M I N U T E S

of the

MEETING OF THE S-9 TECHNICAL COMMITTEE

"NEW PLANTS"

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

University of Kentucky
Lexington, Kentucky

July 23-24, 1973

Agenda for Meeting
of the
S-9 Regional Technical Committee

University of Kentucky
Room A-6, Agricultural Science Center North
July 23 - 24, 1973

1. Call to order and introduction of members and visitors
2. Welcome to University of Kentucky
3. Review and approval of Minutes of 1972 S-9 Meeting
4. Additions to or deletions from Agenda
5. Appointment of committees: (a) Nominations
   (b) Date and location of next meeting
   (c) Resolutions
6. Progress Reports:

   Regional Plant Introduction Station

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

   U. S. Plant Introduction Station, Savannah, Ga.

   Soil Conservation Service

   Northern Research Laboratory

   Germplasm Resources Laboratory

   Cooperative State Research Service
7. ARS personnel associated with Plant Introduction
8. S-9 representation at National Coordinating Committee Meeting
9. Regional Station Budget
10. Inventory of plant germplasm collections in Southern Region
11. Requests for plant explorations
12. Regional publication on ornamental plant introductions
13. Regional publication on new crops
14. Consideration of Inter-Regional Project I
15. Administrative Advisor
16. Plan of work for 1974
17. Committee Reports
18. Field Trip
19. Adjournment

1. Call to Order and Introduction

The meeting of the S-9 "New Plants" Technical Committee was called to order by W. T. Fike at 8:30 a.m., 23 July 1973 in Room A-6 of the Agricultural Science Center at the University of Kentucky Campus. Minutes were taken by M. J. Constantin, Secretary. Each attendee introduced himself. Those in attendance were:

S-9 Committee Members Present

C. R. Jackson	Adminstrative Advisor
W. R. Langford	Regional Coordinator, Georgia
J. L. Bowers	Arkansas
G. B. Killinger	Florida
R. E. Sigafus	Kentucky
R. J. Stadtherr	Louisiana
H. W. Bennett	Mississippi
W. T. Fike	North Carolina
Charles Galeotti	Oklahoma
J. Velez-Fortuno	Puerto Rico
J. A. Martin	South Carolina
M. J. Constantin	Tennessee
E. L. Whiteley	Texas
Quentin Jones	National Program Staff, USDA
F. R. Earle	Northern Regional Laboratory, USDA

Others in Attendance

H. L. Hyland	Germplasm Resources Laboratory, USDA
G. A. White	Germplasm Resources Laboratory, USDA
W. O. Hawley	U. S. Plant Introduction Station, Savannah, Ga.
Charles Adamson	U. S. Plant Introduction Station, Savannah, Ga.
Grover Sowell, Jr.	Regional Plant Introduction Station, USDA
Robert Kleiman	Northern Regional Laboratory, USDA
R. G. Creech	Agronomy Dept., Mississippi State Univ.
C. O. Little	Assoc. Dean for Research, University of Kentucky
D. C. Milbocker	Horticulture Dept., University of Kentucky
N. L. Taylor	Agronomy Dept., University of Kentucky
E. N. Fergus	Retired, University of Kentucky
L. Davidson	Canberra, Australia
J. A. Floyd, Jr.	Dept. of Horticulture, Clemson University

2. Welcome

C. O. Little, Associate Dean for Research, University of Kentucky, welcomed the group to the University of Kentucky Campus.

3. Approval of Minutes for 1972 S-9 Meeting

Additions and corrections of the 1972 Minutes of the Auburn, Alabama meeting were called for. J. L. Bowers moved that the Minutes be approved and the motion was seconded by C. R. Jackson. Approval was unanimous.

4. Consideration of Agenda

The Agenda as shown on page 1 was adopted.

5. Appointment of Committees

W. T. Fike, Chairman, appointed the following committees:

Nominating Committee

H. W. Bennett
J. A. Martin

Resolutions Committee

George White
G. B. Killinger
H. L. Hyland

Time and Place of Next Meeting

R. E. Sigafus
R. J. Stadtherr

6. Progress Reports

Reports of progress in the evaluation of new crops and plants were presented by S-9 Committee Members by states in alphabetical order, and by representatives of other research organizations. Additional reports from the University of Kentucky were presented by D. C. Milbocker on ornamental plants and blueberries, and by N. L. Taylor on the collection of Trifolium species. Representatives from Alabama, Virginia, and the Soil Conservation Service were absent, but reports from Alabama and SCS were submitted for inclusion in these Minutes. Copies of all reports presented are included.

7. ARS Personnel Associated with Plant Introduction

Reorganization of ARS in 1972 placed personnel in new positions and severed many lines of communications that existed in the national program of plant introduction. H. L. Hyland discussed the new organization of ARS at the 1972 S-9 meeting but some positions had not been filled at that time. W. R. Langford distributed a list of ARS employees in the Southern Region. Area Directors, Location Leaders, and Research Leaders were included on the list. The Germplasm Resources Laboratory of the Plant Genetics and Germplasm Institute, ARS, Beltsville, Md. under the leadership of Dr. George White now conducts plant introduction activities that formerly were done by the New Crops Research Branch. Quentin Jones presented a report on personnel constituting the ARS Plant Germplasm Coordinating Committee. Included in the report are the names of individuals, their affiliation and address.

8. S-9 Representation at National Coordinating Committee Meeting

C. R. Jackson announced that the National Coordinating Committee will meet at the National Arboretum in October 1973. S-9 representatives to that meeting will receive more detailed information later. W. R. Langford stated that it has been a long-time policy of S-9 for the Administrative Advisor, Coordinator, Chairman and Secretary of S-9 to attend the NCC meetings and that the nominating committee should take this into consideration when nominating officers for next year.

9. Regional Station Budget

W. R. Langford presented the regional station budget for the coming year. A copy of the budget is attached. He stressed consideration of funds to construct a new seed storage facility worthy of the seed collection on hand. The motion to approve the budget was made by E. L. Whiteley and seconded by W. R. Langford. Approval was unanimous.

10. Inventory of Plant Germplasm Collections in Southern Region

W. R. Langford stated that one function of the ARS Germplasm Coordinating Committee is to review annually the total ARS program of Plant Introduction, determine the germplasm needs, and make recommendations for new plant explorations. In order to establish priorities for future explorations the committee needs to know what germplasm is now available in this country, especially those collections maintained at locations other than at the regional stations. H. W. Bennett stated that 5000 sweet sorghum accessions are maintained at the U. S. Sugar Crops Field Station near Meridian; a regional cotton variety collection of 1200 numbers of 1000 genetic varieties is maintained at Stoneville; and that Group V soybeans, consisting of 1000 strains, are maintained at Stoneville. Dr. Fike discussed the status of the blueberry collection in North Carolina and the probability of preparing and issuing a catalogue of the available stocks. Dr. Whiteley commented on cotton introductions maintained in Texas. Dr. Jackson encouraged the committee to complete the survey of germplasm collections held at state stations and advise the coordinator of such collections.

11. Requests for Plant Explorations

H. W. Bennett and E. L. Whiteley presented formal requests for collections of Paspalum and Bufflegrass, respectively. Copies of these requests are attached. Members of the committee suggested further exploration for tomato, crambe, kenaf, warm season legumes, fescue, Phalaris, Vaccinium, okra, Digitaria, Panicum, Eragrostis, and Capsicum. Dr. Jones stated that S-9 requests would be considered in competation with those from the other three regions, and he suggested formal written proposals with a good justification would likely get more consideration than would informal requests. W. R. Langford stated that perhaps written requests with a strong justification can be prepared for some of the species listed above by the time the ARS Germplasm Committee meets.

12. Regional Publication on Ornamental Plant Introductions

R. J. Stadtherr discussed the progress that has been made toward the publication of a regional bulletin on ornamental plant introductions. A copy of the report is attached.

13. Regional Publication on New Crops

E. L. Whiteley reported that material for this publication is still being assembled. Dr. White will supply evaluations for many species that have not progressed beyond the seed increase and preliminary testing stage. Dr. Jackson encouraged committee members who have material for this publication to submit it to Dr. Whiteley.

14. Support for Project IR-1

Dr. Fike read a letter from Dr. Clare Harris, CSRS, giving the status of Project IR-1 which has been without a project leader since Dr. P. R. Rowe left IR-1 several months ago. Upon discussing the contributions of IR-1 to southern agriculture and the continued need for potato germplasm, the consensus of opinion of the S-9 Committee was that IR-1 should be continued and that funds should be made available to employ a new leader for it. Dr. Fike requested the resolutions committee to prepare a resolution expressing the S-9 committee's attitude toward IR-1.

15. Administrative Advisors Report

C. R. Jackson reported on invitation to Dr. Fenton Sands, Director of Agricultural Experiment Station of the Virgin Islands, to appoint a representative to the committee.

16. Plan of Work for 1974

Dr. George White will keep the coordinator informed of any new accessions of chemurgic plants available for evaluation in 1974. Seed of available materials will be forwarded to the regional station for distribution to state stations participating in the evaluation of chemurgic crops.

17. Committee Reports

a. Nominating

The Nominating Committee nominated E. L. Whiteley for Chairman and R. G. Creech for Secretary. The motion that nominations be closed and that the nominees be elected by acclamation was made by G. B. Killinger and seconded by J. L. Bowers. The motion carried unanimously.

b. Time and Place of Next Meeting

The Committee recommended a joint meeting with W-6 Technical Committee. The S-9 Technical Committee members supported the suggestion and Las Cruces, New Mexico was recommended as the site for a meeting in August 1974.

c. Resolutions Committee Report

Be it resolved that the S-9 Technical Committee unanimously support the long range program objectives of IR-1 which includes the introduction, utilization and preservation of tuber bearing Solanums and strongly recommends the immediate replacement of Dr. Roger Rowe by a qualified professional leader to achieve this end.

Be it resolved that the S-9 Regional Technical Committee express its appreciation and sincere thanks to Dr. Roy Sigafus and his colleagues at the University of Kentucky in hosting the 1973 meeting. The facilities and field tour were further appreciated by all.

Be it resolved that the S-9 Regional Technical Committee also give special recognition to the long term services of a charter member, H. W. (Peter) Bennett, and especially for his voluminous and pertinent reports, as well as his spasmodic contributions of well accepted and enjoyable good wit. The Committee further recognizes the support by the other member of the Bennett team, his wife Mary Ethyl. His presence will be missed at future meetings and the Committee wishes him a happy retirement and extends a standing invitation to meet with the group in the future whenever he chooses.

Be it resolved that the S-9 Regional Technical Committee regrets the retirement of J. Velez Fortuno and expresses its thanks for his valuable contributions from the Island in the Carribean, as well as his long-to-be-remembered gracious hospitality during former meetings in Puerto Rico. The Committee also extends an invitation to him to attend future meetings as he desires.

The S-9 Regional Technical Committee recognizes the continuing valuable leadership and guidance of Curtis Jackson and Bob Langford in promoting the success of this Regional Project.

All resolutions were approved unanimously by the S-9 Technical Committee.

18. The S-9 Technical Committee toured the University of Kentucky South Farm where the watermelon and cantaloupe breeding projects were observed. Breeding objectives and procedures were discussed.

19. Adjournment

The meeting was adjourned at 11:30 a.m. on 24 July 1973 by W. T. Fike, Chairman.

Progress Report
S-9 Ornamental Publication

Richard J. Stadtherr

The research workers testing ornamental plant introductions for each member of the Southern Region (S-9) are listed below:

Alabama	Dr. Fred B. Perry, Auburn University
Arkansas	Dr. A. E. Einert, University of Arkansas
Florida	Sr. Sam McFadden, University of Florida
Georgia	Mr. W. L. Corley, St. Simons Island, Georgia
Kentucky	Dr. Richard Henley, University of Kentucky
Louisiana	Dr. Richard J. Stadtherr, Louisiana State University
Mississippi	Dr. Adolph J. Laiche, Jr., So. Mississippi Branch Experiment Station
North Carolina	Dr. William T. Fike, North Carolina State University
Oklahoma	Dr. Carl E. Whitcomb, Oklahoma State University
Puerto Rico	Dr. O. D. Ramirez-Torres. University of Puerto Rico
South Carolina	Mr. John Alex Floyd, Jr., Clemson University
Tennessee	Prof. Henrik van de Werken, University of Tennessee
Texas	Dr. George Tereshkovich, Texas Tech. University
Virginia	Dr. Robert Wright, Virginia Polytech. Institute and State University

Presently Alabama, Florida, Georgia, Kentucky, Louisiana, North Carolina, South Carolina and Tennessee have had trials underway for 5 or more years. Although requests were sent in recent months for information on several occasions, very few reports were received. Thus, each researcher was asked to fill out a card for each plant introduction which he considered adapted and meritorious. These cards were to be brought to the Lexington, Kentucky, meeting by S-9 members or sent to me.

Mr. John Floyd and Dr. Daniel Milbocker, who attended the 1972 S-9 meetings, agreed to help in preparing a report. Dr. Desmond D. Dolan, Horticulturist, Plant Science Research Division, ARS, USDA, New York Agricultural Experiment Station, Geneva, New York 14456, authored "Ornamental Introductions of the Past - All Still Used", Special Report No. 10, which was published November, 1972. Copies of this report were sent to each S-9 member. This report could serve as a guideline for our porposed publication. However, wherever possible we would like to indicate in which zones each recommended plant introduction is hardy and adapted.

One of the advantages in having this assignment of writing an S-9 report on ornamentals is that I have become aware of many plant introductions which we haven't tested here, but which were reported as outstanding at other locations. We have requested cuttings or liners of these P.I.'s and hope to get them in our trials. We will try to fill requests that others may make to us. We

believe that method of propagation for each introduction should be given in the 'Plant Descriptions' sheets which precede the sending of new introductions from the Plant Introduction Station and the National Arboretum. This could save much time and effort. We would like to urge strongly that all who have P.I.'s from which cuttings might be obtained inform fellow members and, if possible, provide rooted cuttings for others to test.

Finally, we - as I imagine many others - have what we think are P.I.'s, but for which we have no numbers because labels were lost. Several Japanese hollies, several sweet olives, a couple of Saucer magnolias, firethorn, Japanese cleyera, pittosporum, podocarpus, September elm, American holly, umbrella tree, Jerusalem thorn, sawtooth oak, several viburnums, a rose of sharon, a single-flowered gardenia, a golden raintree, many azaleas, Southern magnolia, boxwood, photinia, salt bush, sissoo, privet, Japanese yew, Chinese holly and many others are among this group. We wondered if it would be possible to obtain description lists for all the P.I.'s and if it would be possible to send in material to Beltsville for identification.

More interest in new and different plants has been shown by the public in recent years. From tests which have been conducted on the P.I.'s and other local trials, much valuable information could be gleaned and a head-start for new introductions provided.

Preliminary Proposal for the Exploration of Foreign *Paspalum* species

To: Regional Project S-9

From: Agronomy Department, Mississippi Agricultural and Forestry Experiment Station, Mississippi State, Miss.

Date: July 20, 1973

1. Title: The Exploration of South American Paspalum species

2. Purpose: (a) The main purpose is to collect and obtain as many different *Paspalum* species as possible. These plants will be used in the breeding of better forage grasses for the Southeastern United States. (b) Related to the above purpose, emphasis also will be given to the collection of many different biotypes of dallisgrass, *P. dilatatum* Poir. The reason is to obtain a sexual form which has the desirable forage characteristics of Common dallisgrass and could be used in a plant breeding program.

3. Justification: *Paspalum* is a large diverse genus with more than 400 species which are native to South America, (8). Several species are valuable pasture grasses with dallisgrass, *P. dilatatum* Poir, and bahiagrass *P. notatum* Flugge, the more widely used. Common dallisgrass is an important forage grass because it grows well in combinations with other forage species, persists under grazing and produces highly nutritious forage. Its use is limited primarily because of low seed fertility and susceptibility to ergot, *Claviceps paspali* Stevens and Hall.

   Many *Paspalum* species, including common dallisgrass and bahiagrass, reproduce by apomixis (1, 7). This phenomenon prevents gene manipulation and explains why common dallisgrass has not been improved through conventional plant breeding programs (8). Radiation breeding and interspecific hybridization have been attempted to overcome the apomictic barrier and produce genetic variability (2, 3, 4). Irradiation did not increase fertility or alter the reproductive behavior of the species (2). Sexual interspecific hybrids have been produced from crosses between sexual *Paspalum* species and common dallisgrass. Even though ergot resistance was transferred through interspecific hybridization, progeny of economic importance have never been recovered. This is why plant exploration efforts should be directed toward locating a sexual form of common dallisgrass.

   Since common dallisgrass is a natural hybrid, the Mississippi Agricultural and Forestry Experiment Station (MAFES) and USDA initiated a phylogenetic investigation to determine its relationship to other *Paspalum* species and in order to identify its progenitors. With this information, resynthesis of a fertile dallisgrass might be possible. Recent studies have indicated

that two diploid species, P. intermedium Munro and P. jurgensii Hackel, are closely related to dallisgrass and could be two of its progenitors (5, 6). Additional Paspalum species need to be available for further phylogenetic studies before resynthesis of a fertile dallisgrass is possible.

Another reason for the exploration of Paspalum is that much of the grassland at the center of origin of this genus is being converted to cultivation. This results in the loss of valuable genetic material which would be useful in a plant breeding program. An extensive plant collection expedition should be conducted in Southern Brazil, Uruguay, Paraguay, and Northern Argentina before many of the Paspalum species become extinct.

4. Procedure: Personnel from the New Crops area of USDA and MAFES would travel to the Paspalum center of origin or the area of maximum diversity (Southern Brazil, Uruguay, Paraguay, Northern Argentina) and collect both vegetative material and seed of the desired types and species. This sould require a period of 2 or 3 months during December, January, and February. The material would be sent to the USDA Plant Introduction Station at Experiment, Georgia. After screening and identification, part of the material would be sent to Mississippi for use in the Paspalum breeding program.

5. Budget: An exact budget will be presented in an official proposal. The expenses will involve:

   (a) International Travel (USA to South America and return)

   (b) Domestic Travel (while collecting plant material)

   (c) Per diem

   (d) Miscellaneous

6. Personnel: Byron L. Burson, Associate Professor, Agronomy Department, MAFES.

   Recommend A. J. Oakes, USDA

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2. Bashaw, E. C. and B. J. Hoff. 1962. Effects of irradiation on apomictic common dallisgrass. Crop Sci. 2:501-504.

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5. Burson, B. L. and H. W. Bennett. 1972. Genome relations between an intraspecific Paspalum dilatatum hybrid and two diploid Paspalum species. Can. J. Genet. Cytol. 14:609-613.

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8. Burton, G. W. 1962. Conventional breeding of dallisgrass, Paspalum dilatatum, Poir. Crop Sci. 2:491-494.

9. Chase, A. 1929. North American species of Paspalum. Contr. U. S. Natl. Herb. Vol. 28:Part 1.

UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Soil and Crop Sciences Department
College Station, Texas 77843

June 22, 1973

To: Dr. Eli Whiteley, S-9 Technical Committee Member from Texas

From: E. C. Bashaw and E. C. Holt

Subject: Request for Special Collection of Sexual Plants of Certain Grass Species

Some of the most promising grasses for range and pasture improvement in Southern and Southwestern United States are introduced species which reproduce by apomixis. Apomictic species which have found a valuable place in our grassland program include Dallisgrass (Paspalum dilatatum), buffelgrass, (Cenchrus ciliaris), weeping lovegrass (Eragrostis curvula) and guineagrass (Panicum maximum). Unfortunately, all of these grasses have serious undesirable traits which restrict their use or limit their potential productivity. There is considerable variability among apomictic accessions of these species and ample evidence that tremendous progress could be made through breeding if we could obtain a collection of sexual plants. We now recognize that sexuality exists in all of these grasses. WE have had from one to a few sexual accessions of each species, but not sufficient material for a breeding program. For example, we have had one sexual accession of Dallisgrass from South America, but have not been able to cross it with our apomictic types. We discovered one sexual mutant of buffelgrass on a Texas ranch and have made effective use of this plant in the breeding program. One improved variety (Higgins) has been released using the sexual plant and introduced materials. Obviously the gene is rather limited with only one sexual source. However, this work has shown what can be accomplished through control and manipulation of apomixis when appropriate sexual plants are available.

Discovery of sexual plants in these species and the vast differences among apomictic accessions suggest that sexual plants are available in the native habitat. On the basis of the above information, the urgent need for improvement of these species, and the high probability of success, we feel that every effort should be made to obtain a special collection of sexual plants of these species from their native habitats.

We would like to request the following specific collections:

1. Dallisgrass from South America. The region of greatest variability and potential sexual accessions appears to be in Southern Brazil and Uruguay.

2. Buffelgrass, guineagrass and weeping lovegrass from the Union of South Africa and surrounding countries. The African collection should also include Kleingrass (Panicum coloratum) which is a valuable sexual species. 'Kleingrass 75' is an increase of an earlier introduction of this species.

Some important factors should be considered in planning a collection of sexual material of predominantly apomictic species. The most vigorous plants are not necessarily the most desirable. Sexual plants, desperately needed for the breeding program, may appear useless and escape the attention of the collector unless he is specifically trained to search out particular types. Greatest success would be expected in sites of maximum variability comprising unique individual plants. The collection should be made by a scientist familiar with the breeding programs of the species if at all possible. We are prepared to suggest individuals for the collections and to place them in contact with scientists in the various countries who can provide valuable information on probable sites and seasons for best collection.

The need for superior grass varieties which can be effectively and efficiently established and managed is urgent and ever increasing. The proposed collection should provide valuable germplasm for breeding programs in several southern and western states.

cc: Dr. C. S. Garrison
Dr. C. F. Lewis
Dr. Quentin Jones

Report of Regional Station Activities
to S-9 Technical Committee, 1973

Plant Introduction

Seed or plants of 1026 new introductions were received during the year ending June 30, 1973. These include 561 accessions of mungbeans from Iran, 106 lots of peppers from Yugoslavia, and 36 watermelon introductions from Yugoslavia. Numerous species are represented by the other 323 new introductions. We now have at the regional station approximately 28,000 accessions representing 265 plant genera. Some of the larger collections are as follows:

Plant name	No. of accessions
Arachis spp. (peanut)	4,054
Sorghum	3,504
Capsicum spp. (pepper)	2,008
Cucumis spp. (cantaloupe)	1,759
Vigna spp. (cowpea)	1,253
Phaseolus aureus (mungbean)	2,073
Citrullus (watermelon)	852
Warm season grasses	5,281
TOTAL	20,784

Winter annual legumes (*Trifolium*, *Medicago*, *Vicia*, and *Lupinus*); *Cicer*, *Cajanus*, okra, eggplant, and miscellaneous summer legumes account for much of the remainder. Seed of castors and sesame were transferred to the National Seed Storage Laboratory. Breeding work with these crops was discontinued in the Southern Region several years ago. Consequently, with little or no interest in them and need for storage space in our seed room these two collections were transferred.

Seed Production

2800 accessions were grown at the Regional Station last year for seed production and preliminary evaluation. In addition to these, 1091 new mungbean introductions from India were increased by the Oklahoma Experiment Station. Some of the larger collections grown last year at the Regional Station were: (1) *Digitarias* and other grasses collected in Africa by Dr. Oakes, (2) peanuts from various sources, (3) peppers from Yugoslavia, and (4) cowpeas from India that failed to produce the desired quantity of seed in 1971. Of special interest in the 1972 plantings were 2 mutant peanuts from India. P.I. 362129 is a very dwarf compact plant, and P.I. 362130 has very narrow leaves. These may have value as genetic markers.

Listed below are collections being grown in 1973:

Crop	No. of accessions
Grasses	784
Peanuts	557
Mungbeans	807
Cowpeas	211
Sorghum	222
Pepper	204
Legumes	230
Misc. spp.	156
TOTAL	3,171

Catalogues of grasses, peppers, and edible legumes have been up-dated to include materials increased through 1972. The catalogue of grasses is being printed and should be available for distribution within a few weeks. The peanut catalogue will be revised this winter and it will include data from the protein and amino acid assays of each accession now being done by Dr. Young at the Georgia Station.

Distribution of Seed

The distribution of seed and plants by the Southern Regional Station and by other stations to personnel in the Southern Region is summarized below:

State	Packets of seed and plants distributed in Southern Region, FY-73					
	S-9	NE-9	NC-7	W-6	Other	Total
Alabama	81					81
Arkansas	25		11			36
Florida	487	29		10	267	793
Georgia	1007	45			37	1089
Kentucky	227		100		16	343
Louisiana	3				67	70
Mississippi	122	36	137	34	1	330
N. Carolina	301		428		1	730
Oklahoma	24	16	1			41
Puerto Rico			8		16	24
S. Carolina	457	21	105	600		1183
Tennessee						0
Texas	3027		261	188	5	3481
Virginia		1426	3	4387	6	5822
TOTAL	5761	1528	1099	5219	416	14,023

Materials sent outside the Region by S-9

NE-9	168
NC-7	660
W-6	997
Foreign	3,815
Beltsville	1,021
NSSL	23
TOTAL	6,684

Plant Disease Investigations

A. Screening for Disease Resistance

Peanut, P.I. 109839 was more resistant to early Cercospora leafspot than was P.I. 269685, the variety Mwitunde, which has been reported as resistant to this disease in Africa. This was an isolated planting approximately three miles from the nearest peanuts. In spite of the isolated location and relatively low concentration of Cercospora conidia leafspot was severe on P.I. 269685. Replicated tests have been planted at Tifton and Experiment, including nineteen of the most promising introductions from preliminary screening tests.

The resistance of peanut P.I. 161866 to Rhizoctonia solani was not confirmed in the field test because inoculum applied over the seed did not produce a measurable effect on the plants. Further tests with the bean bioassay of the pathogen indicate that this test must be refined to be reliable.

Pepper, P.I. 271322, P.I. 322719, and P.I. 163192 were resistant to a Georgia isolate of Xanthomonas vesicatoria and a culture of the new race from Florida. Bacterial spot has not caused defoliation on A. H. Dempsey's breeding lines containing P.I. 163192 in the field over a ten year period. This indicates that the pathogen may be less likely to evolve new races under the relatively mild disease conditions of the pepper-growing area except Florida. This observation and the results of greenhouse inoculations indicate that a new variety containing genes for resistance from P.I. 163192 may remain resistant in most areas for at least five years after its release to farmers. The fact that the bacterium has been demonstrated to evolve new races means that research on new sources of resistance should continue.

Resistance to tobacco etch virus (TEV) of pepper has been reported in six plant introductions. Dr. Demski and I inoculated these with PV69, an isolate of TEV obtained from the American Type Culture Collection. All of the plants of P.I. 242947, P.I. 152225, and P.I. 264281 remained free of symptoms. Very few plants of the other three introductions showed symptoms. I believe that such documentation of the resistance of plant introductions to specific isolates of viruses is essential to the effective utilization of reported sources of resistance. For example,

a plant breeder might be very successful in utilizing the pepper introductions which are immune to TEV, whereas he might be unsuccessful in working with the other three. Resistance to other isolates of TEV will be determined.

Four introductions of squash, Cucurbita pepo, produced fruits with very mild symptoms following inoculation with watermelon mosaic virus-2 in the field. All of the introductions with mild symptoms had pale green fruits so their reaction may or may not be indicative of genes for resistance to fruit symptom expression. Crosses between a yellow-fruited variety and two of the introductions have been made. This research is in cooperation with J. M. Demski.

Seventeen introductions of tomato which are listed as resistant to gray leafspot have been planted in a field test to determine their resistance to a natural population of the pathogen (Stemphyllium solani). This Disease is one of the main causes of defoliation of tomatoes in the southern region

A number of new introductions of watermelon appeared to have some field resistance to gummy stem blight when grown last summer. Seed harvested from the 76 new introductions were planted in the greenhouse in an attempt to confirm resistance and to determine the effect of seed-borne bacterial pathogens on greenhouse screening tests. The seed was treated with tetramethylthiuran disulfide to control fungi on the seed. The seedlings of three introductions showed water-soaked lesions similar to those caused by Pseudomonas lacrymans. Only one introduction was severely infected and these plants recovered. No other evidence of seed-borne pathogens was observed. Introductions which appeared to be resistant to gummy stem blight in the field were not resistant in the greenhouse test. This indicates that present greenhouse screening tests may be inadequate to detect some useful levels of "intermediate" or "field" resistance. Therefore, I began a series of tests designed to determine in more detail the effect of variables on disease severity in screening tests. A test with cantaloupe indicated that a lower concentration of conidia (10^4 per ml.) and shorter (24 hr.) incubation period than has been used in previous tests may be necessary to detect intermediate levels of resistance.

Multiple disease resistance of cantaloupe P.I. 321005 was confirmed in replicated greenhouse tests. Resistance to downy and powdery mildews is equal to that of the best available (Ga. 47 and PMR6). The introduction also has intermediate resistance to gummy stem blight equal to that of Ga. 47. The superior horticultural characteristics of this introduction and resistances of this introduction combine to make it the best source of multiple disease resistance available to cantaloupe breeders. It may be satisfactory as a home-garden cultivar without modification.

B. Diseases Associated with Plant Introductions

Powdery mildew (Oidium sp.) of okra was observed in the nursery for the first time this season. Two species of fungi in the powdery mildew

group are listed in Index of Plant Diseases in the United States. Perithecia were not produced before frost. Seed produced on all okra introductions were planted in the greenhouse and the plants showed no symptoms of powdery mildew when grown for several weeks. This indicates that the powdery mildew is not seed transmitted.

Kenaf in J. H. Massey's research plots in the Plant Introduction nursery were severely defoliated by a powdery mildew (Oidium spp.). This disease was also observed in 1970 but caused very little damage in that year. A preliminary review of the literature indicates that this disease has not been reported.

The microflora of the seed of 25 introductions of Phaseolus aureus, some of which were harvested from diseased plants in the nursery in 1972, was determined by two methods. No pathogens were detected with the "blotter" test. Rhizoctonia solani grew from 1 seed of each of 4 introductions. When the seed was surface sterilized and plated on V-8 agar this fungus produced stem cankers and leafspots on young mungbean plants in an inoculation test. No other pathogens were detected.

Peanut rust caused by Puccinia arachidis was noted in the plant introduction nursery for the first time. The disease was severe in the nursery and in the isolated Cercospora test approximately 3 miles east of the nursery. The disease appeared in the nursery sometime after it became severe in inoculated plots about 2 miles west of the nursery. Since rust has not been observed in our nursery previously it appears likely that the rust spores originated in the inoculated plots and that the disease spread at least five miles from that field. Fortunately the wild peanuts growing in the greenhouse did not become infected with rust.

Station Improvements

Dr. Jackson was quite generous to us last year. From funds that he made available the irrigation pump was replaced; irrigation pipes were installed underground; orders were placed for two new tractors to replace two 10-year old tractors; a small seed thresher was purchased; and material was ordered for installing a dust exhaust system in the seed cleaning building.

By purchase or transfer within ARS we obtained 2 incubators, office equipment for an entomologist, a passenger car, hygrothermograph for the seed storage room, and many pieces of office furniture.

Needs

If we continue to receive new introductions at the current rate, the seed storage room will be full in 4 to 5 years. Additional storage space will be needed. Although storage conditions with respect to temperature and humidity are satisfactory, the building is not worthy of this collection. I would recommend that we consider constructing a separate fireproof facility for seed storage.

BUDGETS

Regional Station Budget 1972-73

Source of Funds	
Regional Research Funds (Pooled)	$ 36,500
Regional Research Funds (Ga. Sta.)	30,833
Hatch	4,042
State	2,577
USDA, ARS	54,300
TOTAL	$128,252
Expenditures	
Salaries and labor	$109,987
Equipment	9,122
Operating supplies	8,756
Travel	387
	$128,252

Regional Station Budget 1973-74

Source of Funds	
Regional Research Funds (Pooled)	$ 36,500
Regional Research Funds (Ga. Sta.)	5,557
Hatch	4,042
State	4,486
USDA, ARS	53,800
TOTAL	$104,385
Expenditures (Proposed)	
Personal Services	$ 91,923
Equipment	0
Operating supplies	11,962
Travel	500
TOTAL	$104,385

ALABAMA S-9 (Plant Introduction) ACTIVITIES
July 1972 - July 1973

Carl S. Hoveland, Agronomy & Soils Department
Auburn Univ., Auburn, Alabama 36830

A total of 78 recorded introductions were received from the Plant Introduction Station by Alabama cooperators this year. They included 45 peanuts, 30 peppers, 1 corn, 1 alfalfa, and 1 tomato.

HORTICULTURAL CROPS
(J. D. Norton)

Cantalcupes

Although previous attempts to cross C. melo with other Cucumis species have been unsuccessful, several interspecific crosses among wild types have been made. One partially fertile hybrid between C. melo (P.I. 14047) and C. metuliferus was obtained. Vines, leaves, and fruit of the F_1 plants were intermediate between the two parents. Two types of F_1 fruit color patterns were observed. One fruit type was solid dark green. In contrast, the other fruit were light green with dark green, raised areas or "spots" on the fruit. It was hoped that this hybrid could be used as a bridge to transfer resistance to Meloidogyne incognita acrita into C. melo.

This interspecific cross of C. melo (P.I. 140471) (susceptible). C. metuliferus (resistant) and subsequent outcross of the F_1 to cantaloupe breeding line AC-67-14 (susceptible) produced F_2 and outcross plants that were resistant to M. incognita acrita. The plants that resulted from the outcross of resistant F_1 . Ac-67-14 were vigorous and possessed a high degree of multiple disease resistance. The plants with resistance to the root knot nematode and multiple disease resistance continued to grow vigorously until frost.

A wide difference in resistance to powdery mildew was observed in the F_2 progeny. Plants grown from seed of the "spotted" F_1 were susceptible to powdery mildew. In contrast, all plants from solid green fruit were highly resistant.

Peppers (W. Greenleaf)

Valuable germ plasm in two pepper introductions from Peru is saving the Tabasco pepper industry in Louisiana. "Greenleaf Tabasco", developed at the Alabama Experiment Station, is highly resistant to the tobacco-etch virus. The new variety has performed well in Louisiana where it is being grown commercially by several processors.

AGRONOMIC CROPS

Phalaris tuberosa and tall fescue (C. D. Berry)

Two potential synthetic forage varieties of Phalaris tuberosa have been developed from P.I. materials at Auburn University. These varieties include clones selected for winter tolerance, seedling vigor, and mid-winter forage production. These varieties are superior to 'Perla' var. Koleagrass in winter tolerance and have sustained damage only to 25-30% of the total forage when Perla has sustained damage to 80-90%. Good forage yield during the mid-winter period also is characteristic of these varieties. In a second year stand, each of these varieties produced forage yields superior to Ky 31 during the entire period from November through early April.

In addition, these varieties more than doubled the yield of Ky-31 during the December through February period, the period when forage is in shortest supply. A variety of Phalaris tuberosa developed solely from

P.I. materials will be released in the future.

In 1972, 182 clones were selected from a nursery of 3,240 plants representing 109 different plant introductions of P. tuberosa. Clones were selected for winter tolerance, winter forage growth, rhizomatous spread, seed weight (seedling vigor), and/or delayed maturity and are being progeny tested to identify superior germplasm to include in a recurrent selection program.

In addition, some 133 clones were selected from a similar nursery of 119 P.I.'s of Festuca arundinacea and are being progeny tested to identify superior germplasm.

Arrowleaf Clover (C. S. Hoveland)

Demand for Yuchi arrowleaf clover (from P.I. 233816) was extremely heavy in autumn 1972 and exceeded the supply. Seed prices exceeded $1 per pound at some periods.

In Alabama, Yuchi arrowleaf is grown from the Tennessee Valley area to the Gulf Coast. East Texas acreage continues to expand. A visit to East Texas in June 1973 revealed that this clover is highly productive and widely grown .

Summer Legumes (C. S. Hoveland)

Screening of summer legume introductions revealed several having promise for forage production. Several Desmodium sandwicense accessions were highly productive and produced seed at Auburn. P.I. 364513, 322469, and 322468 were especially good. Dolichos biflorus 330577 and 345729 appeared promising.

High forage quality characterizes many accessions as shown by the high digestible dry matter (DDM). DDM values were obtained from July 28-sampled forage using the in-vivo nylon bag method. All values were

adjusted to known forage samples placed in the steer rumens at the same time. Forages above 65% DDM are considered to be of excellent quality.

Species	P.I. Number	Percent DDM in dry forage
Dolichos biflorus	330577	87
Dolichos biflorus	345729	75
Dolichos lablab	339903	88
Dolichos lablab	322531	92
Dolichos lablab	338341	81
Desmodium intortum	364511	69
Desmodium sandwicense	322469	73
Desmodium sandwicense	322468	68
Desmodium sandwicense	364513	68
Desmodium tortuosum	322477	86
Desmodium uncinatum	335746	73
Desmodium uncinatum	364514	56
Stylosanthes humilis	356018	73

In a replicated experiment, Dolichos lablab yielded over 5,000 lb/acre dry forage in two cuts made in August and October. DDM of forage was 71% on August 3 and 68% on October 5. High quality forage in late summer and early autumn is a serious problem in this region as bermuda and bahiagrass quality is low.

Publications issued during the year dealing with P.I. material:

1. Hoveland, C. S., R. F. McCormick, Jr., and W. B. Anthony. 1972. Productivity and forage quality of Yuchi arrowleaf clover. Agron J. 64:552-555.

2. Hoveland, C. S., R. F. McCormick, Jr., and E. L. Mayton. 1972. Easy establishment of Yuchi on Coastal bermuda sod. Auburn Univ. Agr. Exp. Sta. Highlights of Agr. Res. Vol. 19, No. 3.

3. Norton, J. D. 1972. Chilton - a high quality fruit for the commercial market. Auburn Univ. Agr. Exp. Leaflet 84.

4. Norton, J. D. 1972. Resistance to Mycosphaerella citrullina in watermelon. Proc. Assoc. Southern Agr. Workers 69:167.

5. Wade, R. H., C. S. Hoveland, and A. E. Hiltbold. 1972. Inoculum rate and pelleting of arrowleaf clover seed. Agron. J. 64:481-483.

S-9 TECHNICAL COMMITTEE REPORT

Arkansas Agricultural Experiment Station
Fayetteville, Arkansas 72701
Period of July 1, 1972 to July 1, 1973
J. L. Bowers

Rape: Our 1972 report did not cover the yield nor the results of the oil analyses on seed from selections made in the 51 accessions grown on the Southeast Branch Experiment Station in the winter and spring of 1972. The yield performance and data on analyses are presented in Table 1. These accessions, 250155, 251236, 282570, 305278, 311731, 311732, and 311727, produced seed yields of 1,000 pounds per acre or better. The percent oil content ranged from 42.7 in P.I. 282570 to 38.7 in both P.I. 184453 and P.I. 311730.

P.I. 311727, the Bronowskii variety, had a very low glucosinulate content--only 0.4 percent e-PG and 0.1 percent butenyl but also possessed a very low level of erucic acid. This accession should have usefulness from the standpoint of breeding up a type possessing low levels of glucosinulates in a high erucic acid type.

The weather conditions during the late fall and winter of 1972-73 did not permit us to get a planting made of our selections. These seed are being held and will be planted this fall.

Southern Peas: The F_2 generation of crosses between the powdery mildew and cercospora leaf spot resistant accessions P.I. 339584, P.I. 255785, and P.I. 186340 with several station breeding lines is being grown in the field this season. Two accessions in the cream group, P.I. 293437 and P.I. 293546, are being used in crosses with the station's cream selections to improve the pod fill character of the latter.

Spinach: In the breeding program on this crop our efforts are being directed to obtain a still higher level of resistance to white rust. Plans are being made to screen more plant introductions not only for white rust but for such diseases as anthracnose and fusarium decline. The station has made several crosses between a white rust resistant type selected from a grower's planting and the P.I. accessions P.I. 167195 and P.I. 169025 as with several USDA white rust resistant lines.

Cucumbers: The station has obtained 11 accessions of this crop to use in our program to incorporate bacterial wilt resistance into our breeding material. The station personnel also obtained

Ottawa 43 from Dr. Nuttall as a source of resistance to bacterial wilt to incorporate into our program.

Cantaloupe: Accession P.I. 321005 has been obtained and crossed with two of the station's dwarf cantaloupe selections to incorporate disease resistance. This accession possesses good quality; consequently, we expect to maintain or improve the quality of the dwarf types.

Leaf Pubescence in Oats: Dr. F. C. Collins, plant breeder, reported that leaf pubescence has been found in two plant introductions of Avena sterilis independently by M. E. McDaniel of Texas A & M University and by the Arkansas group. He also states that pubescence on the leaf blades should provide resistance to the cereal leaf beetle (Oulema melanopus L.). The source of pubescence found in Texas is P.I. 295919, and the Arkansas source is P.I. 320993. Preliminary work indicates this character is inherited probably as a single dominant gene for pubescence. The Texas and Arkansas breeders have observed considerable variation in the amount of pubescence on some progenies from certain crosses between these plant introductions and A. sativa or A. byzantina varieties.

Table 1. Yield of the Brassica napus accessions and chemical analyses of these seed.[1/]

P.I. No.	Yield lbs/A	Wt/1,000 g.	Oil[2/] as is %	Erucic[3/] acid %	Glucosinolate[4/] e-PG %	Glucosinolate[4/] "Butenyl" %
171521	578	1.7	39.1	50	0.2	4.2
184453	981	3.9	38.7	48	5.3	2.0
250135	1515	5.0	41.1	46	5.4	2.1
251236	1472	5.1	39.0	46	6.1	2.5
269449	828	3.2	39.0	50	4.6	1.7
282570	1472	3.7	42.7	50	4.4	2.1
282571	752	3.7	40.5	52	4.3	2.3
305278	1363	4.1	40.1	52	6.1	1.9
305279	763	3.9	40.6	47	6.1	1.7
311727	1155	3.1	41.1	22	0.4	0.1
311728	1057	3.1	38.9	48	4.3	1.9
311730	970	3.8	39.7	30	3.3	1.6
311731	1341	3.5	42.0	36	4.8	2.2
311732	1254	3.8	39.5	50	5.5	2.0
311733	970	4.1	38.7	48	5.9	1.7

1/Analyses of these seed was carried out in the Industrial Crops Laboratory, Northern Marketing and Nutrition Research Division, Peoria, Illinois.

2/Moisture content of seed at time of analysis, 5.8-6.2 percent.

3/Includes generally about 2 percent of closely related acids (other C_{22} acids) not separated by the gas chromatography column used.

4/In oil-free meal, as is basis, e-PG = epi-progoitrin. Volitile mustard oils are calculated as butenyl-glucosinolate, the major constituent.

FLORIDA S-9 ' NEW PLANTS' REPORT

July 23-24, 1973

Lexington, Kentucky

G. B. Killinger

Several thousand accessions of seeds and plants were received in Florida by various researchers at a number of locations as well as material received by nurserymen and private individuals during 1972-73.

From west Florida, Jay, L.F. Dunavin reports favorable growth from Lotononis bainesii P.I. 234409 during 1972 and 1973. Stylosanthes hamata P.I. 348954 has flowered and set seed in the west Florida location. Desmodium heterocarpon P.I. 217910 and Zornia diphlla Brazil No. 1580 have performed quite well but require further evaluation. Festuca arundinacea P.I. 203728 has produced more forage during the 1972-73 season than all other cool season grasses.

D.W. Gorbet at Marrianna, Florida reports on peanuts (Arachis hypogaea) that from 1971 introductions two field studies and greenhouse crosses have been made. A field study resulted in the selection of P.I. 268894, 262090, and 306230 for further evaluation on cercospora leafspot resistance. Nineteen other introductions were placed in a soil-born disease study with P.I. 269063 selected for further study and possibly as a parent in a breeding program.

At Stanford, Florida, J.O. Strandberg reported two cucumber (Cucunmis sativus) P.I. 255936 and 277741 previously reported resistant to foliar disease to indeed have individual plants resistant to C. cassiicola. P.I. 277741 had higher resistance than 255936 and will be used as a source of resistance. P.I. 277741 is highly susceptable to downy mildew, powdery mildew and gummy stem blight. It produces large numbers of female flowers and many plants are parthenocarpic. Continued selfing of individual plants produced lines highly resistant to C. cassiicola and through a back-crossing program with a commercial slicing cucumber, this resistance was incorporated into ten lines having multiple disease tolerance, commerical quality and resistance to C. cassiicola. These lines are currently being evaluated for release as breeders lines. Stranberg also reports carrot (Daucus carota) studies where the entire collection of Daucus were screened at two locations for resistance to Alternaria leaf blight (A. dauci) during 1971 and 1972. While no resistance was found, several levels of disease tolerance were observed. Lines selected as having the most useful disease tolerance are being used in a cooperative carrot breeding program. Plant introductions showing outstanding disease tolerance were: Daucus carota P.I. 266043, 294079, 294090 (Japan), 261648 (Netherlands), 277064 (USSR), and P.I. 279767.

J.M. Crall reports from Leesburg, Florida that investigations continue on tolerance to watermelon mosaci virus derived from P.I. 255137.

From Leesburg, Florida, J.A. Mortensen is incorporating the following plant introductions into his Vitis breeding program: P.I. 286535 V. unifera from India with resistance to fruit cracking and fungus diseases, even in a wet climate (1971).

P.I. 360750 'Pirobella' from South Africa with resistance to anthracnose (1972). P.I. 354108 'PQ7' breeding line from South Africa with very early ripening (1972). P.I. 360749 'Muska' from South Africa with resistance to anthracnose (1973). Other Vitis introductions are being screened for possible use as rootstocks or other purposes.

From Canal Point, Florida, J.L. Dean has completed tests on 231 grasses in the Genus Pennisetum as a host for sugarcane ratoon stunting disease. None of these introductions exhibited external systems which was the object of this research to be used as a research tool. Possibly some of these introductions would show internal vascular discoloration symptions but this would not be helpful in this research.

J.B. Brolman, Ft. Pierce, Florida notes some success with early flowering, heat tolerant Lotus uliginosis with P.I. 235526-235531 and 239936-239940 involved. Stylosanthes introductions C.P.I. 40255 and P.I. 358375 show promise under grazing with a high percentage of survival.

At Belle Glade, Florida, R. J. Allen, Jr., reports Hemarthria altissima P.I. 299993, 299994, and 299995, have been placed in grazing trial pastures. Under Belle Glade conditions 299995 establishes best and seems desirable as a pasture forage.

N.R. Lake, Physical Plant Division, Gainesville, reports Photinia sp. P.I. 325008, and Lagerstroemia subcostata P.I. 324994 have survived cold weather and are being increased. Photinia integrifolia P.I. 307304 received in 1969 is a promising landscape plant for this area. Ligustrum ovalifolium 'Argenteum' P.I. 265262 was a promising liqustrum in 1968 but is now considered one of the worst to revert back to the green form. Liriope spicata P.I. 318568 received in 1968 has become a most dependable ground cover on campus. Rapanea neriifolia Taiminta chibana P.I. 227998 is in patio plantings for cold hardiness observation. The 23 P.I. numbered Impatiens received in 1972 were planted around the campus and afforded much flower and foilage color. A few of the less hardy accessions were lost but those surviving will be increased.

At Gainesville, R.H. Sharpe notes the budding of fruit selections P.I. 318871 'Calleryana' pear and P.I. 255586 'Canino' apricot.

A number of P.I.s were listed by E. S. Horner at Gainesville being used in a southern leaf blight corn investigation, namely: P.I. 163597 (Guatemala), 195114* (Ethiopia), 209135*(Pa. 'Mayorbela' Puerto Rico Origin), 226685 (Guatemala), 253730* (Brazil), 317326*(Guatemala), 317330* (Guatemala), 318728* (Brazil), 326535 (Ghana), and 331453 (Ethiopia). These introductions have better than average resistance to Helminthosporium maydis. The numbers with asterisks have also produced progenies with good resistance to common rust (Puccinia sorghi).

D.A. Sleper at Gainesville notes the chromosome numbers on 11 Hemarthria introductions by S.C. Schank. Eighteen chromosomes were found in P.I. 337536, 349748, 349749, 349750, 349751, 349754, 349796, 349797, 349798, and 36 chromosomes found for 349752 and 349753. In Vitro organic matter digestion (IVOMD) was highest in the coarse-stemed tetraploid Hemarthria P.I. 299995 as compared to the diploids 299994, 299993, and 337536. 'Pangola' digitgrass (P.I. 111110), and 'Slenderstem' digitgrass P.I. 300935 were registered in Crop Science. Transvala digitgrass P.I. 299601 (Digitaria decumbens) was released to Florida Cattlemen in 1973. Based on origin, taxonomy, morphology, chromosomes, and izoenzymie anlaysis P.I. No's 299601, 299752, 299837, and 364619 are identical digitgrasses.

A. J. Norden, Gainesville, lists nine new Arachis hypogaea L. accessions being

utilized in a peanut varietal improvement program: P.I. 370149 and/or 268661, a prolific unusually early maturing Spanish type; 268823 with a supressed radicle; 259747, 314817, and 350680 for resistance to rust and/or cercospora leaf spot disease; and 331326, 337394, and 337409 for resistance or tolerance, and to study the inheritance of resistance to toxin producing molds.

Transvala digitgrass (P.I. 299601) as noted by F.T. Boyd at Gainesville has resistance to Pangola Stunt Virus (PSV) and tolerance to sting nematodes (Belonolaimus longicaudatus Rau). Planting of Transvala for pastures is recommended for Florida areas south of 30° north latitude. Circular S 222,'Transvala Digitgrass' a Tropical Forage Resistant to, Sting Nematode and Pangola Stunt Virus was printed April, 1973.

Perennial peanuts (Archis sp) as reported by G.M. Prine from Gainesville, planted in 1965 produced hay in 1972 with 'Arb' (P.I. 118457) highest yielding and others in decending order: GS-1, P.I. 262826, 262797, 262840, 262794, 262818, 'Arblick' (262839), and 262832. GS-1, which is probably a seedling from Arb, Arb and Arblick had average seasonal hay yields of $4\frac{1}{2}$, 4 and $2\frac{1}{2}$ tons per acre,annually, over five harvest seasons.

PUBLICATIONS

1. Prine, G.M. 1972. Perennial peanuts for forage. Soil and Crop Sci. Soc. Fla. Proc. 32 in press.

2. Schank, S.C. 1972. Chromosome numbers in eleven new Hemarthria (Limpograss) introductions. Crop Sci. 12:550-551.

3. Schank, S.C., M.A. Klock, and J.E. Moore. 1973. Laboratory evaluation of quality in subtropical grasses: II. Genetics variation among Hemarthria in in vitro digestion and stem morphology. Agron. J. 65:256-258.

4. Schank, S.C., E.M. Hodges, G.B. Killinger, and D.E. McCloud. 1972. 'Pangola' digitgrass registration. Crop Sci. 12:715.

5. Hodges, E.M. and S.C. Schank. 1972. 'Slenderstem' digitgrass registration. Crop Sci. 12:715.

6. Boyd, F.T., S.C. Schank, Rex L. Smith, E.M. Hodges, S.H. West, A.C. Kretschmer, J.B. Brolmann, and J.E. Moore. 1973. Transvala Digitgrass. Fla. Agron. Exp. Sta. Circ. S-201. 16 p.

PLANT EXPLORATION REQUEST

Chloris gayana from Africa, Brazil, and/or Australia.

Digitaria sp from Africa particularly higher elevations.

Panicum maximum from Africa, India and South America.

Georgia Report to S-9 Committee
July 23 - 24, 1973

Hatch 172 (S-9)

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

Project Leader: John H. Massey

Two kenaf (Hibiscus cannabinus) experiments involving two row-widths in one and three varieties in the other were grown the second year at different levels of nitrogen. Levels of N did not affect any agronomic characteristic measured in either experiment. 'Guatemala 4' (G-4) and 'SH/15R' exceeded 'Everglades 71' (Ev. 71) in stem diameter. Plant height of SH/15R was greater than that of Ev. 71 and G-4. Row width did not affect plant height, but stem diameter was significantly greater in 28- than in 14-in. rows.

Four varieties of kenaf were planted at 2-week intervals beginning April 24. There was no significant difference in yield or plant height due to planting date. However, yields had a tendency to decline at each later planting but did not differ among the other dates. G-4 and SH/15R had greater stem diameters than Ev. 71 and 'Everglades 45'. The highest yielding variety was SH/15R.

An experiment was initiated to test competitiveness of Crambe abyssinica with weeds, when sown broadcast and in 7- and 14-in rows. Treatments used were: (1) plots kept weed-free, (2) weeds first removed at three and at (3) six weeks and kept weed-free for the remainder of the season, and (4) all weeds allowed to grow. Seed yield, test weight, and plant height were not affected by crabgrass, the dominant weed in the area during the growth of the crop. Plant Height increased significantly for 7-in over broadcast, and for 14- over 7-in row plantings. Yields from 7- and 14-in rows did not differ, but they were significantly higher than those of broadcast plantings.

Four rates of N were applied to crambe (1) all at planting time, (2) all at the bud stage, and (3) as a split application of half at planting time and half at bud stage. Rates of N did not affect seed test weight or plant height. Nitrogen at 60 lb./acre gave the highest yield. Time of application did not affect yield, test weight, or plant height.

A number of Stokesia P.I.'s were planted in the field in early May but none germinated.

Publications:

Massey, J. H. 1973. Influence of Within-row Plant Spacing on the Production of Two Varieties of Kenaf. Ga. Agron. Abst. 16:14.

Massey, J. H. 1973. Effects of Plant Density on Two Varieties of Kenaf in the Georgia Piedmont Region. Agron. J. (Accepted for publication in July).

Massey, J. H. and M. D. Jellum. 1973. Effects of Spring Planting Date and Row Spacing on the Agronomic Characteristics and Chemical Composition of Crambe. Agron. J. 65:299-300.

Hatch 1060 (S-9)

Evaluation of New Ornamental Plant Introductions

Project Leader: W. L. Corley

Rooted cuttings of 75 new woody ornamentals were obtained from Glenn Dale, Maryland and the National Arboretum. Sixteen accessions of ornamental peppers were grown for their final evaluation as bedding or pot plants, concluding the testing or ornamental peppers. Twenty-four new Impatiens from New Guinea were grown in pots and in outdoor beds. Six of these with variegated foliage or very large flowers were rated as outstanding. From the collection of 289 ornamental grass accessions, 110 were planted for further evaluation. Twenty-five of these show promise as specimen plants in landscaping and for use in floral arrangements. Thirty-eight dwarf P.I. tomato introductions were grown in two gallon pots for preliminary evaluation of their possible use as patio plants in city apartment gardens. The most promising accessions will be tested further in 1973. Results of testing Solanum nodiflorum P.I. 247828 as an annual ornamental was published and seeds were sent to interested nurserymen and plantsmen. Requests for seeds of ornamental peppers were filled and cuttings of the New Guinea Impatiens collection were supplied to 12 commercial growers.

Publications:

Corley, W. L. 1973. Response to Muskmelon Botanical Varieties to Pickleworm Infestation. HortScience (In press).

Corley, W. L. 1973. New Ornamental Gourds from Africa. Amer. Horticulturist (In press).

Sowell, Grover Jr. and W. L. Corley. 1973. Resistance of Cucurbita Plant Introductions to Powdery Mildew. HortScience (In press).

In addition to the above projects, plant breeders and other scientists at Experiment, Athens, and Tifton reported the following:

T. S. Davis - Observations of woody ornamentals:

Acer rubrum var. tridens, NA 31022 - Looks fair after 4 years but not outstanding. Growth fair.

Cryptomeria japonica, NA 29008 - One remaining plant had some cold damage but pretty good growth. Could be used as screen or individual specimen.

Cunninghamia lanceolata, P.I. 324969 - All three plants seem to be damaged some by cold each winter.

Ilex genus (11 P.I.'s) - 3 dead and remainder with no conclusions at this time.

Metasequoia glyptostroboides, P.I. 286608 - Pretty ornamental, good growth, vigorous, over 10 ft. tall.

Pinus densiflora, P.I. 319315. - Vigorous appearance to date. Could be used as individual specimen.

Pinus thunbergiana, P.I. 317258 - Vigorous. Nice looking ornamental. No good for Christmas tree but good specimen plant. Extremely fast growth in 1973. Main stem somewhat crooked.

Pistachia chinensis - Vigorous. Good ornamental. Not good for shade. Red leaves in fall.

Ulmus pumila, P.I. 310432 - Extremely vigorous and spreading. Not too pretty but could possibly use to screen unsightly areas. Removed since it was spreading over other trees in test (13 ft. high and 17 ft. crown width).

Quercus chenii, P.I. 102653 - Spreading tops, crown broader than height. Foliage not pretty in fall.

R. O. Hammons - 1) During the past 11 years, an impressive number of peanut introductions have been brought into the program. Altogether 2209 entries have been grown in replicated agrotype trials, but since the better-performing entries are retained for repeated testing, the number of independent accessions (P.I.'s) is estimated at between 1200 and 1500 genotypes.

2) Twenty-three percent (= 513) of the entries tested have produced pod yields equal to or exceeding the current commercial standard variety for each type over the span of these trials.

3) An estimated 1000 additional P.I. accessions were screened initially in single-replicate nursery plots, where they were classified for agronomic possibilities, but were not advanced to the replicated yield trials because they lacked certain attributes essential in standard U.S. commercial cultivars.

4) In collaborative research during 1972 with ARS and Ga. AES entomologists (D. B. Jeuck, L. W. Morgan, R. O. Hammons), 2175 peanut introductions were screened in the field for host plant resistance to leaf ragging by a larval complex. Twenty-two lines were found to be significantly less damaged than the others of the total planting. Also, 35 additional lines appeared intermediate in preference resistance to the infesting insect complex.

5) In ARS collaborative nematology research (N. A. Minton & R. O. Hammons), 97 peanut introductions were screened in 1972 in replicated greenhouse trials with standard check varieties for reaction to the parasitic nematode Meloidogyne arenaria. None of the P.I.'s (nor present commercial varieties) gave evidence of high levels of resistance.

The Spancross peanut variety was developed following interspecific hybridization of P.I. 121070 sel. 1 with the introduced wild annual, decumbent species Arachis monticola Krap. et Rogoni. You will be interested to learn of the outstanding performance of Spancross in the Southwest area. The following is from the Southwest Peanut Growers News, vol. 18, No. 2, April 1973:

"Spancross has averaged more than 6% higher in return per acre than Starr. Spancross has exceeded Starr 7.6% in value of production per acre in 19 tests over the past 3 years of testing. This increase has resulted from a combination of 4% higher yield/a and higher grades. Spancross averaged 69.8% SMKs compared with 67.8% for Starr."

You will be interested in learning that three peanuts introduced into the U.S. from foreign countries, and subsequently supplied (by W. K. Bailey) to a researcher in Uganda, have demonstrated field resistance (zero dead plants) to infection by bacterial wilt incited by Pseudomonas solanacearum. The 3 P.I.'s are 341884 (cv. Matjan); 341885 and 341886 (cv. Schwarz 21). Ref.: Simbwa-Bunnya, M. East Afr. Agric. For. J., Kenya, vol. 37, no. 4, p. 341-343, 1972.

C. T. Young - Peanut introductions are being screened for variability in amino acid composition and protein content. Recently we have reported on genetic variation in a limited number of peanut samples (1, 2), but for best utilization of this knowledge, a complete survey of the present peanut introductions and certain breeder selections will be undertaken. The protein survey is expected to be completed about January or February of 1974. The survey on amino acid variability will be initiated as soon as the $50,000 Durrum Amino Acid Analyzer System is delivered in a few weeks. This survey will take about two years to complete.

Of the peanut introductions available, approximately 2,000 were grown in the same field by Loy Morgan at Tifton in 1972. These were harvested, shelled, and are now stored in the Food Science facilities at Experiment. These samples were photographed 1) growing in the field, 2) on the vine at harvest, 3) inshell pods, and 4) shelled seeds. This technique of documentation will be reported on July 16, 1973 at the APREA meeting (3). The more important data will be published in Journal articles with all of the data being made available as supplements to the present Plant Introduction peanut seed catalogue.

In light of the present programs, the continued maintenance of live peanut seed must be emphasized.

Literature Cited

1. Young, Clyde T. and Ray O. Hammons. 1973. Variations in the Protein Levels of a Wide Range of Peanut Genotypes (Arachis hypogaea L.) Oleagineux 28:(In press)

2. Young, Clyde T., G. R. Waller and R. O. Hammons. 1973. Variations in the Amino Acid Content of Peanut Flour. JAOCS 50(2): Abstract 13-81A. (Manuscript accepted with revision).

3. Young, Clyde T., L. W. Morgan and Y. P. Tai. 1973. Film Documentation of Plant Introduction peanuts. Accepted for presentation at the 1973 APREA meeting and published in Journal of APREA

H. R. Harris and D. G. Cummins - Anthracnose, Colletotrichum graminicola, susceptibility among commercial sorghum-sudangrass hybrids often limits regrowth after green chopping or grazing in Georgia. The development of resistant-hybrids should facilitate greater regrowth and total yield and improve the forage quality of sorghum-sudangrass hybrids. More than 200 F_1 hybrids using various sudangrass plant introductions as pollinators on six different experimental male sterile lines carrying dominant anthracnose resistance were made in 1972. These hybrids will be evaluated for regrowth after green chopping, total yield, and forage quality in 1973. Superior hybrids will be considered for release as data is accumulated.

R. E. Burns - Centipede was sprigged into field at Savannah and Experiment on May 10, 1972. Varieties were obtained from several sources including plant introductions. Results are preliminary. Further testing will be carried out.

Cover and color of superior varieties at Experiment one year after sprigging (5-11-73).

Entry No.	Color*	Cover*	Entry No.	Color*	Cover*
P.R. - 12	7	4	P.R. - 13	10	3
P.R. - 11	8	3	P.R. - 7	10	8
P.R. - 10	8	7	California clone	8	9
P.R. - 5	8	9	Miss. #4	9	5
P.R. - 6	7	8	Miss. #3	9	4
Miss. #2	8	5	Tifton Sel.	8	10
P.R. - 2	7	7	P.R. - 8	8	7
P.R. - 3	8	4			

* 10 = most desirable

* 10 = most desirable

The following entries of Festuca rubra were grown in flats in the greenhouse for three months and transplanted as intact sod in the field in full sunlight on March 3, 1972. They grew vigorously in the spring and became well established. None of them survived the summer of 1972 satisfactorily. A seeding of 'Minuet' red fescue adjacent to these also did not survive.

There are some "escape plants" from this test coming up in the spring of 1973. If these survive the summer in good condition, an effort will be made to obtain seed from them:

P.I. Numbers

225824	255428
237181	255880
237548	283311
251687	300968
251824	300969
255427	

R. H. Brown - Numerous plant introductions have been used in studies of photosynthesis and other physiological and biochemical characteristics of various species. Publications resulting from these studies are as follows:

Bhagsari, A. S. and R. H. Brown. 1973. Photosynthesis in Peanut Genotypes. Abstract. Presented at the Amer. Peanut Res. & Educ. Assoc.

Brown, R. H. and V. E. Gracen. 1972. Distribution of the Post-illumination CO_2 Burst Among Grasses. Crop Science. Vol. 12, p. 30-33.

Chen, T. M., R. H. Brown and C. C. Black. 1970. CO_2 Compensation Concentration, Rate of Phothsynthesis, and Carbonic Anhydrase Activity of Plants. Weed Sci. Vol. 18, No. 3.

Gracen, V. E., Fr., Joe H. Hilliard, R. H. Brown and S. H. West. 1972. Peripheral Reticulum in Chloroplasts of Plants Differing in CO_2 Fixation Pathways and Photorespiration. Planta (Berl.) 107, 189-204.

Wynn, Tommy, R. H. Brown, Wilbur Campbell and C. C. Black, Jr. 1973. Dark Release of $^{14}CO_2$ in Higher Plants. (In press)

KENTUCKY S-9 (NEW CROPS) TECHNICAL COMMITTEE REPORT
ROY E. SIGAFUS, AGRONOMY DEPARTMENT
KENTUCKY AGRICULTURAL EXPERIMENT STATION, LEXINGTON
JULY 23-24, 1973

Dr. Norman L. Taylor reported to the committee that he and co-workers had surveyed 206 species of the genus Trifolium and had found associations among genetic systems, chromosome numbers, origin and climate, type of reproduction, root habit, and longevity. They reported that they found the annual species generally to have simple tap roots, low chromosome numbers, usually self-pollinated, and many had originated in a Mediterranean type climate. Perennial species were tap-rooted, stoloniferous, or rhizomatous; had higher chromosome numbers than annuals; were mostly cross-pollinated and came from many different types of climatic areas.

Dr. Robert C. Buckner and co-workers are continuing work with the tall fescue-giant fescue hybrid. They report that colchicine progenies of male and largely female-sterile 2n=42 chromosome hybrids have a fair degree of seed-set. Second generation progenies of the colchicine treated parents appear to maintain the fertility observed in the first generation material. The colchicine progenies are highly susceptible to Helminthsporium spp. and to rust. The more Helminthosporium susceptible plants winter-kill. This provides a screening mechanism that may provide a fairly resistant population.

Dr. Fred W. Knapp in entomology has obtained seeds of 73 plant species in 10 families from the Northern Research Laboratory at Peoria. These have been screened by various laboratory methods for ability of the mucilaginous material to trap mosquito larvae. The seeds were first screened for gum exudate by placing whole seeds in water for 24 hours. Only seeds exuding gum were tested further for ability to trap second and fourth instar larvae. Seeds of Papavaraceae, Umbelliferae, and Boraginaceae exuded no gum from whole seeds. Some species of Convolvulaceae exuded no gum while others had slight gum exudate but no trapping power. Seeds of Plantaginaceae, Linaceae, and Campanilaceae produced much gum but had little trapping power. In the Labiatae, Prunella vulgaris, Sylvia reflexa, and Ocimum basillicum produced much gum but only the last named trapped larvae. In the Cruciferae several species of Alyssum, Lepidium, and Lesquerella were tested. Most species produced gum and several effectively trapped larvae. Other species of Cruciferae gave variable results.

In a cooperative project between entomology and horticulture a total of 1397 P.I.'s of Phaseolus vulgaris L. obtained from Dr. S. M. Dietz of the Western Regional Plant Introduction Station were screened for resistance to the two-spotted spider mite (Tetranychus utricae Koch.) Three different test methods were compared using 12 selected bean lines. P.I. 189013, P.I. 169865, and P.I. 176706 showed resistance to the mite attack. Of an additional 32 named varieties or improved lines tested Dwarf Horticultural Bush Bean was the most susceptible.

Eggplants are also being screened for mite resistance.

Landscape Plant Introduction Evaluations

In June 1973 landscape plants were evaluated by Daniel C. Milbocker and Richard Henley of the Horticulture Department. Their observations and comments are based on plant condition in the field in June and notes made in previous years. Comments relative to the winter of 1971-72 are significant in that there had been a mild fall up into December 1971 followed by severe freezing with temperatures falling to -13°F without the usual conditioning. Most Pyracantha and a few Cotoneaster killed to the ground.

Plant Name	Source, P.I. and year received	Comments on performance and potential as an ornamental
Pinus sylvestris	P.I. 247869 (1959)	Well adapted, 21 ft. tall, broadly pyramidal, good blue color.
Chamaecyparis obtusa	P.I. 235130 (1959)	Well adapted, 20 ft. tall, a good evergreen tree.
Ligustrum ibota	P.I. 235136 (1959)	Sufficiently adapted but develops dead wood, 6 ft. tall.
Philadelphus lemoinii	P.I. 78098 (1959)	Not well adapted, full of dead wood and in poor condition, 6 ft. tall.
Betula ermani subcordata	P.I. 256254 (1959)	Well adapted, 25 ft. tall with dark green foliage resistant to leaf hoppers. An excellent birch tree with a broader limb structure than B. pendula.
Euonymus fortunei radicans	P.I. 226116 (1960)	Well adapted, a 4 ft. shrub with good landscape potential.
Hydranga paniculata	P.I. 235134 (1960)	Well adapted, 6 ft. tall.
Prunus maachii	P.I. 262716 (1960)	Well adapted but of limited landscape value compared to birch or other Prunus.

Plant Name	Source, P.I. and year received	Comments on performance and potential as an ornamental
Betula pendula	P.I. 262712 (1964)	As well adapted as other European White Birch trees in the area but not superior to B. ermani subcordata.
Buxux sp.	P.I. 274869 (1964)	Well adapted. 3 ft. tall, ovoid to conical compact shrub with excellent landscape potential.
Acer compestre	P.I. 293752 (1966)	Well adapted. A low branching tree to 15 ft. Some leaf hopper damage on new growth as is characteristic of other maples.
Vaccinium delavazi	P.I. 242255 (1966)	Not adapted. Died soon after planting. Thought to be sensitive to high temperatures.
Amelanchier alnifolia	*NC-7 (1966)	Branching habit upright and rather open.
Caryopteris clandonensis 'Azure'	NC-7 (1964)	About one-third of tops killed back during most winters. During the winter of 1971-72 the tops were killed to the ground.
Euonymus bungeana	NC-7 (1966)	Upright branching habit. Highly susceptible to Euonymus scale. Not recommended for ornamental use in Ky.
Forsythia viridissima 'Bronxensis'	NC-7 (1966)	An excellent low growing selection of Forsythia suitable for ground cover purposes. Flowers are pale yellow.
Gleditsia triacanthos inermis 'Manclan'	NC-7 (1964)	A globe-headed form of the thornless honey-locust.
Ilex x 'Tanager'	**NA (1968)	A wide spreading form which is relatively slow to develop. Some winter injury to twigs during most winters.
Malus x 'Royalth'	NC-7 (1966)	A relatively slow growing crabapple with dark purple foliage Susceptible to apple scab.
Pyracantha x 'Shawnee'	NA (1968)	Attractive foliage and yellow fruit. Free branching habit. One-third to one-half of tops killed during most winters. Most established plants killed to ground during winter of 1971-72.

* NC-7 indicates North Central Regional Plant Introduction Station, Ames, Iowa
** NA indicates the National Arboretum, Washington, D. C.

Plant Name	Source, P.I. and year received	Comments on performance and potential as an ornamental
Pyrus calleryana 'Bradford'	NC-7 (1964)	One of the best medium height ornamental trees available. Many of the local nurserymen are now handling this selection. Excellent in most respects - form, flower, fall and summer foliage, and winter twig effect.
Shepherdia argentea	NC-7 (1966)	Rather open branching habit. Effective gray-green summer foliage.
Spiraea arguta 'Grefsheim'	NC-7 (1966)	Good display of white flowers in spring. Few pests.
Spiraea nipponica 'Snowmound'	NC-7 (1966)	Very effective flowering habit. Few pests.
Stephanandra incisa crispa	NC-7 (1967)	A useful, fine-textured ground cover material with branches which reflex toward the soil where they often becomr layered.
Syringa 'James MacFarlane'	NC-7 (1964)	Effective flowering habit. No borer injury.
Syringa josiflexa 'Royalty'	NC-7 (1964)	Effective flowering habit. No borer injury.
Syringa microphylla minor	NC-7 (1964)	Effective flowering habit. No borer injury.
Syringa prestonae 'Coral'	NC-7 (1964)	Effective flowering habit. No borer injury.
Syringa prestonae 'Romeo'	NC-7 (1964)	Effective flowering habit. No borer injury.
Viburnum x bodnatense 'Dawn'	NA (1964)	Effective flowering habit. No borer injury.
Viburnum lantana 'Mohican'	NA (1967)	Stiff, upright branching habit.
Viburnum x rhytidophylloides 'Alleghany'	NA (1968)	Superior, dark green summer foliage and relatively compact habit of growth.
Viburnum sargentii 'Onondaga'	NA (1972)	Wide spreading branching habit. Few pests.

L.S.U. S-9 Report
July, 1973
Richard J. Stadtherr
Horticulture Department
Baton Rouge, Louisiana 70803

In 1971 sixty-five P.I. accessions were obtained, including twenty-four Impatiens selections. The plants arrived in very poor condition. They were very susceptible to diseases and insects. Gradual decline and death resulted. However, many fine leaf patterns and good flowering were observed; thus, we would like to try these again.

All of the viburnum cultivars originated at the National Arboretum were tried at least twice and all succumbed due probably to insufficient chilling over winter. Last year there were slightly less than 300 hours of chilling at the Burden Research Center. Some were grown in containers in a lath house and fared no better.

Seventy accessions were received in 1972, including 30 varieties of Coleus blumei. Some cultivars tend to mutate frequently; thus, we would like to have a descriptive list of them. We are not sure of the names on the plants we have. Thus far we have obtained 55 accessions in 1973.

Propagations were begun for the more meritorious accessions as listed in last year's report. Many more have been and will be made this year. Plans were made to test these in other locations within the state. Attempts have been made to identify some of fine specimen plants which we think are plant introductions.

The three turfgrass introductions requested in 1972 by Dr. Earl Barrios were received. They will be increased and field tested. Neither the vegetable soybeans, garlic, rice straw mushrooms and papaya as requested by Dr. Joe Novak, nor the Annona muricata and A. cherimola requested by Dr. Leon Standifer, were obtained.

Mr. Marvin Allen, Southeast Louisiana Dairy and Pasture Experiment Station, Franklinton, Louisiana, obtained 47 pasture introductions in June, 1972. About one-third of these germinated and were planted in the field in rod rows. They are being increased for replicated tests.

1972-73 Report

Regional Project S-9 New Plants

Contributing Project 3-206-436

Mississippi

Workers in Mississippi received 330 plant accessions during the year. Almost all of these are being evaluated for possible use in breeding program--especially disease resistance.

Several P.I. tomatoes are being used to combine fruit rot resistance with fruit-set under high temperatures into a type for machine harvesting. A release is expected in 1974.

Sweet potato P.I. 280036 blooms profusely, is completely self-sterile, is highly compatable with most other material, and is proving very valuable in sweet potato breeding and genetic studies.

Cucumber P.I.'s 227207 and 227208 possess good resistance to powdery mildew which is being incorporated into fresh market or slicer types.

Eight selections from the domestic fruit plant exploration in south Mississippi are being propagated commercially and along with the propagation trees will be released in late 1973 for home garden and commercial orchard production.

Two early P.I.'s of Rubus-kuntzeanus and parvifolius were used in the production of Dormanred raspberry released in late 1972.

Other releases in 1972-73 are Forest variety and strains D67-4601 and D68-129 soybeans. Mississippi Purple Cowpea, and 16 noncommercial stocks of upland cotton germplasm.

Germplasm collection in Mississippi include:

World collection of 5000 sorghums at the Sugar Crops Field Station, Meridian.

Regional cotton variety collection of 1200 numbers of 1000 genetic varieties at Delta Branch Station, Stoneville.

Group V consisting of 1000 strains of soybeans at Delta Branch Station, Stoneville.

Publications

1. Bennett, H. W. 1972. Viability and fertility of three Paspalum species as affected by time and storage conditions. Agron. Abstracts, p. 56.

2. Burson, B. L. and H. W. Bennett. 1972. Cytology of hybrids between an intraspecific dallisgrass hybrid and two Paspalum species. Proc. Assoc. So. Agric. Workers, p. 48-49.

3. Burson, B. L. and H. W. Bennett. 1972. Genome relationships between intraspecific Paspalum dilatatum hybrid and two diploid Paspalum species. Can. J. Genet. Cytol. 14: 609-613.

4. Hare, W. W. 1973. Mississippi Purple Cowpeas. Miss. Farm Res. 36:2: p. 1-8.

5. Hartwig, E. E. 1972. Forest soybean. Miss. Farm Res. 35:9: p. 1.

6. Overcash, J. P. 1972. Dormanred raspberry. Miss. Agric. For. Exp. Sta. Bul. 793.

North Carolina - New Plant Project

Report to S-9 Technical Committee, Lexington, Kentucky, July 23-24, 1973

Of the 31 campus research personnel who receive P.I. catalogues and information through my office, and others who receive information direct, four cooperators received a total of 660 lines consisting of 24 species of 12 plant genera. The largest orders were for 276 P.I.'s of Capsicum annuum and for 334 accessions of Lycopersicon. These are just a small part of the total number of plant introductions under test in North Carolina as many hundreds of accessions are in various stages of advanced testing.

I. New Varieties Released

No new varieties were released during the 1972-73 reporting period with plant introductions in their pedigree. A North Carolina Experiment Station Bulletin discussing the Venus and Saturn tomato varieties is attached. These tomato varieties are doing very well due to their resistance to Southern Bacterial Wilt. This resistance was transferred from P.I. 129080.

II. Plant Introductions of Special Interest

A. Dr. Tom Konsler is maintaining a tomato line, P.I. 251305, which is being used in the breeding program for its resistance to bacterial canker of tomato.

B. Dr. Don Emery reports that over 2000 peanut lines (many P.I.'s) are being screened for resistance to the new peanut disease, Cylindrocladium crotalarium - Cylindrocladium Black Rot.

C. From the 600 ornamental lines evaluated at Rocky Mount by Dr. Bill Fike, write-ups and pictures of the 12 promising P.I.'s have been turned in for incorporation into the Regional Bulletin.

III. Evaluation of Potential New Crops

A. Nepeta cataria - Twenty-one farmers are presently increasing their acres of catnip. The potential contract acreage is for 50 acres as soon as possible. Yields during the first year of establishment have averaged 3500 pounds per acre. During the second year of production, yields have averaged 5500 pounds. A stand usually dies out after two years. Tentative production guides have been developed for the farmers based on our research data. Contract price for the dried herb is 30¢ per pound.

B. Lespedeza capitata - A local drug firm is interested in obtaining the herbage for export purposes. Price paid for wild plants is 10¢ per pound green.

C. Kenaf - Kenaf is not planted this year. Results of data have again been forwarded to Weyerhaeuser. A company official has stated that he will use anything that will keep the pulp mills running, thus another inquiry concerning kenaf. Yields from plots planted in 1972 were as follows.

Nitrogen Rate Tests:	5.44 to 5.95	tons per acre
Row Width Studies	: 5.48 to 6.53	tons per acre
Variety Trials	: 4.13 to 5.87	tons per acre

D. Sunflowers - Nine oilseed and birdfood varieties are being evaluated compared with corn and soybeans. In last year's trials corn yielded 118 bushels per acre and the sunflowers root lodged and were destroyed by wet weather.

IV. State Support for IR-1 (Potato Introduction Project)

Dr. Frank Haynes, Southern Regional Representative to the IR-1 Project asks for the help of S-9 in the continuation and improvement of the IR-1 project. Dr. Roger Rowe, present coordinator has resigned to assume new responsibilities with the International Potato Center in Peru. The project will be reviewed by the National Coordinating Committee. Dr. Haynes is presently screening two acres of P.I. material obtained through IR-1. Resistance to bacterial wilt has already been found. North Carolina and New York are using outside germ plasm working toward Hybrid Vigor. Even though, there are few potato breeders in the Southern Region, the majority of the potatoes produced in the region are from varieties bred using PI's from IR-1. We strongly recommend the IR-1 be continued with backing from S-9.

V. Request for Foreign Exploration

Dr. Gene Galletta would like to receive accessions of Vaccinuim spp. from New Zealand, Malaysia and Madagascar.

VI. Vaccinuim Species Collection - Dr. Gene Galletta Cooperating

Collections were made during 1966-68 of 282 clonal wild species selections. Of these 229 survived and were assigned P.I. numbers. These accessions are being maintained at the Castle Hayne Experiment Station.

A summary of the present work being done is attached. In addition to the work mentioned here, herbarium labels for the Vaccinuim collection have been typed and complete sets are available in the NCSU and UNC herbaria with extras going to the University herbaria in the collecting locales - thirteen universities in nine states.

A completed reference listing the P.I.'s, their place of origin, and distinguishing characteristics will be available by the 1974 meeting. Original plants from the collection have just started to produce fruit, one reason for the delay in describing the P.I.'s under cultivation.

Summary - Period of July, 1972-July, 1973,
Vaccinium Species Work Resulting From S-9
Financed Collection of 1966-1968.

G. J. Galletta, NCSU, Hort. Science

1. Clonal wild species selections were categorized for plant vigor, disease resistance and fruit characters.

2. Approximately 225 horticulturally and botanically desirable seedlings were selected in 1972 from about 5000 seedlings representing progenies from 20-30 native species. These new selections have been propagated, and the original seedlings have been moved to several new rows at Castle Hayne. Selection is almost complete for the 1973 season.

3. 30 seedlings each of 15 species progenies were completely categorized for fresh fruit qualities by Ballinger, Kushman and Galletta during 1972. The data is still being analysed.

4. The species collection, its scope, aims, and proposed methods of study, were discussed in a paper given during the 69th annual meeting of the American Society for Horticultural Science in St. Paul, Minn. (Aug. 1972).

5. Larry E. Cockerham finished his M.S. thesis study in Botany under my direction. The study ("Cytological Analyses of Vaccinium Species") analysed the meiotic regularity of 13 species and 4 interspecific hybrids comprising 3 ploidy levels using the criteria: pollen fertility, unreduced gamete frequency and pollen size. Tetraploid species showed higher pollen fertility than diploid or hexaploid species. Practically all of the species studied produced a significant number of unreduced gametes. Pollen size averaged 11% larger in tetraploids than in diploids and 11% larger in hexaploids than in tetraploids. A manuscript is being prepared in which the implications of these findings are discussed.

6. Doctoral candidate James Ballington has made 2 year's worth of controlled pollinations within and between selected diploid Vaccinium species representatives in an effort to determine the comparative self and interfertility of these species. To date, Vaccinium diploid species appear to possess a large degree of self incompatibility. Jim is now working on techniques to adequately categorize the cross-fertility of these diploid species.

7. Eight of the first planted species progenies were taxonomically categorized for leaf, habit and fruit characters using a random sample of 30-40 seedlings from each progeny, compared with the maternal parent where possible.

8. Selected clones of 3 evergreen species and a species hybrid were established in a replicated trial at Raleigh, N. C. for evaluation as potential ornamental plants. Initial observations after 13 months have just been completed.

Ornamental Blueberry (Vaccinium sp.) Selection Planting - Method, N. C.
6/13/72 - Rows read left (apple orchard side) to right

Orn. Blues Bed 1* Hedge Trials		Species	Orn. Blues Bed 2* Specimen Trials		Species
Row 1	NC 1137	V. darrowi	Row 1	NC 1132	V. darrowi
2	1108	"	2	1137	"
3	PI346739	V.myrsinites x V. australe	3	1131	"
4	NC 1111	V. darrowi	4	1135	"
5	1107	"	5	PI346739	V.myrsinites x V.australe
6	1131	"	6	PI346655	V. myrsinites
7	PI346655	V. myrsinites	7	PI 346657	"
8	NC 1136	V. darrowi	8	NC 1115	V. darrowi
9	PI346717	V. virgatum	9	PI346656	V. myrsinites
10	NC 1114	V. darrowi	10	NC 1136	V. darrowi
11	1134	"	11	1111	"
12	PI346657	V. myrsinites	12	PI346717	V. virgatum
13	NC 1135	V. darrowi	13	NC 1107	V. darrowi
14	1133	"	14	1114	"
15	PI346656	V. myrsinites	15	PI346739	V.myrsinites c V.australe
16	NC 1115	V. darrowi	16	NC 1134	V. darrowi
17	PI346739	V.myrsinites x V. australe	17	1108	"
18	NC 1131	V. darrowi	18	1133	"
19	1111	"	19	1107	"
20	1108	"	20	1137	"
21	1137	"	21	1115	"
22	1135	"	22	1111	"
23	PI346717	V. virgatum	23	PI346739	V.myrsinites x V.australe
24	PI346655	V. myrsinites	24	NC 1133	V. darrowi
25	NC 1115	V. darrowi	25	PI346657	V. myrsinites
26	1134	"	26	NC 1135	V. darrowi
27	1133	"	27	1136	"
28	1107	"	28	1108	"
29	PI346657	V. myrsinites	29	1134	"
30	NC 1114	V. darrowi	30	PI346717	V. virgatum
31	1136	"	31	PI346739	V.myrsinites x V.australe
32	PI346656	V. myrsinites	32	NC 1131	V. darrowi
33	PI346739	V.myrsinites x V.australe	33	1114	"
34	NC 1136	V. darrowi	34	PI346656	V. myrsinites
35	PI346739	V.myrsinites x V. australe	35	PI346655	"

*Ornamental Bed #1 set at 1 1/2' between plants and 2 1/2' between rows
Ornamental Bed #2 set at 3' between plants and 2 1/2' between rows

Shredded pine bark incorporated with regular soil
PI346739 = 7-22-2 clone
PI346655 = 7-14-3 "
PI346656 = 7-24 "
PI346657 = 7-33 "
PI346717 = 7-17-1 "

1973 S-9 Report, Oklahoma Agricultural Experiment Station

Charles Galeotti, James Kirby and Ralph S. Matlock

PULSE CROPS

Cowpea (Vigna sinensis)

Eighteen (18) cowpea varieties and strains are planted in three replication yield tests at Agronomy Research Stations near Perkins, Stratford and Mangum for 1973.

Forty-two (42) cowpea varieties, P.I.'s and selections are planted in a Fusarium wilt test on the Agronomy Research Station near Stillwater for 1973.

Mean dry seed yields per acre for 12 cowpea varieties common to three locations in Oklahoma in 1972 were 698 pounds at Perkins, 593 pounds at Stratford and 959 pounds at Mangum.

The results of 42 cowpea varieties, selections and P.I.'s grown in the Fusarium wilt nursery in 1972 are shown in Table 1.

Mungbean (Phaseolus aureus)

From a mungbean nursery in 1972 containing 1,406 accessions, 291 selections were made for further screening. These are now in observation tests at the Agronomy Research Stations near Stillwater and Perkins.

Oklahoma is cooperating with Missouri and others in 1973 in an Internations mungbean nursery containing 26 P.I.'s and four varieties.

Mean dry seed yields per acre in 1972 for 12 mungbean varieties common to three locations in Oklahoma were 1,042 pounds at Perkins, 515 pounds at Stratford, and 1,047 pounds at Mangum.

Chickpea (Cicer arietinum)

Three accessions (P.I. 297275, P.I. 315784 and P.I. 315815) were planted April 5, 1973 near Stillwater in a 10, 20, 30, and 40-inch row spacing study. The yield (pounds per acre), seed size (grams per 100 seed) and other information is shown in Table 2.

Twenty-four (24) accessions were planted April 6, 1973 on the Agronomy Research Station near Stillwater in a 3 replication yield test consisting of 4 row plots with rows 20 inches apart and 10 feet long. Dry seed yields in pounds per acre and other data are shown in Table 3.

Adzuki Bean (Phaseolus angularis)

A five (5) variety, replicated, 10, 20, 30, and 40-inch row spacing test was planted at the Agronomy Research Station near Stillwater on April 24, 1973.

Two adzuki bean tests are under study at the Agronomy Research Station near Perkins. An eight (8) variety yield test containing 3 replications and a twelve (12) variety preliminary yield test containing 2 replications were both planted June 8, 1973.

Dry seed yields for the 1972 row spacing test were as follows: 10" spacing-511 lbs/A, 20" spacing-633 lbs/A, 30"spacing-825 lbs/A and 40" spacing-696 lbs/A.

The mean yield for the seven (7) adzuki bean varieties grown in the replicated yield test in 1972 was 455 lbs/A.

(Dolichos spp.)

D. biflorus, P.I. 212636, (Okla. Sp-162) is being increased at the Agronomy Research Staion near Perkins and is being considered for release as a wildlife feed.

OILSEED CROPS

Brassica spp.

Seventeen (17) plant introductions and one (1) commercial yellow mustard strain were planted in a three replicated yield test at the Agronomy Research Station near Stillwater and the Southwest Agronomy Research Station near Tipton, Oklahoma on April 5, 1973. Seed yield (pounds per acre) and other information are shown in Tables 4 and 5.

Three (3) Brassica strains (P.I. 48106, P.I. 243913, and a selection from P.I. 243913) were grown in a replicated 10, 20, 30, and 40-inch row spacing test on the Agronomy Research Station near Stillwater in 1973. Yields and other data are shown in Table 6.

Sunflower (Helianthus annuus L.)

In 1973 eighteen (18) regional sunflower varieties and hybrids have been planted in 4 replication yield tests on the Agronomy Research Stations near Perkins, Goodwell and Chickasha.

Mean yields in pounds per acre for ten varieties and hybrids common to all tests in 1972 were 2,068 at Perkins, 951 at Chickasha, and 1,284 at Goodwell.

MUCILAGE CROPS

Guar Cyamopsis tetragonoloba

The 1973 regional guar tests containing four replications of twenty-four (24) varieties and strains are planted on Agronomy Research Stations near Perkins, Chickasha, Ft. Cobb, Mangum and Tipton.

Three (3) varieties were planted on May 11, 1973, at the Agronomy Research Station near Stillwater in a 10, 20, 30, and 40-inch row-spacing study. The dry seed yields in 1972, in a similar test were 10"-2,208 lbs, 20"-2,027 lbs,

30"-2,138 lbs and 40"-1,536 lbs/A.

A guar time of harvest followed by small grains test with two (2) varieties and four replications has been planted on the Sandy Land Research Station near Mangum. The results of a similar test in 1972 at this station are shown in Table 7.

ORNAMENTALS

Carl E. Whitcomb

Of the various accessions received and planted during the spring and summer of 1971 and 1972, a fairly high mortality occurred due to the small size and limited vigor of the plants and drought conditions. Therefore, all accessions received after August 1, 1972 are being grown in containers one to two years prior to field planting. It is thought that through proper nutrition and maintenance the ability of the plants to establish in the field can be substantially increased, providing a more useful and meaningful evaluation.

Pyracantha 'Mohave' NA 32225-C and Hibiscus syriacus 'Diana' NA 32224-C have developed rapidly into attractive nursery plants in one gallon containers.

Hydrangea scandens subsp. chinensis NA 31487-C, Cornus (hybrid) P.I. 367881, Hypericum sp. P.I. 358791, Sorbus terminalis P.I. 358440 and Acer distylum NA 31120 show considerable intolerance of low humidity summer winds in Oklahoma.

Hedera helix 'Jubilee' NA 8103-C has developed as an excellent greenhouse pot plant.

Table 1. Fusarium Wilt of Cowpeas
1972 Data
D. F. Wadsworth

Okla. C-No.	Identity	Stand Count	Number with wilt	Percent Diseased
40	Catjang	126	12	9.5
42	Louisiana Purchase	56	8	14.3
43	Calico	72	21	29.2
58	Bunch P.H.	127	18	14.2
60	Bush Baby P.H.	27	9	33.3
62	Cream Crowder	108	19	17.6
65	White B.E. Crowder	146	39	26.7
642	Spreader Princes Ann			66.2
70	Early Sugar Crowder	162	10	6.2
88	E.R. X K	131	10	7.6
93	Paraquay-1	69	2	2.9
115	P.I. 152195	40	1	2.5
122	P.I. 194268	136	22	16.2
124	P.I. 223720	103	37	35.9
129	Iron x E.E. Browneye	96	15	15.6
134	I x E.E.B	182	12	6.6
178	Red Cowpea	116	16	13.8
182A	OAEC-58-1 (Sel. from P.I. 194208	154	4	2.6
232	P.I. 214354	80	34	42.5
233	P.I. 197019	106	10	9.4
282	Blue Speckled	121	15	12.4
303	P.I. 205139	298	53	17.8
335	White Purple Hull Crowder	66	12	18.2
338	B71-B44 C.R. x Iron	158	3	1.9
343	B-152197	290	37	12.8
356	Red Speckled Crowder	130	15	11.5
363	OAEC-59-3 (Sel. from P.I. 147076)	72	0	0
383	OAEC-59-23 (Sel. from C-36)	99	19	19.2
393	OAEC-59-33 (Sel. from Brown Crowder)	105	4	3.8
384	OAEC-59-24 (Sel. from P.H. 49)	157	0	0
365	OAEC-59-5 (Sel. from P.I. 152195)	156	47	30.1

Table 1. (continued)

Okla. C-No.	Identity	Stand Count	Number with wilt	Percent Diseased
475	OAEC-59-67 (Sel. from Alabama Crowder)	80	12	15.0
482	OAEC-59-74 (Sel. from Alabama Crowder)	94	21	22.3
619	Producer	104	8	7.7
637	Silver Hull Crowder	27	1	3.7
648	Small Brown Crowder	194	23	11.9
672	Small Red	352	40	11.4
677	Ligon	146	10	6.8
684	Cream Sel. of Princes Ann	199	60	30.2
720	Two Crop Brown	244	20	8.2
726	Silverskin Crowder	109	7	6.4
727	Miss. Silver	112	7	6.3
774	Crimson	196	59	30.1

Table 2. 1973 Chickpea Row Spacing Study
Agronomy Research Station - Stillwater

Okla. CP-No.	P.I. No.	Row Spacing	Rows Harvested	Yield lbs/A	Gm/100 Seed	Plant Ht. Inches	Maturity
196	297275	10	8	1560	17.9	9.0	6-29
200	315784	10	8	1731	14.0	8.0	6-29
231	315815	10	8	1590	12.4	11.0	6-29
196	297275	20	4	1191	17.5	9.3	6-29
200	315784	20	4	1278	13.8	9.7	7-1
231	315815	20	4	1428	11.9	11.3	7-1
196	297275	30	3	1161	18.1	9.3	7-2
200	315784	30	3	1435	13.1	9.7	7-2
231	315815	30	3	1259	12.5	11.0	7-3
196	297275	40	2	1082	18.0	10.7	7-4
200	315784	40	2	943	13.2	9.0	7-4
231	315815	40	2	1005	12.3	11.3	7-4

Table 3. Chickpea Variety Yield Test
Agronomy Research Station - Stillwater

Okla. CP-No.	P.I. or Strain	Yield lbs/A	Gm/100 Seed	Plant Ht. Inches	First Bloom	First Pod	Maturity
13	215588	1231	13.3	10.7	6-4	6-11	7-7
54	257583	1437	15.8	11.0	6-2	6-10	7-5
114	OAEC-61-15	1260	15.5	11.7	6-2	6-9	7-4
196	297275	1448	17.0	10.3	6-1	6-8	7-3
200	315784	1499	12.9	9.0	6-2	6-10	7-5
210	315794	1015	11.1	7.3	6-4	6-11	7-7
211	315795	400	24.9	9.0	6-7	6-14	7-10
212	315801	1177	25.5	13.0	6-5	6-13	7-12
214	315798	1377	15.1	12.0	6-4	6-10	7-4
215	315799	1165	12.4	10.7	6-4	6-11	7-8
216	315800	1345	11.4	11.7	6-3	6-10	7-7
217	315801	1383	12.5	10.0	6-4	6-11	7-8
219	315803	1711	12.9	11.3	6-3	6-10	7-6
227	315811	1196	11.2	10.3	6-4	6-12	7-8
229	315813	1397	17.1	10.7	6-4	6-12	7-8
230	318814	1215	12.4	11.0	6-3	6-11	7-4
231	315815	1441	24.1	10.0	6-3	6-11	7-5
233	315817	1080	13.3	9.7	6-5	6-14	7-10
234	315818	441	32.1	10.3	6-5	6-14	7-13
235	315819	1407	12.5	10.3	6-3	6-10	7-5
246	315830	1411	21.5	11.7	6-3	6-10	7-5
251	331381	1291	11.5	9.3	6-2	6-9	7-4
256	339142	516	43.9	11.0	6-5	6-14	7-10
279	339165	452	40.5	12.3	6-8	6-16	7-11

Table 4. 1973 Brassica and Strains Yield Test
Agronomy Research Station - Stillwater

Okla. SP-No.	P.I. or Strain	Yield lbs/A	Plant Ht. Inches	First Bloom	First Pod
628	48051	412	27.3	5-10	5-16
632	48060	512	29.3	5-13	5-17
634	48063	388	34.7	5-12	5-19
636	48067	313	30.7	5-13	5-18
637	48071	315	31.7	5-11	5-15
638	48074	356	31.3	5-12	5-17
645-1	48173 Sel.	220	28.0	5-12	5-18
652	48091	347	29.0	5-11	5-17
653	48099	323	29.3	5-10	5-14
654	48106	285	29.3	5-12	5-18
703	243913	573	42.7	5-24	5-26
704	243913 Sel.	355	40.0	5-20	5-25
704-1	243913 White Blossom Sel.	640	36.7	5-19	5-24
708	169060*				
721	175602	787	32.7	5-15	5-19
751	273641	537	42.0	6-21	6-25

*This variety has not yet reached maturity at the station.

Table 5. 1973 Brassica and Strains Yield Test
Agronomy Research Station - Tipton

Okla. SP-No.	P.I. or Strain	Yield lbs/A	Plant Ht. Inches	First Bloom	First Pod
628	48051	235	23.3	5-1	5-17
632	48060	297	30.7	5-11	5-19
634	48063	313	30.7	5-11	5-18
636	48067	181	28.3	5-11	5-18
637	48071	189	25.3	5-7	5-16
638	48074	232	30.0	5-11	5-17
645-1	48173 Sel.	308	23.7	5-7	5-14
652	48091	203	27.0	5-7	5-17
653	48099	265	25.7	5-11	5-18
654	48106	165	26.7	5-11	5-18
703	243913	1108	38.0	5-23	6-1
704	243913 Sel.	839	35.3	5-24	6-1
704-1	243913 White Blossom Sel.	1009	32.7	5-22	5-30
708	169060	88	50.3	6-16	6-24
721	175602	411	38.0	5-15	5-22
751	273641	1063	38.0	6-12	6-19

Table 6. 1973 Brassica Row Spacing Study
Agronomy Research Station - Stillwater

Okla. SP-No.	P.I. No.	Row Spacing	Rows Harvested	Yield Lbs/A	Plant Ht. Inches	Maturity
654	48106	10	8	267	28.7	6-29
703	243913	10	8	538	46.0	7-9
704	243913 Sel.	10	8	567	39.0	7-9
654	48106	20	4	245	31.0	6-29
703	243913	20	4	535	42.0	7-9
704	243913 Sel.	20	4	382	40.7	7-9
654	48106	30	3	169	25.3	7-1
703	243913	30	3	326	42.3	7-9
704	243913 Sel.	30	3	544	38.0	7-9
654	48106	40	2	167	27.0	7-2
703	243913	40	2	306	44.0	7-9
704	243913 Sel.	40	2	421	38.7	7-9

Table 7. 1972 Guar Time of Harvest Followed by Small Grains
Sandy Land Research Station - Mangum

Variety	Harvest Date	Yield (lbs/A)
Brooks	Sept. 1	541
"	10	721
"	20	862
"	30	803
"	Oct. 10	863
"	20	429
"	30	395
"	Nov. 10	536
"	20	749
"	30	834
Mills Type Sel.	Sept. 1	301
"	10	513
"	20	806
"	30	563
"	Oct. 10	595
"	20	361
"	30	299
"	Nov. 10	345
"	20	734
"	30	751

University of Puerto Rico
AGRICULTURAL EXPERIMENT STATION
Río Piedras, Puerto Rico

NEW CROPS INVESTIGATIONS IN PUERTO RICO
JULY 1972 - JUNE 1973

OSCAR D. RAMIREZ, PLANT BREEDING DEPARTMENT

A total of 54 accessions were received during the year 1972-73. These consisted of 6 fruits, 18 vegetables, 10 legumes, 1 yam and 19 ornamentals.

Fruit Crops: W. Pennock, A. Torres, J. López, C. Torres, J. A. Rodríguez, A. Pérez and A. Serrano.

Sapodilla: A new clone of sapodilla (Manilkara zapota) namely Chipo was introduced successfully from Nicaragua. The fruit of this clone has no seeds. The vegetative material received was grafted but has not yet been planted out. Anastrepha fruit fly infection and injury from wasps was noted in Sapodilla fruits. This problem is being studied by the Entomology Department.

The Sapodilla selections produce fruit of outstanding quality and size and constitute the basis for a promising crop.

Macadamia nut: Seeds of Macadamia tetraphylla were brought from New Zeland and were germinated successfully. These will be set out in Adjuntas where observations on adaptation to the region and on yield will be made.

Root (starchy) Crops: O. D. Ramírez, H. Irizarry, G. Colom Covas, L. B. Ortiz, J. A. Rodríguez.

Yams (Dioscorea sp.). At Corozal substation a variety trial was established during April, 1972. The results obtained were as follows:

Variety	Production/A cwts.
Seal Top	358.66
Barbados	348.48
Farm Lisbon	277.69
Oriental	259.31
Smooth Statia	257.35
Habanero	210.99
Hunte	192.61
Florido	140.00
Guinea Amarillo	83.71

Cassava (Manihot utilissima). A yield variety trial using 11 varieties was planted at Isabela substation on February 1972, and harvested on December 1972. The results are presented on the following tabulation.

Variety	Av. prod./plant lbs.	% comm. wt.	Prod./A cwts.
Brazil	6.51	.784	315.08
Nativa	6.47	.693	313.24
Tremensina	5.65	.760	273.50
Pana	5.03	.705	243.79
Compadre Marqués	4.31	.683	208.70
Pana Monacillo	4.14	.651	200.76
Jamaica 4C	3.93	.795	190.26
Llanera	3.48	.535	168.81
Black Stick	2.66	.705	129.03
Ceiba	2.42	.552	117.32

A cassava variety collection is planted at Corozal and at Fortuna substations. The varieties are harvested at 7, 8, 9, and 10 month in order to catalogue them as to yield potential in relation to maturity. Descriptive and quality data of the roots is collected with the purpose of preparing a descrition of the variety.

Plantains and Bananas: G. Colom Covas, A. Sotomayor Ríos, J. J. Green.

Variety collections of plantains and bananas are maintained at Fortuna and Corozal substations.

At Corozal selection in plantains with the aim of developing higher yielding (from 50 to 60 plantains per bunch) continued. This selected material was propagated, so as to increase the number of plants for further testing.

At Fortuna, local banana clones (Cavendish) selected throughout the Island have demostrated to be better yielders than the ones that were introduced from other countries.

Ornamentals: O. D. Ramírez, S. J. Rodríguez.

In a preliminary evaluation, twelve strains of centipede grass (Eremochloa ophiuroides) received from the University of Florida, have shown differences in visual rating of growth characteristics. The centipede grass already planted at the Station Farm has proved to be as good or better than the introduced strains. The strains will be evaluated under stresses like mowing frequency and water shortage to observe their performance.

With this preliminary evaluation we can conclude that the strain established as lawn in Puerto Rico is as good as any of the introduced strains from Florida. Al least for the northern humid area will be difficult to find a suitable substitute because of its quick coverage and resistance to ecological conditions.

Nineteen ornamentals were received through the New Crops investigation project. Of these seven did not survive, Rhododendron lasiostylum, Ilex verticillata var. Shaver, Ilex verticillata var. Jackson, Potentilla argentea, Rosa sp., Clematis sp., and Cornus (hybrid). The rest are in the greenhouse but their progress in very slow. Probably, these introductions are not adapted to our conditions.

Vegetables: G. Colom Covas

There are no results as yet as to the performance of 18 vegetable received from Brazil. Seed of a long, white sweet pepper received from Spain was planted. The plants were very susceptible to mosaic. The plants of tomato Mallorquín, also obtained from Spain, did not set fruit. There is a possibility of better results when planted during the cooler months.

Coffee: C. J. Torres

Sixteen promising varieties, Villalobos, Padang, Mundo Nuevo, Bourbon, Caturra, KP-228, S-16, Bar Sudan, N-50, Harrar, Puerto Rico Selection, Enrea, Geisha, Mibirizi, Segui, and R-3 were being evaluated as to their performance when harvested by means of using plastic netting. Each variety was replicated six times in individual plots of three trees. For each variety data was recorded every six weeks as to frequency at which coffee beans dropped naturally on plastic netting. The behavior of each one of the varieties is ready to be analyzed statistically, and the results will help the farmers in selecting the varieties best adapted to this new practice of coffee harvesting by using plastic netting.

By observation we consider that high yielding varieties such as Mibirizi, Bourbon, R-3, N-20, S-16, had a tendency to drop 90% or more of their production on nets in a period of 12 weeks. More accurate results will be available when the data is analyzed statistically.

Publications:

Pennock, W.; Técnicas Para Injertar Plantas Tropicales. Bol. 229, Est. Exp. Agr. Univ. of P.R. 1972.

Pennock, W.: Yield and Fruit Size Comparisons in the First Six Crops of 16 Mango Varieties. J. Agr. Univ. of P. R. 56(4), 1972.

Yield, Tree Size, and Commercial Desirability of 16 Mango Varieties in Puerto Rico. Proc. A.S.H.S. Trop. Region Vol. 16, 1972

Annual Report
New Crops Research in South Carolina
J. A. Martin
July 1, 1972 to June 30, 1973

S-9 Technical Committee Meeting at University of Kentucky, Lexington, Kentucky, July 23-24, 1973.

There were 883 accessions of seeds and plants distributed to cooperators in South Carolina since July 1, 1972. Many accessions have been isolated and increased for use in breeding programs or as is.

Reports from cooperators are presented as follows:

Prof. Thomas A. Burch, Assistant Agricultural Economist, Clemson University, Clemson, S.C. 29631.

Sixteen accessions of Camellia sinensis (tea) are being grown at Clemson. Japanese tea material appears to be well adapted to the climate and soil of the Clemson area. The first flush of PI 316473 'Makinowara Wase' (Early crop) was burned by a frost in early April. The last of May a satisfactory black tea was made from a plot of 84 seedlings of Japanese tea material. These seedlings were the result of crosses among PI 235572 'Y-2', PI 236247 'Rosea' or 'Beni-bana-Cha' (Red mountain tea), PI 236357 'Yabukita', and a mislabled plant which may be PI 235570 'Tamamidori' (Shiny green). One seedling in this plot has exceptionally large leaves and a fast fermentation rate was indicated by the chloroform test. Apparently "green" Japanese material can be included in a black tea breeding program.

Accession B-58281 Iran LJ-33 appears to be a vigorous plant worthy of further consideration. PI 304404 and PI 304405, Yugoslavian accessions, show no exceptional characteristics. In fact, both appear to be slow growers. Indications are that PI 236274 'Rosea', an ornamental type with deep pink blooms, may be a source of hybrid vigor even though it is a slow grower. A seedling from a Rosea cross with an unknown plant is a vigorous plant and its offspring exhibit above average vigor too.

Dr. Richard L. Fery, Research Geneticist, U.S.D.A.-A.R.S., Southern Region, P.O. Box 3348, Charleston, S.C. 29407.

A large number of both tomato and southern pea introductions were screened for insect resistance this past year. Thirty-two southern pea introductions were selected for further evaluation for cowpea curculio resistance and 74 tomato introductions were selected for further evaluation for fruitworm resistance. In addition, 53 southern pea introductions were selected as having stinkbug resistance. Lists of the P.I. numbers concerned are as follows:

Plant Introductions Selected for Insect Resistance in 1972

R. L. Fery and F. P. Cuthbert, Jr.

A. Southern pea introductions selected for stinkbug resistance:

311120	352892	353311	354580
318820	352922	353318	354581
326161	352953	353333	354599
339573	352971	353352	354663
339609	352998	354444	354671
352770	353025	354445	354675
352834	353046	354465	354682
352835	353073	354466	354694
352855	353074	354474	354732
352865	353119	354498	354736
352881	353122	354499	354832
352882	353136	354524	354843
352883	353273	354542	354867
352889			

B. Southern pea introductions selected for further evaluation for cowpea curculio resistance:

354579	353081	339603	352902
354694	353167	339612	293550
354523	352880	352830	354801
318821	353381	352836	354693
354682	352832	352829	354488
352908	354443	352916	354469
352994	352933	352776	354445
354580	325773	325775	353383

C. Tomato introductions selected for further evaluation for fruitworm resistance:

193415	118406	220864	270270	102721
209974	127814	237132	270271	102724
258481	127817	262937	281622	114490
270177	127820	270171	289195	118324
270185	120272	270179	289199	118325
270239	126421	128222	303736	120273
270246	128230	128231	303756	120274
270250	128259	128247	303795	126427
303787	129133	270192	303798	126906
123438	148656	270225	128251	126908
128293	163250	270240	128281	126918
65023	167054	270241	128286	126950
92855	182235	270244	303801	127797
97538	201774	270260	92859	128617
102717	206151	270262	95587	

Mr. John Alex Floyd, Jr., Research Assistant, Department of Horticulture, Clemson University, Clemson, S.C. 29631.

The department of Horticulture at Clemson University examined and evaluated approximately 203 woody ornamentals during the Fall of 1972 and Spring of 1973 with special emphasis on landscaping qualities. The following have been rated Superior as landscape woody plant material at Clemson University.

PI 315906 — Camellia rusticana X Camellia lutchunesis- This Camellia has a profused covering of deep pink flowers. We observed almost continuing flowering from late October 1972 through the end of February 1973. The bloom and bud appears entirely hardy in our region. Growth habit is upright and spreading and leaves resemble Camellia sasanqua. We feel there should be breeding work done with this plant.

PI 228187 — Camellia japonica 'Yoshida'- This plant has lustrous green foliage with a globose to upright growth habit. Deep red flowers appear from November to February here at Clemson and the bud even when color is showing has some resistance to the cold. The long bloom period allows this plant merit but hybridization for larger flower size would be desirable. Present height is 5 ft., width 3 1/2 ft.

PI 296026 — Stachyurus praecox- A deciduous plant which produces yellow panicles of flowers up to 6" long in early March. Habit of growth is vase-shaped and foliage appears after flowering period. There are distinctive male and female plants. One note of caution, this plant prefers a good drainage situation.

PI 337619 — Rhododendron 'Mrs. L.B.J.'- This evergreen azalea continues to show superior performance here at Clemson. White clear hose-in-hose flowers appear in mid-April with no winter injury visible to the plant. Propagation is easy with about 95% rooting under mist in a sandpeat mix. Currently we have increased our stock to 250 plants.

PI 242291 — Osmanthus heterophyllus purpureus- This evergreen has two distinctive characteristics (1) The new growth appears purplish and gives the effect of enhancing the mature foliage and (2) The mature foliage has a white to silvery white variegation along the margins of the leaves. Its growth habit is irregular and will make an excellent accent plant for landscape use.

PI 239487 — Cryptomeria japonica- This tree has been in our evaluation area 15 years and has been transplanted twice. It is growing in clay on a dry hillside. It has a height of 25' and a spread of c. 10'. Outstanding features include excellent medium green foliage color and a more conical shape than the regular species.

PI 317359 — Callicarpa japonica- This shrub has a upright irregular habit of growth. Pinkish-purple flowers occur in late May in Clemson. It fruited for the first time in September 1972 here at Clemson. It has small clusters of purple berries which are not as showy as the native species-Callicarpa americana.

PI 317285 — Spirea fritschiana- A very low growing Spirea which resembles Spiraea bumalda in growth habit. This plant produces an abundance of white flowers in June but they have a rather dull color. The foliage color is poor and has landscape possibilities only as a filler plant.

G 13168 — Punica granatum nana- An excellent dwarf pomegranate which exhibits an excellent production of flowers in spring and generally 5-10 small fruits in summer. At Clemson it has to be grown in the greenhouse but we believe it has possibilities as a potted plant in interior plantings. Present height 2', spread 1'.

PI 313550 — Ulmus carpinofolia 'Christine Buisman'
PI 313551 — Ulmus hollandica
PI 313983 — Ulmus hollandica 'Bea Schwarz'- These three elms all have a height of approximately 20 ft. and to date no insect or diseases have been observed on the plants. There seems to be little variation among species other than hollandica seem to take on a upright vase-shape habit of growth where the carpinofolia takes on a more columnar-fastigate habit of growth. All three trees seem to be excellent landscape material from our evaluations.

NA 28861-c — Lagerstroemia indica 'Catawba'
NA 28864-c — Lagerstroemia indica 'Powhatan'
Lagerstroemia indica 'Potomac'- All of the Crepemyrtles in this group appear to be of a medium growing height with excellent foliage color generally deep green with new foliage having a tinge of red. Flowering occurs in Clemson during late July and early August. Flower colors are various shades of lavendar. Catawba has an almost wash out color and is relatively poor in color quality. All plants are planted in full sun and are growing well.

PI 267824 — Ilex 'Lydia Morris'- This holly has an outstanding fruit set in summer which matures in Clemson in October and persists throughout the winter. The fruit is red. It has a conical shape and excellent foliage color (dark green). It is growing in partial shade and is an excellent specimen.

PI 254592 — Ilex cassine- In comparison to the native selection in our garden, this has good light green foliage color and has a loose, upright habit growth. No fruit observed to date. Presently it is to early to tell if it is a dwarf species.

PI 237961 — Cleyera japonica- This Cleyera has excellent foliage and a good globose habit which is not to vigorous. It flowers at Clemson in late spring followed by a heavy fruit set which matures in late summer and is tinged red and very striking. An excellent ornamental for landscape use.

To date in 1973, Clemson has received 24 new ornamentals to evaluate. All except one species survived the transplantation. Approximately 75 species were moved from the lathe house to field for further evaluation and approximately 350 plants were propagated for distribution this summer and fall to the nurserymen. Approximately 10 species are being increased by nurserymen in Georgia and South Carolina for distribution to the public.

Dr. Pryce B. Gibson, Agronomist, U.S.D.A., Agronomy and Soils, Clemson University, Clemson, S.C. 29631.

We obtained seed of PI 120190 Trifolium argutum early in April 1973. Plants
PI 179056 " "
PI 233287 " "
are in the seedling stage. As yet we do not know if this material will be useful in our work.

Dr. James C. Hoffman, Research Horticulturist, U.S.D.A.-A.R.S., Southern Region, P.O. Box 3348, Charleston, S.C. 29407.

Brassica PI lines tested during 1972.

PI 343569 - was somewhat similar to Kohlrabi. One cabbage plant was selected from the line. This line was not outstanding.

PI 343635 - was very self-incompatible. We produced little seed from a plant that was moderately high in ascorbic acid. We had two plants that set a fair amount of seed with one early cabbage having 75 mg/100 gms AA.

PI 205992 - Early Copenhagen type. Downy mildew - 2.

PI 245021 - Late, no heads. Leaf like Savoy, downy, mildew 4-5.

PI 246109- Red cabbage with 65 mg/100 gms AA. Downy mildew -4.
Nothing really unusual.

PI 343637- Red. Downy mildew - 4.

PI 343638- Red. Downy mildew - 4.

Field Evaluation of Muskmelon PI Lines During the Spring and Fall 1972

These PI's were very interesting again this year. There is some excellent resistance to Powdery mildew and some acceptable resistance to Downy mildew. More emphasis should be placed on PI lines resistant to Gummy Stem Blight, Alternaria and several insects. Perhaps multiple resistance should be stressed. The more resistance factors a PI line has along with some desirable horticultural characters, the better it will fit in a breeding program.

Insect resistance is very important, particularly if a fall melon crop is to be grown. The most important insects are aphids, leafminers, pickleworm, spider mites, and cucumber beetles. PI lines tolerant or resistant to one or more of these insects would be welcomed for testing in our spring and fall observations. A source of cucumber beetle resistance not related to the bitter principal would add to already resistant lines. If research shows the bitter principal is a factor involved in spider mite resistance, we may have to use something else for cucumber beetles. Pickleworm is the worst pest of fall melons in the Charleston area. Without resistance to this insect, there can be no fall melons.

Other factors of interest that we should continue to look for in PI lines are:

1. Bright attractive rind colors. There were some very attractive yellow, orange and white rinds in this year's lines. Some had attractive contrasting stripes or blotch patterns. Anything that would help improve the external appearance of muskmelon would be desirable.

2. Bright attractive flesh colors. I am interested in any line that has bright yellow, orange or green flesh.

3. Sugar and flavor. PI lines high in sugar and with flesh that has a pleasing flavor would make interesting combinations with breeding lines and varieties.

4. Plant habits. New sources of bush or dwarf plants would be desirable. Any smaller plant type that shows the capability of producing one or more 3-4 pound fruit would be nice.

5. Flowering habits. Plants that have a high ratio of female or perfect flowers to male flowers during the early stages of growth would contribute to earliness and concentrated yield. This might be desirable for mechanical harvesting.

Muskmelon PI's 1972

1. Spring Downy Mildew readings*

PI	DM	Remarks
123681	2	
124111	3	Monoecious, explodes as fruit ripen
124112-A_2 sel.	3	
140471	3	Original seed
140471-M1b	4-	Mass of plain yellow fruit
140471-M1a	4	Mass of striped fruit
140471	3	New pack of original seed
164756	3	
164756 sib.	3	
164756	3	Cucumber beetle resistant selection
164756 sel.	4+	Seg. many fruit shapes and rind colors
165525	4	
165525 sel.	3	
182959	4	
183307	4	
183307	4	Cucumber beetle resistant selection
183311	3	Small fruit with orange and white stripes
183397	3	
214154	3	Long pear shape fruit, orange and green stripes
214154 sel.	3	Cucumber beetle resistant
230185	3	
236355	2	
296345	3	
313950	3	
318653	3	
321005	4	
323427	2	
344325	2	
351133	2	
353451	2	
353452	2	
353453	2	
353454	3	

*1-dead to 5-superior resistance

Muskmelon and Cantaloupe PI's 1972

2. Fall Disease Ratings*

PI	PM	DM	GSB	Remarks
124111	5	3.5	3	
124112	5	2	3	
136224	5	2	3	
164323	5	3.5	3	
164723	5	3.5	3	
164756	4	2.5	3	Many colorful fruit some striped,
164756 sel.	5	4	3	some blotched, some plain, usually
164756 sel.	4	3	3	yellow or orange with stripes.
164756 sel.	5	3	3	This has cucumber beetle resistance
165449	4	3.5	3	
174143	2	1	1	
177334	2	2	3	
179669	3	2.5	3	
179671	4	2	1	
180283	5	3	2	
182952	3	1	1	
182953	5	3	1	
182954	5	3.5	2	
182959	5	3	3	
193495	5	3	3	
212895	5	3	3	
214154	4	3	3	Orange and green stripes
223673	3	3	2	
234607	5	3	2	

*1-dead to 5-superior resistance.

J. A. Martin, Associate Professor of Horticulture, Clemson University, Clemson, S. C. 29631.

Stokesia laevis: P.I. accessions 347645, 354065, 355044, 358718, and 366021 were grown in the field in 1972. The crop is a perennial and it survived the winter of 1972-73 -- all accessions appeared to be very winter hardy as no plants were lost during the winter months. In early April the plots were fertilized with 5-10-10 at the rate of 800 pounds per acre and cultivated. The plants were spaced one foot apart on slightly raised beds in 42 inch rows. The plant grows rapidly in April and May. The peak of bloom is the month of June for P.I. accessions 347645, 354065, 358718, and 366021. However, P.I. 355044 begins blooming about a month later with the peak of blooming expected around the middle of July. Seed harvest for these accessions should begin around September 1 to 15. Seed from sixty-five individual selections were saved from P.I. accession 355044 as it was the tallest accession with a range of 22 to 30 inches in height. In fact, P.I. 355044 may lend itself to mechanical harvesting as it stands more erect than any other accession. Since there is much variation in seed type, plant types, etc. a selection program will continue for obtaining uniformity for desirable plant characters.

The 1972 planting has been very helpful in learning the cultural requirements of Stokesia.

The 1973 field test will consist of P.I. accessions 346981, 347645, 354065, 355044, 358718, and 366021. Plants are now ready for a July planting for yield determination and for observation of other desirable characters.

The 65 individual selections from P.I. 355044 will be grown for obtaining more uniformity in plant types, etc.

More seed from individual plants will be saved from the 1972 planting with hopes that more uniformity in plany types can be obtained.

At this time a few plants have died in the 1972 field planting. The cause will be determined as soon as possible. No insects have been observed to date. The plant height range will run from 18 to 30 inches. The tall and erect plants may be more desirable for mechanical harvesting.

In propagation of Stokesia for our purpose seed was planted in Jiffy-mix on April 5, 1973, and transplanted to flats on May 28th. The plants will be ready for transplanting to the field in late July.

PEPPERS: Approximately 300 accessions of peppers were planted in 1972 for evaluation and observation. Data were obtained on plant height, habit of growth, pod shape and length, diameter of pods, pod color, position of pods on plant, number of pods per node, etc.

From a commercial standpoint a number of outstanding Paprika pepper types were observed. Seed was saved from best individual plants for further testing--especially for red color and pickability. The following P.I. accessions of Paprika were outstanding for bright red color, heavy pods, good yields, and ease of picking:

P.I. No.	Source	P.I. No.	Source
281434	U.S.A.	357429-1	Yugoslavia
342946	California	357429-2	Yugoslavia
344282	Turkey	357429-3	Yugoslavia
344284	Turkey	357431	Yugoslavia
344291	Hungary	357435	Yugoslavia
355720	Hungary	357552	Yugoslavia
355723	Hungary	357602	Yugoslavia
357420	Yugoslavia	357634	Yugoslavia

It has been impossible to get any commercial pepper growers in South Carolina interested in the production of peppers. Therefore, our plans for carrying on mechanical harvesting studies have failed due to lack of funds and growers' interest. Growers in California are using a modified bean picker for harvesting Cayenne pepper such as Carolina Hot and other types.

Kenaf-Roselle Rotation Test: This test was designed to be conducted for a period of four to five years on the same soil plots which were heavily infected with Meloidogyne incognita. The varietal treatments are as follows:

1. Kenaf followed by Kenaf
2. Kenaf the first year alternated with roselle in subsequent years.
3. Roselle the first year alternated with roselle in subsequent years.
4. Roselle followed by roselle.

Excellent stands were obtained in 1971, 1972, and 1973. Yield and other tests will be available from Dr. W. C. Adamson who is compiling the overall data from similar experiments at other locations.

Impatiens species: Twenty-three accessions of Impatiens species from New Guinea were received on March 16, 1972. The plants were placed in 6 inch clay pots using a good fertile potting mixture. Even with the best of cultural practices in the greenhouse we were disappointed with the overall performance of most of these species. Growth is slow as compared to Impatiens sultani, very little or no blooms, and Red spiders thrive on these plants. However, P.I. accessions 354261 and 354266 have fancy colored leaves on red stems and they make beautiful plants for porches and patios.

More work is planned with these Impatiens species with hopes that ways and mean can be found to stimulate flowering.

Sunflowers: The 1972 Regional Sunflower Test which was planted at the Edisto Experiment Station, Blackville, S.C., was a complete failure due to adverse weather conditions.

The 1973 test is being conducted at the Simpson Experiment Station near Clemson. A perfect stand was obtained from the May 18 planting. On July 10, the plants were almost in full bloom. The test consists of 37 cultivars (mostly male-sterile hybrids) and is set-up as a randomized single row plots with four replications for each entry.

Dr. E. F. McClain, Asst. Professor of Agronomy and Soils, Clemson University, Clemson, S.C. 29631.

Much of the materials obtained to date have not yet been evaluated. One plant from each of the accessions PI - 207960, PI - 319071, PI - 308605, PI - 292206, PI - 249836, PI - 240279, PI - 201945 (Phalaris aquatica) and PI - 261030 (P. aquctica X P. arundinacea), has been selected for inclusion in experimental synthetics and for further observation. These selections were based on survival in ladino clover and on vigor. The plant from PI - 292206 appears to possess outstanding vigor.

None of the P. truncata accessions survived at Clemson. However, all of the Phalaris species were transplanted to late in the season (November). All of the Cynosuras species failed to survive during the summer.

Dr. R. E. Schoenike, Associate Professor of Foresty, RSS, Clemson University, Clemson, S.C. 29631.

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

Accession PI 168939 Quercus acutissima

The plantation is healthy and tallest trees are over 18 feet. Six trees were observed fruiting in fall 1972 - the first noted so far.

Accession PIM 19451 Eucalyptus cinerea

Only 2 trees remain after being top killed for the fourth consecutive winter. The plants are weak.

Accession PI 293810 Pinus stankewiczii

The two plants remaining are vigorous but growing slowly. Nantucket pine tipmoth infestation was noted for the third consecutive year.

Accession PI 293809 Pinus nigra pallasiana

The one remaining plant is vigorous and doing well.

Accession NA 26310 Pinus pinaster maghrebiana

The one plant developed a rust gall at the base (Cronartium ?) and blew over in a windstorm in June 1973. It does not appear adaptable to the area.

Accession NA 29211 Viburnum obovatum

One plant remains and is mildly vigorous.

Accession NA 28285 Acer grosseri

The one plant is weak and doing poorly.

Accession NA 827-S Quercus chenii

All five plants received are growing well. The tallest is now over 6 ft. and is very vigorous.

Accession PI 320525 Larix gmelini var. olgensis

The plant remains healthy and is growing slowly.

Accession NA 23214-C Ilex x koehneana

One plant died in 1972. The two remaining are healthy but growing slowly.

Accession PI 316681 Viburnum sargentii

Two plants suffered dieback last winter but since have made a recovery. Currently they are doing well.

Accession PI 324940 Abies kawakami

Two plants died in a late summer drouth in 1972.

Accession PI 317188 Abies koreana

Two plants died in a late summer drouth in 1972.

Accession NA 30158 Abies bornmuellariana

One plant showed winter injury in winter 72-73 and currently is weak.

Accession NA 30051 Abies koreana

The plant is healthy and growing slowly.

Accession NA 30030 Arbutus texana

No plants survived the past winter. All have died.

Accession NA 32233 Abies pinsapo

All three plants were field planted under light shade in fall 1972. Two succumbed over the winter. The remaining plant is healthy.

Accession NA 14089-C Chionanthus retusus

All three plants were field planted under light shade in fall 1972. One succumbed in the winter. The remaining two are healthy.

Accession NA 35758 Clethra barbinervis

All three plants were field planted in fall 1972. None survived the winter.

Accession NA 33031 Pinus brutia

All three plants were field planted in fall 1972. All survived the winter with some needle scorching. They are currently vigorous.

Accession NA 31740 Pinus koraiensis

One plant succumbed in the container. The remaining two were field planted in fall 1972 and are currently healthy.

The following items were received in March 1973 and are currently in containers to be planted at a later date.

NA 33517 Alnus japonica (3 plants)
NA 33520 Betula platyphylla (3 plants)

Mr. R. B. Taylor, Owner Greer Nursery Garden Center, 1501 West Poinsett Street, Geer, S.C. 29651.

Going back to 1925, I have a report that I received P.I. accession No. 57080, Juniperus cedrus, from Plant Introduction Station, Glenn Dale, Maryand, same year. This tree was brought into this country by the Plant Introduction Station from the Royal Botanical Garden and it is a rare type of cedar native to the Himalayan Mountains of India.

Mrs. Hubert D. Anderson of Coward, S.C., obtained a small tree from me many years ago and planted it in her front yard. In 1972, the highway was to be widened to the extent that the tree would have to be moved. Mrs. Anderson contacted S.C. Governor John C. West who said he should be honored to have such a beautiful tree standing on the State House Lawn. So the tree, a beautiful specimen over fifty feet high was moved to the lawn in March 1972.

The Berries Jubilee, 3168, came from seed of Ilex cornuta, PI 24638, which originally came from Northern China. In fact, all the new Cornuta varieties were produced from the one parent Cornuta. I could name them all, but you know them.

I have quite a few new **Ilex** cultivars that will be outstanding-variagated. beautiful yellow berried, but it's going to be quite sometime before I can evaluate them.

I have lots of Camellias and Rhodendrens that I have received from Glen-Dale. Some of them are going to be outstanding and I will report on them later.

I received the first Chestnut from U.S.D.A. at GlenDale, No. 56392, Castanea mollissima in 1925-26 and the first seed was sold to H. G. Hastings and they sold them all over the South.

Begonias from USDA Plant Introduction Service

Dr. Klaus Neubner, Senior Vice President
Geo. W. Park Seed Co., Greenwood, S. C.

General Observations

1. Leaves will deteriorate if watered from top consistantly.
2. Best growth occurs in the spring.
3. Either self or cross pollination is rather difficult at this point.
4. All plants were grown in greenhouse.

P.I. 349557 B. sp.

1. Hard to grow in our environment.
2. Hard to propagate.
3. Produced a few flowers in fall or winter.
4. Low growing.

P.I. 354179 B. augustae 2N-44

1. Grows tall and erect.
2. Easy to grow and propagate.
3. Produced a few flowers in fall or winter.
4. Can't see much commercial value.

P.I. 354180 B. serratipetala 2N-44

1. Easy to grow and propagate.
2. Would be a nice hanging basket plant because of branching and hanging habit.
3. Produces flowers year-round, but more-so in the spring.

P.I. 354182 B. breuiramosa "Exohea" 2N-44

1. Grows slower than B. augustae.
2. Grows tall and erect.
3. Propagates rather easily.
4. Produces flowers primarily in the spring.

P.I. 354184 B. sp.

1. Easy to grow and propagate although we have had some rot problems.
2. Branches good - would be good pot plant.
3. Produces flowers year-round but in profusion during spring.

TENNESSEE REPORT ON PLANT INTRODUCTIONS TO S-9 TECHNICAL COMMITTEE

July 1972 to July 1973

M. J. Constantin

My records show that collaborators in Tennessee did not receive any plant accessions during the past year.

The reports on performance of PI materials will be presented under four broad categories as follows:

CROPS

A. Zea mays - L. M. Josephson of the Plant and Soil Science Department is using Zapalote Chico P.I. 217413 in a breeding program designed to transfer earworm resistance into inbred lines used to produce Tennessee hybrid varieties. Some progress has been made in transferring silk and husk characteristics of Zapalote Chico to inbred lines and selection is being continued with emphasis on earworm resistance.

B. Nicotiana tabacum - C. L. Gupton of the Tobacco Experiment Station, Greenville, is using TI 1406, a green type tobacco, isolated by Koeller in Germany, to transfer resistance to potato virus Y into commercial varieties. Resistance to potato virus Y is controlled by a single recessive gene located on chromosome E. A back-cross breeding program is being used.

C. Medicago. W. D. Barber of the Plant and Soil Science Department has treated seed of a number of Medicago introductions with physical and chemical mutagens. The primary objective of the program is to produce mutants that are resistant to the alfalfa weevil (Hypera postica). M_1 plants are being self-pollinated under high temperature conditions and M_2 populations will be screened for resistant mutants under field conditions using natural infestations.

D. Fragaria - The strawberry breeding program conducted by W. E. Roever of the Plant and Soil Science Department has been discontinued because of Dr. Roever's retirement. In the past, PI material has been used in this program.

ORNAMENTALS

A. Ornamental Species.

H. van de Werken of the Department of Ornamental Horticulture and Landscape Design, the University of Tennessee at Knoxville reports that all PI species at the Knoxville campus are being tested for both cold and heat resistance and for pest resistance and landscape quality. With the recent departmental organization there is now a greater opportunity for increased and more accurate testing of PI materials.

Sedum telephium PI 297377 has a quite open habit and flowers of lower quality than some known telephium cultivars but is hardy and vigorous. Sedum hybr. ellacombianum PI 297374 is a relatively low broad plant (16" wide) and hardy. Sedum hybr. PI 207375 has showy yellow flowers in May which develop unattractive brown seed heads thereafter. Sedum aizoon PI 297373 has a somewhat open habit in May and develops new growth only in June. Polygonum cuspidatum compactum PI G-18343 NY, obtained from Geneva, NY is vigorous, attractively flowering and lower than P. Reynoutri but is severely plaqued by a so far unidentified conspicuous leaf spot. Thuja koraiana PI 317297 appears variable in growth habit but one plant is compact and attractive. Callicarpa japonica

PI 317359 is compact, vigorous and produces flowers and berries at early age (3'-4' tall plants).

Spiraea fritzchiana PI 317286 is a relatively low broad-leaved plant with white flower clusters hidden between the foliage. Ilex glabra 'Albert Close' PI 331202 is hardy and attractive but has not berried yet. Viburnum sieboldii 'Seneca' PI 316682 grew 3 ft in 1973, has attractive leathery large leaves but appears to be somewhat tender. Ilex crenata PI 231948 is an irregular shape, yellow-berried plant that grows slowly. The yellow berries are quite dull but may be useful for interspecific breeding with red berried species. Viburnum PI 316675 has attractive leathery foliage similar to V. rhytidophyllum and has been hardy so far. We still have 2 chinese gooseberry (Actinidia chinensis) plants PI 295681 left from 50 seedlings 4 years ago. These two plants appear to be hardy at a minimum temperature of 15° F, tip damage at 10° F but freezing back to soil level when temperatures approach 0° F. All others were killed at 0° F or earlier. Spiraea salicifolia PI 317288 is a 3' tall plant producing pink spires of flowers in June. The very small glossy foliage of Ilex crenata microphylla PI 317235 and 317234 both are outstanding but the plants suffer tip damage from freezing. Photinia PI 325009 dies back to soil level at temperatures below 15° F but can grow into a 6' tall columnar plant in one year. Pinus densiflora PI 319315 is attractive, slow growing and dense but subject to pine tip moth damage.

Cunninghamia lanceolata PI 324969 is quite hardy but has a poor winter color and is lacking the blue cast expected on Cunninghamias. Euonymus echinatus PI 324972 did not survive our winters. Azalea Mrs. LBJ, PI 337619 appears to do quite well in full sun exposure. Hypericum patulum PI 247782 is quite floriferous and has withstood 0° F temperatures. Of several other Ilex crenata selections PI 276162 is the lowest and most compact and is also without winter damage. Cornus Mas PI 293772 and 293775 have made attractive 6' tall hardy plants after 3 years of field culture. Sambucus siberica PI 376939 seedlings seems to be extremely susceptible to spider mites and white flies under greenhouse conditions. The early branching, vigor and matted root-system of Salix fragilis PI 370126 seem to indicate possible use of it for preventing wave erosion on the shore of large lakes.

FOREST TREES

A. Abies - E. Thor of the Forestry Department reports that five accessions, viz., A. kawakamii PI 324940, A. koreana PI 317188, and A. nephrolepis PI 317189, are growing well under greenhouse conditions. These plants will be transplanted to the Oak Ridge Arboretum this winter. Dr. Thor has expressed an interest in getting more seed and plant materials of Abies for evaluation at low elevations in East Tennessee.

WILDLIFE DEVELOPMENT

A. Wildlife Food Plant Development. D. H. Scanlon, TVA Division of Forestry, Fisheries, and Wildlife Development, Norris, Tennessee 37828 reports on the TVA program involving the evaluation and selection of shrub-type plants to be grown on utility rights of way and strip mines for the purpose of increasing food and habitat area for wildlife. Collections of plant materials are being

expanded to provide the genetic diversity necessary for making selections of outstanding individuals. Initial plantings have been established to evaluate species performance on sites representing plant hardiness zones 6B, 7A, and 7B.

Performance of Introduced Plants, July 1972 to July 1973

Only a preliminary evaluation is possible since most of the accessions were outplanted in March 1973. The following group of species grew well from seed in the nursery and transplanted satisfactorily to the field as 1-0 seedlings.

Quercus acutissima P.I. 78658
Q. pumila BN - 10352-71
Cornus mas P.I. 323959
Lespedeza bicolor P.I. 286477
L. japonica P.I. 90664
L. cyrtobotrya P.I. 286480
L. cyrtobotrya P.I. 295323
L. hedysaroides P.I. 193950
L. thunbergii BN - 3532-68

The evergreen species, Quercus mysinaefolia P.I. 74222, Lithocarpus species S#2484, and Castanopsis schlerophylla P.I. 58394 germinated and grew well in the nursery but proved difficult to transplant satisfactorily to the field as 1-0 seedlings. Lithocarpus henryi P.I. 120650 performed poorly in the nursery and in transplanting the few available seedlings.

The Lespedeza capitata accessions, P.I. 287114, P.I.287121, and P.I.303845, grew poorly in the nursery and most seedlings did not survive transplanting.

Two accessions Elaeagnus umbellata NA 31662 and E. pungens NA 30128 were received as softwood cuttings. Both were rooted under intermittent mist, the P.I. 31662 with 90 percent success and the NA 30128 with 50 percent. The accessions were transplanted successfully to a field planting.

Cornus sanguinea P.I.293777 received as a single seedling in 1972 died during the late summer of that year possibly due to heat and drought conditions.

Performance evaluations of these materials will be continued on planting sites representing the hardiness zones of the Tennessee Valley.

Dr. Scanlon is seeking seed of various wildlife food plants to broaden the genetic base of the collections now being grown. He is primarily interested in oaks, dogwoods, cherries-plums, wild grapes, Elaeagnus, honey suckles, and shrub lespedezas. Although many of these species are native to the Tennessee Valley, he is interested in getting material representing different geographic ecotypes.

Annual Report on New Crops Research in Texas

Hatch 2091 - Contributing to Regional Project S-9

Lexington, Kentucky, July 23 and 24, 1973

Prepared by Eli L. Whiteley

The 1972-73 crop year was unusual, even for Texas. Rainfall started in September of 1972 and has been above normal to date. Sleet and snow occurred at College Station which is very unusual. Temperatures were well below normal in the early spring with cool nights and mild days extending into late May.

Researchers in Texas received 1204 accessions in 1972-73. The major genera were Capsicum, Sorghum, Brassica, and Cucumuis. Most of these materials are now being evaluated in the field.

Ornamentals

Dr. George Tereshkovich files the following report on his ornamental work at Lubbock, Texas. In late 1972, this project was initiated to study and determine the cause of differential response of new ornamental species to varied climatic conditions, landscape usage, and various cultural practices. To date, about 275 plants representing 35 species have been planted for evaluation. On June 14, 1972, a severe hail storm caused considerable damage to many P.I. and National Arboretum accessions by defoliating them and splitting the woody canes, branches, and tree trunks. Many of these plants were not able to recover from this damage (unable to form wound healing tissue) and died during the summer or winter of 1972-73. Those lost will be included in a final report at a later date. Since many of the plants have been under observation for only one growing season, additional time will be necessary before final summaries can be made. As new plants become available,

they will be added to the collection.

Mrs. John N. Martin of Dallas, Texas reported that Solanum nodiflorum (P.I. 247828) did not grow well after the plants were transplanted to a bed. The plants were attacked by "leaf eating bugs much more than their neighboring ornamental plants in the same bed".

Field Crops

Dr. Olin D. Smith reports that the peanut accessions acquired over the past 2 years are still undergoing evaluation for pod rot tolerance, burrowing bug tolerance or resistance, and lesser cornstalk borer resistance or tolerance. Several accessions show some promise, but it is too early in the program to identify these accessions.

Dr. Murray L. Kinman reports that P.I. 372172 through 372178, a group of very high oil, open-pollinated, single plant selections from Peredovick selected at Krasnodar, USSR, in 1972, appear promising; only high oil, self- or sib-pollinations were saved for further study, cms P.I. 343765 introduced from France in 1969 (which contributed male-sterile cytoplasm) and HA 119 (an inbred line selected from P.I. 265100, Jdanovsky 8281, introduced from the USSR) each make up 1/8 of the parentage of RHA 271 and RHA 273, two restorer lines possessing dominant mildew resistance (due to the $P1_2$ gene) and recessive branching (bb) which were released in the spring of 1973 jointly by USDA and the Texas and North Dakota Agricultural Experiment Stations. Additional lines of similar parentage are under increase in 1973. These lines will make possible high oil, commercial, F_1 hybrids completely resistant to the downy mildew disease caused by the widely virulent Red River race of Plasmopara halstedii. This is a persistant soilborne organism which can cause very severe losses in heavy soils such as those encountered in the Texas Blackland area, especially when rainfall occurs between plant-

ing and emergence.

Dr. R. D. Brigham reports that two soybean accessions (P.I. 227555 and P.I. 200503) are being used as a source of resistance to soybean mosaic virus. Nineteen accessions of Glycine max are currently being evaluated as sources of genes for the breeding program. Several other accessions are in a screening program for tolerance to cotton root rot. Three accessions of Glycine gracilis and six accessions of G. ussuriensis are being evaluated as gene sources.

Forage Crops

Dr. A. Robert Shank of our Overton Station reports that the USDA collection containing 457 lines of ryegrass were planted for evaluation in the fall of 1972 at the Texas A&M University Agricultural Research and Extension Center at Overton. Lines which showed characteristics contributing to total or seasonal forage production are being used in a breeding program to increase the productivity of annual cool season pastures.

The following accessions of L. multiflorum have excellent potential. They are characterized by having early stand establishment, excellent fall growth, frost tolerance, and continued excellent forage production in the spring.

227020 (perenne?)	241913	321395
238937	266111	324711
240732	268333 (perenne?)	321396 (per x mult)
241586	283609	
241912	295600	

The following accessions of L. rigidum appear to be very productive. They produce large amounts of forage in the fall and early spring. Their bushy growth habit should give support to cattle when soil moisture is in excess.

239766	239784	269385
239768	239786	302919
239769	250804	317502
239770	250805	
239781	250806	

The following accessions of L. perenne are late forage producers which have potential in sod mixtures. They are not productive until after the multiflorum and rigidum types have begun to mature, but when planted in combination, may extend the normal grazing season.

231604	284824	287855
231606	284825	303047
241608	284826	284823
283614	287849	
284821	287854	

Dr. John Birchett reports that three accessions are in an advanced stage of evaluation at the Texas A&M University Research and Extension Center at Dallas.

Oryzopsis milicia (P.I. 330678) - plants are very leafy, however, they appear to be damaged by cold winters. At present, the selection does not appear to be of major value to agriculture in Texas.

Oryzopsis milicia (P.I. 198091) - plants are very leafy, but not as vigorous as P.I. 330678. The plants appear to be damaged by cold weather.

Phalaris tuberosia var. Stenoptera (P.I. 156210) - this selection is very vigorous, leafy, and dark green in color. It has not been tested for summer survival, but looks very good and has potential in the Dallas area.

Renner Lovegrass was released by the Dallas Station and is a plant introduction; the number is not available at this time.

Oilseeds

About 200 Brassicas were planted at College Station for evaluation. Most

of the accessions were killed by the very severe cold in late winter. These materials were planted in late October and were out of the rosette stage and growing very rapidly when the 9°F temperature occurred. These plants were covered by snow and sleet for about 3 days. The very sudden temperature change caused more damage than the low temperature. Data on these plantings have not been compiled at this time.

Pulp Crops

Kenaf plantings grew very well in 1972. The fertilizer test and the spacing test produced yields well above the average over the period that these tests have been conducted. In the fertilizer test, the lowest yield occurred in the 200-0-60 (N-P-K) treatment and was 10.34 tons per acre o.d. material. The highest yield was produced in the 300-60-0 treatment and was 16.55 tons per acre.

In the spacing study 20 inch rows produced the highest yield of 12.80 tons per acre. The 3 inch spacing in the row in 20 inch rows produced the highest yield in the test which was 14.68 tons per acre.

In the kenaf-crotaloria rotation (1st year) crotaloria 10.28 tons per acre while kenaf produced 8.32 tons per acre. Roat knot nematode damage was responsible for the lower yields of kenaf.

Publications

Tereshkovich, G. and F. L. Finch, 1972. Ornamental peppers for West Texas. Coll. of Agr. Sci. Pub. No. T-6-111. Texas Tech University.

Work Planned for Next Year

Work with selected Brassicas will be continued next year. This work will be conducted at several locations in the state. Work on the kenaf-crotaloria rotation will be continued and some data on nematode control should be obtained in 1973-74. If time is available, a planting of orna-

mental pepper selections will be made in the spring of 1974.

Request for Plant Exploration

Dr. E. C. Bashaw and Dr. E. C. Holt requested the following specific collections:

1. Dallisgrass from South America. The region of greatest variability and potential sexual accessions appears to be in Southern Brazil and Uraguay.

2. Buffelgrass, guineagrass and weeping lovegrass from the Union of South Africa and surrounding countries. The African collection should also include Kleingrass (Panicum coloratum) which is a valuable sexual species. 'Kleingrass 75' is an increase of an earlier introduction of this species.

Some important factors should be considered in planning a collection of sexual material of predominantly apomictic species. The most vigorous plants are not necessarily the most desirable. Sexual plants, desperately needed for the breeding program, may appear useless and escape the attention of the collector unless he is specifically trained to search out particular types. Greatest success would be expected in sites of maximum variability comprising unique individual plants. The collection should be made by a scientist familiar with the breeding programs of the species if at all possible. We are prepared to suggest individuals for the collections and to place them in contact with scientists in the various countries who can provide valuable information on probable sites and seasons for best collection.

The need for superior grass varieties which can be effectively and efficiently established and managed is urgent and ever increasing. The proposed collection should provide valuable germ plasm for breeding programs in several southern and western states.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
Southern Region
U.S. Plant Introduction Station
Route 4 Box 433
Savannah, Georgia 31405

Walter O. Hawley
Horticulturist, in Charge

GERMPLASM LISTING

P.I.	Permanent Planting
302815	Acer japonica
21969	Albizzia kalkora
91789	Altingia chinensis
74413	Bambusa arundinaria
73823	Butia capitata
274869	Buxus sp.
66282	Buxus harlandii
118761	Callistemon citrinus
48662	Celtis australis
48663	Celtis spinosa
S-2437	Cephalotaxus fastigiata
S-2555	Cephalotaxus fortunii
S-2556	Chamaerops humilis
81058	Cornus florida
105596	Cunninghamia lanceolata
279748	Cryptomeria japonica
24638	Ilex cornuta
91518	Ilex latifolia thunbergii
80095	Ilex purpurea
112222	Ilex rotunda
42822	Liquidambar formosana
67019	Lithocarpus cornea
231949	Osmanthus sp.
76927	Phillyrea latifolia
49505	Phyllostachys nigra
271431	Pinus sp.
21970	Pistachia chinensis
242264	Podocarpus gracilior
47950	Prunus mume
109352	Pyracantha sp.
80408	Pyracantha atlantoides
54433	Quercus acutissimia
79658	Quercus acutissimia
74222	Quercus myrsinaefolia
126978	Rapidophyllus hystrix
43873	Rhamnus davurica
226148	Rhodo sp.
228115	Rhodo sp.
105633	Sapindus mukorossi
47363	Sapium sabiferum
237833	Sarcocoa hookeriana
52674	Sasa pygmea
102963	Spiraea sp.
102963	Spirea chinensis maxim

70973	Viburnum setigerum
39695	Zanthoxylum bungii
50530	Zelkova sinica
67399	P. nidularia
128769	P. nidularia
128776	P. nidularia (Smooth Sheath)
128779	P. nidularia
49505	P. nigra
66784	P. nigra
75159	P. nigra
77259	P. nigra
77258	P. nigra Bory
75158	P. nigra Henon
24761	P. nigra Henonis
66787	P. nigra Henonis
80034	P. pubescens
128805	P. purpurata (Solid Stem)
77001	P. purpurata (Straight Stem)
116711	P. purpurata (Straight Stem)
128792	P. purpurata (Straight Stem)
128797	P. purpurata (Straight Stem)
68398	P. rubromarginata
77000	P. rubromarginata
123432	P. viridi glaucescens
77257	P. viridis
82047	P. vivax
110509	Arundinaria amabilis

P.I.	Bamboo Collection
128796	Phyllostachys sp.
23237	P. angusta
77007	P. arcana
38919	P. aurea
55975	P. aurea
75153	P. aurea
55713	P. auro-sulcata
12180	P. bambusoides
77003	P. bambusoides
128787	P. bambusoides
42659	P. bambusoides Castiloni
146420	P. bambusoides (Crookstem)
66785	P. bambusoides (White Crookstem)
80149	P. congesta
128789	P. decora
73452	P. dulcis
128778	P. elegans
52686	P. flexuosa
116965	P. flexuosa
77011	P. glauca
116768	P. meyerii
63696	P. nidularia
63697	P. nidularia
62757	P. nidularia
66786	P. nidularia

Camellias

Collection includes:

C. japonica, C. rusticana, C. senensis,

C. fraterna, C. granthamiana, C. hongkongensis,

C. kissi, C. nuyagii, C. sasanqua, C. oleifera,

C. reticulata, C. saluenensis

258 accessions
60% wild forms

Pears

Chinese round forms

"Orient"

P. calleriana

Chinese Chestnuts

Approximately 15 trees resistant wild forms.

Kenaf

Adamson's successions.

Greenhouse Ornamentals

330372	Acacia dawsonii
345538	Bauhinia congesta
	Castanea mollis
58394	Castanopsis schlerophylla
480100	Citrus sp.
358787	Clematis sp.
358788	Clematis sp.
275910	Costus afer (Ginger) .
S-702	Cudrania tricuspidata
62719	Euonymous fortunii
240075	Ficus magnoliafolia
255632	Geijera muelleri
50419	Grewia biloba
70980	Ilex cornuta
143795	Ilex cornuta rotunda
183818	Ilex opaca
112222	Ilex rotunda
377678	Ilex verticillata
302822	Liquidambar sp.
302822	Liquidambar formosana
22982	Loropetalum chinensis
24005	Malva sp.
55735	Myrica rubra
285392	Pieris formosa
75165	Pseudosasa japonica
61938	Pterocarya stenoptera
515996	Pyracantha angustifolia
72814	Pyracantha crenulata
78658	Quercus acutissima
89605	Quercus dentata
370126	Salix fragilis
376939	Sambucus siberica
358440	Sorbus terminalis
24322	Stromanthe sanquinensis
S-2237	Tetrapanax papyriferum
325073	Tucheria shinkoensis
313982	Ulmus hollandi
64466	Ulmus japonica
112116	Ulmus pumila pilosa
50530	Zelkova sinica
22686	Ziziphus jujuba

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

The Soil Conservation Service Report on S-9 New Crops for 1972 in its South RTSC Area, July 23-24, 1973 Lexington, Kentucky

by
W. C. Young, Plant Materials Specialist, South RTSC

This year I have tried to emphasize the narrative portion and only summarized by count the number of items we have under test. Reports come from the four nursery managers for the materials on the four southern centers. These are:

John D. Powell, Americus Plant Materials Center, POBox 688, Americus, Georgia 31709

Robert D. Roush, Brooksville Plant Materials Center, Route 2, Box 242, Brooksville, Florida 33512

B. B. Billingsley, Jr., Coffeeville Plant Materials Center, POBox D, Coffeeville, Mississippi 38922, and

Jacob C. Garrison, James E. "Bud" Smith, Jr. Plant Materials Center, Route 1, Box 133A, Knox City, Texas 79529

Work with field plantings in the States come from:

T. A. Bown, PMS headquartered in Jackson, Mississippi, serving Mississippi, Arkansas, and Louisiana

H. J. Haynsworth, PMS headquartered in Athens, Georgia, serving Georgia and Tennessee

R. M. Craig, PMS headquartered in Gainesville, Florida, serving Florida and Alabama, and

Arnold G. Davis, PMS headquartered in Temple, Texas, serving Texas.

At present we are without a plant materials specialist in North and South Carolina, so we do not have detailed information from that area. Several of the same items that appear in other reports are doing well there.

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS
USDA-SCS-FORT WORTH, TEX. 1973

The following comments have been made by the plant materials center managers concerning outstanding plants growing on their centers. The initials of the managers--J. D. Powell, Americus, Ga.; R. D. Roush, Brooksville, Fla.; B. B. Billingsley, Coffeeville, Miss.; and J. C. Garrison, Knox City, Tex.--follow their comments.

Acroceras macrum - PI-364375

This accession has only been observed for one growing season. It produces a very dense stand of soft, medium wide blades which apparently would be good forage. It is vigorous, spreads well, and could be useful for warm season forage production on wet soils. BBB

Arachis glabrata - PI-118457 (Arb), PI-262817 (Arbrook), PI-262839 (Arblick)

The Arb, Arblick, and Arbrook forage peanuts are perennial, summer growing leguminous herbs which grow well as far north as Tifton, Ga. These peanuts grow to 75 cm in length but ordinarily stand only 38-43 cm tall. They spread by rhizomes. The stems are single, erect, and arise from nodes of the rhizomes. The foliage is similar to that of commercial peanuts, but becomes thicker and somewhat more leathery as the plants age.

The three accessions withstand close mowing and are easily managed in pastures. Three to five years is required for full stand development. The peanut planting should not be grazed the first year unless a grass is planted with it.

These plants are well adapted to the doughty soils of the southeastern United States Coastal Plains areas not subject to salt spray. The Arbrook recovers earliest and makes an abundance of growth during spring drought periods. RDR

Brachypodium pinnatum - PI-172692

After two growing seasons, this accession appears to be the best of 38 accessions of Brachypodium. It produces good quantities of forage and has shown no disease or insect problems. There is a good production of seedheads, and though the number of filled seed is not exceptional, it is an adequate seed producer. Perhaps one of its most useful characteristics is the ability to spread very well by means of rhizomes. BBB

Calamagrostis pseudophragmites - PI-222041

This accession has an amazing ability to spread by means of rhizomes. This spreading ability should make it useful for providing ground cover for erosion control or possibly for managed grazing. The number of seed produced is unknown, but seedhead production is good. BBB

Cenchrus ciliaris - PI-271198

Very leafy, fine stemmed grass that grows to 1.2 m in height. It produces moderate quantities of seedheads, some reaching to 1.4 m in height. Early spring recovery; very vigorous summer growth; excellent ground cover coupled with high yielding forage production. Spreads

well by short rhizomes. Drought tolerant in Florida and Puerto Rico. Resists injury by leafhoppers, aphids and stem borers. Moderate to low seed producer. Strong perennial under moderate to high fertility. RDR

Desmodium cinerascens - PI-282691

is a large, very leafy, perennial legume with somewhat coarse, woody stems. Growth to 3.75 m height is common on well drained soils. Seed is produced in moderate and forage in abundant quantities. The seed germinates and the seedlings compete well with moderate to heavy competition. RDR

Eragrostis curvula - PI-295689

A ½ acre planting was established in 1968 and ½ acre in 1969. This is a wide-leafed strain first grown on the Center in 1965. Several plantings in central and south Texas have shown that cattle graze this strain readily. It is being tested, using Ermilo and Morpa as standards for comparison. It has developed a cholorosis here at Knox City growing on a soil pH of 8 to 8.3. Iron chelate makes it respond for a short period of time. It was thought that phosphate was causing an iron tie-up. Phosphate was not added and it still has chlorosis here at the Center. Seed production has dropped drastically. The 1972 seed yield was 85 pounds per acre. JCG

PI-295703. A wide leaf bluegreen large strain. The field production block was established on the Center in 1968. Seed production has been eratic. There were 125 pounds of seed produced in 1972 for field evaluation plantings. This plant has trouble surviving the winter period. Winter survival has been eratic with no set pattern. This accession will probably be discontinued. JCG

Eragrostis lehmanniana - PI-295698

This accession was first increased at Knox City in 1968. Another half acre planting was made in 1970. Seed being produced at Knox City is being used in range seedings in southwest Texas. It is gaining in acceptance to range seedings in the black grama sub-desert area of west Texas and westward. Two harvests can be obtained at Knox City. There were 211 pounds of seed produced in 1972. JCG

Eragrostis robusta - PI-234218

Strong, vigorous, leafy, sub-erect, bunch type, perennial grass with fine-medium textured stems. Leafiness extends to 1.2-1.3 m height and seedheads 1-2 m height. The numerous leaves are blue-green in color, 5-6 mm wide by 58-82 cm long midway along the stem. Both leaves and stems are more tender and palatable than the "weeping" types. Produces fair quantities of very fine, highly viable seed. Excellent potential for critical area, pasture, hay or green chop usage. Adapted to a wide range of soil types and drainage. RDR

Eragrostis superba - PI-295704 and PI-299959

Two accessions survived the winter at Knox City, and the seed were blended and a .3 acre planting established in 1969. It is quick to establish and a good seed producer. There were 85 pounds of seed harvested in 1972. The grass seed harvester is used from three to four times and harvest is completed with the combine. Two harvests are made at Knox City. JCG

Fingerhuthia sesleriaeformis - PI-299968

This plant appears to have good possibilities as a cool season forage producer. Forage quality would seem to be considerably better than for tall fescue and the quantity produced is probably as good. It is not as cold resistant as fescue but possibly it could be used south of the useful range of fescue. Seed production for this accession is superior to all other accessions of Fingerhuthia. BBB

Hemarthria altissima

PI-299993, var Redalta. This grass from So. Rhodesia, Africa, is a strong, perennial, stoloniferous grass with fine, abundant stems and moderately fine, very abundant leaves. The leaves, stems and seedheads grow to 117-127 cm height on fertile ground. The stolons reach 150-275 cm in length in one growing season. The joints of both the upright stems and stolons will produce rooted shoots. A red color is present in the upper leaves and stems, and becomes more pronounced in times of drought or cold and with old materials. Leaves formed at or near ground level tend to have a green or yellowish-green appearance. The upper leaves twist in corkscrew fashion from drought or advanced age conditions. Rarely have viable seeds been observed.

This is an excellent ground cover capable of covering the ground rapidly. It is a high yielding grass of high palatability and withstands trampling well. The grass may be used for grazing, for making hay or for use as a standing hay (green, dry, or mixed). Present indications are that this grass will greatly extend the use period for either grazing or hay making because of its excellent keeping qualities in the fresh green state.

The grass responds well to fertilization and grows well on somewhat poorly drained soils. It overwinters well throughout Florida. It is resistant to moderate frosts at 23°F. in central Florida. Frost at 18°F. has been observed to slowly kill all the above ground portions of the plant except the tuft of basal leaves. The growth period is from the last frost of spring to the first frost of winter with a fair amount of growth occurring during the winter months in central and southern Florida. Growth and recovery after planting, mowing or grazing are slower than with other presently used improved pasture and meadow grasses. With adequate moisture, fertility and time this grass will produce excellent quantities of long lasting green forage.

Because of the tolerance of this grass to moderate frosts and occasional flooding plus slow but continued growth during the cool seasons, it is suggested that it may be adapted to utilization in the removal of minerals such as nitrates, phosphates, potash and perhaps some of the minor elements from treated sewage effluent in landspreading operations in central and south Florida. Care should be taken so that only intermittent or rotated

flooding is permitted as the grass may not withstand constant flooding. Tall stands of this grass have been known to withstand flooding to 75-90 cm depth for nearly two weeks on organic soils. RDR

PI-299994, var Greenalta. The first two paragraphs above concerning Redalta also apply to Greenalta. RDR

PI-299995, var Bigalta. This grass is similar to Redalta, and description of that grass also applies to Bigalta. It overwinters well throughout Florida and has been known to perenniate as far northward as Americus, Ga. Light to moderate frosts kill the leaves and stems but do no serious damage to the rooted crowns. On organic soils, this grass has withstood flooding at 75-90 cm depth for nearly two weeks. Extended flooding should be avoided. RDR

PI-299993 and PI-299994 have been under fertilizer tests and proved to be quite responsive to nitrogen and gave excellent forage yields. We have 22 other accessions for comparison studies with few showing much promise. JDP

PI-364344. This is a very good looking plant from the standpoint of warm season forage production on moist soil areas. It has medium size stems, as compared to other Hemarthrias, but forage quality seems good. Rapid spread is by means of stolons. Growth is continuous over a long period of time and it seems that there is no definite tendency to go dormant. No viable seed have been produced to date. BBB

Indigofera pseudotinctoria - PI-197075

This legume should prove useful on road shoulders and sand dunes. It makes vigorous growth, is large rooted and can be grown from easily harvested seed. It is a spreading type and grows well in light soil. JDP

Lespedeza virgata - PI-218004

Seed of this legume is being sought by state highway departments for planting on road shoulders. It is lower growing than sericea and does not block views on the inside of curves. It also grows well and makes a good leaf mulch. We hope to get the crop certified this summer. JDP

Malus hupehensis - PI-122586

An excellent wildlife food. This is reported to be easy to transplant. JDP

Paspalum nicorae - PI-202044

This rhizomatous species is doing real well holding soil in waterways. Some farmers are claiming it gives excellent grazing-outrating bahiagrass. However, this accession suffers considerable cold damage at Americus during hard winters. Subsequently eight other PI accessions have been received and at least three appear superior to the above in tests now under way. JDP

Pennisetum purpureum - PI-300086

is a very large, strong, perennial, leafy, coarse stemmed grass which grows to 3.75 m in height. This is an erect, slow spreading grass with very high forage production capacity. It has great potential for use as a windbreak on a wide range of soil types and drainage conditions. The erect form should allow comparatively easy utilization as a green-chop or silage forage. RDR

Pistacia chinensis - PI-21970

This fall foliage in the South rivals New England maples for color. The seed of this dioecious species are eaten by birds.

JDP

Following is a summary of work being done on the four centers during the 1972 calendar year, with PI materials.

Item	Americus	Brooks-ville	Coffee-ville	Knox City	Total
Initial evaluation...	83	234	344	1069	1730
Initial increase plantings.....	14	15	8	0	37
Advanced evaluations.	54	9	9	89	161
Cultural evaluations.	0	1	2	45	48
Supplemental increase	9	10	0	40	59
Material named and released.....	0	0	0	0	0
Field evaluation plantings.....	0	2	0	22	24
Miscellaneous evaluations.....	0	48	0	0	48

Arachis monticola, PI 263393

Is showing promise as a pasture plant on well-drained sandy soils along the gulf coast of Louisiana. It has been grazed out of other field plantings on interior coastal plain soils.

Echinochloa frumentacia, PI 196293

Variety chiwapa has been released by the Soil Conservation Service and Mississippi State Experiment Station. It is a tall growing late maturing form of Japanese millet that is suggested for use as a waterfowl food plant on wet sites. Breeders seed is available at the Coffeeville PMC; certified seed not available; commercial seed available in limited quantities.

Eragrostis robusta, PI 208385

This plant is being tested for ground cover on critical areas and as a pasture plant. It is being compared with common weeping lovegrass, E. curvula. E. robusta does not form large bunches and appears to have a higher plant density than E. curvula. Its forage production is probably slightly less than common weeping lovegrass.

Glycine ussuriensis, PI 163453

This plant is a viney type soybean that has indeterminate flowering habit. The seed shatter easily as they ripen, making it difficult to harvest large quantities of seed per acre. It is an excellent quail food plant.

Lespedeza virgata, PI 218004

Virgata is being compared with sericea, L. cuneata on road embankments. It appears to have about the same climatic and geographic ranges as sericea. Virgata is lower growing and makes a more dense cover than sericea. It is used on road embankments without mowing. Under these conditions, it makes an excellent cover that holds down other vegetation.

Malus hupehensis, PI 122586

This is a white flowering tea crabapple with columnar form, bright green leaves and small golden yellow fruit. This plant has resistance to fireblight but is not immune. The apples on these trees are used by birds and other wildlife in late fall and early winter.

Paspalum nicorae, PI 202044

Brunswickgrass appears to be winter hardy south of a line extending east and west through Texarkana, Arkansas; Warren, Arkansas; Greenwood, Mississippi; and Starkville, Mississippi. This grass has produced up to 50 per cent more forage than Pensacola bahiagrass when grown under the same conditions. The brunswickgrass produces a much denser sod than Pensacola bahiagrass in all of the field plantings.

Pistacia chinensis, PI 21970

The range of adaptation has not been determined for this plant in Arkansas, Louisiana and Mississippi. Transplanting bare root seedlings of this species has given very irratic results; survival has been from 0 to 99% when handled in the same manner. Frost sometimes damages the tips of the early spring growth.

Photinia villosa sinica, MS 2426

Appears to be climatically adapted to South Mississippi. It has made good growth in the last year.

Phyllostachys bissettii, PI 143540
Phyllostachys meyerii PI 116768

These accessions are being evaluated for screen plantings and as windbreaks. The establishment of these species has been erratic in the field plantings and the growth for the first 4 or 5 years has been very slow.

Quercus accutissima, PI 76481

This species is being evaluated for its soil adaptation. It appears to only be adapted to deep well-drained or moderately well-drained soils. It is not well adapted to soils with hardpans or to flood plains that have periodic summer flooding.

T. A. Bown

Field Plantings in Arkansas T. A. Bown

Plant Name	P.I. Number	Number Test	Purpose of Test	Relative Performance
Arachis monticola	263393	1	Growth and use by wildlife	Poor
Echinochloa frumentacea (Chiwapa)	196293	1	Growth and use by Waterfowl	Good
Eragrostis robusta	209385	1	Climatic adaptation and forage yield	Fair
Glycine ussuriensis	163453	8	Growth and use by quail	Good
Lespedeza virgata	218004	4	Growth and forage production and ground cover	Fair to good
Malus hupehensis	122586	37	Growth and use by wildlife	Growth excellent
Paspalum nicorae	202044	5	Climatic adaptation and forage yield	Fair
Phyllostachys meyerii	116768	6	Growth for screen plantings	Poor--hard to establish and slow grow
Phyllostachys bissettii	143540	3	Growth for screen plantings	Poor--hard to establish and slow grow
Pistacia chinensis	21970	36	Growth and use of nuts by wildlife	Fair growth
Ptercarya stenoptera	61938	3	Climatic and soil adaptation	Unknown
Trifolium vesiculosum	233782	22	Reseeding and forage production	Good

Plant Name	P. I Number	Number of Test	Pupose of Test	Relative Performance
Arachis monticola	263393	2	Wildlife food plant	Good
Echinochloa frumentacea	196293	11	Reseeding, growth and use by birds	Good
Glycine ussuriensis	163453	22	Growth and use by birds for food and cover	Good
Lespedeza virgata	218004	1	Growth and ground cover	Good
Malus hupehensis	122586	60	Growth and use by wildlife	Excellent
Paspalum nicorae	202044	2	Ground cover and forage production	Excellent
Phyllostachys meyerii	116768	11	Growth and as a screen planting	Fair
Phyllostachys bissetti	143540	5	Growth and as a screen planting	Fair
Pistacia chinensis	21970	54	Growth and use of seeds by birds and squirrels	Fair
Quercus acutissima	?	12	Survival and growth as a wildlife plant	Good
Pterocarya stenoptera	61938	3	Climate and soil adaptation	Unknown

Plant Name	P. I. Number	Number of Tests	Purpose of Test	Relative Performance
Arachis monticola	263393	2	Reseeding and forage production	Excellent-one location
Castanopsis schlerophylla	58394	1	Climate and soil adaptation	Unknown
Echinochloa frumentacea (Chiwapa)	196293	12	Growth and seed production	Good
Eragrostis robusta	209385	1	Ground cover--critical area	Good
Glycine ussuriensis	163453	9	Stand establishment from reseeding	Fair
Hemarthria altissima	299993	2	Climate and soil adaptation	Unknown
Lespedeza virgata	218004	1	Growth and ground cover	Poor
Malus hupehensis	122586	23	Growth and use by wildlife	Growth--good
Paspalum nicorae	202044	8	Growth and production	Excellent
Phyllostachys mayerii	116768	2	Growth for plant screens	Poor
Phyllostachys bissetii	143540	2	Grwoth for plant screens	Poor
Pistacia chinensis	21970	27	Growth and use of nuts by birds	Growth--good

Plant Name	Acres Planted	Seed Production (lbs.)
1. Brunswickgrass (PI 202044)	200	2,000
2. Meechee arrowleaf clover (PI 233782)	100,000 estimate	100,000 estimate
3. Chiwapa millet (PI 196293)	300	2,500

NARRATIVE FOR PLANTS UNDER TEST

Arachis monticola, PI-26393. Plantings were made in 1970 on Coastal Plain and Piedmont soils. Volunteer stands continue to emerge each year. Degree of crop success is commensurate with management provided. Some reports that wild turkey are attracted to plantings.

Castanopsis schlerophylla, PI-95630. Survival of bare-root stock has been very disappointing. Generally, vigor and growth of surviving plants have been poor.

Hemarthria altissima, PI 299993 and 299994. Contrary to earlier reports, both accessions suffered winter damage at Nashville and Cookeville, Tenn. this past winter. Some replanting was necessary to have a full stand.

Lespedeza virgata, PI-218004. This legume continues to show promise as a critical area cover and erosion control plant in Georgia and Tennessee.

Malus hupehensis, PI-122586. Favorable results continue to be reported for this crabapple in Georgia and Tennessee. There were a few reports of fire blight causing moderate damage.

Paspalum nicorae, PI-202044. Plantings on highway roadbanks, field waterways and pasture have given favorable results on Coastal Plain soils.

Pistachia chinensis, PI-21970. Good results are being obtained from plantings on a wide variety of soils throughout Ga. and Tenn. Fertile, well drained soils are preferred.

Pterocarya stenoptera, PI-61938. The 1971 Plantings made in Ga. and Tenn. continue to show good adaptation and growth. A few plants at high elevations suffered minor cold damage.

Quercus myrsinaefolia, PI-74222. Transplanting this oak as bare-root stock has given poor survival. Plants are slow in recovering from transplanting but make satisfactory growth once they are well established.

H. J. Haynsworth

Plant Name	P. I. Number	Number Test	Purpose of Test	Relative Performance
Arachis monticola	263393	3	Adaptation and use by wildlife	Good
Castanopsis schlerophylla	95630	4	Adaptation, wildlife food, ornamental qualities	Poor
Lespedeza virgata	218004	12	Erosion control, adaptation to sandy soils on roadbank	Good
Malus hupenhensis	122586	37	Wildlife food production, ornamental qualities	Very Good
Paspalum nicorae	202044	8	Erosion control (1) Waterways (2) Roadbanks (3) Pasture	 (1) Fair (2) Good (3) Good
Pistachia chinensis	21970	15	Ornamental qualities, wildlife food production	Very Good
Pterocarya stenoptera	61938	11	Ornamental qualities and adaptation	Good
Quercus myrsinaefolia	74222	9	Ornamental qualities and adaptation	Poor

Tennessee Field Tests 1972

H. J. Haynsworth

Plant Name	P. I. Number	Number Test	Purpose of Test	Relative Performance
Castanopsis schlerophylla	95630	16	Adaptation, wildlife food, ornamental qualities	Poor
Hemarthria altissima	299993 and 200004	2	Winter hardiness, forage production	Poor
Lespedeza virgata	218004	23	Erosion control, adaptation on critical areas	Good
Malus hupenhensis	122586	22	Adaptation, wildlife food, production, ornamental qualities	Very Good
Pistachia chinensis	21970	41	Ornamental qualities, wildlife food production	Very Good
Pterocarya stenoptera	61938	14	Ornamental qualities, wildlife food production, adaptation	Good
Quercus myrsinaefolia	74222	21	Ornamental qualities and adaptation	Poor

NARRATIVE FOR PLANTS UNDER TEST

FLORIDA

Woody plants for wildlife and beautification. We are currently testing five woody species for the above use. It now appears that Quercus prinus, swamp chestnut oak, offers the best possibilities for this use. Survival and growth has been excellent on a wide range of soil and climatic conditions. It seems to be superior to the standard (other native oakes) in beauty, soil and climatic adaptation, and ease of propagation.

Non-woody plants for wildlife food and cover. We are currently testing three plants for this use. Results are inconclusive at this time.

Improved forage grasses. We are working mainly with two plants. Hemarthria altissima shows promise for use as an improved pasture grass on wetter soils. In the past, there has been some difficulty in establishing a stand. This problem is minimized by planting on poorly drained soils during the rainy season. Weed competition during establishment is also a problem and this grass does best on new land. It is superior to existing standards (improved bermudagrass and similar grasses) in extending the grazing season in the fall and spring, and providing some green winter forage in south Florida. It is inferior in being slower and more difficult to establish.

Improved forage legumes. Most of our work has been with perennial peanuts, Arachis glabrata. The results are inconclusive but the plant appears to have several shortcomings. It has a relatively short range of soil adaptability and is very difficult to establish. Perennial peanuts do provide excellent forage and there continues to be interest in the plant by farmers and others.

Plants for range seeding. We are working with five plants at this time. This is a relatively new approach to Florida's range problems. No results are available at this time.

Erosion control plants for coastal areas. In Florida, the plant materials problems have been shifting from agriculture to urban. This is especially evident in the need for plants to vegetate coastal areas and especially coastal dunes. This work has received increased emphasis beginning in 1972. It is still too early for definite conclusions. It now appears that Panicum amarulum and P. virgatum will be important in this work. Good seed production is the key to success.

Erosion control plants for inland areas. This work is also receiving greater attention. Lespedeza cuneata, Okinawa sericea, will provide vegetative cover on mine spoil in west Florida. Panicum virgatum will do the same in central Florida. The availability of seed has limited the widespread use of the latter. There are no standards for comparison because these plants are being used in areas that are not now being revegetated either naturally or by man.

R. M. Craig

Field Plantings - Florida

R. M. Craig

Plant Name	P.I. Number	Number of Tests	Purpose of Tests	Relative Performance
Arachis glabrata	118457 262839	In all areas of state	Improved forage legumes	Perennial, summer growing. Have been planted for several years. Takes time to obtain a full stand. Results inconclusive to date.
Hemarthria altissima	299993 299994 299995	44	Improved forage grass	Shows promise, primarily summer forage, cold resistant which should extend grazing season. Best adapted to wet soils or poorly drained soils.
Panicum texanum	BN11637	1	Wildlife cover and food	Best on poorly drained soils.
Pennisetum hybrids	300086 304189 BN17962	5	Improved forage grass	No evaluations yet.
Pteracarya stenoptera	61938		Woody plants for wildlife and beautification	One failure reported. Was on somewhat poorly drained soil.
Vicia sativa	228301	1	Improved forage legumes	No observations or evaluations yet.

NARRATIVE FOR PLANTS UNDER TEST

ALABAMA

I have been working in Alabama for only a short period of time, and it is difficult to form any opinions other than those in my 1972 Annual Report.

Several plants appear to have special values for conservation use:

Quercus acutissima, sawtooth oak, for beautification and wildlife.

Elaeagnus umbellata, autumn olive, for beautification and wildlife.

Castanea alnifolia var. floridana, Florida chinkapin, for beautification and wildlife. This plant is doing very well throughout central and south Alabama. There is an extremely large demand for this plant and several cooperators are planning to go into commercial production.

Panicum miliaceum, 'Dove' proso millet, for wildlife food and cover. In south Alabama, most cooperators believe that it is a better wildlife food plant than browntop or Texas millet.

Lespedeza virgata, virgata lespedeza, for erosion control.

Paspalum nicorae, Amcorae brunswickgrass, for waterways. All plantings have been successful in south and central Alabama. It is superior to the standard bahiagrass because it forms a dense sod.

Paspalum notatum, 'Wilmington' bahiagrass, for use as an improved forage grass. This plant is superior to 'Pensacola' bahiagrass in north Alabama. This is due to a longer grazing season and better growth. It also requires less care than the improved bermudagrasses. One farmer in north Alabama is producing seed for local use.

R. M. Craig

Field Plantings - Alabama

R. M. Craig

Plant Name	PI Number	No. of Tests	Purpose of Tests	Performance
Castanea mollissima	70314	47	Wildlife and beautification	26 successful, 17 moderate, 4 failures
Pistacia chinensis	21970	47	Wildlife and beautification	26 successful, 15 moderate, 6 failures
Pterocarya stenoptera	61938	3	Wildlife and beautification	2 successful, 1 failure due to deer browse and dry weather
Quercus acutissima	BN8298 BN8317	55	Wildlife and beautification	45 successful to moderately so. Failures involved planting acorns instead of plants. First acorns produced in 4-6 years.
Lespedeza cuneata ('Okinawa'sericea)	BN12470	7	Erosion control, forage, wildlife use.	1 successful, 3 moderate, 3 failures due to dry weather and weed competition.
Lespedeza virgata	218004	4	Erosion control, forage, wildlife use.	3 successful, 1 failure. Information not adequate to form definite opinion.
Panicum virgatum ('Pangburn' switchgrass)	BN14668	1	Forage and erosion control.	Successful on less steep areas.
Paspalum nicorae ('Amcorae' brunswickgrass)	202044	2	Waterways	Appears well suited for vegetating waterways.
Paspalum notatum ('Wilmington' bahiagrass)	BN3028	8	Improved forage grasses.	Appears well suited to northern Alabama.

Field Plantings in Texas

A. G. Davis

Eragrostis curvula,

PI-295689. Early spring growth, poor seed production under field conditions. Good forage production.

PI-295703. Low in lignin (cell wall). Excellent seed production. Volunteers. Winter hardiness, losing stands. Preferred by cattle in 'cafeteria-type' grass. Sensitive high water, low phosphate.

Eragrostis superba

PI-295704
and PI-299959 Two field plantings-place in range.

Eragrostis lehmaniana

PI-295698 Promise over common in the drier part of state. One-third more forage. Good volunteer. Good seed production.

Panicum coloratum

PI-166400 Selection 75 kleingrass. 142 acres certified seed. 107 acres registered seed, 1 acre foundation seed (1972). 3,000 acres harvested non-certified field 132,000 total acres March 1973.

Tremendous success in dryland pastures, and is in use in range mixtures.

'Mason' sandhill lovegrass - released for certified seed production early in 1972. First seed field established 1973.

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Denley, Gerald, Local PMC Seeks Plants to Fill All Needs, Is Visited by Many States, Editor, Coffeeville Courier, Vol. 61, No. 28, 7/20/72.

_____, Tri-State Field Day - July 7 at PMC, Coffeeville Courier 1972.

Editor, SCS Meets with Texas Parks & Wildlife Department, Knox County Herald.

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Garrison, J. C., Weekly Weather and Rainfall Record and Soil Temperature Readings, Knox County Herald.

Manning, Earl, The Search for New and Better Plants, Progressive Farmer, Vol. 87, No. 9, P. 24, September 1972.

Tan, Beaty, McCreery and Powell, Humic-Fulvic Acid Content in Soils As Related to Ley Clipping Management and Fertilization, Soil Sci. Soc. of America Proceedings, Vol. 36, 1972.

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_____, Sawtooth Oak Feeds Wildlife, Vol. 87, No. 3, p. 76A, Progressive Farmer, March 1972.

_____, One of the Beautiful Sights This Spring, Knox County Herald.

_____, Field Day Coverage of James E. 'Bud' Smith PMC, Knox City, Tex,, - Abilene Reporter News, Knox County Herald, Wichita Falls Record News, Farmers-Stockman (2 articles).

Report for 1973 Meetings of Regional Technical Committees on New Crops

W. H. Tallent
Northern Regional Research Laboratory

Screening. Prospects for samples for the screening program have improved during the past year. Between March 1, 1972, and April 30, 1973, 274 samples were received, including 118 new species, in contrast to the 79 samples with 19 new species received the year before. There were 51 legumes and 56 Brassica from India, 37 miscellaneous from Ghana, 87 from Tanzania, and 8 from Colombia. We have been promised a continuing flow from contracts and grants initiated by the Plant Genetics and Germplasm Institute in a number of countries from which we have not previously had samples. Seed grown in the U.S. included 1,046 Brassica from Oregon and 15 from Arkansas. There were 72 crambe samples from individual fields grown in 1972. Six samples of Limnanthes were received from WRPIS and an 800-pound shipment from Oregon. Two samples of hollyhock stems were received from Montana for fiber evaluation and two of seed for oil analysis. Two Ribes samples were collected from the wild in Utah. Seventeen samples were seed increased at the Chico station.

Oil, glucosinolates and erucic acid (C_{22} acids) were determined on 725 Brassica samples from the breeding work at Corvallis and 56 new accessions from India. An encouraging number of plants among the breeding samples were found to have glucosinolates reduced by about half while C_{22} acids were maintained above 50 percent. The 72 crambe samples all fell within the normal range for oil and erucic acid. Only about 50 accessions for screening were analyzed. In analysis of oils, two new acids were found in seed of Alvaradoa amorphoides and one in seed of Picramnia pentandra. Unusual cyclic acids (chromanones) were found in oil from Calophyllum spp. as free acids, not as part of the glycerides. Seed of Cichorium intybus, Crepis alpina, and C. vesicaria were analyzed to provide more information on the formation of oxygenated acids in storage (cf. 1971 report). The increase in epoxy and hydroxydienoic acids reported in preliminary instances was confirmed. Since the increase in epoxidation was specifically at the 9,10 position, the reaction must be enzymatically controlled.

Gas chromatographs and the mass spectrometer are now directly connected to a computer. The saving in operator time on GLC analyses becomes especially important when samples of the same type are run automatically, e.g., when breeding samples are processed. Electronic processing of data from the mass spectrometer, in addition to saving a great deal of time, permits much more effective use of the instrument in identifying unknown components of seed oils and helps to counterbalance the reduction in our staff assigned to characterization work. Also, the data for about 5,000 screening samples are on computer cards which should facilitate manipulation of data and preparation for publication.

Broadened studies involving the NRRL seed collection will seek new leads on natural products suitable for use in pest control. Work already underway is directed toward elucidating morphological and chemical features that

differentiate kenaf (Hibiscus cannabinus) from its subtropical relative Roselle (H. sabdariffa). Roselle is resistant to nematodes while the most productive lines of kenaf are not. It is expected that knowledge of features that correlate with resistance will contribute to the selection of resistant lines.

Kenaf. An interregional ARS research conference on this prospective new crop was held May 10 in Savannah, Georgia. Highlight of the meeting was the report by Dr. Charles Adamson of the U.S. Plant Introduction Station there of definite progress toward development of nematode resistant varieties. As a result of discussions about future needs and priorities, Dr. James L. Butler, agricultural engineer stationed at Tifton, Georgia, will begin devoting part of his time to kenaf.

Substantial progress was made toward completion of long-term storage experiments that ultimately will reveal relative effects of such variables as starting with fresh vs. frost-killed material, initial moisture content in either case, use of preservatives, and presence or absence of covers on the stored material. Still going forward at the Herty Foundation is pilot-plant work that will be climaxed by production of enough paper containing 60 percent kenaf fibers to publish a promotional insert in a trade journal. New results extended earlier evidence that the NRRL wet-chemical pretreatment procedure commonizes kenaf pulping substrates, whether they be from roots or stems, fresh or aged, deteriorated or well-preserved, etc. This is important because it will enable mill operators to accept a wide range of kenaf raw materials and still achieve consistent pulping characteristics (e.g., chemical consumption) and consistent product yield (50% or greater) and quality.

Sperm oil replacements. Evaluation of potential sperm oil replacements is underway enabled by contractual arrangements with the Southwest Research Institute (SwRI) in San Antonio, Texas. This is a widely recognized center of authoritative research in lubricant technology. Working with the SwRI scientists is a group of industrial specialists who, by virtue of experience in the sperm oil products market, possess expert knowledge of the chemical modifications and applications of sperm oil. The program is designed to explore potential for use in extreme pressure lubricants, a major market previously satisfied by sulfurized sperm oil and for which sperm oil is still being consumed at a minimum critical rate near 10 million pounds per year from domestic stocks estimated at about 50 million pounds.

Candidates that enter the evaluation program are reacted chemically with sulfur according to an established commercial method and then are examined in laboratory-scale tests for stability, friction-reducing ability, and other important qualities exhibited by sulfurized sperm oil. Those that perform strongly are to be selected for large-scale simulated in-use testing of effectiveness in especially demanding applications such as differential gear lubricants, automatic transmission fluids, and engine crankcase oils.

Material derivable from new crops, thus far synthetic waxes prepared chemically from crambe and Limnanthes fatty acids and the natural wax from Simmondsia (jojoba), are showing promise though still in initial stages of evaluation. These waxes, which are analogous to those found in sperm oil, sulfurized readily to commercial levels of sulfur in quantitative yields. In terms of lubricant properties, the sulfurized products from crambe and

Limnanthes both out-performed sulfurized sperm oil in extreme pressure wear and load tests. Sulfurized jojoba wax also withstood higher loads than sulfurized sperm oil but allowed a slightly larger wear scar. The three product fluids exhibited good solubility in different petroleum-base oils, as required of lubricant additives, and they performed reasonably well in a test measuring stability and corrosiveness toward a bearing metal.

This research, in which thorough assessment of the lubricant performance qualities of unusual lipid structures from new crops sources is envisioned, has repeatedly stimulated expressions of interest and enthusiasm from individuals in the lubricants industry. Their quest for new and alternative types of raw materials is accelerating to keep pace with design changes in machinery, environmental issues, and market changes disrupting traditional lines of supply. There is reason to expect that their interest in unusual materials from agricultural oils will continue.

Crambe. Of the 4,909 acres contracted by Crambe Enterprises, Inc. (CEI) in 1972, 3,138 were actually planted and 1,675 harvested. Acreage was approximately distributed among Illinois, Indiana, and Ohio. Reductions from contracted to planted and from planted to harvested were due mainly to adverse weather conditions in late April and in late July-early August, respectively. Carry-over of a herbicide to which crambe is sensitive also contributed to the second drop. Nevertheless, a total of 42 farmers in three states succeeded in harvesting at least some of their crambe crop. In spite of their inexperience with the new crop and losses due to late harvest, their overall average yield was almost 900 pounds per acre. Several got up to 2,000 pounds per acre, and one near Peoria took 87,500 pounds from 35 acres (2,500 pounds per acre).

The extraction plant in which the 1972 crambe seed was processed had stood idle for over a year and was not shaken down in advance. Consequently, time-consuming and expensive breakdowns occurred during the production run. Complications such as these led the CEI managers--who were also academic administrators with responsibility for running a college--to give up the crambe business, though they netted a profit from it. However, 150,000 pounds of planting seed were saved, and several other organizations are considering purchasing this seed for future crambe production. Prominent among these are the Iowa Development Commission and the Illinois Agricultural Association (IAA), both of which are organizations with decision-making procedures that involve governing boards and committees. Unfortunately, by the time the availability of the CEI-controlled supply of crambe planting seed became known to them, it was too late to carry through with these procedures and then sign up farmers to grow crambe in 1973. But prospects are quite favorable for 1974.

Crambe meal is being fed to beef cattle at Purdue AES under a cooperative agreement with NRRL and in accordance with an experimental protocol approved by FDA. In the first year of this study animals receiving two-thirds of their supplemental protein from crambe meal gained 96 percent as much as ones getting all of it from soybean meal. To provide seed from which meal can be made for the second round of feeding trials, the Illinois Contract Marketing Association (a subsidiary of IAA) has arranged under NRRL purchase order to have three 5-acre fields of crambe grown at diverse locations in Illinois this year. The scattered growing sites were chosen to provide maximum protection against total crop loss due to adverse weather.

Antitumor agents. Syntheses of cephalotaxine, the most abundant (but inactive in antitumor tests) Cephalotaxus alkaloid, have been reported from two academic laboratories in New York (Cornell and Fordham). NRRL chemists have concentrated on transforming cephalotaxine to its active esters--harringtonine, isoharringtonine, homoharringtonine, and deoxyharringtonine. They are making substantial progress, but the conversion has proved to be far more complicated than anticipated. A byproduct of these efforts has been the production of a number of analogous esters, testing of which has underscored and further delineated the specificity of structural requirements for antitumor activity in cephalotaxine derivatives.

The seed extract of Sesbania vesicaria, another "confirmed active" in the 3PS leukemia system, has been fractionated by countercurrent distribution and the active principal has been pinpointed in certain fractions. Further fractionation and characterization of this material is in progress. A. M. Davis (WRPIS) has supplied Astragalus calycenus (P.I. 314357) harvested after flowering (because he previously found that alkaloid biosynthesis does not take place in less mature plants). A new extract of this plant material has been prepared and submitted for antitumor testing.

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

As a result of the ARS reorganization, the New Crops Research Branch was divided into the Plant Taxonomy, Medicinal Plants, and Germplasm Resources Laboratories. Two elements of the Cereals Branch - Small Grains Collection and International Rust Nursery program - were included with the latter Laboratory. This is the first report of the Germplasm Resources Laboratory.

Two factors have impeded the efficient program of plant introduction and exchange. Mr. H. R. Hanes assumed most of the duties of our capable program specialist, Myra L. Haines, who retired on June 30, 1972, but now two persons are attempting to handle the former responsibilities of three. This fact has delayed P.I. write-ups and Inventory preparation. The retirement of a key editor and curtailment of funds have set back the publishing of the Inventories by an estimated two years. Consideration must be given to alternative computerization and printing of the inventories. These delays are serious in view of the increasing awareness of the need to introduce and preserve valuable germplasm while it still exists and the establishment of special germplasm committees. International problems especially in documentation and preservation of grain legumes (pulses), sorghums, and millets have arisen. The responsibilities of the regional coordinators and state technical committeemen are broadening in these and other germplasm areas.

We have maintained close to our annual average in adding accessions to regional programs. 9,293 accessions were received during calendar year 1972 and included significant groups of (a) forage grasses and legumes from Australia (420); (b) numerous species of vegetables (690) and ornamentals (190) through PL 480 Projects in Yugoslavia, (c) 2,300 small grain cereals, mostly Avena and Hordeum from Israel, Poland and Switzerland and (d) 270 crop varieties from the Soviet Union. Exploration in Iran and Turkey resulted in 1,700 dryland grasses and legumes, including 800 Agropyrons. Experimental stocks sent abroad required 1,100 shipments to 110 countries and an estimated total of 35,000 items. Under a special agreement for servicing AID technical missions, 165 shipments of experimental plant stocks were sent to 33 countries and included 2,208 varieties or species.

Dr. Ian Forbes, Tifton, Georgia, has just completed his survey and collecting for lupines and clovers in Morocco, Tunisia, Spain and Portugal. Approximately 250 accessions were obtained and arrangements set up whereby additional accessions can be obtained from these areas in the future. Future explorations have been proposed for collecting tomatoes in Latin America, and for crambe in the western Mediterranean area but these were not approved for FY-74. The only domestic exploration activity has been centered with NC-7 whereby the collecting of native grasses from the Dakotas was completed as of June 30, 1972.

The USDA Small Grains Collection has been operative since 1898 and now provides cereal workers internationally with wheat, oats, barley, rye, and Aegilops seed for research. There is a continual and urgent need to obtain seed of the wild and native cultivars of these crops from foreign countries as none of these crops are native to the Western hemisphere. Viable seeds of more than 65,000 entries are now being conserved so that cereal breeders throughout the world, present and future, will have ready access to the genetic diversity needed to develop improved cultivars. The collection is composed of approximately 50% Triticum, 25% Hordeum,20% Avena, 5% Secale and Aegilops. Annually, more than 150,000 packets of seed are prepared and distributed to researchers throughout the world. The benefits of this collection to basic and applied research are readily acknowledged by cereal crop specialists, public and private, domestic and foreign.

The International Rust Nursery program (IRN) involves wheat and oat nurseries planted at 140 locations in 41 countries. The objectives are (1) to test new and promising selections of wheat and oats to the natural population of rusts around the world and (2) to find new genes or combinations of genes which condition resistance to the population of rust fungi. Cooperators plant, take disease notes, and return the data to the Laboratory for compilation of reports. Entries are rated according to susceptibility to different diseases and desirable entries are incorporated into breeding programs. Plant introductions are screened in the greenhouse for reaction to virulent cultures of stem rust fungi. Selections with good resistance are then placed in one of the nurseries. Entries for the nurseries are obtained primarily from the Small Grains Collection or from other countries. Several countries have made selections from the IRN material which were superior to their own material and made joint releases with the original breeder for commercial production. The ever-changing population of rusts illustrates the necessity for obtaining diversity of rust resistant germplasm in wheat and oats.

Research activities with horticultural crops are divided into two main categories (1) planning of explorations and other methods of expanding germplasm collections of horticultural crops, and (2) evaluation of germplasm collections. An exploration is being planned to collect endemic tomato cultivars in South and Central America and Mexico. PL 480 projects in Yugoslavia continue to yield new collections of horticultural materials. The projects are nearing completion, however, and new projects are not being approved for the area. The evaluation of germplasm collections is being continued by informal collaboration with four Federal and four Regional Plant Introduction Stations. By direct collaboration with research workers in the Vegetable Development Laboratory, the P.I. collection of eggplant is being screened for resistance to spider mites, flea beetles and Colorado potato beetles. The evaluation of rosemallow hibiscus breeding lines is being continued through informal cooperation at the Glenn Dale Station.

The Forage and Range Research Branch seed room was disbanded July 1, 1972 and contents turned over to Germplasm Resources Laboratory. Stocks consisting of 1,040 accessions of clovers, 30 alfalfa cultivars and 190 accessions of

miscellaneous legumes were transferred to other locations for use, increase, and preservation. Germination studies were initiated on selected ground cover species for use by Maryland Highway Administration. Propagation stocks of the Digitaria collection were accrued and increased for screening for yellow sugarcane aphid and winter hardiness. The utilization and checking of documentary information pertaining to introduced germplasm was continued by using ADP techniques.

In the area of new chemurgic crops, new germplasm of Crambe and Limnanthes was added to field programs. B. C. Willingham, Chico Station, collected Limnanthes in northern California. A specific obligation cooperative agreement on agronomic development of Limnanthes with the University of Maryland was approved in late June. This work coupled with that at Corvallis, Oregon, should permit large scale selection and rapid evaluation of superior types. Based on morphological characteristics and chromosome counts, three accessions of Crambe hispanica including the cultivar 'Indy' have been reidentified as C. abyssinica. Records will be changed this fall. Favorable responses were received from foreign contacts concerning a Crambe exploration next spring. Initial seed yield estimates for Stokesia laevis ranged from 350 to 1160 kg/ha. Unfavorable crop characteristics of S. laevis are slow emergence and the long period between planting and copious seed production. Our studies showed the chromosome number 2n=14 contrasted to 2n=18 in the literature. The researcher who reported n=9 (2n=18) has confirmed our count. Several studies including date of planting, row width x plant population, nitrogen level, and selection within accessions are underway. Kenaf seed stocks are being held at Glenn Dale; their domestic distribution is being coordinated with Dr. Adamson, Savannah.

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