureum	B,M							
300114	Pennisetum setaceum	C							
304750	Pennisetum unisetum					A			
271603	Pennisetum sp.	B,C				A,C			
304751	Pennisetum sp.	M				A			
315868	Pennisetum sp.	C				A			
321087	Pennisetum sp.	B,M							
310292	Phalaris angusta	B							
184205	Phalaris aquatica	K							
240249	Phalaris aquatica					A			
284202	Phalaris aquatica	K							
284241	Phalaris aquatica	K							
306735	Phalaris aquatica					A			
306743	Phalaris aquatica					A			
306756	Phalaris aquatica					A			
306760-63	Phalaris aquatica					A			
306778	Phalaris aquatica					A			
306780	Phalaris aquatica					A			
207959	Phalaris aquatica x arundinacea					A			
236525	Phalaris arundinacea					A			
297362	Phalaris arundinacea	B,C,K							
233707	Phalaris arundinacea x tuberosa					A			
202480	Phalaris tuberosa					A			
207961	Phalaris tuberosa					A			
207968	Phalaris tuberosa					A			
316339	Phaseolus atropurpureus	B							
322575-79	Phaseolus atropurpureus	B							
3225781	Phaseolus atropurpureus	B							
280130	Phaseolus lathyroides					K			
316464	Phaseoluslathyroides	B							
322591-94	Phaseolus lathyroides	B							
40842	Phyllostachys bambusoides					A			
143540	Phyllostachys bissetii				Ar	A	C		
116768	Phyllostachys meyerii				Ar		C		
316977	Pinus koraiensis	C							
317255-56	Pinus koraiensis	C							
246336-37	Pistacia atlantica	B				A			
276701-03	Pistacia atlantica	B,C				A			
21970	Pistacia chinensis		A,Ar,L,M		A,G		A,C		

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or oundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
91608	Pistacia terebinthus	B				A			
246341-42	Pistacia terebinthus	B,C				A			
12815	Pistacia vera	B				A			
17250	Pistacia vera	B				A			
121176	Pistacia vera	B				A			
284254	Poa iridifolia	K							
238351	Psoralea adscendens	C							
238252	Psoralea bituminosa	C							
246744	Psoralea bituminosa	C							
283967	Psoralea bituminosa	C							
283969	Psoralea bituminosa	C							
287920-21	Psoralea bituminosa	C							
302954	Psoralea bituminosa	C							
238353	Psoralea cinerea	C							
246745	Psoralea dentata	C							
255746	Psoralea eriantha	C							
287922	Psoralea eriantha	C							
183344	Psoralea sp.	C							
246747	Psoralea tenax	C							
61938	Pterocarya stenoptera					A			
322613	Pueraria javanica	B							
322602-07	Pueraria montana	B							
322609-12	Pueraria montana	B							
203240	Pyracantha coccinea	C							
322614	Quercus acutissima	B							
371372	Quercus acutissima						A		
544332	Quercus acutissima						A		
74222	Quercus myrsinaefolia	C				A			
74227	Quercus myrsinaefolia	C				A			
322614-15	Rhynchosia minima	B							
322616-17	Rhynchosia phaseoloides	B							
322619-25	Rhynchosia sp.	B							
265662	Salix aurita	C							
266477	Salix purpurea	C							
265667	Salix repens v. rosmarinifolia	C							
265663	Salix x chrysostala	C							
287923	Sanguisorba minor	K							
297952	Sanguisorba minor	K							
52674	Sasa pygmaea	C				A			
322626-27	Sesbania exasperata	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322628	Sesbania punicea	B							
322629	Sesbania sesban	B							
186346	Setaria argentina					A			
186965	Setaria argentina	C	N,S,T						
316341	Setaria australiensis	B				A			
300109	Setaria flabellata	C				A			
316422	Setaria geniculata	C							
208303	Setaria gerrardi	C	N,S,T						
230136	Setaria italica	C							
283987	Setaria italica					K			
315885	Setaria longiseta	B							
217229	Setaria macrostachya	C							
229129	Setaria macrostachya	C							
229131	Setaria macrostachya	C							
300110	Setaria neglecta	C							
209396	Setaria perberis		N,S,T						
153695	Setaria sphacelata		A			A			
280125	Setaria sphacelata	C							
284477	Setaria sphacelata	C							
295368	Setaria sphacelata	B							
296007-08	Setaria sphacelata	C							
314868-69	Setaria sphacelata	C							
314871-72	Setaria sphacelata	C							
314874-75	Setaria sphacelata	C							
314877-78	Setaria sphacelata	C							
314881-84	Setaria sphacelata	C							
316343	Setaria sphacelata	C							
316406	Setaria sphacelata	C							
321672	Setaria trinerva	B							
308976	Sorghum sudanense	B							
300123	Sporobolus fimbriatus	B,C				A			
197687	Stipa hyalina	K							
237818	Stipa nessiana					A			
314113	Stipa pennata v. lessingiana	K				A			
314395	Stipa pennata v. lessingiana	K							
314482	Stipa pennata v. lessingiana	K							
147820	Stipa splendens		A			A			
147821	Stipa splendens					A			
314114	Stipa ucrainica	K							
314396	Stipa ucrainica	K							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
311517	Stizolobium aterrimum					B			
322634	Stylosanthes capitata	B							
197554	Stylosanthes fruiticosa	K							
261266	Stylosanthes gracilis	K							
311267	Stylosanthes gricalis	B,K							
319490	Stylosanthes gracilis	B,K							
322635	Stylosanthes gracilis	B							
322636	Stylosanthes gracilis	B,K							
322637-39	Stylosanthes gracilis	B							
322641	Stylosanthes guyanensis	B,K							
187098	Stylosanthes humilis	B,K	F					F	
322643-44	Stylosanthes humilis	B							
322645	Stylosanthes humilis	K							
322646	Stylosanthes montevidensis	K							
275764	Stylosanthes sundaica	K							
322663-71	Teramnus uncinatus	B							
322672	Teramnus volubilis	B							
300136	Tetrachne dregei	B,C							
300137	Tetrachne dregei	B							
308072	Tetragonolobus requienii	C							
308073	Tetragonolobus siliquosus	C							
310431	Tetragonolobus siliquosus	C							
218114	Themeda anathera	C							
271553	Themeda anathera					A			
281968	Themeda australis	C				A			
246782	Themeda japonica					A			
206349	Themeda triandra	C				A			
207932	Themeda triandra	C				A			
208197	Themeda triandra					A			
208198	Themeda triandra	C							
274091	Themeda triandra					A			
276070	Themeda triandra	C				A			
318746	Thuarea involuta	B							
166381	Tricholaena monachne	C							
238273	Tricholaena repens	C							
310319	Tridens brasiliensis	C							
241079	Tridens muticus	C							
251172	Tridens agrarium	B							
209016	Tridens alexandrinum					A			
194827	Trifolium amabile	B							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
206483	Trifolium ambiguum	B							
283999	Trifolium ambiguum	C							
284003-04	Trifolium ambiguum	C							
300148	Trifolium butchellianum	C				A			
174392	Trifolium campestre	B							
206479	Trifolium campestre	B							
207937	Trifolium campestre	B							
226678	Trifolium campestre	B							
233718	Trifolium campestre	B							
241474	Trifolium campestre	B							
226101	Trifolium cheranganianis	B							
308079	Trifolium clypeatum					A			
314755	Trifolium fragiferum	K							
316347	Trifolium fragiferum	K							
168636	Trifolium globosum	B							
244678	Trifolium globosum	B							
201211	Trifolium glomeratum	B							
207936	Trifolium glomeratum	B							
249846	Trifolium hirtum	B							
251563	Trifolium incarnatum	B							
255892	Trifolium incarnatum	B							
308082	Trifolium incarnatum	C				A			
197741	Trifolium isthmocarpum	B							
121233	Trifolium luppaceum					A			
241117	Trifolium medium	C							
250989	Trifolium medium	C							
251210	Trifolium medium	C							
253200	Trifolium medium	C							
260249	Trifolium medium	C							
284621	Trifolium medium	C							
238156	Trifolium meneghinianum	B							
206926	Trifolium nigrescens	B							
210354	Trifolium nigrescens	B							
233723	Trifolium nigrescens	B							
249855	Trifolium nigrescens	B							
201213	Trifolium pallidum	B							
204933	Trifolium pratense	B							
214207-08	Trifolium repens					A			
300147	Trifolium repens	B,C							
204932	Trifolium resupinatum	B							

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P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
223537	Trifolium resupinatum	B							
223826	Trifolium resupinatum	B							
250035-36	Trifolium resupinatum	B							
250999	Trifolium resupinatum	B							
251000	Trifolium resupinatum	B							
261198	Trifolium resupinatum	B							
268432	Trifolium resupinatum	B							
316354	Trifolium resupinatum		A						
180896	Trifolium spumosum	B							
200373	Trifolium spumosum	B							
241481	Trifolium spumosum	B							
244325	Trifolium spumosum	B							
253992	Trifolium spumosum	B							
238372	Trifolium strictum	B							
249853	Trifolium strictum	B							
168639	Trifolium tomentosum	B							
170817	Trifolium tomentosum	B							
170826	Trifolium tomentosum	B							
233782	Trifolium vesiculosum	B,C	A,Ar,M				C	C	Ar,L,M
233816	Trifolium vesiculosum	B,C							
234310	Trifolium vesiculosum		S		S,T			A	S,T
279948	Trifolium vesiculosum					A			
337041	Tripsacum australe					A			
316360	Urochloa panicoides	B							
316679	Viburnum lantana					A			
286489	Vicia amoena	C							
227880	Vicia angustifolia	B							
238383	Vicia angustifolia	B							
230665	Vicia atropurpurea	B							
199265	Vicia benghalensis	B							
220880	Vicia benghalensis	B							
308098	Vicia bithynicia						A		
121276	Vicia cordata	B							
238375	Vicia cornigera	B							
316684	Vicia floridana	B,C							
238376	Vicia globosa	B							
308103	Vicia graminea					A			
183099	Vicia hirsuta	B							
183100	Vicia hirsuta	B							
307469	Vicia lathyroides	C							

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
316686	Vicia leavenworthii	C							
316687	Vicia ludoviciana	C							
249880	Vicia lutea		A				A		
249922	Vicia lutea	B							
284354-55	Vicia lutea	B							
308107	Vicia lutea laevigata	C				A			
238379	Vicia macrocarpa	B							
314260	Vicia michauxii	C							
170017	Vicia narbonensis	B							
230275	Vicia narbonensis	B							
238380	Vicia narbonensis	B							
316685	Vicia ocalensis	C							
193683	Vicia onobrychoides	B							
170008	Vicia pannonica	B							
314502	Vicia peregrina	C							
175956	Vicia sativa	B							
176954	Vicia sativa	B							
193116	Vicia sativa	B							
193686	Vicia sativa	B							
212482	Vicia sativa	C							
228301	Vicia sativa					B			
228305	Vicia sativa					B			
230362	Vicia sativa					B			
230608	Vicia sativa	B							
239348	Vicia sativa	B							
247092	Vicia sativa	B							
284056	Vicia sativa	B							
289483	Vicia sativa	C							
293298-99	Vicia sativa	B							
293300	Vicia sativa	B							
293430	Vicia sativa	B							
254922	Vicia sp.	B							
314504	Vicia sp.	C				A			
317185	Vicia sp.	C							
312481	Vicia tetrasperma	C							
314561	Vicia tetrasperma					A			
229970	Vicia villosa					B			
250796	Vicia villosa					A			
308123	Vicia villosa	C				A			
314404	Vicia villosa	C							

SCS-34

P.I. Number	Scientific Name	Status				Increase - Centers 1/			District Seed Increase - Field 2/
		Initial Observation		Supplemental Observation		Initial	Supplemental	Breeder or Foundation Seed	
		Center 1/	Field 2/	Center 1/	Field 2/				
322683-84	Zornia brasiliensis	B							
322685-87	Zornia diphylla	B							
231060	Zoysia japonica			C					
235334	Zoysia japonica			C					
324184	Zoysia japonica			C					
264343	Zoysia matrella			C					

1/ A=Americus; B=Brooksville; C=Coffeeville, and K=James E. "Bud" Smith.

2/ A=Alabama; Ar=Arkansas; F=Florida; G=Georgia; L=Louisiana; M=Mississippi; N=North Carolina; S=South Carolina; T=Tennessee; and Tx=Texas.

Report for 1969 Meetings of Regional Technical Committees on New Crops

I. A. Wolff
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COMMENTS ON SELECTED PLANTS

Tephrosia vogelii. In October of 1968 a meeting of USDA Utilization and Farm Research scientists took place at the Northern Division to review the status and potential of research on T. vogelii and to establish research priorities. Critical needs include improved seed production, higher rotenoid percentages, and still more rapid and improved analytical procedures that breeders can use for assay of large numbers of samples.

New analytical procedures developed at the Northern Division have now been applied to a number of samples. Total rotenoid content varies within lines both with location and season, due to unknown factors. All of the lines presently under study have about the same rotenoid-producing capacity (about 4%). However the ratio of rotenone to total rotenoids varies considerably and seems more characteristic of individual lines and less affected by environmental factors. Twenty-one species of Tephrosia (seed from Puerto Rico station) have been planted in Peoria for exploratory tests of rotenoid-production capability, as shown by our improved analytical procedures.

Sunflower. Utilization research on sunflower has been administratively assigned to the Southeastern Agricultural Research Laboratory at Athens, Georgia. Prior to discontinuing research at the Northern Division we obtained extensive compositional data on selected new Russian oilseed sunflower varieties (J. Amer. Oil Chem. 45(12), 876-879 (1968)); demonstrated that during storage of some lines of sunflower seed oxidative changes in the oil occurred in the intact achenes (Lipids 3(6), 489-494 (1968)); studied the nature of the wax in sunflower oil that sometimes contributes to haze in the oil; investigated oil autoxidation; and identified some of the sugars and phenolic constituents of defatted sunflower meal. Manuscripts are in preparation on the last three research areas.

Hemarthria altissima. Cooperative studies with the S-9 representative from Florida are continuing, to ascertain whether a useful beverage can be prepared from this introduced grass that has tea-like odor and flavor. Preliminary organoleptic evaluation with the Northern Division's taste panel had limited validity. The panel, trained to distinguish fine nuances of differences between edible vegetable oil samples, did not like the commercial green tea preparations used as controls. The preliminary studies suggested better flavor from mature than immature leaves, and a preference for leaves over stems for beverage preparation. Further studies seem worthwhile and are planned with a panel selected from among tea drinkers.

Briza spicata. Additional industrial requests for evaluation samples of the lipid from B. spicata seed, for use as a breadmaking adjunct, were received during the year. Further development work awaits harvest of larger sized plantings and more seed for utilization research. In the interim while crops research is progressing on the species, seed oils from 51 other species, primarily grasses (and including six other Briza species) were examined to ascertain if any other rich sources of glycolipids might be found. None contained more than very small amounts, not at all comparable to B. spicata.

High Erucic Oilseeds. Interest remains high in crambe. A small trial processing of Indiana- and Louisiana-grown seed was satisfactorily carried out in June 1969 in a small expeller mill at Alexandria, Louisiana. Additional seed will be processed as available. The oil has been sold. A Louisiana farmer reports an aphid problem in that area and has requested control information. According to information at NU several hundred acres of crambe will be grown in southern Indiana in 1969 and perhaps several thousand acres in the Louisiana-Mississippi area. A Louisiana farmer estimated his potential crambe yield at close to 3,000 pounds per acre but heavy rains and flooding near his harvest time reduced yields and harvested acreage.

Research continues at the Northern Division on derivatives of industrial value from crambe oil. Included is work on new nylons and other plastics, on plasticizers, and on lubricants. Investigations are also continuing on improved processes to obtain better feed meals as a coproduct of processing crambe for oil.

The Northern Division has entered into a cooperative agreement with the Oregon AES and is furnishing some funds for the work which has as objectives getting adapted, high-yielding Brassica lines that have high-oil content, high erucic acid in the oil, and low thioglucoside content in the meal. Screening samples on which NU has analyses will be provided, as well as materials from CR, and regional programs. The agreement provides for CR to participate in planning and evaluation of results on this cooperative agreement.

Biologically Active Substances from Plants. In cooperative work with the NIH's Cancer Chemotherapy National Service Center (CCNSC) studies are continuing on a search for antitumor compounds in plants. We have isolated and structurally characterized an alkaloid from Cephalotaxus harringtonia that is active in small doses against an experimental leukemia in mice. The extent of additional chemical effort at NU will be governed by the pharmaceutical merit of the drug as determined by the CCNSC.

Of three dozen materials submitted to the Southern Research Institute, oil from Picramnia pentandra showed activity as a sterilant for the female boll weevil. It is undergoing further study.

Kenaf. The first trials of continuous pulping of kenaf were carried out during the last year by NU at a rented industrial facility in Ohio. Runs on both green and field-dried kenaf were successful, although some problems were encountered. Evaluation of the pulps is in progress but has not been completed. An American firm has conducted studies in France on the pulping of kenaf along lines similar to ours. In general, results are comparable, and the company will continue its studies. A different group is conducting studies on storage of green kenaf at the pulp and paper center at Grenoble, France. We have recently learned that another major American pulp and paper company has been investigating various pulping methods on dried kenaf for some time. Results have not been published but are said to be very encouraging. The high brightness of the bleached pulps was of special interest, but all types of paper and paperboard are being considered. The continuing industrial interest in kenaf is reflected by the transfer of the TAPPI ad hoc committee on kenaf to permanent status with the title "Non-Wood Plant Fibers Committee."

Material for continuous pulping was grown at Glenn Dale, Maryland, that for dejuicing studies at Ripley, Ohio, and that for studies on hemicellulose composition at Peoria, Illinois, and Gainesville, Florida. Appreciation is due the cooperating growers which include CR and SAES personnel.

Milk-clotting Enzymes. Calf rennet is becoming more expensive and in short supply; new sources of this type of enzyme activity would be desirable. Microbial sources are being considered, and at least one microbial enzyme for the purpose is on the market. At NU 1,300 samples, including oil-free seed meals, fruits, leaves, and other plant parts were tested for milk-clotting ability. Some activity was found in 111 samples. Examples of active species are Actinidia chinensis, Centaurea americana, several Solanums, and Carduus gayanus. The evaluation is most preliminary; numerous additional criteria must yet be met to achieve a commercially acceptable enzyme source for use in cheesemaking.

SCREENING

A serious situation exists relative to acquisition of new seed samples for chemical screening. A sufficient number to keep pace with the analyses was acquired during the last year only because of a gift of 481 samples from a Canadian investigator upon his retirement. If the various regional committees endorse and recommend domestic collections for chemical screening it may serve to help the New Crops Research Branch justify assignment of personnel to this activity. As a result of previous NC-7 and W-6 recommendations some collections were made in the southwestern U.S. That activity has already provided 74 samples (including 16 Cruciferae), and has resulted in one interesting discovery. The species Physaria floribunda, a close relative of Lesquerella, contains the same unique C_{20} hydroxy fatty acid in its seed oil as that in the western Lesquerellas. The sample situation during the year is shown in the following table.

Samples

May 1, 1968-April 30, 1969

	Increase from April 30, 1968	Total
Seed samples received.	871	10,396
Families	20	187
Genera	145	1,756
Species.	440	5,583
Incomplete identification.	33	534
Samples analyzed	746	8,578
Oil samples analyzed by gas chromatography . . .	396	3,035
Samples disposed of without screening.	14	203
" deferred (hard to clean; special). . . .	16	160
" " (4 replicates analyzed)	33	507
Increase samples received.	144	1,838
" " analyzed.	85	1,316

Methodology. Improved procedures now permit us to obtain data on oil composition for smaller samples than hitherto possible, when precious materials require microtechniques. A number of herbarium samples of rare Crepis seeds are being studied by the new techniques. However, the methods are more tedious, require experienced personnel, and versatility and accuracy of chemical operations are affected. Seed samples of substantial size are still needed for maximum information and minimum operator time.

Unusual Oils. A number of the seed oils encountered have contained fatty acids of unique chemical structure. Some of these in the past year were new ones, which were structurally characterized; others represent additional sources of previously found unusual acids, frequently in the same genus as that in which originally discovered. Typical of two unusual seed oils which contain fatty acids in combinations other than conventional triglycerides are those from Cordia verbenacea (Boraginaceae) and Monnina emarginata (Polygalaceae). Cordia verbenacea oil has a high percentage of a long-chain diester of a unique 5-carbon nitrogen-containing (cyano) diol. The Monnina emarginata seed oil contains a 14-carbon ring compound (macrocyclic lactone) derived from coriolic acid as well as coriolic glycerides in which the hydroxyl group is esterified by another long-chain fatty acid.

SOIL CONSERVATION SERVICE SAMPLES

Most of the samples of grass seed obtained from SCS have been analyzed. Surprisingly six contained over 10 percent of oil, a large amount for this plant family. The oils appeared to be of usual composition. However

seed from one of the grasses (with 19%) oil, Koeleria cristata, is in the group of grasses that earlier investigators recognized as being odd in that they contain liquid endosperm. Chemical investigations at NU are being directed toward ascertaining the composition of this type of endosperm.

SPECIAL SAMPLES FROM REGIONAL COMMITTEES

The 213 samples received from Regional Committees and related stations, included seed increased in 1968 (24 samples), 38 earlier increases (Chico), 49 Brassica (12 Ames, 37 Florida), 21 Tephrosia (Puerto Rico), 12 Solanum (Georgia), 57 samples from Soil Conservation Service (Miller, Portland), 5 Hemarthria (Florida), 3 fruit (Miami), 2 sesame (North Carolina), 2 kenaf (Texas). The Brassica from Florida were mostly B. carinata examined in search of high-erucic oil, preferably in a line with light-colored seed suitable for condiment use. The erucic acid ranged from 37-50 percent. The range suggests probable success in selection and the best lines appear to provide superior starting material than our earlier samples which were mostly 40-43 percent erucic acid. The Solanums were primarily for the exploration for rennet-like activity. The SCS samples were mostly grasses, with some legumes, from various stations in the western region. The sesame had been processed for oil by an unusual method developed by a private company in North Carolina. The procedure did not produce good sesame oil but might be applicable to other materials. The two kenaf seed samples from Texas were of early-maturing lines, for us to observe in the Peoria area.