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MINUTES OF THE MEETING OF THE S-9 TECHNICAL COMMITTEE ON

THE INTRODUCTIONS, MULTIPLICATION, AND EVALUATION OF NEW PLANTS FOR AGRICULTURAL AND INDUSTRIAL USES AND THE PRESERVATION OF VALUABLE GERMPLASM

Miami Marriott Motor Hotel
Miami, Florida

19-20 August 1976

Respectfully submitted,

Richard J. Stadtherr, Secretary

AGENDA
S-9 Technical Committee Meeting
Miami Marriott Motor Hotel
1201 NW 42nd Avenue
Miami, Florida 33126
19-20 August 1976

1. Call to order 8:00 a.m. 19 August 1976

2. Introduction of Attendees

3. Welcome - L. W. Larson

4. Approval of minutes of 1975 meeting

5. Approval of Agenda

6. Appointment of Committees

   a) Nominations
   b) Time and place of next meeting
   c0 Resolutions

7. Remarks from Administrative Advisors - C. R. Jackson

8. Remarks from Representative of National Program Staff - O. Jones

9. Remarks from CSRS Representative - C. O. Grogan

10. Report - National Resources Board - C. T. Lewis

11. Report on the Clonal Repository - C. R. Jackson

12. National Seed Storage Laboratory - D. C. Clark

13. Discussion of Plant Variety Protection Act - B. M. Leese

14. Status of S-9 Project - W. R. Langford

15. Report of S-9 Project Revision - R. S. Matlock

16. Report of Plant Exploration Request Committee - A. G. Davis

17. Progress Report and Research Plans - Representatives of participating states and federal agencies

(continued)

18. Committee Reports

    a) Nominations
    b) Time and place of next meeting
    c) Resolutions

19. Tour - Subtropical Horticultural Research Station and the University of Florida Research Station at Homestead, 20 August 1976

1. CALL TO ORDER

The meeting of the S-9 Technical Committee was called to order by Milton J. Constantin, Chairman, at 8:00 A.M. August 19, 1976 in the Orlando Room, Miami Marriott, Miami, Florida.

2. INTRODUCTION OF MEMBERS* AND VISITORS

NAME	ADDRESS	PHONE NUMBER
*M. J. Constantin	Comparative Animal Research Lab. Oak Ridge, TN 37803	615-483-8611 Ext. 34205
*W. R. Langford	Plant Introduction Station Experiment, GA 30212	404-228-7255
*Quentin Jones	ARS - NPS - ARC - West Beltsville, MD 20705	301-344-3930
*W. M. Bruce	ARS Tifton, GA 31794	912-382-8245
Howard L. Hyland	Germplasm Resources Lab. Beltsville, MD 20705	301-344-3328
Charles T. Lewis	ARS - NPS Beltsville, MD 20705	301-344-3884
Donald C. Smith	SCS P. O. Box 1208 Gainesville, FL 32611	904-377-8732
*Arnold G. Davis	SCS, Technical Service Center Box 6567 Fort Worth, TX 76133	817-334-5408
*Eli L. Whiteley	Texas A & M College Station, TX 77843	713-845-1426
*Richard A. Hamilton	Horticulture Department University of Hawaii Honolulu, HI 96822	808-948-7934
*John L. Bowers	Dept.of Horticulture & Forestry University of Arkansas Fayetteville, AR 72701	505-575-2605
James S. Kirby for *Ralph S. Matlock	Dept. of Agronomy Oklahoma State University Stillwater, OK 74074	405-624-6419

NAME	ADDRESS	PHONE NUMBER
*Roy G. Creech	Dept. of Agronomy Mississippi State University/MAFES Mississippi State, MS 39762	601-325-4181
Richard V. Connin	Plant Introduction Station Experiment, GA 30212	404-228-7303
*R. Gordon Halfacre	Horticulture Department Clemson University Clemson, SC 29631	803-656-3405
*Gordon M. Prine	Agronomy Department University of Florida Gainesville, FL 32611	904-392-1811
R. J. Varnell	Agronomy Department University of Florida Gainesville, FL 32611	904-392-1811
R. J. Sooy	ARS, USDA Beltsville, MD 20705	301-344-3817
D. C. Clark	National Seed Storage Lab. Fort Collins, CO	
Jay April	Joint Study Group National Germplasm Info. System 1229 University University of Colorado Boulder, CO 80309	303-443-8621
Robert Kleiman for *L. H. Princen	Northern Regional Res. Lab. 1815 N. University St. Peoria, IL 61604	309-685-4011
*Clarence Grogan	CSRS, USDA Washington, DC 20250	202-447-6096
*Oscar D. Ramirez	Plant Breeding Dept. Agric. Exp. Station University of Puerto Rico Rio Piedras, PR 00928	809-767-9705
L. W. Larson	USDA - ARS P. O. Box 14565 Gainesville, FL 32604	FTS 947-7251 904-373-6701
Bernard N. Leese	USDA, PVPO, NAL Beltsville, MD 20705	301-344-2158

NAME	ADDRESS	PHONE NUMBER
*Curtis R. Jackson Administrative Advisor	Georgia Exp. Station Experiment, GA 30212	404-228-7263
*Carl S. Hoveland	Agronomy & Soils Dept. Auburn University Auburn, AL 36830	205-826-4100
Arthur K. Burditt	USDA - ARS Subtropical Hort. Res. Station Miami, FL 33158	FTS 350-5820 305-238-5932
Robert J. Knight, Jr.	USDA - ARS Subtropical Hort. Res. Station Miami, FL 33158	FTS 350-5820 305-283-5932
Paul K. Soderholm	USDA - ARS Subtropical Hort. Res. Station Miami, FL 33158	FTS 350-5820 305-238-5932
*Roy E. Sigfus	Agronomy Dept. University of Kentucky Lexington, KY 40506	606-257-1009
*Richard J. Stadtherr	Horticulture Dept. Louisiana State University Baton Rouge, LA 70803	504-388-2052

3. OFFICIAL WELCOME - L. W. Larson

All S-9 members and visitors were welcomed to the Miami area and Florida by L. W. Larson who wished for a successful, fruitful meeting and pleasant visit.

4. APPROVAL OF MINUTES 1975 MEETING

Chairman M. J. Constantin called for any necessary revisions or additions to the minutes as distributed to all members. H. L. Hyland indicated that the appendices listed on page 12 did not agree with those in the text. Since typing was done at two locations, changes were not detected and coordinated. The corrected appendix is: A - Regional Station Reports; B - Reports by State Agricultural Experiment Stations; C - Reports by Federal Agencies; and D - Requests for Plant Exploration. W. R. Langford moved and C. S. Hoveland seconded that the 1975 minutes be approved. Motion carried unanimously by voice vote.

5. ADDITIONS TO AND APPROVAL OF THE AGENDA

Items 10, 11, and 12 were added to the original proposed agenda. These additions to and the original agenda were approved unanimously.

6. APPOINTMENT OF COMMITTEES

Chairman M. J. Constantin appointed the following committees:

Nominations

R. G. Creech, Chairman
R. A. Hamilton
R. G. Halfacre

Site of Next Meeting

C. S. Hoveland, Chairman
J. S. Kirby
Quentin Jones

Resolutions

J. L. Bowers, Chairman
E. L. Whiteley
G. M. Prine

7. REMARKS FROM ADMINISTRATIVE ADVISORS

C. R. Jackson, S-9 Administrative Advisor, reported that the S-9 project was looked on very favorably by directors of the Southern Experiment Stations. The Program was considered productive and beneficial. No difficulty was anticipated in acceptance of the revised S-9 Project. More funds were appropriated for the Regional Station with $72,000.00 for a seed storage building. Bids were to be opened August 25. These funds must be obligated by September 30. Building was to begin as soon as contracts were let. The new facility will be almost entirely devoted to seed storage which will be of tremendous value to the entire program. Presently the two small rooms devoted to seed storage are bulging at the seams.

C. R. Jackson stated that although regional funding occurs for the Regional Plant Introduction Station the station would still function even if S-9 folded. Local, regional, and federal funds are used to run the station. Local and federal funding occurs for S-9 projects in each state.

Dr. R. V. Connin, station entomologist, was introduced after which he told about work he had done. Other personnel additions include three technicians. Two additional greenhouse sections will be built. Plumbing and electrical needs will be provided by the state. Laboratory space and equipment were provided for the new entomologist. The new seed storage facilities should be ready by Christmas.

Future needs include better seed drying facilities and areas for production of seed of tropical plants. Cooperation with Mexico is in the offing. The bamboo collection in Savannah, Georgia was moved to Byron where the fruit and nut selections are grown.

8. REMARKS FROM Q. JONES - NATIONAL PROGRAM

Maintenence of Germplasm under NRP20160, which will be sent to all S-9 members, was described. A national computer system which will handle all plant materials coming into this country is being tested. The University of Colorado is conducting a thorough feasibility study of the national germplasm system as well as the ARS Program. Needs and an evaluation of what they already have will determine flow and use of materials as well as provide suggestions to implement the program. An evaluation of international systems will be considered so that all systems are compatible and coordinated.

Dr. Jay April, Join Study Group leader, Germplasm Information System, University of Colorado, stated that troubles and their rectification in the present system were discussed in a work program conducted at Geneva, NY. For the curators, handling of the data and communications were investigated. Users with different activities and problems were permitted to give their points of view. After individual discussion of curators' and users' points of view, joint discussions were made. For the crop collections in the U.S., a computer orientated program considering all aspects would be established which would be compatible internationally and be workable, effective and used.

C. R. Jackson asked about examples under investigation and the scope of their communications. Dr. April replied that data on over 95,000 seed accessions at Fort Collins was in the program. Broad requests were made of the data bank but more specific answers could mean a savings in time and money. The data is sent out followed by the materials. Many times, several descriptions exist in catalogs which make locations difficult. For each crop, the important collections, number of scientists working on the crop, and its priorities are considered.

The importance of a simple, easy-to-use international system was stressed.

Quentin Jones reported that the International Board for Genetic Resources publised an annual report and also newsletters which come out periodically. This board was created because of a worldwide erosion of native germplasm and a lack of efforts to rescue it. There is a good budget for this recovery and projects have begun on small grains and peanuts. Copies of the publications could be made available to the S-9 members. Distribution of the newsletters was considered essential and R. G. creech offered to xerox and send them out to members.

Regional centers for germplasm collections are at Ismir, Turkey, Bari, Italy, Southeast Asia, India, Costa Rica and Africa. These centers are functioning now. A Crop Advisory Committee has been set up for: rice, maize, beans, and coconuts. The needs were established and descriptions sent to the Computer Information Center.

9. REMARKS FROM CSRS REPRESNETATIVE - C. O. GROGAN

The CSRS is actively involved in the germplasm program. Much interest has been observed in germplasm preservation and utilization; thus, this is an opportune time to get into the program. The computer system allows the scientists to obtain quickly the characters he needs rather than to screen to find them. Although germplasm needs to be international in scope, sizeable collections not readily available are found in private seed companies. Much time is involved in getting to them and determining their best usage.

CSRS became involved in 1964 in germplasm preservation. In 1966 grants were established for specific plants. Leaf blight of corn in 1970 pointed out the need to look at all genetic resources and the dangers of genetic vulnerability. Grants totaling $6.8 million were made in fiscal year 1976 with $625,000.00 earmarked specifically to genetic vulnerability. For fiscal year 1977, forages, soybeans, pest management and pesticide clearance will be major areas for grant funding.

C. R. Jackson questioned if some other better methods of conserving germplasm which were more easily accomplished than the large collections of plants might be found. C. R. Grogan replied that tissue cultures and other ways are being sought. Cryobiology was too new presently to put funds into it. Q. Jones stated that funds were available for cell culture research for germplasm at Beltsville at the Center of Excellence.

10. REPORT - NATIONAL RESOURCES BOARD - C. T. LEWIS

The National Plant Genetics Resources Board has Robert W. Long,assistant Secretary of Agriculture as its chairman. Drs. Harold D. Loden, David S. Beard and W. L. Brown are industry representatives. Other members include: Dr. Paul J. Fitzgerald - ARS; Dr. Sterling Workman - Rockefeller Foundation; Dr. C. O. Gardner - University of Nebraska; Dr. W. H. Gableman - University of Wisconsin; Dr. C. M. Rick - University of California, Davis; Dr. D. C. Peters - Oklahoma State University; Dr. H. F. Robertson - Western Carolina University and Dr. George Sprague - University of Illinois.

The research program on the general vulnerability of crops is about ready to be printed in its final form. The major points for a crop are: (1) collection and preliminary evaluation, (2) maintaining and distributing it, (3) needed taxonomic classification, (4) various disciplines looking for desirable traits from a pool, (5) inheritance of a character, (6) gene assembly stage and development of breeding, (7) applied breeding, and (8) testing and maintaining of commercial lines. There must be a constant flow system with reserves just back of the cultivars. All germplasm won't be necessarily used by a breeder but its availability should be such that all might use it in their programs.

11. REPORT ON THE CLONAL REPOSITORY - C. R. JACKSON

Dr. Marvin Wilson, Associate Director of Agriculture, New Mexico State University, initiated the program to maintain germplasm of crops which must be propagated vegetatively. The approach was to get the American Society for Horticultural Science, regional stations, various commodity groups, ARS and state institutions throughout the United States interested in their own commodities and measures to conserve them. Dr. Howard Brooks, ARS, worked with the National Germplasm Committee and various commodity groups in developing plans for repositories. The plan is to work in a low key until a formal announcement is made. Twelve sites have been chosen tentatively for clonal repositories. The plan will be presented to ESCOP for its support of budget requests to be made by ARS and CSRS. About $5.5 million will be needed to get the program started. Several ARS stations and state locations have been selected tentatively as repositories. Under present plans CSRS would put in 55% of the funds with 45% from ARS. Suggested sites of repositories include: (1) Geneva, NY for apples and grapes; (2) Davis, CA for stone fruits and nuts; (3) Riverside, CA for citrus and figs; (4) Poma, Oahu for macadamia and tropical fruits; (5) Carbondale, IL for black walnut, chestnut, and hickory; (6) Corvallis, OR for small fruits; (7) Byron, GA for stone fruits and apples; (8) Orlando, FL for citrus; (9) Miami, FL for coffee, cacao, and tropical fruits; (10) Indio, CA for dates; (11) Brownwood, TX for pecans; and (12) Mayaguez, PR for tropical fruits. C. R. Jackson stated that Irish potatoes were covered by the IR-1 Project and the Sturgeon Bay, WI station.

12. NATIONAL SEED STORAGE LABORATORY - D. C. CLARK

Plant breeders developing new lines should place a sample of seed of each new variety in the NSSL at their release. The NSSL needs a full description for each. Stored seed must be increased periodically to avoid deterioration. Additional funding is needed to keep a good viable seed supply for seed increases either by state universities or commercial firms. Certain locations might be requested to produce specific seeds.

R. G. Creech discussed the need for better communications between NSSL and individual curators.

Q. Jones called attention to the second paragraph in D. C. Clark's handout (see Appendix A) and said one or more regional stations or curators should be the source of seeds which are requested. The National Germplasm Committee has outlined the functions and responsibilities of each part of the germplasm system. A workshop on plant Germplasm maintenance including curators and experiment station personnel could solve many problems and answer many questions.

D. C. Clark responded that this would be of great value to NSSL in establishing lines of communications. Q. Jones suggested that four representatives from each region be sent to the workshop.

13. DISCUSSION OF PLANT VARIETY PROTECTION ACT - B. M. LEESE

Handouts included: (1) The Plant Variety Protection Act AMS-557; (2) Rules and Regulations Red. Reg. 39(2), 40(3) and 40(181); (3) United States Plant Protection Act of December 24, 1970, (84 Stat. 1542) (7 U.S.C. 2321 Et. Seq.), 1973; and (4) Application for Plant Variety Protection Certificate Form GR - 470 (1-76). These publications are available from USDA, PVPO, NAL, Beltsville, Maryland 20705.

There are 14 members on the Plant Variety Protection board which includes the ARS, trade, National Plant Breeders Association and the National Seed Storage. These members function mainly in processing applications and necessary legislation. Standards were established by the American Seed Growers Association, National Plant Breeder's Association, American Society of Agronomy, and the American Society for Horticultural Science. Foreign countries are given 60 days to make comments. The system is computer compatible, being simple, versatile and easily changed. Several international groups are members. An individual can protect his own variety or protection can be given by the federal government. Most state experiment stations obtain certification and have the federal government take care of the protection.

A discussion followed in which the following items were mentioned: Fees, applications, maintenance, duration of protection, novelty classification, adding resistance to a variety, challenges, international problems and marketing time. Nationally, marketing can be done a year before making application for protection. Internationally, it is 5 years. Some countries have different requirements so that there are problems internationally in the program. R.E. Sigafus asked if libraries at the state universities could have the descriptions available for use by breeders and other research people. B. M. Leese replied that all literature is cited and documented and on computer cards. They would like to get this information out more widely but a larger staff and budget are needed to do this.

14. STATUS OF THE S-9 PROJECT - W. R. LANGFORD

Dr. Connin reported that he has started research on the melon aphid and the cowpea aphid. He has set up his working laboratory but more work needs to be done to get it in proper shape.

W. R. Langford moved and E. L. Whiteley seconded that the Regional Station budget for fiscal year 1977 be approved. The motion was passed unanimously. (See Regional Station Report in Appendix A.)

15. REPORT OF S-9 PROJECT REVISION - R. S. MATLOCK

R. S. Matlock was unable to attend the meeting but sent his report to W. R. Langford who presented it. Each member was given a copy of the present S-9 project. Dr. Jackson called attention to the requirement that each state or federal agency member fill in the SY's on page 13. These can be obtained from the director of research at each station. Pages 4,5,6 and 7 must be filled out also. The CRIS forms will suffice in filling in the forms. If revisions are made, members should put in the old project number and the new one after it in parentheses. Titles of the state projects should be the same as the regional. Objectives should be filled in to show what each state will do. The completed form should be sent to W. R. Langford.

Discussion on a title change followed with a proposal that it be changed to: S-9 Plant Germplasm - Its Introduction, Maintenance and Evaluation. H. Hyland moved and E. L. Whiteley seconded that the revised title be accepted. Motion passed.

The present committee would work on the final draft. All revisions must be sent to them by September 15.

16. REPORT OF PLANT EXPLORATION REQUEST COMMITTEE - A. G. DAVIS

A. G. Davis distributed a handout (see Appendix B) with a draft of the procedures for requesting plant exploration through Regional Project S-9. The forage expedition to collect hardy Eragrostis species was completed and was very successful. The sugar cane trip was partially completed and the cotton trip is scheduled this fall. All requests need to be reassessed and resubmitted.

Pending trips for the coming year are: (1) Trifolium, (2) Sugar cane, (3) Luecaena and Mimosa, (4) avocado, (5) peanuts, and (6) oil palms and nuts.

Q. Jones stated that the forage trip to the USSR was not undertaken in 1976 but will be in 1977. The cotton trip was approved. Two domestic collection trips for tepary beans and xerophytic gourds were approved. There will be an October 18 meeting of the ARS Plant Germplasm Coordinating Committee to determine future trips. The S-9 Committee must have their requests in by October 1.

A discussion ensued on the pattern for future requests for collection of germplasm. A.G. Davis said the first contact to the committee is informal. Preliminary requests are returned for completion and them resubmitted for action to the committee. Q. Jones stated that 1977 will be a transitional period with requests filled mainly from 1976 requests. A possibility exists that a change for trip requests to a calendar year rather than to a fiscal year, as in the past, may be instituted.

M. J. Constantin suggested the committee receive the final requests at least two months before the annual meeting. A.G. Davis said that some time was needed after committee approval to get the request in its final form. E.L. Whiteley suggested a May 1 deadline. However, since annual meeting dates vary, the format would have to consider foreign travel deadlines by the ARS. (Corrections and additions to the handout have been made on the copy which is in Appendix B.)

17. PROGRESS REPORTS AND RESEARCH PLANS

R. J. Varnell, University of Florida, gave an over-all-view of the newly organized International Peanut program and distributed a copy of the IPP Newsletter. The concept for this organization is to promote international cooperations and awareness of peanut research.

Each member proceeded to present his annual report. (See appendix A)

18. COMMITTEE REPORTS

(a) Nominations
Chairman: R. J. Stadtherr
Secretary: Gordon M. Prine

R. G. Creech moved and E. L. Whiteley seconded the nominations and the above slate was nominated.

(b) Time and place of the next meeting.

C. S. Hoveland, chairman of the committee, moved that the next meeting be held at Oklahoma State University, Stillwater, OK in late July and suggested Louisiana in February, 1978. E. L. Whiteley seconded the motion and it passed unanimously.

(c) Resolution committee composed of J. L. Bowers, chairman, E. L. Whiteley and G. M. Prine drafted the following resolutions:

(1) Be it resolved that the S-9 Technical Committee express their appreciation to the local arrangements committee of Drs. Burditt, Larson, Soderholm, and Knight for making arrangements for the meeting at the Miami Marriott and the tour to the Miami Station.

(2) Be it resolved that members of the S-9 Technical Committee express their appreciation to Dr. B. M. Leese for his discussion of the Plant Protection Act at the request of our S-9 Committee.

(3) Be it resolved that the S-9 Technical Committee members express their appreciation to the management of the Marriott Motel in providing facilities for our meeting.

(4) Be it resolved that the S-9 Technical Committee members express sincere appreciation to Drs. Andrew Duncan and Carl Campbell for the tour of the Homestead Station.

(5) Be it resolved that the S-9 Technical Committee members express their appreciation for the contributions made at our meetings by Howard L. Hyland and that we wish him well on his retirement.

The motion was made by J. L. Bowers and seconded by R. A. Hamilton and passed unanimously.

Meeting was adjourned and a tour of the Subtropical Horticulture Research Unit, Miami, and the IFAS station, Homestead was conducted on August 20.

19. TOUR

A very educational and interesting tour was conducted by Drs. A. K. Burditt, R. J. Knight, and P. K. Soderholm of the Miami Subtropical Horticultural Research Station and Drs. A. A. Duncan, C. W. Campbell, and S. E. Malo of the University of Florida Agricultural Research and Education Center and Homestead, FL.

APPENDIX A

STATE and FEDERAL AGENCY REPORTS

Progress Reports presented at
the meeting are attached
in the following order:

ALABAMA
ARKANSAS
FLORIDA
GEORGIA
KENTUCKY
LOUISIANA
NORTH CAROLINA
OKLAHOMA
PUERTO RICO
SOUTH CAROLINA
TENNESSEE
TEXAS

Germplasm Resources Laboratory

Northern Regional Research Center

National Seed Storage Laboratory

Soil Conservation Service

Regional Station Report

ALA-1

ALABAMA S-9 PLANT INTRODUCTION ACTIVITIES
August 1975-August 1976

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

A total of 34 recorded introductions were received from the Plant Introduction Station by Alabama cooperators this past year. They included 33 winter annual clovers and 1 walnut introduction.

HORTICULTURAL CROPS

Watermelon (J. D. Norton)

P.I. 189225 is the source of resistance to Mycosphaerella citrullina (Gummy Stem Blight). Advanced lines with this resistance are being increased for variety trials and possible release.

Muskmelon (J. D. Norton)

P.I. 140471 is the source of resistance to Mycosphaerella citrullina (Gummy Stem Blight) and Diaphania nitidales (pickle worm). Advanced lines have been developed with resistance to both organisms. Chilton and Gulf Coast varieties were released with resistance to Gummy Stem Blight. The inheritance of resistance to the above organisms was also determined.

AGRONOMIC CROPS

Tall Fescue (R. L. Haaland)

A tall fescue composite was established at Auburn in 1976. The composite consists of open-pollinated progeny from select clones obtained from PI's 231557, 231560, 231561, 231562, 234710, and 297903. The select material from these PI's exhibited excellent winter forage production and acceptable seed yield.

Tall Fescue Grass Tetany Research (R. L. Haaland and C. S. Hoveland)

Selections from open-pollinated seed obtained from two clones obtained from PI 231560 have been used in grass tetany research at Auburn. Several of these selections have forage with a high magnesium content, even under low soil oxygen (as is common in winter). It appears probable that tall fescue cultivars with a high level of magnesium can be developed to reduce the incidence grass tetany in cattle.

Sericea lespedeza (E. D. Donnelly and N. A. Minton

We have screened about 40 sericea lespedeza P.I.'s for resistance to root-knot nematodes. About 13 were found to be segregating for resistance to Meloidogyne acrita. This research is being done to broaden our gene base and to have available germplasm that is resistant to nematodes. Primarily, we are looking for genes conditioning a high level of resistance to Rhizoctonia in low-tannin sericea.

Cool Season Annual Legumes (C. S. Hoveland)

Yuchi arrowleaf clover (Trifolium vesiculosum P.I. 233816) acreage continues to expand. Seed production in central Alabama alone exceeded 300,000 pounds this year. Substantial amounts of uncertified seed of this cultivar was produced in Georgia, east Texas, and Oklahoma. Pastures of this clover in scattered locations were badly damaged by fusarium wilt (Fusarium oxysporum) in late winter and spring. Some fields had stands wiped out. Arrowleaf clover plants are currently being inoculated and screened in the growth chamber for tolerance to this disease. This problem again points out the need for collecting and maintaining large stocks of clover introductions.

Trifolium purpureum P.I. 287174 from Turkey was one of the most productive cool season annual legumes in replicated forage yield trials at 5 locations this past winter. This clover has performed particularly well on Black Belt soil where most other cool season annual legumes do badly. A seed increase of this clover will be planted this fall to supply seed for a grazing trial. Selections were also made from a space plant nursery of this clover for further evaluation.

Other promising cool season annual legumes that have been increased and will be evaluated in replicated yield trials this winter are Medicago tornata 334642, Trifolium dubium 383770, T. mutabile 269053, T. nigrescens 304380, T. hybridum 383779, T. pallidum 201213 and 247868, T. hirtum 348886 and 170821, and Ornithopus sativus 284140.

S-9 TECHNICAL COMMITTEE REPORT

Arkansas Agricultural Experiment Station
Fayetteville, Arkansas 72701

Period of July 1, 1975 to July 1, 1976

J. L. Bowers

Rape: The yield trial on this crop was repeated in 1975-76 on the Southwest Branch Experiment Station, Rohwer, Arkansas and on the Vegetable Substation, Alma, Arkansas. The four most promising plant accessions were tested at each site.

Table 1. Yield performance of four plant accessions, Rohwer, Arkansas, 1976.

Plant Accession #	Yield in grams of seed per plot					Pounds
	Rep. 1	Rep. 2	Rep. 3	Rep. 4	Ave.	per acre
P.I. 305278	1005	362	368	257	503.0	691
P.I. 311731	283	431	392	282	347.0	473
P.I. 251236	330	426	302	278	334.0	460
P.I. 250135	259	248	333	269	277.3	380

Table 2. Yield performance of four plant accessions, Alma, Arkansas, 1976

Plant Accession #	Rep. 1	Rep. 2	Rep. 3	Rep. 4	Ave.	Pounds per acre
305278	155	90	147	246	159.5	218
311731	28	67	179	179	113.2	156
251236	61	30	150	143	96.0	131
250135	62	149	122	423	189.0	261

The variation in yield between plots for any one plant accession was very large in the trials at both locations. A large part of this variation can be attributed to a lack of genetic uniformity in each accession.

Low yields in the trials in the Vegetable Substation were also attributed to a small amount of winter kill and a water-logged condition on several plots. In general the yields were not as good as those observed in previous seasons. Even though a rather mild winter was incurred in the Alma area, we still had cold that damaged the over-wintered crop.

Snap Beans: (Drs. T. E. Morelock and M. J. Goode)

P.I. 165426 and P.I. 203598 appear to have good levels of resistance to Rhizoctonia root rot. These two plant accessions are being crossed with other sources of resistance. Other plant introductions which show promise as possible sources for resistance to Rhizoctonia root rot are: P.I.'s 309743, 307760, 173045, 169787, 172035, 208773, 190076, 307783, 200959, 165933 and 310531.

Chick Pea: As indicated in the 1974-75 report, the early spring planting (April 16) of 1975 was severely affected by an infection with two diseases: a foliage rust

and Thielaviopsis root rot; and these diseases caused a severe reduction in the yield.

A later planting was made in the spring of 1976 and our crop is setting a good crop of pods. We have not observed any plant losses from the root rot organism nor any rust on the foliage. A late August or early September harvest will be made.

Southern Pea: The work is being continued in the screening of the accessions for resistance to Xanthomonas vignicola. We have experienced some difficulty in establishing a good reliable seedling screening procedure.

The F_3 generation of material obtained from Mayaguez, Puerto Rico Station is being grown in the field this summer and we have attempted our second field inoculation in August.

Spinach: The stations breeding lines which have derived their resistance in part from the source P.I. 165560 are continuing to show good levels of white rust resistance and we have also observed some resistance to Fusarium oxysporum spinaceae in this material. Our source of resistance came out of the material obtained from Dr. R. E. Webb. Dr. Webb and his co-workers found resistance in the plant accession P.I. 165560.

Cantaloupes: Our work on the dwarf cantaloupes has been slowed up because of the pressing work on other crop plants. We are still very favorably impressed with the potential of P.I. 321005 for its ability to transmit such useful genes as high level resistance to powdery mildew and good eating qualities.

Germ Plasm Needs: We would like to see a plant exploration on cucumbers in areas where we might expect to find resistance to the fruit rots, both Rhizoctonia and Pythium.

Florida S-9 "New Plants" Report

G. M. Prine

Scientists from many disciplines in Florida continue to receive and evaluate plant introductions from the Southern Regional Plant Introduction Station. This service of the regional station is of inestimable value as it provides breeders, physiologists and other scientists with a continuous flow of selected germplasm.

Dr. L. C. Hannah and co-workers in Vegetable Crops Department at Gainesville have screened some 1200 plant introductions of Cowpea (Vigna unquiculata (L.) Walp.) for methionine content. Among the cowpea lines with elevated levels of methionine is P.I. 353086.

Dr. Emil A. Wolf, Horticulturist at Belle Glade AREC, is using resistance to Cercospora apii Fres. found in P.I. 171499 in his celery breeding program. The P.I. 171499 celery accession has very thin hollow stems and is strong flavored so it is taking a long time to get desirable horticultural types with disease resistance.

Dr. J. M. Crall at Leesburg ARS is using P.I. 255137 in breeding for tolerance to watermelon Mosaic virus. He has several watermelon lines derived from P.I. 255137 but none are close to varietal release and the degree of tolerance to MWV has not been fully determined. Dr. J. A. Mortensen at same station is using a number of Vitis introductions in his grape breeding program. He reports that the following P.I. Nos. of Vitis species have been useful in breeding of scion types:

1. P.I. 360750 'Pirobella' (early ripening, crack resistant)
2. P.I. 354108 'PQ 7' (very early ripening)
3. P.I. 341824 'Bharat Early' from India
4. P.I.M. 18902 Large black grape productive in Cuba and South Florida

The following P.I. Nos. of Vitis have promise in breeding of rootstock types:

P.I. 279898 'Malegue 44-53'

Other P.I. numbers are likely to be useful, such as Argentina numbers P.I. 391446, 391448, and 391449, in breeding for seedlessness and earliness of ripening. As yet they have not come into bloom.

Dr. J. O. Strandberg, Sanford AREC, reports he is close to release of a cucumber breeder line which is resistant to Corynespora cassiicola. Resistance was obtained from P.I. 27741. He is also looking at some disease problems on several P.I. numbered accessions of Psophocarpus tetragonolobus.

Dr. T. J. Sheehan, Ornamental Horticulture Department, reports a promising Sansevieria plant from seed collected in Africa last year. Dr. Tjia in same department is evaluating some Chrysanthemum varieties he obtained from Japan.

While not using P.I. introductions, Dr. D. L. Sutton, Ft. Lauderdale ARC, is using some of the Aquatic macrophytes as a crop for extracting nutrients from sewage effluent. This crop is then used to feed herbivorous white amur fish.

Dr. E. S. Horner, Corn Breeder, Agronomy Department, Gainesville, reports that the following introductions have been used as parents in a new corn population that is highly resistant to southern corn leaf blight:

P.I. 195114	Ethiopia
P.I. 209135	Puerto Rico (from Pennsylvania)
P.I. 226685	Guatemala
P.I. 317326	Guatemala
P.I. 317330	Guatemala

The three from Guatemala constitute about 6% of the population and the other two about 1%, so the five introductions are responsible for 7% of the germplasm in this population, which is the basis for a new breeding program. Introductions received directly from CIMMYT, Pioneer, and others are responsible for another 30% of the population.

Based on two harvests in 1976, Dr. L. S. Dunavin, Jay ARC, ranks Hemarthria introductions in decending order of yield as follows: P.I.'s 349752, 365509, 364891, 349748, 299993, 364863, 349749, and 364344.

Dr. Kelvin McVeigh at Quincy AREC is screening a large number of Trifolium, Lolium (ryegrasses) and rescuegrass plant introductions for their cool season forage producting properties. Similiar screening is being conducted by G. M. Prine, Agronomy Department at Gainesville. Drs. McVeigh and Prine are cooperating in developing by mass selection a reseeding, rust-resistant annual ryegrass which has numerous P.I. accessions in background. The last cycle of selection will be during 1976-77 cool season.

Dr. A. E. Kretschmer, Ft. Pierce ARC, is presently evaluating numerous P.I. accessions in the genera Stylosanthes, Desmodium, Indigofera, Aeschynomene, Calopogonium, Centrosema, Clitoria, Thychosia and Zornia. He reports the probable release of three introductions in the next year or so:

1. Digitaria pentzii (identified also as D. decumbens by South African workers) P.I. 279651. This accession from Taiwan (Taiwan A 24) was introduced at the ARC, Ft. Pierce on July 27, 1962 and can be described as having a growth habit similar to 'Pangola' but having larger stems and leaves. Its production is equal to or better than that for 'Transvala' digitgrass. Its cool season growth is much superior to that of Pangola. Probably 1000 acres have been planted in the area. It is been under grazing for at least three years. It will be named 'Taiwan' digitgrass.

2. Desmodium heterocarpon, P.I. 217910, from India was introduced to the ARC, Ft. Pierce on August 17, 1964. It will be called 'Florida' carpon desmodium (or carpon desmodium). It is a long-lived perennial tropical legume that can withstand heavy grazing. In mixtures with 'Pangola' or bahiagrass annual yields were about 9.5 metric tons/ha, crude protein (of mixtures) averaged about 9.5%, and crude protein yields were about 950 kg/ha. It is a high seed yielding legume and with non-seed shattering characteristics. Unfortunately, it is susceptible to root-knot nematode attack.

3. Stylosanthes hamata, P.I. 348954. Introduced to the ARC, Ft. Pierce in September 1970, this biennial tropical legume is similar in growth to S. humilis but flowering commences much earlier in the fall and seed harvesting is more assured. The Australians recently have named the species Caribbean stylo with the varietal name of 'Verano'.

Dr. John B. Brolmann, also of Ft. Pierce ARC, is breeding Stytosanthes and has a large number of Stylosanthes accessions under observation. He has 42 accessions of native S. hamata's which he has collected.

Dr. D. W. Gorbet, Marianna ARC, is conducting a peanut and sorghum breeding program and has a number of P.I. introductions of each crop. Crosses were made in 1976 with plant introductions P.I. numbers 383424, 383423, and 274190 for leaf spot resistance.

Dr. Ron Barnett, Quincy AREC, is using some P.I. numbered material in his wheat, barley, and oat breeding program. He has made a number of crosses involving P.I. lines mainly for rust resistance for high protein characteristics. Some of his lines which have P.I.'s for parents show promise.

Dr. G. M. Prine, Gainesville, has 12 accessions of perennial peanuts (Arachis sp.) under clipping tests. Release is expected in the next year of GS-1 perennial peanut, believed to be a chance seedling out of P.I. 118457.

Dr. K. H. Quesenberry, Agronomy Department at Gainesville, is evaluating numerous Hemarthria and Paspalum accessions in his grass-breeding program. He has counted chromosome numbers on all intorductions he received before January 1976. If the data continues to look promising, he anticipates the release in next year or so of one or all of the first Hemarthria introductions, P.I. Nos. 299993, 299994, and 299995. The SCS is interested in participating in the release of these grasses.

R. L. Smith and S. C. Schank, Agronomy Department at Gainesville, continue their grass breeding programs on guinea-grasses and digitgrass which involve a large number of introductions. Most of their time however is spent in studying N-fixation by Spirillum lipoferum on a wide variety of grass species.

Smith, Schank and Quesenberry form the plant geneticist portion of a sizeable team working on the Spirillum inoculation of grasses. The following TABLE gives some of their findings on the ability of Spirillum inoculated grasses to fix nitrogen as demonstrated by their ability to reduce acetylene.

Grasses	ACETYLENE REDUCTION nm/(g x hr)		
	No. of Lines	Range	% Lines Above 100
Zea mays	63	0-377	21
Sorghum sp.	51	0-1934	69
Pennisetum americanum	5	0-522	40
Chloris guyana	36	0-180	5
Cenchrus ciliaris	3	0-163	33
Panicum maximum	7	0-115	14
Digitaria sp.	21	0-32	0
Paspalum notatum	3	0-16	0
Hemarthria altissima	15	0-16	0

Dr. C. E. Dean, Agronomy Department at Gainesville is studying the genetic variability in alyceclover (Alysicarpus vaginalis)collected from old stands at a number of locations throughout Florida. If enough variability exists, particularily as to root-knot resistance, he will attempt to develop a superior cultivar.

GEORGIA AGRICULTURAL EXPERIMENT STATIONS

REPORT TO S-9 TECHNICAL COMMITTEE

August 19 - 20, 1976

2466 samples of seeds and plants were distributed to plant scientists during the last year. 630 of them were peanut introductions sent to Dr. R. O. Hammons for seed multiplication only for the National Seed Storage Laboratory. The other material went to a number of scientists for evaluation and use in research programs. Following are comments received from some of these people reporting on the use of material received in recent years.

I. Turner Davis, Department of Horticulture, Georgia Station, Experiment, Georgia. In response to your request, following is a brief resume on some of the woody plant introductions (trees):

(a) (Pinus thunbergii). One tree (P.I. 342930) planted in 1971 and 4 trees (P.I. 317258) planted in 1969. All living but older trees developed a little die-back in terminals in 1976.

(b) (Pistachia chinensis). Ten trees planted 1969. Good growth, over 20' tall, spreading form, two trees with a lot of seed in 1976, and beautiful fall color. An excellent specimen tree and free of disease and insects at this time. Wood is tough.

(c) (Quercus myrsinaefolia). Ten trees planted 1969. Slow growth for about 2 years after planting, then fast growth. Spreading evergreen oak and should be a good specimen tree. A few seed present in 1976.

(d) (Pinus densiflora). One tree (P.I. 319315) and one tree of (P.I. 317254) planted in 1969. Good growth and spreading form but both trees had some die-back on branch tips in 1976. New growth and end of branches reddish in color. Height about 9 feet.

(e) (Quercus chenii). P.I. 102653 or NA 827-S. Five trees planted in 1969. Irregular and very spreading form. Growth in 1975 and 1976 very fast. Takes up a lot of room. May be used to screen large areas. Over 25 feet tall.

(f) (Cryptomeria japonica). NA 13454-C. One tree planted 1971. Has maintained its green color through winter. Height over 12 feet. Note: One tree, NA-29008, planted 1969, has not held green color well during winter but growth is excellent.

(g) (Cunninghamia lanceolata). P.I. 324969. Three trees planted 1969. Cold damage to two very obvious each winter. Some die-back from cold, but sprout back.

(h) (Magnolia virginiana var. Australis). NA-31021. Three trees planted 1969. Foliage sparse, trees about 8 feet tall.

(i) (Acer rubrum var. tridens). NA-31022. One tree planted 1969. Good growth, small leaves, color not too outstanding to date.

(j) (Metasequoia glyptostroboides). P.I. 286608. One tree planted 1969. About 21 feet tall. Branches sweep upward and looks somewhat like Taxodium distichum. Could be used as specimen tree.

(k) (Betula platyphylla var. japonica). P.I. 235128. Five trees planted 1972. Good growth, white bark, height to 21 feet, some fruit on trees in 1976. Grown from seed collected in Washington, D. C. by H. H. Fisher.

(l) (Quercus robur salicifolia). NA-15313-1-S. One tree planted 1970. Over 15 feet tall, lot of mildew on foliage.

(m) (Acer ginnala var. Semenovii). One tree planted 1969. About 6 feet tall, very spreading, small leaves, unhealthy appearance, sparse foliage.

II. Dr. Aubrey Mixon, ARS. Coastal Plain Station, Tifton, Georgia.

Within the past year 292 peanut introductions have been increased by growing out plants in nurseries in Tifton, GA. and in Puerto Rico. Forty-seven of these introductions were saved from prior screening and evaluation for A. flavus resistance. Fifty-four introductions from New Mexico and 131 introductions from Argentina were grown for increase and A. flavus evaluation for the first time. Sixty introductions from the peanut breeding program in Stephenville, Texas, are currently being grown for A. flavus evaluation this fall.

Several crosses have been made with introductions that have shown a high degree of resistance to A. flavus infection. Many selections are continually being made from these crosses in an attempt to breed an improved peanut variety with resistance to A. flavus infection.

III. Dr. Harold Brown, Department of Agronomy, University of Georgia, Athens, Georgia.

This is to report briefly on the work we have done in the past year which involves species obtained from Plant Introduction. I am enclosing a reprint of a publication of our work with Panicum milioides which we have concentrated on for 2 or 3 years. We are now studying species closely related to P. milioides. I recently visited Brazil, Uruguay, and Argentina to collect these plants. Enclosed is a report to Dr. Flatt on the collection trip. I will be happy to share these materials with Plant Introduction.

We have recently obtained from Plant Introduction at Experiment and other locations approximately 60 accessions of grasses to test for reduced photorespiration. We are optimistic about the chances for increased photosynthesis in the future from reductions in photorespiration through genetic or chemical means. In the meantime we are searching for variation among species in characteristics associated with photorespiration. The availability of a wide range of material from Plant Introduction is a great help to us.

This is to report on the trip to South America to collect species in the Laxa group of Panicum as spelled out in the proposal (TR13-009). Panicum milioides, which is intermediate between C_3 and C_4, belongs to this taxonomic group.

I collected a total of 37 specimens, including 6 of the species known to be in the Laxa group, 2 or 3 others which appear similar to Laxa in panicle morphology but which we could not identify and 3 other grass species which I had a hunch would be interesting to study. The following grasses are in the Laxa group which I collected.

1. Panicum milioides - A short (20-50 cm tall) species which is a common component of native lowland pastures in southern Brazil, Uruguay, and northern Argentina. There are many ecotypes which differ in size, form, flowering date, etc. We collected 1 ecotype much larger than I had seen before.

2. Panicum laxum - The habitat and size of this species is similar to P. milioides but tends to occur in wetter, more shaded areas. It is apparently spread over most of Central and South America. It is also a component of most native lowland pastures.

3. Panicum decipiens - This species is apparently much more rare than P. laxum and P. milioides. I saw it only once, for sure, and perhaps twice. It is similar in size to the above mentioned species, but has different panicle characteristics and possesses rhizomes (underground runners) which P. laxum and P. milioides do not.

4. & 5. Panicum hylaeicum and Panicum pilosum - These two species are very similar to P. laxum but has pubescence on the rachis (P. pilosum) in the panicle and the other has pubescence on the spikelet (seed structure). They are not nearly as common as P. laxum. I am not sure I have these yet, but I believe I do. It was not possible to make positive identification there.

6. Panicum rivulare (Panicum grumosum) - There was some disagreement among the scientists I visited whether this is 1 species or 2 distinct species. At any rate it is a large bunch grass (1.5 - 2 M tall) growing in very wet places, stream banks, etc. It has wide leaves (2-3 cm) and is very palatable to cattle. It also has large, vigorous rhizomes.

7. Panicum prionitis - This is also a tall grass (1.5 - 2 M) which grows in low pastures. It is almost completely refused by cattle because of its tough, saw-toothed leaves which are over 1 M long. Its main use if for thatched roofs, for which it serves well.

The above species are ones which have been classified in the Laxa group of Panicum. I obtained 2 others which are apparently in the Laxa group, but which we could not identify. In addition, we collected Panicum minutiflorum which is similar to the Laxa species in some panicle characteristics and habits, but is classified in another group. We also collected Paspalum repens which is a grass that grows floating in water and was found to have a low PEP carboxylase level for a C_4 plant by a fellow in Venezuela.

IV. Dr. Clyde T. Young, Department of Food Science, Georgia Station, Experiment, Georgia.

The tryptophan content and its relationship to total protein were studied in the 37 U. S. commercial varieties or advanced breeding lines of peanuts (A. hypogaea L.) and in 64 plant introductions of the genus Arachis from South America. A highly significant correlation ($r = 0.47$) was found between the tryptophan and the total protein content among all genotypes. Deviations from this correlation, however, indicated that the "high-protein" genotypes did not necessarily contain the highest proportions of tryptophan in the protein. In some cases, protein increments affected by environmental factors resulted in significant decreases of tryptophan-to-protein ratios. Variations of both protein and tryptophan were substantially greater among the wild than among commercial genotypes. Protein varied in the commercial peanuts from 20.2 (Florunner) to 30.4% (improved Spanish 2-B), while tryptophan percent in the protein ranged from 1.05 (Spanette) to 1.40 (Virginia Bunch 46-2). Among the wild genotypes, protein varied from 20.7 (A. sp. P.I. 338297) to 33.5% (A. sp. P.I. 338279), whereas the percent tryptophan in the protein ranged from 0.84 (A. sp. P.I. 289639) to 1.66 (A. villosulicarpa P.I. 336985: an apparently promising genotype). These data also showed that, in relation to the spectrum of wild genotypes analyzed, the majority of the U. S. commercial varieties contain a medium-high level of tryptophan.

Kentucky Annual Report to S-9 (New Crops) Technical Committee
Miami, Florida, August 19-20, 1976
Roy E. Sigafus, Agronomy Department, University of Kentucky

One Kentucky worker obtained more plant accessions through the plant introduction stations than all others together. A screening trial is being conducted on legume seeds for certain enzymes and other compounds. A chief objective is to identify natural plant compounds which can be used in biological control of insects.

The Missouri Botanical Garden has been helpful in supplying information and plant materials from another plant family, the Asclepiadaceae. A few diseased plants of honeyvine milkweed, Ampelamus albidus, were found in Lexington in 1974. Plants showing virus-like symptoms have been found by Beltsville laboratories to contain mycoplasmas. With the help of Entomology and Plant Pathology, efforts are being made to identify the insect vector. If there are no unforseen complications the disease will be tried for use in biological control.

Additional accessions of Festuca gigantia have been obtained to continue efforts to incorporate its desirable characteristics into the widely used tall fescue. First tested in the 1930's, tall fescue is now used on over 20% of the land area of Kentucky.

The Horticulture Department obtained more tomato, cucumber and melon strains to continue their breeding work with these crops. Virus-free budwood has been obtained from Prosser to study further the dwarfing mechanism started earlier with apple varieties from the same station.

Pharmacy college personnel, concerned about a possible shortage of natural steroids, inquired about growing Fenugreek in Kentucky. We were advised by Dr. James A. Duke, that based on his Crop Diversification Matrix, Trigonella was not likely to be suited to Kentucky climate. We found plants slow to establish and two sprayings did not keep insects from severely damaging the young seedlings.

The Southern Forage Breeders Group made plans in 1975 to facilitate forage variety testing of forage legumes. Under this program coordinated by J. D. Miller of VPI, birdsfoot trefoil seed is being distributed through Dr. Langford's office. It is suggested that anyone trying Birdsfoot trefoil in the South read the article, "Management Effects on Persistence and Productivity of Birdsfoot Trefoil", by T. H. Taylor, W. C. Templeton, Jr. and J. W. Wyles, Agronomy Journal 65:646-648, 1973. Management to permit reseeding and establishment of young seedlings has been found necessary in Kentucky for maintenance of long-time stands.

Greenhouse studies at Lexington have not supported the idea that big trefoil is better suited than birdsfoot to low fertility and acid soils. Big trefoil is slower to establish than birdsfoot, but its creeping ability may overcome other disadvantages. It is hoped that some cooperative studies can be made of this species also.

LOUISIANA S-9 REPORT
August 1976

Dr. James F. Fontenot grew 79 pepper and 27 okra accessions for evaluation and use for development of new varieties. The results of his findings will appear in the proceedings.

Ornamentals which were received in 1975 included: (1) National Arboretum-14; (2) Soil Conservation Service - 30; and (3) Subtropical Horticultural Research Unit Miami - 34. There were 13 woody species among those received from the National Arboretum. All accessions received from the Soil Conservation Service were low-growing (2 feet or less) groundcovers. Among the accessions from the Miami Station, 13 had P.I. numbers.

A complete listing of the various accessions obtained in 1971 will appear in the proceedings. Those which showed the greatest potential include: Chamaecyparis obtusa, NA31690; Cryptomeria japonica 'Bandai-Sugi', NA20068-c, and 'Globosa nana', NA18295-c; Cupressocyparis leylandii 'Leighton Green', NA4464-c-c-c; Gardenia spatulifolia, NA31452; and Prunus x icam 'Okame'. The greatest commercial potential is in the two cryptomerias, the cupressocyparis and the Okame flowering cherry.

DIFFERENT PEPPER PLANT INTRODUCTIONS
EVALUATED IN LOUISIANA FOR THE FIRST TIME

POTENTIAL RATING - A, high; B, good; C, fair; D, discard.

NOTE: Rating was done with regards to commercial potential or otherwise stated.

Date: 7/29/76

	PI	Rating
1.	123166 India	B
2.	135873 Pakistan (heterozygous)	D
3.	159233 USA	D
4.	159236 USA	C
5.	159237 USA	A
6.	159252 USA	Commerical - C Ornamental - B
7.	159256 USA	D
8.	163186 India	B
9.	166988 Turkey	D
10.	171559 Turkey	C
11.	173877 India	B
12.	174810 India	D
13.	175622 Turkey	D
14.	176463 Turkey	D
15.	179864 India	D
16.	183297 India	B
17.	194259 Ethiopia	D
18.	194567 Guatemala	B
19.	201244 Mexico	A
20.	224405 Mexico	Commercial - D Ornamental - B
21.	266040 Mexico	D
22.	267730 USA	Commercial - D Ornamental - A
23.	267731 USA	Commercial - D Ornamental - A
24.	273418 Italy	B
25.	273428 USA	B
26.	288950 Hungary	C
27.	297459 Spain	D
28.	297463 Hungary	B
29.	321003 Taiwan	A
30.	322728 India	C
31.	322730 India	Commercial - A Ornamental - A
32.	344279 Turkey	C
33.	344280 Turkey	C
34.	344296 Turkey	D
35.	357423 Yugoslavia	Commercial - A Ornamental - C

	PI		Rating
36.	357435	Yugoslavia	D
37.	357447	Yugoslavia	C
38.	357459	Yugoslavia	B
39.	357461	Yugoslavia	D
40.	357467	Yugoslavia	C
41.	357499	Yugoslavia	D
42.	357500	Yugoslavia	C
43.	357501	Yugoslavia	D
44.	357522	Yugoslavia	B
45.	357578	Yugoslavia	D
46.	368409	Yugoslavia	D
47.	370375	Yugoslavia	D
48.	380521	Yugoslavia	B
49.	152452	Brazil	C
50.	159240	USA	Commercial - D Ornamental - C
51.	159241	USA	Commercial - D Ornamental - C
52.	194879	British Guiana	A
53.	209589	Cuba	D
54.	215737	Peru	Commercial - D Ornamental - B
55.	215738	Peru	Commercial - D Ornamental - B
56.	257046	Colombia	D
57.	257175	Peru	D
58.	260472	Peru	Commercial - D Ornamental - A
59.	260475	Peru	Commercial - C Ornamental - B
60.	260478	Peru	B
61.	260491	Bolivia	Commercial - A Ornamental - B
62.	260504	Peru	Commercial - D Ornamental - C
63.	260518	Peru	Commercial - D Ornamental - B
64.	260520	Peru	Commercial - C Ornamental - C
65.	260558	Peru	Commercial - A Ornamental - B
66.	281338	Ecuador	C
67.	281421	Philippines	D
68.	281428	Surinam	C
69.	210981	USA	Commercial - D Ornamental - B
70.	257070	Colombia	C
71.	368070	Yugoslavia	D
72.	273427	USA	D
73.	281336	Costa Rica	D
74.	281397	Mexico	D
75.	281418	Philippines	D
76.	281419	Philippines	D
77.	355396	Ecuador	D
78.	368068	Yugoslavia	D
79.	368073	Yugoslavia	D

LIST OF OKRA PLANT INTRODUCTIONS EVALUATED IN 1976

LSU, BATON ROUGE, LOUISIANA

EVALUATED - AUGUST 4, 1976

	PI	REMARKS
1.	306379 pl. #1	long, round, green pods - good type
2.	306379 pl. #2	no fruit
3.	306379 pl. #3	long, light green, spiny fruit
4.	311106	light green, angular pods
5.	344073	no fruit
6.	349232	no fruit
7.	356831	light green angular pods - no spines
8.	357989	Louisiana Green Velvet type
9.	357990	no fruit
10.	357991	no fruit
11.	357992	no fruit
12.	357993	no fruit
13.	357994	poor type, blotchy pod color, many spines
14.	357995	no fruit
15.	357996	white angular pods, many spines
16.	357997	no fruit, very dwarf, nice plant, good cover crop
17.	357999	no fruit
18.	370025	mixed, long, white angular pods
19.	370026	Gold Coast type, many spines
20.	370027	Angular green pods, no spines
21.	370028	long, light green angular pods, no spines
22.	370029	red pods, beautiful red main stems, no spines, good ornamental
23.	370030	light green angular pods, spineless
24.	378630	light green, round pods, few spines
25.	379352	very spiny, long light green angular pods
26.	379353	no fruit
27.	379583	nice plant, light green angular pods at tip, medium length

NAME Reporting for the first time.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
Received 3/1/71					
Viburnum dilatatum 'Iroquois'	PI 316678, NA 28867-c	1	0		Insufficient chilling - winter
Viburnum x 'Mohawk'	PI 315889, NA 28181-c	1	1	60" x 36"	here for most Viburnums
Viburnum sieboldii 'Seneca'	PI 316682, NA 28871-c	1	1	36" x 30"	
Received 3/8/71					
Abies bornmuelleriana	NA 30158	1	0		
Abies holophylla	NA 30050	1	0		
Abies koreana	NA 30051	1	0		
Acer distylum	NA 31120	1	0		Dead, 1/76
Alnus hirsuta var. sibirica	NA 31688	1	1		Campus planting - ordinary
Alnus pendula	NA 31689	1	1		" "
Alnus sieboldiana	PI 342923, NA 31687	1	1		" "
Arbutus texana	NA 30030	3	0		
Camellia 'Fragrant Pink'	NA 29184-c	1	0		
Cassia (hybrid)	NA 31741	2	0		
Chamaecyparis obtusa	NA 31690	1	1		Propagated; interesting - Grass
Clematis orientalis	NA 30383-c	1	0		fire damaged, 1/76
Cryptomeria japonica 'Yoshino'	NA 13454-c	1	0		
Cryptomeria japonica 'Bandai-Sugi'	NA 20068-c	1	1		Have small plants - Fire dam. 1/
Cryptomeria japonica 'Globosa Nana'	NA 18295-c	1	1	24" x 18"	prop. doing well, sm. due to fir
Gardenia spatulifolia	NA 31452	2	2	48" x 50"	Blooms well-rounded early '76
Hedera canariensis 'Gloire de Marengo'	NA 30347-c	1	1		prop. easily in lath house in containers
Hedera colchica var. dentata 'Aurea Striata'	NA 30349-c	1	1		in lath house in containers
Hedera helix 'Jubilee'	NA 8103-c	1	0		lost
Hedera colchica	NA 30348	2	1		in lath house in containers
Juniperus ashei	NA 31250	1	0		killed by fire, 1/76
Kirengeshoma palmata	NA 31171	5	0		
Myrceugenia apiculata	NA 32218-c	1	1		held over in gh.-not hardy to fr
Pinus densiflora	NA 31693	1	1	36" x 30"	lower branches - needles
Pinus thunbergii	NA 31694	2	2	52" x 36"	burned by grass fire 1/76
Rhododendron bakeri 'Camp's Red'	NA 7829-c	1	0		" "
Rhododendron 'Bowie'	NA 32966-c	1	0		
Rhododendron indicum balsaminae-florum	NA 11996-c-c	1	1	24" x 15"	drought has weakened it

NAME Reporting for the first time.	P.I. OR N.A. NOS.	NO. PLANTS REC'D.	NO. PLANTS LIVING	AVERAGE HEIGHT & WIDTH	C O M M E N T S
(Received 3/8/71 continued)					
Rhododendron prunifolium 'Hohman'	NA 14086-c	1	0		
Prunus x icam 'Okame'	NA 18355-c	1	1	65" x 24"	when moved to a campus planting
Sycopsis sinensis	NA 13038-c	1	1	96" x 24"	was rptd. dead but growing well
Viburnum setigerum 'Aurantiacum'	NA 29609-c-c	3	1	18" x 6"	barely alive-suspect insuf. col during winter
Received 3/16/71					
Abies kawakamii	PI 324940	2	0		
Abies koreana	PI 317188	3	0		
Abies nephrolepis	PI 317189	1	0		
Cotinus coggygria	PI 323962	2	0		killed by grass fire 1/76
Juniperus chinensis var. sargentii	PI 317238	2	0		" "
Received 8/1/71					
Cupressocyparis leylandii 'Leighton Green'	NA 4464-c-c-c	25	4	150" x 48"	Rest were distributed for wider testing. Well adapted. Excellent tree. Propagates easily and have many coming along exceptional.

North Carolina - New Plant Project

Report of W. T. Fike to S-9 Technical Committee, Miami, Florida, August 18-19, 1976.

Of the 28 campus research personnel who receive P.I. catalogues and information through my office, and others who receive information direct, seven cooperators received a total of 113 lines consisting of 19 species of 14 plant genera. These are just a very 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.

A. Plant Introductions of Special Interest

1. An extreme dwarf cucumber was found in the USDA Plant Introduction collection (P.I. 308916) in 1970. C. S. Kauffman and R. L. Lower named this distinctive plant type "compact". Dwarf cucumber plants may be useful for mechanical harvest. A copy of their reprint is attached. This P.I. is being used in the breeding program.

2. Seed of Hibiscus cannabinus 'Training No. 1' (P.I. 365441) is also being increased for a 1000-acre planting in 1977. The bast fiber from this crop is used in the production of fine paper pulp.

3. Seed of Crotalaria juncea (P.I. 248491) is being increased for a 100-acre planting in 1977. The bast fiber from this crop is also used in the production of fine paper pulp.

4. Dr. Dave Timothy is still very interested in Pennisetum orientale and P. flaccidum (P.I.'s 271596 and 220606, respectively). These are being established in large replicated plots for grazing trials.

B. Evaluation of Potential New Crops

1. The fiber crops kenaf and sunn hemp are being evaluated for their yields of bast fiber to be used in making a quality paper product. Varieties, populations and row width, nitrogen levels and harvesting dates are being screened at three locations. Yields in 1975 averaged 6.5 tons of dry matter per acre. Harvesting techniques are being evaluated this year on a four acre planting of kenaf at the Plymouth station. The fiber will hopefully be cut and crimped with a mower-conditioner and then baled for the decortication process.

2. Fourteen sunflower varieties, both oilseed and birdfood types, are being grown in cooperation with the Regional Variety Testing Program. In the 1975 tests the three birdfood types averaged 2087 pounds per acre while the top three oil types averaged 1983 pounds per acre.

3. Other crops being evaluated for various purposes are Deer Tongue and Catnip. These and many other potential crops are presently collected from the wild but a scarcity of pickers, coupled with increased demand make the cultivation of these crops possible on a limited acreage.

C. Requests for Foreign Explorations

1. Dr. D. C. Zeiger continues to be interested in any Rosaceae genera for possible use as rootstocks.

2. Dr. D. H. Timothy is interested in receiving additional collections of Pennisetum flaccidum. It is found at 1600 to 4300 m. elevation from western Nepal, Tibet, and China through the Kashmir to Afghanistan.

   He would also be extremely interested in receiving Tripsacum collections from Ecuador, and the Guiana Highlands. Also, he would like Tripsacum from Venezuela - south of the mountains and the Llanos.

D. Germplasm Maintenance

1. Dr. D. H. Timothy maintains, as clones, 234 accessions of South American Tripsacum species. Most of these were obtained by him from 1966-68. All came through Plant Introductions. However, P.I. numbers were listed in groups so his records and accession numbers must be matched through the appropriate plant inventories.

National Sunflower Performance Trial
Salisbury, North Carolina - 1975

W. T. Fike

Soil Type : Lloyd clay loam Previous Crop: Corn
Fertilization: 600# 10-10-10 AP; 50# N sidedressed
Date Planted : May 28, 1975 - Rainfall 12.12" June 3.46; July 6.71; August 1.95
Plot Size : Four 38-inch rows 25 feet long, replicated five times
Population : Seed planted two per hill 9" apart - Very poor germination however, could not even thin to one plant every 9 inches
Harvest Date : September 16, 1975 - Three replications only

	Seed Source	Variety	Total Yield #/acre	Head Diameter inches	Bird Damage %	Stand %	Flowering 50%	Plant Height feet
1.	A	Peredovik	1539	4.7	7	90	8/3	6.8
2.	A	Sputnik 71	1590	4.7	7	92	8/3	6.5
3.	A	Hybrid 201	1591	5.7	18	91	8/3	5.7
4.	A	Hybrid 204	1533	4.8	10	71	8/2	5.9
5.	B	Sun-Gro Hybrid 372	1343	6.2	13	57	8/2	5.4
6.	B	Sun-Gro Hybrid 380	1482	5.7	22	85	8/2	6.2
7.	C	Hybrid 8941	1949	6.3	12	86	7/26	6.3
8.	C	Hybrid 8944	1865	5.5	9	84	7/22	5.8
9.	D	Hybrid 212	2134	6.3	5	81	7/28	6.9
10.	D	Hybrid Rumson HS52	1654	6.0	0	68	8/3	6.3
11.	E	Sun Hi Hybrid 301	1663	6.0	13	86	8/3	5.9
12.	E	Sun Hi Hybrid 304	1705	5.8	3	64	7/31	5.7
13.	F	Arrowhead	2048	4.8	0	93	7/24	6.5
14.	F	Mingrin	2183	5.8	0	79	7/30	6.4
15.	F	Sundak	2030	5.3	0	77	8/3	6.2

LSD .05% 406# CV 13.7%

Seed Source
A. Cargill, Inc. - Glyndon, Minnesota
B. Grower Seed Association - Lubbock, Texas
C. Interstate Seed Company - Fargo, North Dakota
D. Northrup King and Company - Woodland, California
E. Pacific Oilseed - Woodland, California
F. Red River Commodities - Fargo, North Dakota

Reprinted from Vol. 101(2), March 1976
Journal of the American Society for Horticultural Science
Mount Vernon, Virginia 22121, USA

J. Amer. Soc. Hort. Sci. 101(2):150–151. 1976.

Inheritance of an Extreme Dwarf Plant Type in the Cucumber[1]

C. S. Kauffman and R. L. Lower[2]
Department of Horticulture, North Carolina State University, Raleigh, NC 27607

Additional index words. Cucumis sativus

Abstract. **An extreme dwarf plant type in cucumber (*Cucumis sativus* L.) is controlled by the homozygous recessive state of a simply inherited gene, designated *cp* for compact. The dominant allele yields the standard vine type plant. The gene is inherited independently from the gene for determinate dwarf habit, *de*. The mode of action of the recessive allele, *cp*, is to reduce the length of the individual internodes, but it apparently has little effect on the total number of internodes. Seed size of fruits from compact plants is also reduced.**

An extreme dwarf cucumber was found in the USDA Plant Introduction collection (PI 308916)[3] in 1970. We named this distinctive plant type "compact." It has easily recognizable phenotypic characters including very short internodes, a brachytic type stem, poorly developed tendrils and small flowers (Fig. 1). Seed from compact plants are approximately 1/3 the size and weight of more common cucumber cultivars.

Dwarf cucumbers are of interest to horticulturists and agricultural engineers since dwarf plants may be useful for mechanical harvest (1). Although short internode cucumbers have been mentioned in the literature (5), there have been no reports of their mode of inheritance. Inheritance of the determinate character in cucumbers has been examined by various researchers (1, 2, 3, 4).

The compact habit was studied by observing the progeny of its crosses with standard vine types and determinate dwarfs and by comparing the number of internodes of standard vine plants with the internode number of compact plants of the same age.

Materials and Methods

The term "standard vine type" refers to the commonly grown cucumber that has an indeterminate habit of growth. "Determinate dwarf" refers to a distinct plant that has slightly shorter internodes than do standard vine types and whose end point of growth is marked by a terminal cluster of flowers.

The mode of inheritance of the compact character was examined by making crosses with standard vine types and determinate dwarfs that were previously selfed and screened for homozygosity.

Compact PI 308916 was used as the staminate parent in crosses with determinate breeding line PG-57 and indeterminate 'Chipper', 'Gynoecious 3', 'Poinsett', and 'Tablegreen 65'. Appropriate F_1 hybrids were selfed, and backcrossed as pollen parents, to both parents of each cross, respectively.

All seed were sown directly in the field at Raleigh or Clinton, North Carolina during May and data were recorded in July for the crosses involving 'Poinsett' and 'PG-57'. The 'Chipper' and 'Tablegreen 65' crosses were seeded in August and data recorded in Oct. The 'Gynoecious 3' crosses were observed during the winter months following a greenhouse seeding in January and data collection in March. All field plantings were replicated 4 times in a randomized complete block design. The greenhouse design was completely random with 4 replications. Segregates were counted and ratios tested for fit to standard genetic ratios by the chi-square goodness-of-fit tests.

Results and Discussion

Crosses to standard vine types. PI 308916 was used as a pollen parent in crosses to the standard vine 'Chipper', 'Gynoecious 3', 'Poinsett', and 'Tablegreen 65'. In all cases, the F_1 progeny were phenotypically similar to the standard vine parent. Progeny from a backcross to standard vine types did not segregate and were of the same phenotype as the F_1. The backcrosses to PI 308916 segregated into the 2 parental categories within the acceptable limits for a 1:1 ratio (Table 1). The F_2 generations also segregated for parental types only. The segregates fell within the acceptable limits for a ratio of 3 standard vine type: 1 compact dwarfs. Both phenotypes were easily identified. Selfed compact dwarfs from the F_2 generation produced only compact dwarfs in the F_3.

The observations indicated that compact plant type was controlled by a simply inherited recessive gene hereafter designated *cp* for compact. The standard vine type had a genotype of *Cp Cp*, and the compact dwarf had a genotype of *cp cp*.

Crosses to a determinate dwarf plant type. All F_1 plants from the determinate dwarf by compact cross were of neither parental type, but were the standard vine type and at age 8 weeks showed no signs of cessation of growth.

Classification of determinate segregates in the backcross and F_2 generations was difficult because of the lack of homogeneity for internode numbers expressed at the time of termination of growth. Determinate types were identified by tying a string to the end point at age 6 weeks. Those which failed to lengthen further after 2 more weeks were classified as determinate. Determinate plants were selfed and resulting progeny were all determinate.

The F_2 progeny behaved as expected on the basis of 2 independently segregating genes for plant type. It segregated 4 categories: standard, compact, dwarf determinate and a new

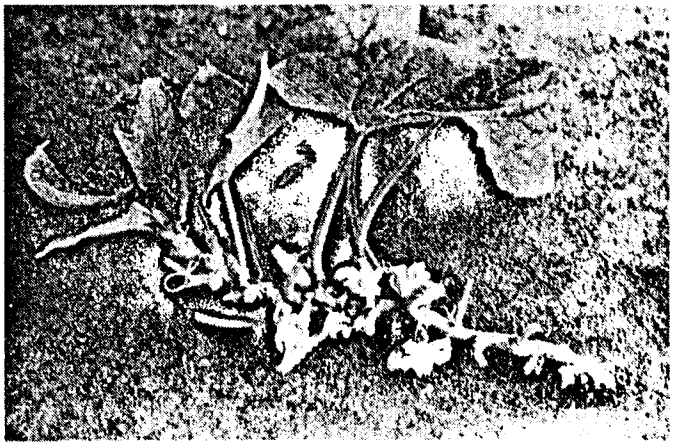

Fig. 1. *Compact*, a new cucumber plant type.

[1]Received for publication September 2, 1974. Paper No. 4346 of the Journal Series of the North Carolina Agricultural Experiment Station, Raleigh.

[2]Former graduate assistant and Professor, respectively, Department of Horticultural Science.

[3]Seed was obtained from the Regional Plant Introduction Station in Ames, IA. Origin was the All Union Institute of Plant Industry, Leningrad, USSR.

Table 1. Distribution and chi-square analyses of backcross and F_2 progenies of crosses between standard vine and compact plant types.

Generation cross	Total plants	No. of plants		Ratio tested	P
		Standard	Compact		
Chipper (P_1)	20	20	–		
PI 308916 (P_2)	20	–	20		
F_1 ($P_1 \times P_2$)	20	20	–		
F_2	78	57	21	3:1	.75–.50
BC to P_1	53	53	0	1:0	
BC to P_2	31	14	17	1:1	.75–.50
Gynoecious 3 (P_3)	20	20	–		
F_1 ($P_3 \times P_2$)	20	20	–		
F_2	234	177	57	3:1	.90–.75
BC to P_1	55	55	0	1:0	
BC to P_2	99	43	56	1:1	.25–.10
Poinsett (P_4)	20	20	–		
F_1 ($P_4 \times P_2$)	20	20	–		
F_2	171	127	44	3:1	.90–.75
Tablegreen 65 (P_5)	20	20	–		
F_1 ($P_5 \times P_2$)	20	20	–		
F_2	32	22	10	3:1	.50–.25

dwarf which was both determinate and compact. The observed segregation fitted a 9:3:3:1 ratio (Table 2). The compact determinate segregates were extremely short, usually 12 cm or less in length at age 8 weeks, and quite weak (Fig. 2).

The backcross of F_1 to compact segregated standard vines and compact dwarfs in a 1:1 ratio. The backcross to dwarf determinate segregated standard vines and dwarf determinate plants in a 1:1 ratio (Table 2). Identification of the phenotypes was aided by the string test.

Another F_2 population was planted the following year in order to gain additional information on the behavior of the compact determinate plant type. Sixty-eight compact plants were found in the 273 plant population and 17 of these were determinate as identified in the field by low internode number and the string test. Test crosses of some of the double recessives to the determinate parent yielded only determinate types.

Classification of the segregates indicates that the simply inherited genes which control compact and determinate habits are independently inherited. Our observations support the hypothesis that determinate habit is controlled by the recessive allele of the simply inherited gene *De* (4). The proposed genotypes of the parents and the 4 phenotypes are: *Cp– De–*, standard; *Cp– de de*, determinate; *cp cp De–*, compact; and *cp cp de de*, compact determinate.

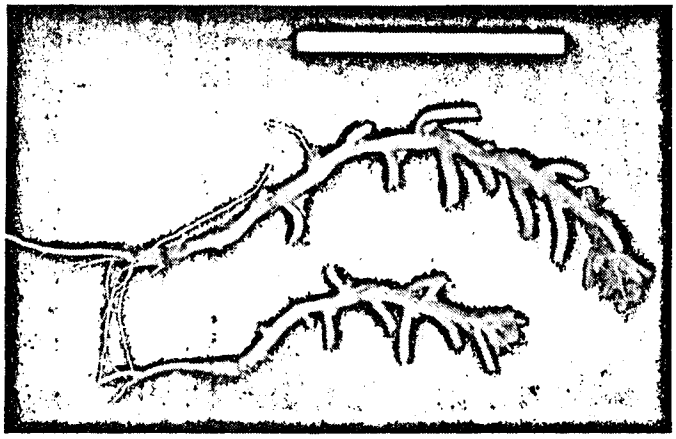

Fig. 2. Compact indeterminate plant type (top) and compact determinate plant type (bottom) with leaves removed at end of flowering stage.

Table 2. Distribution and chi-square analysis of backcross and F_2 progenies of crosses between determinate and compact plant types.

Generation cross	Total plants	No. of plants				Ratio tested	P
		Standard	Compact	Determinate	Compact determinate		
PG-57 (P_1)	20	–	–	20	–		
PI 308916 (P_2)	20	–	20	–	–		
F_1	20	20	–	–	–		
F_2	124	67	22	28	7	9:3:3:1	.75–.50
BC to P_1	124	58	–	66	–	1:1	.50–.25
BC to P_2	47	23	24	–	–	1:1	.90–.75

Comparison of internode numbers of standard and compact plants. Fifteen F_1 plants (standard) from a cross of PG-57 x PI 308916 had an average of 12.3 internodes at age 8 weeks. Sixteen compact plants had an average of 13.3 internodes. An analysis of variance for 2 groups of unequal sizes indicated the the plant types did not differ in internode number (6). The presence of the homozygous recessive (*cp cp*) acted only to reduce the length of the individual internodes and not the number of internodes.

Behavior of compact in a breeding program. After 5 backcrosses to standard commercial types it is apparent that many of the desirable horticultural characters lacking in PI 308916 can be incorporated with the compact plant type. Small seed size is an exception and is still associated with compact after several generations of breeding. Although the seed are much smaller, the emergence rates of many compact lines are similar to those of commercial cultivars unless placed under stress conditions. Compact lines have been developed that grow and flower at rates similar to those of standard cultivars. Although PI 308916 was a strongly staminate type when first obtained it has been relatively easy to incorporate the gynoecious character. Fruit quality of PI 308916 was lacking as fruit were somewhat smaller, lighter in color, and had relatively larger seed cavities than acceptable commercial cultivars. Additional fruit size and color have been added to new compact lines, however seed cavities remain proportionately large. Field resistance to downy and powdery mildew and anthracnose has also been incorporated. Late generation breeding lines appear to possess potential for once-over harvest and also as parental material for standard vine gynoecious hybrids.

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PULSE CROPS

Mungbeans (Vigna radiata)

Preliminary and replicated variety tests were continued during 1975.

Field Peas (Pisum arvense)

Seed of varieties and accessions with winter forage possibilities have been accumulated but not yet planted.

MUCILAGE CROPS

The guar tests cooperative with USDA, ARS and the Oklahoma Agricultural Experiment Station, Department of Agronomy are being conducted near Mangum and Tipton in 1976.

SORGHUM

Dr. Dale Weibel reported receiving and planting 16 accessions of pearl millets (Pennisetum typhoides) for evaluating during 1976.

PEANUTS

Dr. James Kirby is increasing 500 peanut accessions for supplying fresh seed to NSSC and Southern Regional Plant Introduction Station.

Dr. Don Banks observed accessions with high populations of early leafspot and reports: The following accessions of cultivated peanuts showed high resistance to defoliation (ability to retain leaves even when infected with the organism).

P.I. 280688
P.I. 393516
P.I. 393526
P.I. 393527
P.I. 393529
P.I. 393532

(The first accession, from Mexico, had shown some resistance to tobacco thrips in earlier tests in Oklahoma. The last five accessions were collections made by Leland Tripp during his trip to Peru in 1974.)

The following accessions of wild species of Arachis showed little or no apparent spotting:

262141 (A. cardenasii)
276235 (A. chacoense)
276233 (section Rhizomatose)
338280 (section Axonomorphae)

VEGETABLES

LeVern Lorenz - Isabella

These evaluations were made under conditions of the Southern Great Plains.

Onions - P.I.'s 321385 good; 275164 most light resistance of those tried; 321385 best of the yellow globe onions; 288079 best of all the white onions; 379073 best of all the flat onions.

Leaf Lettuce - P.I.'s 28016 good; 289037 good; 271476 tinted red; 278103 good leaves, and 20877 Cos good.

Corn - P.I. 311229 only flint type that made under Southern Great Plains conditions.

Needs include a sweet corn that will stand more stress and has cornear worm resistance. Need tomatoes that will set at high temperature and possess fruit color more resistant to heat. Need onions that mature early, when seeded in field, has high keeping quality and sweet taste.

ORNAMENTALS

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

Carl E. Whitcomb

Objective(s):

To obtain new woody plants for evaluation under Oklahoma Conditions.

Methods:

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

Results:

The following plants have been in the O.S.U. Arboretum for 2 or more growing seasons and especially show promise.

Alnus glutinosa, Black Alder.

Test plants were grown from seed from a young tree at Will Rogers Park in Oklahoma City. Young plants are vigorous growers with good form and branch development. The form of the young tree is reminiscent of pin oak or sweet gum in that the form is basically a triangle with well spaced branches vertically and around the stem. When in containers, the seedlings lose water rapidly and require more frequent watering than other plants of similar size. However, once established in the landscape, Black Alder appears to be moderately drought tolerant and grows very well. Black Alder is native to wet swampy areas in Europe and has naturalized in some areas of the northeastern United States. It appears to be a very rapid growing tree but with moderately durable wood and may have potential for various sites, at least in the eastern one-half of the State of Oklahoma.

Betula platyphylla, variety 'Japonica', Japanese White Birch. (NA 33520).

The specimen in the arboretum was obtained from the National Arboretum which in turn came from seed collected in Japan. In recent visits with people in Washington, D.C., it is reported that Japanese white birch is much less susceptible to the Bronze Birch borer than are the commonly grown white bark birch species in this country. These test plants are 3 years old, are growing very well in the arboretum and appear to be well established. These have shown considerable drought resistance and apparently are well adapted to Oklahoma. A white bark birch with at least moderate resistance to the Bronze Birch borer would appear to have a definite place in Oklahoma landscapes.

Elaeagnus macrophylla 'Nana', Dwarf Silver Thorn.

Plants were obtained from Dave Stabler, Sr., Winterhaven Nurseries, Winterhaven, Florida. This cultivar was selected from a group of cuttings from stock thought to be Elaeagnus pungens. However, its appearance and characteristics much more closely resemble those of Elaeagnus macrophylla. This cultivar remains smaller and much more compact than most other Elaeagnus macrophylla or Elaeagnus pungens cultivars and has much less tendency to develop strong water sprouts or suckers from the base of the crown of the plants. Plants are growing very well in the arboretum in Stillwater and appear to have a great deal of merit to the nursery trade for a broadleaf evergreen hedge or shrub particularly where growing conditions and soils are less than ideal. As these specimen increase in size, it is hoped that liners can be made available to various nurserymen in the state who would like to try to grow this plant.

Pinus brutia (NA 33064).

This pine was obtained from the National Arboretum from seed collected near Kabul, Afghanistan. It is thought to be hardy in Zone 7 and has survived two winters in Stillwater without any indication of cold sensitivity. The tree branches more profusely and has a more loose open texture than most of the commonly grown pines in Oklahoma. It appears to be at least moderately drought tolerant and adaptable to Oklahoma conditions. In two seasons, no pine tip moth has been detected on either specimen.

Punica granatum 'Nana', Dwarf Pomegranate.

In the spring of 1973, ten dwarf pomegranates were obtained from Olle Olsson Nursery in California. These were grown in containers for 1 year before being planted in the landscape. This dwarf pomegranate has functioned very well under Oklahoma conditions and is a prolific flower producer during the summer and early fall and has produced numerous sizable and attractive fruits in Stillwater. Like the large parent pomegranate, it appears to be quite tolerant to drought, heat and alkaline soils, prerequisites for use of plants in some areas in Oklahoma. Although this is not a new plant for Oklahoma, it is a relatively new cultivar and one that appears to function very well in our state and should probably be used more for showy flowers in the summertime. These 2 year old plants are about 3 ft. tall and are thick and bushy with no pruning.

Pyracantha hybrid 'Mohave', (NA 32225).

This cultivar was developed by the National Arboretum from a cross from Pyracantha koidzumi and Pyracantha coccinea, cultivar 'Wyatti'.

Under Oklahoma conditions, as in other tests throughout the United States, it has been a heavy fruit producer creating an attractive show in the landscape. It is hardy in Zone 6 and functions very well as far as north as Wichita. The fruits are a brilliant red-orange and although not as red as some of the more southern cultivars of pyracantha, it is certainly more nearly red than the orange of the cultivars normally seen in Oklahoma. 'Mohave' is currently available in the nursery trade and appears to have considerable merit for landscape use in Oklahoma.

NEW CROPS RESEARCH IN PUERTO RICO

Annual Report July 1975 - June 1976

Oscar D. Ramírez
Plant Breeding Department
Agricultural Experiment Station
College of Agriculture
University of Puerto Rico
Río Piedras, Puerto Rico 00928

During the period covered by this report 176 accessions were received. These were grouped as grasses, 100; legumes, 48; root crops, 3; fruits, 2; starchy crops, 21; ornamentals, 1; and miscellaneous, 1.

Forages: Table 1, presents preliminary results on the performance of 27 non-hardy varieties of alfalfa (Medicago sativa). Some of them seem very promising and will be planted in a replicated trial for additional evaluation. Also, there are 11 forage legumes and 100 forage grasses under evaluation. These comprise the genera Centrosema, Desmodium, Stylosanthes, Pennisetum, Cynodon, Hemarthria, Lolium, Dactylis, Festuca, Phalaris.

Performance of various grasses introduced to Puerto Rico through this program is presented in tables 2, 3 and 4 and publication "Effect of three harvest intervals on yield and composition of nineteen forage grasses in the humid mountain region of Puerto Rico,, A. Sotomayor-Ríos, J. Vélez-Santiago, S. Torres-Silva and S. Silva. J. Agr. Univ. P.R. 60(3):294-309, 1976."

Fruits: Work on table grapes continued. Varieties Exotic and Ribier seem to be the most promising after 6 years of evaluation.

The variety collection of avocados (Persea americana) is being maintained and properly managed. It provides excellent material for propagation. Two new plantings were established, one comprises 32 of the best varieties in the collection and the other, 12 of the most promising selections.

ABOUT PUERTO RICO

Puerto Rico, easternmost island of the Greater Antilles, was inhabited by Taino Indians of the Arawak culture when Columbus discovered it Nov. 19, 1493. Ponce de León established the first colony, Caparra, in 1508. San Juan, the capital, was founded in 1521 and in its first 117 years was attacked by Carib Indians, English and Dutch fleets and again by the English in 1797.

Soon after its colonization in 1508 the gold that had attracted the Spaniards began to fail and settlers turned to growing sugar cane and also coffee which became highly prized in Europe. These main crops were the basis of the economy until the present century when coffee culture dwindled. After World War II an intensive industrialization program was undertaken and is still continuing.

After the Spanish-American War in 1898 Spain ceded the island to the United States and in 1917 Puerto Ricans became U. S. citizens. Their Governors were Presidential appointees until in 1948 they elected their own Governor for the first time. July 25, 1952, Puerto Rico became a commonwealth voluntarily associated with the United States through a compact approved by Puerto Ricans at the polls and by the U.S. Congress.

Puerto Rico, lying between the Atlantic Ocean and the Caribbean Sea, is 100 miles [illegible] Venezuela. Bordered by a coastal plain, the interior is mountainous, its highest point being Cerro de Punta which rises 4,348 feet above sea level.

The climate is tropical marine. The surrounding ocean modifies surface temperature to a seasonal variation of about six degrees from the coldest months (Jan., Feb.) to the warmest (Aug., Sept.) for an island-wide average of 77 degrees. The mean maximum temperature for San Juan is 85 degrees and the mean minimum 70.9 degrees.

Average annual rainfall in the north coastal sections is about 60 inches compared to about 85 inches in higher interior regions. In the Luquillo Mountains rain forest—El Yunque—annual rainfall averages 180 inches though a few miles away on the south coast it averages about 40.

As Puerto Rico is part of the United States, U.S. money, mail and measures are used except that highways are marked in kilometers on little white posts along the roadside. Spanish is the official language but English is widely spoken. The population of the island is about 2.7 millions, 775 persons per square mile. The death rate is 6.5 per 1,000 population as compared with 9.4 per 1,000 in continental United States. Life expectancy is 70.2 years as compared with 70.5 years in continental U.S.

The sapodilla (Manilkara zapota) collection has been properly managed. Preliminary information is being taken of the few individual trees already producing.

Normal management operations were carried on the citrus collection. Records are kept on fruit production per tree. This collection provides excellent material for propagation, especially those trees certified free of virus.

Coffee: Trees from Pacas variety, introduced from El Salvador, were planted in the field and kept under intensive culture for further evaluation.

All valuable material from the coffee variety collection is maintained as stock for future work.

Ornamentals: An ornamental grass, Phalaris arundinacea var. Picta was received from Experiment, Georgia. It is being increased, for further evaluation. Another introduction, Hoya australis (190391) flowered this year. It has a showy inflorescence.

Four varieties of Crape myrtle (Lagerstroemia indica) received from the National Arboretum in Washington, D. C., flowered.

Variety	P.I.	Color of bloom
Catawba	NA 28861	Dark purple
Conestoga	NA 28862	Medium to pale lavander
Potomac	NA 28863	Medium pink
Powhatan	NA 28864	Medium purple

Seed is being harvested for further propagation.

Segregation as to the color of the blooms was observed in the bougainvillea seedlings.

The following introductions died. It seems they did not adapt to our conditions.

Cultivar	P.I.
Cotoneaster microphylla	362106
Cotoneaster lucida	384451
Cotoneaster sp.	358790
Ligustrum vulgare	377831
Ligustrum vulgare	377833
Ligustrum vulgare	377834
Ligustrum vulgare	377835
Ligustrum vulgare	377837
Peristrophe speciosa	384452
Photinia sp.	325010
Sambucus nigra "Purpureus"	304737
Viburnum dilatatum "Catskill"	316677

Miscellaneous: A new crop, reported as very promising for arid lands, was introduced. It is known as Jojoba (Simmondsia chinensis) P.I. 246807. The seed of this plant produces a liquid wax that may be a source for a whale-oil substitute. With the seed received, seedbeds were prepared.

Table 1. Dry forage yields (lb/A) of 28 varieties of alfalfa (Medicago sativa) for one year period, May 20, 1975 to June 11, 1976.

Varieties	Number of harvest and date										Total lb/A
	1 8/19	2 9/30	3 11/6	4 12/10	5 1/13	6 2/12	7 3/11	8 4/6	9 5/4	10 6/4	
	lb/A	lb/A	lb/A	lb/A	lb/A	lb/A	lb/A	lb/A	lb/A	lb/A	
UC-76-C	683	878	1,449	1,621	3,243	2,313	2,531	2,872	3,218	1,888	20,696
Caliverde 65	829	1,170	1,726	1,429	2,202	2,860	2,609	2,153	2,975	1,071	19,024
UC-Salton	902	854	1,409	1,625	2,033	2,091	1,805	1,433	1,912	1,181	15,325
Sonora 70	951	878	1,584	1,666	1,912	2,131	1,563	1,203	1,665	1,170	15,323
Florida 66 (AN-2)	854	878	1,505	1,513	2,033	1,796	1,527	1,227	1,967	1,150	14,450
El Unico	951	925	1,719	1,404	2,251	1,725	1,745	1,403	1,453	713	14,291
AZ-Ron	603	366	771	894	1,137	1,566	1,820	2,132	2,307	1,482	13,258
NC-W-18	2,146	1,024	1,174	1,353	1,065	1,385	1,312	1,378	1,022	849	13,208
Florida 66	652	805	899	960	1,718	1,476	2,643	1,246	1,714	1,039	13,159
Hayden	700	902	1,463	1,172	1,670	1,643	1,532	1,087	1,353	895	12,497
AZ-Mesa Sirsa	488	854	1,284	1,027	1,694	1,782	1,258	1,408	1,013	832	11,650
Mesilla	926	707	1,083	1,304	1,041	1,670	1,464	1,659	688	1,025	11,566
AZ-Meson	634	927	1,396	1,104	1,525	1,543	1,200	1,227	1,183	780	11,525
NC-W-20	732	683	891	1,035	944	1,103	1,931	1,960	741	1,259	11,279
NC-CR-2	1,439	829	1,126	1,217	968	1,257	1,009	1,440	684	680	10,649
El Unico (Comp.)	1,146	1,293	1,116	992	1,331	1,122	949	1,009	1,039	520	10,517
Lew (AZ-SWR)	341	487	810	894	1,210	1,533	1,271	1,759	1,400	773	10,491
Mesa Sirsa	488	756	1,035	864	1,162	1,354	1,164	1,009	1,184	820	9,836
AZ-Hayden I	707	585	1,009	800	1,210	1,178	970	1,109	1,210	844	9,622
Tanhuato	--	--	601	864	1,113	1,555	1,123	1,360	2,161	1,580	8,902
Apalachee (Phyto 2)	237	537	682	960	1,113	1,144	1,559	1,302	619	415	8,568
ZIA	707	512	487	662	678	1,135	1,830	1,307	537	641	8,546
ARC	224	219	130	1,040	1,162	1,412	1,363	1,229	1,008	--	7,914
NC-MP	488	439	565	503	605	1,024	1,283	1,336	657	652	7,551
Hayden (Comp.)	829	585	803	756	1,016	898	494	818	823	447	7,469
Apalachee	415	463	576	698	605	860	1,111	1,060	512	408	6,708
Apalachee (AN-2)	366	341	465	691	702	849	1,019	1,035	610	578	6,656

Table 2. Effect of harvest frequency on the forage yields and dry matter content of 7 Pennisetum cultivars

Species	U.S.D.A. P.I. No.	Green forage yield/Ha	Dry matter	Dry forage yield/Ha
		Kg	%	Kg
			30 Days	
Pennisetum purpureum	300086	162,041 a[1/]	14.32 ab	21,680 a
" purpureum	255303	146,810 ab	14.99 a	20,813 a
" purpureum (Hybrid #3)		156,759 ab	13.41 bc	20,655 ab
" purpureum (Hybrid #4)		131,412 ac	14.00 ab	17,613 ac
" purpureum of P.R.		114,908 bc	14.30 ab	15,148 bd
" purpureum	337620	101,834 cd	12.92 c	12,546 cd
" purpureum (I-12)		85,575 d	13.55 bc	11,295 d
			45 Days	
Pennisetum purpureum	285303	237,546 a	15.13 a	33,850 a
" purpureum	300086	230,549 ab	14.43 ab	30,676 ab
" purpureum (Hybrid #4)		224,420 ab	13.79 ab	29,537 ac
" purpureum (Hybrid #3)		206,217 ab	13.48 b	26,588 bd
" purpureum (I-12)		196,612 ac	13.46 b	25,607 bd
" purpureum	337620	188,775 bc	13.59 b	24,003 cd
" purpureum of P.R.		156,881 c	14.21 ab	21,370 d
			60 Days	
Pennisetum purpureum	300086	353,560 a	17.31 cd	58,430 a
" purpureum	285303	324,152 ab	18.74 ab	58,267 a
" purpureum (Hybrid #3)		336,653 ab	17.63 cd	57,847 a
" purpureum (Hybrid #4)		283,468 bc	19.40 a	53,833 a
" purpureum of P.R.		251,832 cd	18.28 ac	45,309 b
" purpureum (I-12)		246,138 cd	17.66 bd	43,250 b
" purpureum	337620	231,440 d	16.90 d	38,815 b

1/ Means followed by same letter are not significantly different at the 0.05 level of probability.

Table 3. Effect of harvest frequency on the forage yields and dry matter content of 10 Cynodon cultivars

Species	U.S.D.A. P.I. No.	Green forage yield/Ha	Dry matter	Dry forage yield/Ha
		Kg	%	Kg
			30 Days	
Cynodon dactylon (Coast-Cross)		53,675 a[1/]	28.97 ab	15,015 a
" plectostachyus	341818	51,246 a	28.64 ac	14,157 ab
" plectostachyus	341817	48,665 ab	29.31 a	13,610 ab
" nlemfuensis var. nlemfuensis		50,071 ab	27.64 c	13,367 ab
" dactylon	293611	46,244 ac	29.48 a	12,972 ab
" plectostachyus	341820	47,001 ab	28.95 ab	12,858 ac
" sp. (Oklahoma hybrid)		48,113 ab	28.47 ac	12,536 bd
" aethiopicus		43,032 bd	27.96 bc	10,679 ce
" dactylon var. coursii	292061	39,089 cd	28.88 ab	10,406 de
" plectostachyus	341819	38,252 d	29.36 a	9,754 e
			45 Days	
Cynodon dactylon (Coast-Cross)		72,660 ab	30.38 ce	21,390 ab
" plectostachyus	341818	74,511 a	31.69 ab	22,881 a
" plectostachyus	341817	61,312 cd	30.79 be	18,402 c
" nlemfuensis var. nlemfuensis		65,477 ac	28.74 e	18,922 bc
" dactylon	293611	60,680 ce	32.30 a	19,075 bc
" plectostachyus	341820	61,081 cd	30.97 bd	18,167 c
" sp. (Oklahoma hybrid)		62,976 bc	31.28 ac	18,517 c
" aethiopicus		54,495 df	29.68 e	14,934 d
" dactylon var. coursii	292061	50,792 ef	29.67 e	14,008 d
" plectostachyus	341819	45,114 f	30.12 de	12,311 d
			60 Days	
Cynodon dactylon (Cost-Cross)		82,396 ab	33.39 bc	26,733 b
" plectostachyus	341818	87,977 a	35.10 a	29,702 a
" plectostachyus	341817	75,196 bd	33.44 ce	24,281 cd
" nlemfuensis var. nlemfuensis		79,895 ac	33.32 bd	26,208 bc
" dactylon	293611	76,353 bc	34.77 ab	25,318 bc
" plectostachyus	341820	66,625 df	34.41 ac	21,589 de
" sp. (Oklahoma hybrid)		74,351 ce	34.93 ab	24,517 cd
" aethiopicus		63,938 ef	32.38 ef	19,299 ef
" dactylon var. coursii	292061	61,143 fg	31.49 f	17,866 fg
" plectostachyus	341819	45,114 f	32.77 df	15,470 g

1/ Means followed by same letter are not significantly different at the 0.05 level of probability.

Table 4. Effect of harvest frequency on the forage yields and dry matter content of 10 Brachiaria cultivars

Species	U.S.D.A. P.I. No.	Green forage yield/Ha	Dry matter	Dry forage yield/Ha
		Kg	%	Kg
			30 Days	
Brachiaria sp.	299497	119,567 a[1/]	21.04 b	22,548 a
" brizantha (Signal)		105,834 ab	22.11 ab	21,165 ab
" ruziziensis		104,129 ab	21.71 ab	19,724 ac
" ruziziensis	338221	99,095 b	21.84 ab	18,992 ac
" mutica (Pará)		98,687 b	22.53 a	19,214 ac
" ruziziensis		97,737 b	21.91 ab	18,394 bc
" ruziziensis	338220	96,656 b	21.73 ab	18,663 ac
" ruziziensis	247404	94,525 b	22.59 a	19,296 ac
" ruziziensis	344764	94,286 b	21.59 ab	17,304 bc
" sp. (Tanner)	299499	93,005 b	21.25 b	16,882 c
			45 Days	
Brachiaria sp.	299497	160,451 a	19.78 d	30,633 ab
" mutica (Pará)		151,697 a	22.53 a	31,338 a
" brizantha (Signal)		134,853 b	21.92 ab	27,597 b
" sp. (Tanner)	299499	123,030 bc	20.91 bd	23,361 c
" ruziziensis	338221	120,803 bc	21.02 bc	22,826 c
" ruziziensis		120,614 bc	20.52 cd	21,728 c
" ruziziensis		119,902 bc	20.47 cd	22,133 c
" ruziziensis	247404	114,583 c	21.14 bc	22,063 c
" ruziziensis	338220	112,906 c	21.05 bc	21,683 c
" ruziziensis	344764	112,652 c	20.93 bd	21,526 c
			60 Days	
Brachiaria sp.	299497	146,318 a	21.72 e	31,147 bc
" mutica (Pará)		143,908 a	25.91 a	36,946 a
" brizantha (Signal)		136,553 ab	24.04 b	31,665 b
" ruziziensis		133,894 ac	22.09 e	28,725 b
" sp. (Tanner)	299499	132,113 ac	23.01 b	30,789 b
" ruziziensis		131,960 ac	22.78 c	29,344 b
" ruziziensis	338221	126,124 bc	22.43 d	27,860 c
" ruziziensis	344764	124,057 bc	22.76 c	27,252 d
" ruziziensis	338220	117,879c	23.32 b	26,699 e
" ruziziensis	247404	117,463 c	22.35 d	25,743 e

1/ Means followed by same letter are not significantly different at the 0.05 level of probability.

Preliminary Report on Evaluation of Plant Introductions of Forage Grass Species in South Carolina - 1976[1]

by

E. F. McClain, M. W. Jutras
G. C. Kingsland, and J. S. Rice

This preliminary report primarily covers approximately four-hundred and forty accessions of warm-season grass species which were established as 10-plant rows in two replications on the Edisto Agricultural Experiment Station in 1973. However, we will mention that approximately four-hundred accessions of cool-season species were established as spaced plants in 'Tillman' white clover on the Simpson Agricultural Experiment Station in 1971. Another set of approximately eight-hundred cool-season accessions were seeded in rows at both the Edisto and Simpson stations in 1973. Plantings of some species failed to become established at the Simpson station.

Details of evaluations of the cool-season species should be available at a later date. However, our observations indicate that accessions of tall fescuegrass (*Festuca arundinacea)* reed canarygrass *(Phalaris arundinacea)*, and hardinggrass (*P. aquatica)* generally exhibit more survivors than do those of the other species included in these tests. Nevertheless, some accessions of redtop (*Agrostis alba)* and *Agropyron intermedium* have survived well both in the Coastal Plain and Piedmont areas. Two accessions of *A. intermedium*, PI-273732 and PI-273733, have spread and formed a dense sod when grown in association with white clover on the Simpson station and when kept in cultivated rows on the Edisto station. Some accessions of smooth bromegrass (*Bromus inermis)* also have survived well on the Simpson station.

Stand counts of all warm-season species being evaluated at Edisto were obtained in 1975 and 1976 but have not yet been tabulated for all species. Production of dry matter measured by clipping in 1975 and by stand counts taken in 1975 are shown in tables 2-6. Notes on the various species follow:

Bahiagrass (*Paspalum notatum)*. Many plants failed to survive the first winter. However, practically no loss occurred during the second winter, and all plants of several accessions are now well established. Much variation in leaf width, leaf length, vigor, color and seed-head production is apparent among, and sometimes within, accessions. A high degree of uniformity within many accessions suggests that they may be apomictic, whereas variation within others indicates that they are either products of sexual reproduction or are mixtures.

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[1] Conclusions stated in this report are subject to change as further data is obtained and analyzed. No attempt has yet been made to verify species identification or regrow certain accessions to check for possible planting errors.

Dallisgrass (*P. dilatatum*). Almost all plants survived the first winter, but many were lost during the following summer, fall, and winter seasons possibly due to drought, infrequent clipping, cold injury, or some combination of these factors. Many plants appeared to be dead in the fall of 1975. Both within and among accession variation for type and vigor appeared to be slight. However, one obviously different accession, PI-304014, produced 2.66 tons of oven-dry forage per acre in one harvest (6/18/75) compared to two "average appearing" plots whose mean production was 1.24 tons per acre. Another accession PI-316729, with much more than "average vigor" and extreme pubescence produced 2.19 tons per acre. All accessions appeared to be infected with ergot.

Vaseygrass (*P. urvillei*). Almost all plants have survived two winters. Vaseygrass remained green later in the fall and became green earlier in the spring as compared to dallisgrass. Oven-dry forage production ranged up to 8.24 tons per acre as the total of three harvests (table 2). Plant height at the time of the first harvest was approximately six feet.

Brunswickgrass (*P. nicorae*). By the time stand counts were made on this test in August 1975, individual plants could no longer be distinguished with certainty. Most plants appeared to have survived the first winter (table 3). However, as did most dallisgrass plants, all brunswick plants exhibited little or no green color in the fall of 1975 and did not recover during the following spring. Oven-dry forage production in 1975 ranged up to 1.50 tons per acre (table 3).

Paspalum species. Several species were placed in a single test because they were represented by only a few accessions. Stand and forage production data are shown in table 4. The highest forage yield in this group based on one harvest July 1, 1975 was that of PI-303957 labeled *P. almum*. General appearance of this accession was the same as that of vaseygrass. Other accessions labeled *P. almum* were more like dallisgrass but, perhaps, leafier (PI-303958) and somewhat higher yielding (PI-310044). *P. paucicilliatum* accessions also were similar to dallisgrass in type but much leafier and more productive, especially PI-310216.

The one accession of florida paspalum (*P. floridanum*) survived the first but not the second winter. It appeared to be about as productive as *P. paucicilliatum* but not as leafy. The one accession of *P. alcalinum* did not appear to be particularly productive but could be valuable because of its habit of spreading both by rhizomes and stolons (or decumbent stems). Appearance of this species was closest to that of brunswickgrass. Accessions labeled *P. quadrifarium* and *P. boscianum*[2] were similar to each other in general appearance. These two species remained green during cold weather longer than any other *Paspalum* species but probably have no forage value inasmuch as their foliage is very stiff and tough.

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[2]This species is described as an annual by W. A. Silveus in Grasses. Paspalum and Panicum of the United States. 1942.

Of the *Panicum* species observed, switchgrass (*P. virgatum*) and *P. stapfianum* exhibited both the most productivity and the best survival. Forage yields of switchgrass accessions shown in table 5 indicate that the yield of BM-314 (6.80 tons of oven-dry matter per acre) approaches the yields of vaseygrass accessions in table 2. Most accessions were segregating for rust resistance. The best forage yield of *P. stapfianum* was that of PI-208012 with 4.40 tons per acre (table 6). These accessions are high tillering, very fine stemmed, and heavy seed producers.

Kleingrass (*P. coloratum*) plants generally failed to survive the first winter. However, some accessions exhibited good survival through the first winter. Also, dense stands of volunteer seedlings appeared in the following year. Plants from PI-185552 are still surviving. This accession has the same general appearance as *P. stapfianum* accessions. General appearances of some kleingrass accessions also were the same as others labeled *P. antidotale* and *P. makarikariense*.

Guineagrass (*P. maximum*) accessions exhibited almost no surviving plants. However, a dense stand of seedlings appeared in 1975 and again in 1976.

Rhodesgrass (*Chloris gayana*) accessions had no surviving plants but in many cases, produced dense stands of volunteer seedlings. Accessions of *C. polydactyla* survived the first winter but not the second one.

Pennisetum flaccidium and an unidentified species of *Pennisetum*, both represented by a few plants of one accession each (PI-220606 and PI-271601, respectively), have survived to the present time. Both accessions are vigorous, have spread considerably by rhizomes, and have the same general appearance.

Accessions of yellow indiangrass (*Sorghastrum nutans*) and of *S. pellitus* were slow to establish themselves and initial stands were poor. However, once established, most plants have survived.

Digitaria argyrograpta was the only one of several *Digitaria* species tested which exhibited a high degree of survival over the first winter. However, a few plants of only *D. eriantha* and *D. smutsii* remained after the second winter.

Hyparrhenia hirta, Themeda anthera, T. australis, and T. triandra accessions failed to survive the first winter, in most cases. PI-245099 (*H. hirta*) exhibited 14 survivors out of the original 20 plants after the first winter. However, none of these plants survived the second winter.

Table 2. Stand Count and Yield of Oven-Dry Forage from Foreign Plant Introductions of Vaseygrass (*Paspalum urvillei*) Transplanted on the Edisto Agricultural Experiment Station July 25, 1974.

Entry No.	P.I. no.	Origin	No. plants/2 reps. 10-17-74	7-1-75	Oven-dry forage (T/A) 6-19-75	8-13-75	10-23-75	Total
2	202046	Argentina	20	20	5.66	2.23	.31	8.20
3	202296	Argentina	20	20	3.78	1.48	.14	5.40
5	203739	Brazil	10[1]	10[1]	4.40[1]	1.76[1]	1.01[1]	7.17[1]
6	203747	Brazil	15	15	2.58	1.54	.40	4.52
7	203749	Uruguay	20	20	3.36	1.50	.34	5.20
8	203752	Brazil	20	20	4.92	2.48	.52	7.92
9	204237	Uruguay	20	20	3.60	1.33	1.50	6.43
10	204241	Brazil	20	20	3.34	1.93	.40	5.66
11	276255	Uruguay	20	20	2.62	1.74	.14	4.50
12	283025	Uruguay	20	20	3.36	1.64	.23	5.23
13	300079	S. Africa	20	20	4.56	1.51	.44	6.51
14	304041	Brazil	9[1]	9[1]	3.33[1]	2.22[1]	.38[1]	5.93[1]
15	304042	Brazil	19	19	4.71	2.20	.36	7.27
16	304044	Brazil	20	20	4.72	2.42	.36	7.49
17	304045	Brazil	20	20	4.63	2.21	.44	7.28
18	304046	Brazil	20	20	4.17	2.26	.30	6.72
19	304047	Brazil	20	20	4.51	2.36	.44	7.31
20	304048	Brazil	18	18	3.78	2.37	.34	6.49
21	304049	Brazil	18	18	4.66	2.50	.38	7.54
22	304050	Brazil	20	20	5.11	1.98	.34	7.44
23	304146	Mexico	10[1]	10[1]	5.20[1]	1.90[1]	.55[1]	7.65[1]
24	310251	Brazil	20	20	3.96	2.56	.72	7.23
25	310253	Brazil	20	20	5.44	2.38	.42	8.24
26	310254	Brazil	20	20	3.92	1.98	.60	6.50
27	310255	Brazil	20	20	4.87	2.84	.52	8.22
28	310257	Brazil	19	19	4.19	2.85	.80	6.02
29	310258	Brazil	20	20	3.90	2.25	.56	6.70
30	310259	Brazil	19	19	4.86	2.22	.72	7.80
31	310263	Brazil	19	19	4.98	2.40	.56	7.94
32	310264	Brazil	20	20	3.54	2.16	.49	6.19
33	310265	Brazil	20	20	5.04	2.20	.58	7.82
34	310266	Brazil	20	20	4.54	2.16	.46	7.17

[1]One replication

Table 3. Stand Count and Yield of Oven-Dry Forage of Foreign Plant Introductions of Brunswickgrass (*Paspalum nicorae*) at the Edisto Agricultural Experiment Station.[1]

Entry No.	P.I. no.	Origin	No. plants/ 2 replications 10-17-74	8-13-75[2]	Dry forage (T/A)[2] 7-1-75
1	202044	Argentina	2[3]	?	
2	209983	Argentina	1[3]	?	
3	276248	Uruguay	17	17	.83
4	276249	Uruguay	20	20	.76
5	284171	Central America	6[3]	?	
6	304003	Brazil	20	20	.88
7	304004	Brazil	20	20	.88
8	310128	Brazil	20	20	1.53
9	310129	Brazil	20	20	1.47
10	310130	Brazil	20	20	.89
11	310131	Brazil	20	20	1.34
12	310132	Brazil	20	20	.88
13	310133	Brazil	20	20	1.13
14	310134	Brazil	20	19	.72
15	310135	Brazil	20	20	.93

[1]Transplanted July 25, 1974
[2]Estimated (most plots had become solid stands)
[3]One replication

Table 4. Stand Count and Yield of Oven-Dry Forage from Foreign Plant Introductions of Paspalum Species transplanted on the Edisto Agricultural Experiment Station on July 25, 1974.

Entry no.	P.I. no.	Species	Origin	No. plants/ 2 replications 10-17-74	12-17-75	Oven-dry forage (T/A)[1] 7-1-75
1	337555	alcalinum	Uruguay	19	12	1.55
2	276240	almum	Uruguay	20	0	
3	276241	almum	Uruguay	17	7	
4	284523	almum	U.S.A.	19	0	
5	303957	almum	Brazil	20	20	4.99
6	303958	almum	Brazil	18	18	2.39
7	303959	almum	Brazil	14	11	
8	310044	almum	Brazil	20	20	3.08
9	310049	boscianum	Brazil	19	17	3.02
10	310052	boscianum	Brazil	17	17	1.94
11	276242	cromyorrhizon	Uruguay	15	14	
12	315730	floridanum	U.S.A.	20	20	2.86
13	276246	guaranticum	Uruguay	(no germination)		
14	310111	intermedium	Brazil	(no germination)		
15	310112	intermedium	Brazil	(no germination)		
16	303994	juergensii	Brazil	17	15	1.05
17	310114	juergensii	Brazil	15	8	
18	310115	juergensii	Brazil	13	10	
20	310215	pauciciliatum	Brazil	20	20	2.94
21	310218	pauciciliatum	Brazil	20	19	1.86
22	161886	quadrifarium	Argentina	1	0	
23	310046	quadrifarium	Brazil	6	6	
24	203882	umbrosum	Brazil	10	3	

[1]One replication

Table 5. Stand Count and Yield of Oven-dry Forage from Accessions of Switchgrass (Panicum virgatum) Transplanted on the Edisto Agricultural Experiment Station July 26, 1974.

Entry no.	Accession[1]	No. plants/2 reps. 10-17-75	7-2-75	Oven-dry forage (T/A) 7-1-75	8-22-75	10-24-75	Total	
1	Am-175	20	20	2.81	1.74	.26	4.82	
2	**Bn-314**	20	20	3.84	2.82	.15	6.80	✓
3	BN-2259	20	20	2.94	1.92	.25	5.12	
4	BN-8574	20	20	1.34	1.43	.16	2.93	
5	BN-9195	16	20	.75	.66	.20	1.85	
6	BN-11361	20	20	3.30	2.34	.34	5.98	✓
7	BN-11362	17	16	1.42	1.57[2]	.29	3.28	
10	FC-37758	20	19	1.25[2]	1.30[2]	.18[2]	2.73[2]	
11	Sc-5527	20	20	3.06	1.75	.30	5.12	
12	SC-56-23	20	20	2.18	1.87	.19	4.24	
13	SC-56-24	19	19	2.11	1.98	.26	6.46	✓
14	SC-56-26	20	20	2.38	1.74	.27	4.40	
15	SC-56-27	20	20	2.51	1.78	.25	4.50	

[1]All accessions originated in U.S.A.
[2]Based on one replication

Table 6. Stand Count and Yield of Oven-Dry Forage from Foreign Plant Introductions of Panicum stapfianum Transplanted on the Edisto Agricultural Experiment Station July 26, 1974.

Entry no.	P.I. no.[1]	No. plants/ 2 replications 10-17-74	7-2-75	Oven-dry forage (T/A) 6-19-75	8-13-75	10-23-75	Total
1	178257	20	19	1.96	1.86	.94	4.26
2	185547	8[2]	8[2]	1.41[2]	2.13[2]	.41[2]	3.95[2]
5	206371	10[2]	8[2]	1.14[2]	1.20[2]	.34[2]	2.69[2]
6	**208012**	10[2]	10[2]	1.99[2]	1.74[2]	.67[2]	4.40[2]
7	208013	10[2]	10[2]	1.56[2]	1.60[2]	.61[2]	3.77[2]
8	208014	19	19	1.36	1.32	.52	3.22
9	208015	19	19	1.34	1.28	.34	2.96
11	208017	7[2]	7[2]	1.33[2]	1.32[2]	.35[2]	3.00[2]
14	208246	10[2]	9[2]	.78[2]	1.14[2]	.37[2]	2.29[2]
17	208401	14	14	1.12[2]	1.17[2]	.36[2]	2.65[2]

[1]All accessions originated in South Africa
[2]One replication

S-9 Technical Committee Report
University of Tennessee
Agricultural Experiment Station
Knoxville, Tennessee 37916
August 1975 - August 1976

Milton J. Constantin

Cooperators in Tennessee received one accession of plant introduction material during this reporting period.

The following programs involving plant introduction material are underway at the University of Tennessee:

1) Resistance to Corn Earworms. L. M. Josephson of the Plant and Soil Science Department is continuing his efforts to transfer resistance from Zapalote Chico (PI 217413) to Tennessee inbred lines that are used to produce Tennessee hybrid corn varieties.

2) Mutation Induction In Soybeans. N. S. Hall of the Department of Agricultural Biology and L. N. Skold of the Plant and Soil Science Department are using chemical and physical mutagens to induce mutations in the black-seeded soybean introduction (PI 88788) that has resistance to race 4 of Heterodera glycines (cyst nematode). Bush-type plants with beans that have cream-colored seed coats are sought.

3) Evaluation of Ornamental Plants. H. Van De Werken of the Ornamental Horticulture and Landscaping Department is evaluating a number of ornamental shrubs and trees as part of the landscape plantings on the Knoxville Campus.

David Scanlon of the Tennessee Valley Authority, Wildlife, Forestry and Fisheries Division at Norris, Tennessee is evaluating a number of plant accessions as habitats and sources of food for wildlife.

Annual Report on New Crops Research in Texas
Contributing to Southern Regional Project S-9

Prepared by Eli L. Whiteley
August 19 and 20, 1976

The 1975-76 crop year was the usual-unusual weather. Fall and winter temperatures were above long-time averages. Rainfall patterns in the State did not fit the long-time patterns. Some sections of the State were dry when they should have been wet and wet when they should have been dry. Rainfall amounts in some parts of the State are several inches above the long-time average while other parts are below average.

Industrial Crops

Dr. R. A. Creelman is working with new crops at the Weslaco Center since W. R. Cowley retired. He is working with crambe, sesame, Berssica and kenaf. Crambe, growing in the winter, is a promising crop for use in a double cropping system in the Rio Grande Valley if yields and price received for the seed is favorable.

Dr. Sim A. Reeves reports that 22 tons of surgar was produced at the W. R. Cowley Sugar House from sweet sorghum. A few problems were encountered in harvesting and milling but these can be solved. Yields of sweet sorghum have ranged between 10 and 20 tons of stripped stalks per acre.

Sweet sorghum yields in the Brazos River Valley have averaged about 12 to 15 tons of stripped stalks per acre. Brix has averaged between 16 and 18% over the past five years.

Research on sesame was resumed in 1975 to evaluate some new breeding lines and some varieties released in the early 1960's. Yields were lower than desired but the tests were planted late in the season. The 1976 test looks very promising.

The regional sunflower test was planted at College Station in 1976 and should be ready for harvest on about August 25.

Dr. R. D. Brigham reports from the Lubbock Center that he is using P.I. 343765, a short statue, early, desirable plant type and head shape sunflower in test crosses with various female lines.

Field Crops

Dr. Brigham also reported that he is uing P.I. 227555 and P.I. 200503 in the soybean breeding program at Lubbock; both P.I.'s are resistant to soybean mosaic virus.

Dr. A. Bruce Maunder of Dekalb AgResearch, Inc. reports that he is using a variety from Brazil, AF-28, for midge resistance and the Ethiopian acessions which Purdue found to contain high lysine.

Vegetables

Dr. Ben Villalon at the Weslaco Center has been screening pepper accessions

for resistance to tobacco etch virus. He reports the following are resistant.

No.	P. I. No.	Genus	Species	Source	Fruit Type
1	105363	Capsicum	annuum	Turkey	Hot small cayene
2	105444	Capsicum	annuum	Turkey	Hot small pointed serrano
3	109469	Capsicum	annuum	Turkey	Hot small red chili
4	123166	Capsicum	annuum	India	Hot erect tobasco type
5	142838	Capsicum	annuum	Iran	Hot purple cayenne
6	15225	Capsicum	chinense	Peru	Hot wide tabasco type
7	155349	Capsicum	annuum	Argentina	Hot erect 4" thin chili
8	159229	Capsicum	annuum	U.S.A.	Hot 2" erect serrano
9	159234	Capsicum	annuum	U.S.A.	Hot long, wide wrinkled tabasco type
10	159236	Capsicum	annuum	U.S.A.	Hot long, wide wrinkled tabasco type
11	159261	Capsicum	annuum	U.S.A.	Hot long, wide wrinkled tabasco type
12	159262	Capsicum	annuum	U.S.A.	Hot long, wide wrinkled tabasco type
13	159274	Capsicum	annuum	U.S.A.	Hot long, wide tabasco type
14	174810	Capsicum	annuum	India	Hot, small pointed red chili

Outstanding characteristics of numbers 4, 5, 6, 9, 10, 11, 12 and 13 are the similarity in plant and foliage type. They are medium large plants, bushy with dense lush green foliage. Leaves are medium in thickness but quite soft and flexible. The plants in general appear to be immune to our mosaic viruses but slight traces of mosaic patterns can be seen when observed carefully. The fruit pods are also quite similar bearing a wide, wrinkled 3" to 5" light green pod that tapers at the end. Some pods are purple, brown, orange and red. Crosses involving 6 of these P. I.'s with our most resistant breeding lines have not yielded anything outstanding and have been dropped as F_4's.

We still have about 1400 other P.I.'s to be screened yet.

July 1976

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

Highlights

Howard Hyland was presented a USDA Superior Service Award on May 25, 1976, "For significant contributions in the introduction and exchange of valuable plant germplasm for use in crop improvement programs throughout the world." In February, Howard gave a presentation on the history of U.S. plant introduction at the Symposium on Plant Germplasm Resources--American Independence Past and Future, AAAS Meeting, Boston.

Two foreign explorations involving Laboratory personnel were completed during the year. Harold Winters and Ray Clark (Ames) collected in Panama, Costa Rica, Nicaragua, Honduras, and El Salvador. The quake changed their plans in Guatemala. The total collection of 310 accessions included 213 tomatoes--the main objective of the exploration--and other accessions of beans, peppers, and ornamental plants. Jack Oakes participated with E. C. Bashaw (Texas) in a plant exploration to South Africa during February-April. They collected 1,320 accessions including 550 buffelgrass, 300 lovegrass, and 470 various forage species. Their collection adds significantly to the germplasm base of these forage grasses.

Harold Winters was selected to serve on the International Board for Plant Genetic Resources (IBPGR) Advisory Committee on Phaseolus. Joe Craddock serves in a similar capacity on the Wheat Committee.

Approximately 500 acres of kenaf were planted this spring in New Jersey. The best fiber will be utilized commercially to manufacture high quality paper. Dry conditions in the east may reduce yields. Prospects are good for acreage expansion in New Jersey and North Carolina next year. Six nematode-tolerant kenaf lines are being increased for multi-locational field testing ln 1977.

Plant Introduction and Exchange

GRL should be notified of pending assignments by state or federal researchers on sabbatical or related travel when they plan to collect seed or plant material. This allows for strengthening regional and national participation and use of such germplasm. The International Plant Genetics Resources Board (IPGRB) is now funding collecting activities in various parts of the world, some of which are of interest to U.S. breeders. For example, Dr. W. C. Gregory, North Carolina, has approached that group for support in collecting peanut germplasm in South America. Dr. J. G. Waines, California, is receiving similar consideration for collecting wild relatives of small grain cereals and food legumes in Syria, Iraq, and Iran. Other explorations under consideration include Alaska's proposal for exploration in the Soviet Union which has already been funded by the State and asking for additional support from ARS. Dr. D. M. Stewart, Arizona, is promoting the collecting of barley from the Near East and Mediterranean areas for developing more suitable varieties for the southwestern U.S. Dr. Franklin W. Martin, Mayaguez Institute for Tropical Agriculture (MITA) is working on plans for expanding exploration to obtain vegetable crops adapted to subtropical environments. The first phase of an expansive search for clover germplasm may be conducted during the late summer of 1977. Other proposals submitted through the ARS and National Plant Germplasm Committees may have been approved.

Tentative plans indicate a probable move of the Plant Germplasm Quarantine Center to a temporary location on the east side of the Beltsville Center in December or January. Hopefully, a more permanent location will be available within 12 months of the interim move.

The 13,725 seed and plant introductions in 1975 included 5,435 small grain cereals (3,945 rice), 4,588 vegetables, 1,754 forages, 1,254 oilseeds, 236 ornamentals, 143 sugar, 91 fruit, 84 tobacco, 58 cotton and fiber, and 82 speciality crops. There were 1,604 seed shipments to 104 countries including 70,364 exchange items. Pigeonpeas (4,200) were sent to Puerto Rico for increase and preliminary evaluation. Collections of tobacco assembled in

recent years by the Tobacco Laboratory, and seed held by Plant Material Centers, Soil Conservation Service, were catalogued for the first time. Oilseed and vegetable crops were in greatest demand for overseas cooperators. Under the AID project on plant materials, 56 shipments of 2,809 cultivars and lines were sent to 26 countries. Considerable use is being made in Ethiopia of various crop germplasm provided through this program. Improved documentation of the use of germplasm by the recipient missions is needed.

Agronomic Crop Germplasm

New accessions to the Small Grains Collection totaled 2,698 (1,984 foreign, 714 domestic). Plant scientists received 102,550 packets of seed from the collection. There were 34,417 samples distributed in 229 foreign shipments, and 68,133 samples in 250 domestic shipments. Descriptive notes were recorded from field nurseries. The Wheat Cultivar Handbook has been prepared in cooperation with the Cooperative Extension Service. A similar handbook on oats will be initiated.

Thirty lines of barley from the Uniform Winter Barley Nursery were evaluated for reaction to two cultures of scald (Rhynchosporium secalis). Six were resistant to the agressive culture 492-A and six to culture 531. Lines (489) from Ethiopia and Turkey were evaluated for possible resistance to an admixture of both scald cultures. Sixty-six Ethiopian lines were resistant compared to 31 of the Turkish lines. Five international, 3 uniform, and 2 special nurseries for Puerto Rico (1 wheat and 1 oat) were prepared in 1975 and sent to cooperators in 41 countries. Eighty percent of the cooperators returned information on the nurseries. Nine reports on reaction of wheat and oats to rust and other diseases were prepared and distributed to cooperators. Approximately 16,000 wheats were inoculated with virulent cultures of the stem rust organism. Approximately 900 entries were selected for resistance and possible use in future international nurseries. Screening of wheat (5,285) and rye (611) introductions to virulent cultures of Bipolaris sorokinianum (leaf blotch) were made in the greenhouse. Susceptible plants died within 72 hours after inoculation. One-hundred and fifty entries were selected for additional testing.

An inventory of the USDA rice collection was completed, computerized, and distributed to rice researchers worldwide. About 1,000 accessions were grown under greenhouse quarantine. Seed stocks of 1,500 accessions were sent to cooperators for increases.

The Digitaria collection was screened for resistance to Pyricularia grisea. A high incidence of disease resistance was found. The limpograss, Hemarthria altissima, collection contains considerable resistance to the yellow sugarcane aphid, Sipha flava. The field evaluation, in cooperation with Sam Braverman (Geneva), of the perennial ryegrass collection for disease resistance and winter-hardiness is continuing.

Horitcultural Crops

Resistance in spinach to Fusarium oxysporum f. sp. spinaciae was found in ten P.I.'s out of the 60 tested lines. P.I. 317425 from Korea was the most disease-resistant in all tests; P.I. 175926 from Turkey was the best at 24°C. F. oxysporum was isolated from the embryos of spinach seed from plants that had been inoculated with the organism but pathogenicity of the isolates has not been determined.

The Potato Diseases Handbook has been completed and awaits issuance.

Two individuals from a seedling progeny of rosemallow hibiscus are being considered for possible release pending the development of suitable propagation methods. Flower color is bright pink, flowers remain open all day, both are nearly sterile and resist lodging, one is tall and the other semi-dwarf.

Seed of an unnamed citrus relative, P.I. 355305, collected in New Guinea in 1970, was distributed to various stations working with citrus. It proved immune to Phytophthora root rot and has been crossed with Citrus in an effort to produce resistant rootstocks. H. F. Winters collected and named the new species Microcitrus papuana.

New Crops

About 1,000 acres of crambe were harvested in 1975. In

1976, the planted acreage is somewhat under 1,000. World distribution of wild Crambe species and their association with pests and pathogens point to southwest Eurasia as the likely home of the genus. Of the six Crambe species in section Leptocrambe, four have been collected and shown to contain high amounts of erucic acid. Accessions of C. hispanica varieties hispanica and glabrata showed a range of 24.5 to 38.6 percent oil in the fruit and 47.4 to 63.6 percent erucic acid in the seed oil. C. kralikii has three ploidy levels; i.e., n = 15, 30, and 45. C. hispanica and certain other species are distributed in the wild Mediterranean area and C. abyssinica in northeast Africa and Turkey. An effective technique for obtaining infectivity of Crambe seedlings with Alternaria has been worked out.

Of 11 cultivars and lines of kenaf, roselle, and Crotalaria juncea, Tainung #1 (kenaf) was significantly higher yielding across three planting dates. Maximum yield was 15.4 mt/ha. There was no significant stem yield differences between May 20 and June 4 planting dates.

At Corvallis, Oregon, 22 phenotypically superior plants of Limnanthes alba were selected and selfed from 1,445 transplants of earlier selections from Oregon and Maryland. These included upright plant types, a few high seed yielders, and one selection with six seeds/flower (also six petals). The best selection from P.I. 374799 and P.I. 283703 showed excellent potential for further development. These lines had seed shattering losses of only 10.9 and 17.2 percent, respectively, compared to 27.8 percent for Foamore. The best seeding rate for Foamore was 20 to 30 lb/A. Ammonium sulfate reduced seed yields while ammonium nitrate did not affect yields. Insects are important pollinators in L. alba because anthers dehise two to three days before the stigma is receptive.

Lesquerella fendleri and L. gordonii winter killed at Corvallis; whereas, L. angustifolia over wintered but did not grow well. In Arizona, yields from 16 selections of L. fendleri (P.I. 331165) ranged from 589 to 1,034 lb/A. Of 158 nondormancy selections, height ranged from 11 to 18 inches; six yielded 1,476 to 1,808 lb/A in single row plots.

Significant progress has been made in selecting nondormancy plants with good erectness and height. Resistance to seed shattering has not been found.

"-consider the lilies of the field, how they grow-"

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Tissue Culture--Cephalotaxus harringtonia contains an inactive alkaloid, cephalotaxine, and four antitumor esters of cephalotaxine: harringtonine, deoxyharringtonine, isoharringtonine, and homoharringtonine. A young (30 cm) plant growing under fluorescent lights in the laboratory was used for the initiation of callus cultures. For comparison to the tissue culture, this plant was subsequently analyzed for the above alkaloids by GLC on Dexsil 300 and OV-101 and by GLC-MS. Unusually high levels of antitumor alkaloids (fiftyfold greater for homoharringtonine), and low levels of cephalotaxine (twentyfold less) were found compared to earlier studies with relatively mature plants. This may be due to differences in genetic composition, age, or growing conditions, or to the freshness of the present sample (previous samples were shipped long distances before extraction).

Callus cultures of C. harringtonia were grown on Murashiga and Skoog media with various organic supplements. All cultures produced cephalotaxine and its four esters, and excreted about half of the total into the medium. The pattern of alkaloid production was basically different from the parent plant: higher levels of cephalotaxine compared to its esters. Total antitumor ester production per dry weight of callus (including amounts in the medium) was 1/10 to 1/20 that of mature plants analyzed previously, but much less than the young parent plant.

Tephrosia vogelii produces two natural isoflavonoid insecticides, rotenone and deguelin. East Indian workers report that callus cultures produce even higher levels of rotenone and deguelin than the intact plant, and also biosynthesize elliptone, a rotenoid foreign to this species. Studies to confirm and extend these studies have been initiated. Six varieties of T. vogelii of known rotenone-deguelin composition are being cultured for analysis, and their cultural requirements are being established. For comparison, rotenoid metabolism in the germinating seeds from which the callus cultures were established is also being studied.

Drugs and Pesticides--Numerous esters of cephalotaxine are being synthesized in a search for compounds that will approach the antitumor activity of harringtonine, one of the highly active alkaloids of Cephalotaxus. Harringtonine is very sparse in its natural occurrence, but the much more abundant alkaloid cephalotaxine is inactive in its free state. Four new active compounds have been discovered, and their ester moieties have structures surprisingly different from that of harringtonine. Meanwhile, there are indications that investigators in Mainland China are conducting clinical trials with harringtonine.

Half a ton of seed of Sesbania drummondii, collected in the wild in Texas, is being processed to facilitate isolation of a compound that is highly active in a murine leukemia system. Screening to uncover new plant sources of substances with antitumor activity continues.

Increased emphasis on a search for plant-derived pesticides is being instituted. After the program is better developed, we anticipate that each extract will be examined for both antitumor and a variety of pesticidal activities. We would be happy to hear from ARS or AES investigators who would consider collaborative work in the area of natural pest control agents.

New Crops Screening--While receipt of new seed samples has been less than previous years, chemical screening was accomplished on seed from 350 new species, most of which were received earlier. Many of these samples resulted from collections made in Africa, India, and New Zealand. Seed oils from these species contained a variety of fatty acid compositions, varying from large amounts of short-chain fatty acids (49% C_{10} and C_{12}) to oils with long-chain acids (83% C_{20} acids). Other oils were found to contain unusual acyl groups, such as acetylenic acids and allenic acids. In-depth studies resulted in characterization of several new acids, particularly a C_{20} homologue of vernolic acid, which makes up over 50% of Alchornea cordifolia seed oil.

Cooperation with plant breeding programs is a large part of our total effort. Programs at Corvalis, Oregon, provided 428 Brassica and 40 Lunaria samples for analysis; Puerto Rico provided 32 winged bean samples; and BARC, 21 Stokesia and six Crambe samples for analysis.

Glucosinolates in Cruciferous Vegetables--Up to 12 different glucosinolates (GS's) have been found to be present by detailed analysis of the edible part of 22 varieties of cabbage. Total GS content ranged from 275 to 1290 ppm on a fresh-weight basis. The GS's were analyzed for their aglucons by GLC or colorimetry; and it was determined that indolylmethyl GS's formed 18 to 63 ppm thiocyanate ion, allyl GS reverted to 4 to 146 ppm allyl isothiocyanate (ITC), 3-methylsulfinylpropyl GS to 30 to 164 ppm ITC, 4-methylsulfinylbutyl GS to 0.2 to 119 ppm ITC, and goitrin-forming GS produced 1.2 to 26 ppm goitrin. Head-to-head variation within each of 12 open-pollinated varieties was greater than this variation within 10 hybrid varieties.

In general within a variety, the larger the head, the lower was the GS concentration. Significant differences in amount and type of GS's can be attributed to genetic variability. Thus by means of GS analysis, plant breeders can now develop new varieties that are low in total GS's or low in only those GS's that form the most harmful products. During autolysis of raw cabbage (wet grinding) the GS's rapidly hydrolyze to form organic nitriles instead of goitrin and ITC's. From this study it may be assumed that nitriles are formed when raw cabbage is eaten. Three preparations of sauerkraut made from cabbage of unknown GS content, contained 4 to 16 ppm 1-cyano-3-methylsulfinylpropane instead of the expected 3-methylsulfinylpropyl.

The relationship of storage qualities of cabbage to GS content of 10 varieties is almost completed. Preliminary results indicate that cabbages of high GS content keep longer under refrigeration than do those containing less GS.

Determination of the GS content of radishes is also near completion, and that of other horticultural crops from the Crucifer family are in progress. Isolation of specific GS's and their hydrolysis products in sufficient amounts for biological testing has been started.

Kenaf--Storage tests on chopped green kenaf in 3-ton stacks for 1 year under a variation of conditions showed that covering of the stack with a tarpaulin, combined with sodium bisulfite treatment of the kenaf, afforded the best recovery of both total material and fiber yield, 70% and 45%, respectively.

Bulk density of whole kenaf stalks can be readily increased twofold by high-density baling. Commercial high-pressure balers should be able to increase the density even further. Cubing of chopped kenaf in field tests with commercial equipment increased the bulk density threefold. Kenaf can be harvested from 6 weeks before frost to 3 months after frost without loss of cellulose content.

Initial experiments of growing kenaf on reclaimed strip-mine land in 1975 were unproductive for a number of reasons. However, improvements were indicated and implemented in 1976 at a new location. The behavior during papermaking of pulps prepared under identical conditions from whole kenaf and its separated bark and core fibers were studied by scanning electron microscopy. Fiber structures remained virtually uncollapsed until the webs were nearly dry. Bark pulp responds to mechanical beating much the same as a southern kraft pine pulp. Kenaf core pulp does not become highly fibrillated during beating, but it becomes more flexible.

Crambe/Limnanthes--The CRIS work unit on lubricant research on seed oils of new and established crops will be terminated in September 1976, and scientists will be redirected to new challenges in new crop research. Wax esters prepared from crambe in Limnanthes oils have been made into high-pressure lubricant additives that displayed overall properties as good as or even better than commercial products from traditional sperm whale oil. Also products from jojoba oil were superior to sperm whale oil. First attempts with Limnanthes seed oil derivatives resulted in excessive foaming, an undesirable property, that has been eliminated upon further purification of either starting or intermediate materials.

Crambe was grown in Montana in 1975, and 286 tons were processed at Continental Grain's plant at Culbertson, MT. Subsequent feeding trials with the meal at Purdue University were terminated after 1 month for

two reasons. Due to the lateness of the crush and subsequent transportation delays of the meal to Indiana, the test cattle were already too old and too heavy to show clear-cut differences in weight gain. Secondly, after the first 30 days into the experiment, lack of overall weight gains indicated that the quality of the crambe meal might be substandard. Also last year's meal from Culbertson appeared to be poor in nutritional value. Subsequent analysis of the meals showed that they did contain the expected, acceptable levels of glucosinolates and breakdown products. However, protein solubility was below acceptable levels by standards set for nutritionally sound soybean meal. Soybean meal becomes substandard at protein solubility levels below 40%. Our 1974 crambe meal had a protein solubility of 22% in 0.5 M NaCl and 36% in 0.03 M NaOH. For the 1975 meal, the solubility values were 35% and 50%, respectively, whereas the 1973 Angola meal had solubilities of 54% and 72%. These data correlate directly with the weight gain data with beef cattle. At this point we have to make the decision of whether we will start a new feeding trial with the intermediate 1975 meal or wait for an improved meal from the 1976 crop.

Jojoba--Southern California and Arizona each have a production potential of 1/4 million lbs of dried jojoba seed from their wild stands alone. The native stands of Mexico (Baja California and Northern Sonora) could also provide a similar quantity. A 700-hectare plot of native stands is protected and cultivated near Ensenada, Baja California Norte, and produces over 20,000 lbs of seed annually. Other cultivated jojoba of 12-year-old trees in Mexico produces 44 lbs of seed per tree. Jojoba seedlings on irrigated plantations have all started to flower and produce seeds 3 years after germination.

Interest in jojoba is increasing everywhere. Established plantings in the United States include those at Marana, Safford, Messa, Yuma, and 20 acres at San Carlos in Arizona, 5 acres in Riverside and 60 acres near Indio, California. Jojoba is now also cultivated in South Africa, Australia, and Israel.

Tests for extreme pressure lubricants have shown sulfurized jojoba oil to be equal to or superior to sulfurized sperm whale oil. A Japanese cosmetics firm has received clearance to formulate and market jojoba products in Japan after extensive tests on acute toxicities. Jojoba oil and its hydrogenated solid wax can be formulated with paraffin, polyethylene, or polypropylene to produce a large variety of waxes, readily usable as replacements for beeswax, carnauba wax, and other plastic coatings. Jojoba oil is an excellent agent for controlling foaming in penicillin and cephalosporin fermentations for antibiotics production. The yield of penicillin is 10% to 20% greater when jojoba oil is used in place of sperm whale oil.

New Programs--The HSC Laboratory at NRRC has already initiated research in several new areas. Scientists are looking at the physics and chemistry of tomoto rot (Rhizoctonia solani) or its prevention in resistant tomato lines. Natural toxicant research is being expanded from the Cruciferae to include other plant families, such as the Umbelliferae. Physical chemical properties of fats, oils, and waxes will be evaluated to arrive eventually at better formulations for food, feed, and industrial products. For example, we will attempt to design a dye solution container with a sharp-melting plug that can be installed in an animal's ear, so that a slightly elevated body temperature will release the dye solution and thus provide an indicator for subclinically diseased animals. Some of our scientists will assist other research groups at NRRC in solving problems encountered in the high-priority development of aflatoxin detoxification processes for corn and other important sensitive crops.

Cooperation With and Use of The National Seed Storage Laboratory

Seeds for permanent storage in the National Seed Storage Laboratory are provided by cooperators, such as member companies of the American Seed Trade Association and the various State Seed Associations, State Agricultural Experiment Stations, the Soil Conservation Service, private and commercial plant breeders, ARS scientists, the Regional Plant Introduction Stations, the Inter-Regional Potato Station, and the Plant Variety Protection Office.

Seeds stored in the National Seed Storage Laboratory are distributed only when a requested item is unavailable elsewhere. Consequently, the number of accessions distributed annually will become increasingly larger as the Laboratory becomes the only source for more and more items.

Accessions held in permanent storage on August 3, 1976, total more than 92,331. Between January 1, 1976, to August 3, 1976, there were 922 new accessions and 450 second samples received.

During the past 7 years, shipments from the National Seed Storage Laboratory totaled 8,566 (2,887 horticultural, 3,661 agricultural, and 18 Plant Virus Indicator Collection) accessions, distributed to:

1970-1975

134 scientists at universities	(666 horticultural; 1,385 agricultural)
52 scientists at seed companies	(110 horticultural; 1,300 agricultural)
58 scientists at ARS facilities	(1,685 horticultural; 661 agricultural)
29 scientists in foreign countries	(300 horticultural; 747 agricultural)

1976
January 1-August 3

23 scientists at universities	(70 horticultural; 174 agricultural)
8 scientists at seed companies	(17 horticultural; 141 agricultural)
4 scientists at ARS facilities	(36 horticultural; 7 agricultural)
4 scientists in foreign countries	(3 horticultural; 259 agricultural)
2 facilities for regrowing	(987 agricultural)

7 scientists interested in Plant Virus Indicator Collection (18 samples)

The attached table gives a summary of the approximate number of accessions of various kinds of seed presently held at the Laboratory.

National Seed Storage Laboratory

APPROXIMATE SUMMARY OF THE NUMBER OF SAMPLES
OF VARIOUS KINDS OF SEEDS PRESENTLY IN STORAGE

CHEMURGIC		506
Crambe	111	
Dimorphotheca	21	
Osteospermum	43	
Others	331	
CORN		1,496
Zea	1,496	
COTTON AND FIBER		1,947
Gossypium	1,743	
Hibiscus	194	
Others	10	
FORAGE		6,153
Agropyron	387	
Arrhenatherum	150	
Bromus	170	
Cyamopsis	1,156	
Dactylis	378	
Elymus	61	
Eragrostis	106	
Festuca	351	
Lolium	195	
Lotus	374	
Medicago	690	
Onobrychis	150	
Phalaris	88	
Phleum	158	
Poa	165	
Trifolium	1,128	
Others	446	
GENETIC		3,965
Avena	566	
Datura	180	
Gossypium	46	
Hordeum	1,000	
Ipomoea	31	
Lycopersicon	500	
Oenothera	252	
Sorghum	150	
Triticum	312	
Zea	877	
Others	51	
OILSEEDS		12,645
Arachis	3,271	
Carthamus	1,315	
Glycine	4,001	
Linum	2,197	
Ricinus	997	
Sesamum	816	
Others	48	

ORNAMENTALS		681
Antirrhinum	72	
Lathyrus	25	
Leucaena	97	
Matthiola	42	
Petunia	94	
Tagetes	50	
Others	301	
GRAINS		33,797
Avena	5,297	
Eleusine	700	
Fagopyrum	117	
Hordeum	1,321	
Oryza	18,033	
Triticum	8,268	
Secale	56	
Others	5	
SORGHUM		13,195
Sorghum	13,195	
STRATEGIC		99
Atropa	1	
Digitalis	3	
Papaver	95	
SUGAR CROPS		126
Beta	126	
TOBACCO		1,045
Nicotiana	1,045	
VEGETABLES		15,756
Abelmoschus	125	
Allium	314	
Apium	131	
Beta	119	
Brassica	516	
Capsicum	654	
Citrullus	687	
Cucumis	1,152	
Cucurbita	459	
Daucus	120	
Lactuca	518	
Lens	480	
Lycopersicon	3,872	
Phaseolus	2,955	
Pisum	1,094	
Raphanus	71	
Solanum	1,319	
Spinacia	56	
Vigna	703	
Zea	84	
Others	327	

This includes 71 samples from the Plant Virus Indicator Collection.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
South Technical Service Center

Report to S-9 Committee
Introduction, Multiplication and Evaluation of New Plants for Agricultural and Industrial Uses and the Preservation of Valuable Germplasm
1976

Arnold G. Davis, Plant Materials Specialist, SCS
Fort Worth, Texas

This report is assembled from information submitted by the four Plant Materials Center Managers and seven Plant Materials Specialist serving the states in the south technical service center area, Soil Conservation Service.

Major emphasis is being placed on the evaluation of grasses, legumes, trees, shrubs and forbs for:

Erosion Control Critical erosion prone areas, including mine spoils roadsides, gullied areas, rural and urban disturbed areas are receiving primary attention.

Shoreline Erosion Control Shoreline erosion control along streambanks and wave action and wind erosion control along tidal estuaries, inland and oceanic waterfronts.

Wildlife Plants are being evaluated for wildlife food and cover in areas where bird and animal populations have either depleted the food supply or where food is not available in critical periods.

Forage Plants having potential to supply forage for livestock in problem soil areas, energy conservation and in seasons of short supply.

Environment Screening, windbreaks and attractiveness of foliage or flower are evaluation criteria for plants.

Initial studies are conducted at the plant materials centers, selections are made here and proof of performance is obtained through field studies in the potential area of use and in cooperative studies with other agencies. Many native plant assemblies are being evaluated in addition to plant introductions.

Over 600 plantings of promising plant introductions have been made and are being evaluated in field conditions.

A summary of the total number of accessions in some stage of evaluation or increase follows:

Plant Materials Centers
Summary of all PI Accessions
1976

Evaluation or Increase Status	Americus Georgia	Brooksville Florida	Coffeeville Mississippi	Knox City Texas	Total
Initial Evaluation	58	376	119	84	637
Advanced and Cultural Evaluations	92	3	13	3	111
Increase for Evaluation off Center	11	10	7	2	30
Breeder or Foundation Fields or Orchards	3	3	1	1	8
Seed Orchard, holding block or other	0	31	6	2	49
	174	423	146	92	835

Field Plantings

Locations & PMS	No. Accessions	No. Plantings
Tx. - DeReath Palmer	13	50
Ark., Ms., La. - Kenneth Blan	15	238
Ga., Ala. - Harry Haynsworth	8	148
Fla., P.R. - Don Smith	11	66
No. & So. Carolina - Sheridan Dronen	2	30
Ky., Tenn. - H. Wayne Everett	1	1
Total	50	533

HIGHLIGHTS
S-9 Technical Committee
Introduction, Multiplication and Evaluation of New
Plants for Agricultural and Industrial Uses and
the Preservation of Valuable Germplasm
1976

Arachis benthamii - PI-338282 - The (Arben) perennial forage peanut is a generally erect growing (50-60 cm high by 70-90 cm wide), deep green, vigorous, bunch type, dense, tender legume palatable to livestock and especially so to deer. It produces a few low growing stems which root if covered with moist soil. This plant is not rhizomatous and should not be considered as truly stoloniferous. However, stem cuttings of this plant have rooted and survived the most readily of all the perennial peanuts tested in this manner at the Brooksville Plant Materials Center. This variety has excellent hay or grazing potential. Growth is continuous throughout the frost free period if moisture and fertility are both available. R.D. Roush

Arachis glabrata - PI-262839 -(Arblick)perennial forage peanuts are dense-growing, deep green, rhizomatous peanuts of excellent forage potential on well drained soils. Annual forage production is usually 6.75 - 9.0 metric tons per hectare/year. Yields of 13.4 metric tons/hectare/year have been obtained. This variety is very resistant to attack by insects and diseases. The growing period is from the onset of the summer rainy season until killed to ground level by autumn frost. These materials continue to grow well at Brooksville, Lowell, Gainesville and Tallahassee, Florida. R.D. Roush

This peanut starts growth a little later than some other varieties. Has produced an excellent cover that is very dense. Perennial peanut stands in general are slow to establish. This plant tends to have a low dense appearance. Don Smith

PI-262817 -(Arbrook) perennial forage peanuts are dense-growing, strongly vigorous, rhizomatous peanuts of excellent forage potential on well drained soils. Annual forage production is comparable to the Arblick. This variety is resistant to attack by insects and diseases. The growing period is from last frost of spring to first killing autumn frost. Extremely drought resistant because of the good quantity of deep penetrating secondary taproots produced by the coarse rhizomes. This continues to grow well at Brooksville and Gainesville, Florida. R.D. Roush

Calamagrostis pseudophragmites - PI-220584, PI-222041 - This warm season grass spreads very rapidly by means of rhizomes. Seed production is poor due to a poor fill of seed. Growth and vigor are excellent, and the plant could have value for some type of erosion control. B.B. Billingsley

Castanea mollissima - PI-70314 - Attractive tree with much branching and good nut production. Nuts have a good flavor and provide food for deer and other wildlife species. H.J. Haynsworth

Desmodium cinerascens - PI-282691 - This is a perennial, erect, very leafy, woody stemmed legume that grows to 3.35 - 4.00 m tall. This leafy plant can provide abundant forage for cattle. The seed volunteer and develop well under overhanging competition from weeds and grasses. Seed is produced in the late spring and early summer period with a second and larger seed crop in mid to late autumn. The foliage has very good browsing potential with cattle. The stems are too woody for hay. This plant is well adapted at Brooksville and is resistant to locally available insects and diseases. R.D. Roush

Digitaria macroglossa - PI-299648 - This is a perennial, dense, bunch type, digitgrass with only moderate forage potential. It is tolerant to salt spray and has grown well on the coastal dunes in plantings made in Southeastern Florida. Growth response is good on the dunes and its initial growth exceeds that of some of the native dune species. The plant is propagated by separating tillers for planting. No seed production has been observed. The grass is heavily damaged by frosts at 24° F (-4.5°C) and use of the plant in Florida should be limited to the more southerly coastal areas. R.D. Roush

Has done well as beach stabilization plan in southern part of Florida. Has survived on dry sandy soils. While it has not spread much in a year's time, it has grown in association with the vine plants on the first dune. Don Smith

Eragrostis curvula - PI-295689 - PMT-718 - Higher forage production and cattle preference over common weeping lovegrass continue to be reported. Good to excellent survival and good growth have been reported where plantings were made in rather wet areas. D.N. Palmer

Eragrostis curvula - PI-295703 - PMT-729 - This wide-leaf, blue-green weeping lovegrass is preferred by cattle over 'Ermelo' or common weeping lovegrass. Plantings show good initial establishment and quick initial growth. Winterkill was again reported. D.N. Palmer

Eragrostis lehmanniana - PI-295698 - PMT-732 - Lehmann lovegrass is a perennial warm-season bunchgrass with ability to root at the nodes. It is a drought resistant species, suited for Western conditions. It originated in South Africa and tends to be a good seed producer. D. Lorenz

This accession continues to look promising in the drier parts of Texas on gravelly or sandy soil. It appears to have a good potential for increasing forage production in those areas where common lehmann lovegrass is used. No winterkill was reported. D.N. Palmer

Eragrostis robusta - PI-208385 - Has been established in a grazing trial at Pocahontas, Arkansas. In early comparisons this species seems to outyield Morpa, Ermelo, and common weepinglovegrass and it also appears to be more palatable to cattle. K. Blan

Fingerhuthia sesleriaeformis - PI-299968 - This bunch grass acts basically as a cool season plant at Coffeeville, Mississippi. It produces good quantities of foliage, though forage quality may not be real good. It does not go dormant as early as most cool season grasses. B.B. Billingsley

Festuca spectabilis - PI-257742 - This plant is also in a field evaluation planting on a channel improvement project in Western Kentucky. Outstanding characters include rhizome and stolon production. It appears more vigorous and more inundation tolerant than KY-31 tall fescue. Evaluation is not complete. H.W. Everett

Glycine ussurrinsis - PI-163453 - Is a reseeding soybean which we have studied for several years. Under proper management it gives good yields of seed which are readily taken by quail, dove, several other bird species, deer, and apparently by wild turkey. If the soil is disturbed (such as by disking) every two or three years this species seeds back rather well. K. Blan

Hemarthria altissima - PI-299993 - (Redalta) limpograss from Southern Rhodesia is a strong perennial, stoloniferous plant with fine abundant stems and leaves. It can stand to 1.0 - 1.3 m in height and produces stolons 1.5 - 2.75 m in length in one growing season. It is highly palatable to cattle and horses. The grass grows well on poorly drained soils. 40 - 44 metric tons per hectare per year of air dry forage have been produced. This is the most cold hardy of the three accessions currently being field tested in Florida. Frosts at -4° C have usually resulted in 15-20 cm of apical leaf and stem damage. Produces excellent ground cover and readily withstands grazing. An excellent grass for extending the grazing period in Florida. Has gained rather wide user acceptance within the State and is being successfully used in other Southeastern coastal states. R.D. Roush

Plant has done well on the wet soils in Florida. While it grows on some of the dryer soils, it is more susceptible to nematode damage. Plant has been well accepted for livestock pasture. D. Smith

Hemarthria altissima - PI-299994 - (Greenalta), an excellent grass of similar characteristics and adaptation as Redalta limpograss. It is preferred in some locations in Florida where wet, acid soils predominate. It is somewhat less productive, less stoloniferous and produces ground cover inferior to that produced by the Redlata. R.D. Roush

Hemarthria altissima - PI-299995 - (Bigalta) limpograss, is a larger, coarser leaved and stemmed limpograss which is both highly palatable and digestible. It produces dense, leafy, stoloniferous stands of perennial grass highly adapted to the organic soils of Florida. The grass can be planted directly into 10-15 cm of water as cuttings, root and resume excellent growth. The grass produces excellent ground cover and withstands periods of flooding of 90-100 cm. It is currently receiving strong farmer and rancher acceptance and utilization in Central and South Florida. The grass is the most easily frost damaged of the three limpgrasses currently being field tested in Florida. R.D. Roush

This large leaf grass is growing in favor as a livestock pasture in Central Florida and Plantings are being made in Northern Florida. Plant has survived the colder temperatures of Northern Florida. Has been used as late fall pasture after frost along with summer grazing. D. Smith

Hemarthria altissima - PI-299993, 299994, and 299995 - Several small field plantings (1-5 acres) of one or more of the above three accessions have been planted in the Waller County area. These plantings and the original plantings at Prairie View A&M University indicate a good potential for the use of one or more of these accessions for pasture improvement in southeast Texas. Plants of all three accessions have made good growth, but PI-299995 is again the most vigorous and has produced the most growth. D.N. Palmer

Indigofera pseudotinctoria - PI-197015 - False anil indigo is being field tested for suitability as an erosion control plant in the Sandhills (MLR-137) and on coastal sand dunes (MLR-153). Preliminary information from field plantings is encouraging and both direct seeding and transplanting seedlings have been successful. S.I. Dronen

Perennial, deep-rooted, semi-decumbent legume with potential for providing cover on cirtical areas and controlling soil erosion. It can be established from seed. H.J. Haynsworth

Lespedeza virgata - PI-218004 - 'Ambro' virgata lespedeza is being evaluated for erosion control purposes on critical areas especially roadsides. It appears to be climatically adapted to northern Mississippi and Arkansas. It does not thrive further south. This plant appears to have real potential for this use within its area of adaptation. K. Blan

An attractive, low growing perennial that is effective in helping control erosion on roadbanks, and other critical areas. H.J. Haynsworth

Malus hupehensis - PI-122586 - Is a tall gowing crabapple which begins to produce fruit in about five years. After a few more years it produces heavy crops of small (3/8" diameter) crabapples which are readily taken by songbirds. The lower apples are also taken by deer. This plant usually produces beautiful white flowers in abundance early in the spring. K. Blan

An attractive tree with columnar form. Moderate production of small furits which provide food for birds and other wildlife species. H.J. Haynsworth

Panicum coloratum - PI-166400 - 'Selection'-75 Kleingrass, a warm-season perennial bunchgrass, was introduced from Africa. It is fine-stemmed, leafy, spreads by seed or rhizomes and is adapted to a wide range of Southern soils and moisture conditions. It is one of the earliest greening species at the Knox City PMC and produces forage throughout the summer until heavy frost in the fall. D. Lorenz

Released in 1968 as 'Selection 75' kleingrass, seed of this grass continues to be much in demand. As a result of a conference on "Developing Pilot Programs for Small Farm Land Owners and Operators" and assistance and cooperation of the Texas Department of Agriculture Seed Certification Program and SCS, two farmers have established plantings of 'Selection 75' kleingrass for the production of certified seed. A check with the Texas Department of Agricultrue, Seed and Plant Division, shows that as of June 30, 1976, there were 67 acres of 'Selection 75' being grown for certified seed production in Texas. Price of certified seed continues to be $6.50 to $8.00 per PLS, with noncertified $.75 to $1.00 less. D.N. Palmer

Paspalum nicorae - PI-202044 - A perennial grass that spreads by short rhizomes forming a good sod on sandy soils. Responds favorably to close clipping or grazing. Potential forage and cirtical area cover plant. H.J. Haynsworth

Pennisetum purpureum - PI-300086 - Napiergrass, is large, strong, very vigorous, perennial, leafy, slow spreading, bunch type grass grows to 3-4 m in height. It is adapted to soils having a broad drainage range. Deep rooting makes this grass exceptionally well adapted to deep droughty sands. The material is well structured for use as a field windbreak and is climatically adapted throughout Florida. It is an excellent producer of forage and is well adapted for use as green chop feed or silage. Yields of 135 - 157 metric tons per hectare have been obtained. R.D. Roush

Pistacia chinensis - PI-21970 - A tree of good form and attractive fall color. It produces small fruits that are eaten by various bird species. H.J. Haynsworth

Chinese pistache is being evaluated for adaptation in the Blue Ridge (MLR-130). It has already proved to be adapted to the rest of the Carolinas. S.I. Dronen

Quercus acutissima - PI-142294 - Plants have had high survival rate in Florida and have been used for wildlife, beautification plantings. Mainly on outdoor classroom laboratories. D. Smith

Trifolium vesiculosum - PI-233782 - "Meechee" was cooperatively released by MSU and SCS for forage production several years ago. This accession has more recently been evaluated for use by wildlife. It has been determined that this plant is used by deer, rabbits, and wild turkey. K. Blan

Report of Regional Station Activities
to
S-9 Technical Committee
July 1, 1975 to June 30, 1976

Plant Introduction

Seed or plants of 5064 new introductions were received during the year ending June 30, 1976. The new material consists of 4079 pigeonpea accessions, 395 mungbeans, 192 peanuts, 158 Leucaena, and 240 accessions representing numerous other species. These new additions increased the inventory of seedstocks held at the Regional Station to 33,700 accessions. Some of the larger collections are:

Arachis spp. (peanuts)	4,300
Sorghum spp.	3,700
Cajanus cajan (pigeonpea)	4,150
Capsicum spp. (pepper)	2,200
Vigna spp. (cowpea, mungbean)	3,600
Warm-season grasses	5,800
Cucumis spp. (cantaloupe)	1,700
Citrullus spp. (watermelon)	650
Winter legumes	1,900
Others (sesame, guar, castors, okra, eggplant, summer legumes)	5,700
TOTAL	33,700

Production of Seed

3306 introductions are being grown at the Regional Station for seed increase and preliminary evaluation. In addition to these the large collection of pigeonpeas mentioned above was increased at Isabela, P.R. by Dr. Raul Abrams and Mr. Frank Julia. With financial support from the National Seed Storage Laboratory arrangements were made with Dr. Matlock to increase 500 Spanish type peanut introductions and with Dr. R. O. Hammons to increase 630 other peanut accessions. These increases are for both NSSL and the Regional Station. Fifty new cantaloupe introductions are being increased at the U.S. Vegetable Breeding Laboratory, Charleston, S. C. Arrangements were made with Mr. E. H. McIlvain, U.S. Southern Great Plains Field Station, Woodward, Oklahoma, for increasing 420 introductions of old world bluestems. Dr. A. L. Kretschmer, Agricultural Research Center, Ft. Pierce, Florida, is increasing the new introductions of Stylosanthes. Following is a summary of materials planted at the Regional Station this year:

Cantaloupes	301
Summer grasses	668
Peppers	36
Brassica	133
Cowpeas	149
Watermelons	200
Castorbeans	330
Mungbeans	586
Peanuts	480
Gourds	99
Pumpkin	60
Eggplant	15
Summer legumes	200
Total	3,257

Cataloguing and Distribution of Seed

Catalogues of Solanum, Table Legumes, Winter Legumes, and Peanuts have been updated recently. Some of them were sent to you earlier this week. Others are being printed.

During the last year there was a resurgence of interest in plant introductions as a source of higher protein content and resistance to diseases and insects. Entire collections of several crops were requested by various scientists interested in screening for one of these characteristics.

Following is a summary of the distribution of seed and plants in the Southern Region during FY-76:

Packets of seeds and plants distributed in Southern Region FY-76

State	S-9	NE-9	NC-7	W-6	Other	Total
Alabama	61	0	0	1	0	62
Arkansas	58	0	2	0	0	60
Florida	451	858	417	193	2855	4774
Georgia	1909	57	108	287	105	2466
Hawaii	54	0	6	0	0	60
Kentucky	3	0	43	8	0	54
Louisiana	109	0	78	0	37	224
Mississippi	38	5	10	316	9	378
North Carolina	17	1	29	75	20	142
Oklahoma	3118	31	3	17	0	3169
Puerto Rico	739	19	0	45	97	900
South Carolina	215	6	0	726	2	949
Tennessee	1	0	0	0	0	1
Texas	294	0	5	6	1	306
Virginia	21	0	0	2297	1	2319
NE-9	848					848
NC-7	436					436
W-6	374					374
Foreign	3443					3443
NSSL	94					94
TOTAL	12,283	977	701	3971	3127	21,059

Screening for Disease Resistance

Anthracnose of Watermelon: Watermelon breeders expressed a strong need for a source of resistance to race 2 anthracnose. To meet this need we began screening the collection of plant introductions for resistance to an isolate highly pathogenic on Charleston Gray. Two hundred introductions have been screened to date, and three appeared to have some resistance.

Bacterial Spot of Pepper: Three hundred thirty-six new pepper introductions were screened for resistance to bacterial spot. None of them showed any resistance in the preliminary screening tests.

Watermelon Mosaic Virus 1 in Cantaloupe: Cantaloupe P.I. 180283 does not show symptoms when inoculated with WMV-1, except for local lesions on the inoculated true leaves. Research in cooperation with Dr. J. W. Demski showed that the virus can be recovered from the local lesions but does not move systemically. WMV-1 has not been a serious problem on cantaloupe in the South, but its widespread occurrence on Cucurbita moschata in the nursery during 1975 indicates that this virus is becoming more widely distributed.

Peanut Leafspot Resistance: Peanut accessions that have shown resistance to Cercospora leafspot were planted at different times so that all entries would mature on approximately the same date. Differencies in yield and in the severity of leafspot were highly significant in favor of some introductions. These results indicate that late maturity is not the primary factor associated with resistance to leafspot. In this test P.I.'s 109839, 162857, 259679, 259747, 259685 and 270806 were equally resistant. P.I.'s 259747 and 270806 yielded twice the pod weight that was produced by Florunner.

Seed-borne Pathogens of Plant Introductions:

(1) Viruses of southern pea: Virus diseases were severe in the 1975 nursery and were a major factor in the failure of many southern pea introductions to mature seed. Reaction of four tester plants to samples from the nursery indicated that at least 3 of the 4 viruses known to occur on this crop in Georgia were present in the nursery.

(2) Seed-transmitted viruses of peanuts: Peanut mottle virus (PMV) was common in the 1975 peanut nursery and in many commercial peanut plantings in the southeastern peanut growing areas. One hundred seed of each of 20 intorductions grown in the 1975 nursery were planted in the greenhouse to determine the percent of seed transmission. Plants showing symptoms were indexed by rubbing sap on Topcrop bean. Eight of the introductions indexed positive for PMV. Symptoms and indexing indicated that from 1.1 to 5.9% of the emerging seedlings were infected. Since PMV is commonly carried in commercial seed produced in most of the United States, the presence of this virus in seed of plant introductions has little practical significance to users of peanut germplasm.

Powdery Mildew on Cucurbits: Collections of powdery mildew provided by cooperators in South Carolina, Alabama, and Florida indicate that the population of the pathogen has changed so that it produces a race 1 reaction on PMR45. It is important for breeders to monitor the population of the pathogen for significant changes in pathogenicity since a change in the pathogen population to a race 2 pathogenicity could result in severe disease on varieties and breeding lines highly resistant to the present field population of the pathogen. Races can be monitored by the inclusion of PMR45 and either PMR6 or Ga-47 in the breeding nurseries and variety trials. PMR45 is readily available and seems to be homozygous for a resistant reaction to race 1 and susceptible reaction to race 2. Stocks of Ga-47 and PMR6 are more difficult to obtain and some stocks of Ga-47 have contained many susceptible plants. Four stocks of Ga-47 were tested for reaction to powdery mildew in our greenhouse last winter. All stocks produced at least 1 susceptible plant when 100 seeds of each stock were planted and one stock produced 35 susceptible plants. A selection of P.I. 124111 maintained by Dr. G. W. Bohn produced 52 symptomless plants and none with symptoms.

Screening for Insect Resistance

Laboratory facilities for entomological research have been completed. Space has been provided for and equipped with environmental chambers; and a self-contained room for culturing insects is being constructed which should permit selective year-round screening for insect resistance in available plant materials. Evaluation of the melon collection for resistance to the melon aphid will be attempted during the coming winter.

Field observations were made of the materials being increased in 1976 but the observations were complicated by the insecticide application to insure seed increase.

Peanuts: Definite differences in plant response to thrip infestations were observed. However, none of the 480 introductions observed were superior to the Tiftspan border plantings.

Eggplant: Several introductions appeared to be quite tolerant to Colorado potato beetle.

Budget

Funds for operating the Regional Station during FY-76 and the proposed budget for FY-77 are shown in the following table:

Regional Station Budget

Source of Funds	FY-76	FY-77
Regional Research (Pooled)	$136,740*	$ 64,740
Regional Research (Georgia Station)	0	14,821**
Hatch	3,000	0
State Appropriations	855	0
Agricultural Research Service	152,000	150,800
TOTAL	$292,595	$230,361

Expenditures		
Personal Services	$141,990	$165,004
Equipment	52,563	28,357
Operating Expenses	7,336	10,000
Travel	6,400	2,500
Seed increase at other locations	1,500	12,000
Seasonal Labor	10,400	12,500
Seed storage building	72,000	0
TOTAL	$292,189	$230,361

* Includes $72,000 non-recurring allotment of Regional Funds for construction of seed storage building.

** In addition to these funds the Georgia Station provides land, office space, and utilities for operating the Regional Plant Introduction Station.

Regional Funds provided by the Southern Directors and ARS funds available to the Regional Station were increased considerably for additional personnel and facilities.

New personnel

1. Jerry Goddard, Agricultural Research Assistant I, Georgia Station
2. James Walden, Agricultural Research Assistant I, Georgia Station
3. James T. Strickland, Agricultural Research Technician (Plants), ARS
4. Richard V. Connin, Entomologist, ARS

Facilities and equipment

1. Seed storage building (Bids now being solicited)
2. Two environmental growth chambers
3. Environmental room
4. Cabinets and benches in Entomology Laboratory
5. 20-ft. addition to machinery storage building
6. Tractor
7. Replacement of irrigation pump and engine
8. Replacement of pick-up truck
9. Soil sterilizer and cart
10. Laminare station

APPENDIX B

Procedure for Requesting Plant Explorations

Procedure for Requesting Plant Explorations
Through Regional Project S-9

Requests for plant explorations, foreign or domestic, should be submitted in a formal project plan to the regional coordinator of Project S-9 or to your representative on the S-9 Technical Committee by May 1, prior to the S-9 annual meeting. The proposal should be of interest to and supported by two or more states. Plans for an exploration should be written according to the following outline.

I. Title
II. Objectives (specific types of germplasm to be collected)
III. Justification (why is this germplasm needed?)
IV. Approach (areas to be explored and dates of travel)
V. Budget (estimate of costs of (1) transportation,
(2) per diem, and (3) supplies)
VI. Personnel

The plan will be reviewed by the S-9 sub-committee for plant germplasm to determine its merits in relation to other germplasm needs and for specification of areas to be explored, date of travel, cost, and personnel. The germplasm sub-committee may recommend it for consideration by the S-9 Technical Committee, or if necessary, the proposal will be returned to the author for revision or additional information. When approved by the S-9 committee, the plan will be forwarded to the ARS Plant Germplasm Coordinating Committee for consideration with exploration requests from the other three regions. Based on national needs for germplasm and available funds, the ARS committee assigns priorities to the various proposals and makes recommendations to the Administrator of ARS for funding each. Individuals submitting requests will be informed by the Regional Coordinator of action taken by the reviewing committees. Where ARS personnel are involved in the exploration activity they must follow the policy of prior approval for foreign travel.