MINUTES OF THE MEETING OF THE S-9 TECHNICAL COMMITTEE ON THE INTRODUCTION, MULTIPLICATION, AND EVALUATION OF NEW PLANTS FOR AGRICULTURAL AND INDUSTRIAL USES AND THE PRESERVATION OF VALUABLE GERMPLASM

University of Georgia
Experiment, Georgia

July 25-26, 1984

Submitted by

David L. Coffey, Secretary
S-9 Technical Committee 1983-84

AGENDA

S-9 Technical Committee
University of Georgia
Experiment, GA
July 25 and 26, 1984

1. Call to Order, 8:00AM, July 25, 1984.

2. Introduction of Attendees.

3. Official Welcome - Dr. Charles Laughlin, Research Director and Administrative Advisor.

4. Approval of Minutes, 1983 Meeting.

5. Additions to and Approval of Agenda, 1984 Meeting.

6. Appointment of Committees:

   A. Nominations
   B. Time and place of next meeting.
   C. Resolutions

7. Introduction of and Remarks from the Administrative Advisor.

8. Report on Peanut Stripe Virus - Dr. Jim Demski.

9. State Progress Reports and Research Plans.

10. Other Agency Reports and Research Plans.

11. Introduction of the P. I. Station Staff (immediately after 10:00 Break).

12. National Program Staff Report.

13. Plant Exploration Proposals.

14. Committee Reports and Acceptance.

   A. Nominations
   B. Time and place of next meeting
   C. Resolutions

15. Unfinished or New Business.

16. Adjournment, Noon, July 26, 1984.

A Tour of the Plant Introduction Station will be the afternoon of 7-25-84. A Banquet will be held on the evening of 7-25-84 at 7:00PM.

1. CALL TO ORDER

The 1984 annual meeting of the S-9 Technical committee was called to order by Chairman Oliver Smith at 8:30 a.m. on July 25 in the auditorium of the Georgia Experiment Station, Experiment, Georgia.

2. INTRODUCTION OF ATTENDEES

Name	Address	Phone
Charles Adamson	USDA-ARS Experiment, GA 30212	(601) 325-2311
*David W. Bradshaw	Dept. of Horticulture Clemson University Clemson, SC 29631	(803) 656-3404
Dorris C. Clark	USDA-ARS National Seed Storage Lab. Fort Collins, CO 80521	
*David L. Coffey	Dept. of Plant and Soil Sci. University of Tennessee Knoxville, TN 37901	(615) 974-7391
James A. Duke	GRL, PGG USDA, Beltsville, MD 20705	(301) 344-4419
H. Wayne Everett	Plant Materials Specialist USDA-SCS Fort Worth Federal Center Bldg. 23, Room A-3 Fort Worth, TX 76115	
*Bill Fike	Dept. of Crop Science North Carolina State Univ. Raleigh, NC 27650	(919) 737-3267
*Carl S. Hoveland	Agronomy Department University of Georgia Athens, GA 30602	(404) 542-2461
*Philip J. Ito	461 W. Lanikaula St. Hilo, HI 96720	(808) 935-2885
*Richard Johnson	Horticulture Department VPI & SU Blacksburg, VA 24061	(703) 961-7639

Name	Address	Phone
*James S. Kirby	Agronomy Department Oklahoma State University Stillwater, OK 74078	(405) 624-6417
Robert J. Knight, Jr.	USDA/ARS Subtropical Agric. Exp. Station 13601 Old Cutler Road Miami, FL 33158	(305) 238-2905
*Gilbert Lovell	USDA-SEA-AR, P. I. Station Experiment, GA 30212	(404) 228-7255
Elliot Mavimbela	Graduate Student North Carolina State Univ. Raleigh, NC 27650	
*Teddy Morelock	Dept. of Horticulture University of Arkansas Fayetteville, AR 72701	(501) 575-2603
Mike Owsley	Plant Materials Center Mgr. American Plant Materials Ctr. Patton Drive Americus, GA 31709	
*Jeff Pedersen	Dept. of Agronomy & Soils Auburn University, AL 36830	(205) 826-4100
*Gordon M. Prine	University of Florida Agronomy Department 304 Newell Hall Gainesville, FL 32611	(904) 392-1811
*Oscar D. Ramirez	University of Puerto Rico Horticulture Department Agri. Exp. Sta. College of Agriculture Rio Piedras, Puerto Rico	(809) 767-9705
Bill Rhodes	Horticulture Dept. Edisto Experiment Station Blackville, SC 29817	(803) 284-3343
*Roy E. Sigafus	Agronomy Department University of Kentucky Lexington, KY 40546	(606) 257-3144

*Oliver E. Smith	Soil & Crop Sciences Dept. Texas A&M University College Station, TX 77843	(409) 845-5389
Donald Surrency	Plant Materials Specialist USDA Soil Conservation Service State Office Fed. Bldg., Box 13 355 E. Hancock Ave. Athens, GA 30601	
Francisco Vazquez	USDA, ARS, TARS Box 70 Mayaguez, Puerto Rico 00709	(809) 834-2435
*Clarence Watson	Mississippi State University Box 5248 Mississippi State, MS 39762	
Samuel G. Wiggins	CSRS/USDA Washington, DC 20251	(202) 447-4202

*Members of the S-9 Technical Committee.

4. APPROVAL OF MINUTES

Dr. Jim Kirby moved approval of the 1983 minutes as circulated. The motion was seconded by Gordon Prine and approved

5. APPROVAL OF AGENDA

A modification of the tentative agenda prepared by chairman Smith to include

(1) introduction of P. I. Station Staff,

(2) a report on peanut stripe virus and

(3) a report on the virus indexing of sweet potato germplasm was approved.

6. APPOINTMENT OF COMMITTEES

Chairman Smith appointed the following committees:

A. Nominations — David Coffey, David Bradshaw, Philip Ito

B. Time and Place of Next Meeting — James Kirby, Roy Sigafus, Jeff Pederson

C. Resolutions — Oscar Ramirez, Teddy Morelock, Bill Fike

7. REMARKS FROM ADMINISTRATIVE ADVISOR

Dr. Charles Laughlin expressed his thanks for the opportunity to attend the meeting and his opportunity to serve as administrative advisor to the S-9 Technical Committee.

8. STATE PROGRESS REPORTS

The following state representatives presented their annual reports. Copies of the state reports are included in Appendix I.

Representative	State
J. Pedersen	Alabama
T. E. Morlock	Arkansas (no written report)
G. M. Prine	Florida
C. S. Hoveland	Georgia
P. J. Ito	Hawaii
R. E. Sigafus	Kentucky
C. E. Watson	Mississippi
W. T. Fike	North Carolina
J. S. Kirby	Oklahoma
O. D. Ramirez	Puerto Rico
D. W. Bradshaw	South Carolina
D. L. Coffey	Tennessee
O. E. Smith	Texas

9. INTRODUCTION OF THE SOUTHERN P. I. STATION STAFF

Gil Lovell, Southern Regional Director, introduced his staff and briefly described the duties and responsibilities of each person. The following P. I. Station Staff members were in attendance: Verlene Byous, Joy English, Sandra Harrison, Linda Impson, Lebus Kilgore, Alex Leverett, Keith O'Dell, Jerry Scott, Merrelyn Spinks, Jim Strickland, Caywood Chapman.

10. COMMITTEE REPORTS

A. Nominations - David Bradshaw, Chairman of the nominating committee, reported that his committee wished to nominate David Coffey (Tennessee) as Chairman and Jeff Pederson (Alabama) as Secretary of the S-9 Technical Committee for the 1984-85 term. These nominees were elected by acclamation.

B. Time and Place of Next Meeting - In response to an invitation from Bill Fike (North Carolina), Jim Kirby, Chairman of this committee, moved that the 1985 annual meeting of the S-9 Technical Committee be held at Raleigh, North Carolina July 23-24, 1985. Motion was approved.

C. Resolutions - Oscar Ramirez, chairman of the Resolutions Committee, moved acceptance of the following resolutions:

Resolution 1

Be it resolved that the S-9 Technical Committee expresses its appreciation to Dr. Gil Lovell our coordinator, to Director Charles Laughlin, our new Administrative Advisor and their associates at the University of Georgia Agricultural Research, Experiment for their efforts in hosting our annual meeting. The facilities and the extras were great.

Resolution 2

Be it resolved that the S-9 Technical Committee expresses a special thanks to the staff of the Plant Introduction Station for the extra effort they expended in preparing for our meeting and their assistance to us while here. Our field trip guides and speakers are to be commended for a job well done.

Resolution 3

Be it resolved that the S-9 Technical Committee offer a special appreciation to speakers Dr. Jim Demski for his update of the Peanut Stripe Virus situation and Dr. Jim Moyer for his plans and efforts for a "clean" sweet potato repository. Comments by guests were also a welcome assist to our meeting.

Resolution 4

Be it resolved that the S-9 Technical Committee express special recognition to Dr. Grover Sowell and to Dr. John Bowers for their long and faithful service to our committee. We welcome T. E. Morelock as John's replacement from Arkansas and Carl Hoveland as the new representative from Georgia.

These resolutions were approved.

11. SWEET POTATO VIRUS INDEXING REPORT

Dr. Jim Moyers from North Carolina State University gave a progress report on virus indexing of sweet potato germplasm. He outlined the clean-up and indexing procedures followed and defined some of the problems associated with the vegetative propagation and maintenance of sweet potato germplasm.

12. PEANUT STRIPE VIRUS REPORT

Dr. Jim Demski reported on the incidence and occurence of peanut stripe virus. He showed photographs of symptoms and described a test that had been developed for seed assay.

13. OTHER AGENCY REPORTS

Dr. Samuel Wiggans gave a CSRS update. He informed the committee that competitive grants were being funded in the area of pest research, stress physiology and interdisciplinary investigation, and encouraged committee and colleagues to apply. He reported on the information sheet, "Pink Sheet" which was available to all experiment station personnel through his office. He sadly also reported the recent death of Dr. Clarence Grogan.

Dr. James A. Duke representing Dr. George White presented the report for the national laboratory (Report included in Appendix I).

Dr. Dorris C. Clark from the National Seed Laboratory presented the report by Dr. Bass, director. (Report included in Appendix I).

Dr. H. Wayne Everett presented the report of the Soil Conservation Service (Report included in Appendix I).

14. PLANT EXPLORATION PROPOSALS

Prior to the meeting, Gil Lovell had circulated to the committee a report of the explorations carried out in FY84 and proposals submitted for funding in FY85. He reported that the proposal review committee recommended order of priority for 1985 proposals was (1) Vaccinum, Fragaria, Ribes, and Rubus to Pacific Northwest, $6,020.00, (2) Gossypium spp and other taxa (Sorghum, Pennisetum, Glycine, Hibiscus) to Western Australia and Northern Territory, $8540.00, and (3) Gossypium spp to Galapagos Islands and Ecuador, $6500.00. (Report included in Appendix II).

15. UNFINISHED OR NEW BUSINESS

Bill Fike posed a question concerning S-9 members subscription to "Diversity" magazine. Gil Lovell responded that this was being investigated and he felt the project should support this idea and he was going to pursue it further.

David Bradshaw questioned the policy of inviting access users to annual meetings. It was agreed among the committee that this was appropriate and should be encouraged.

16. ADJOURNMENT

There being no further business, Chairman Smith adjourned the meeting at 11:45 a.m. July 26.

17. TOUR

A tour of the Plant Introduction Station was conducted on the afternoon of July 25.

APPENDIX I

STATE AND FEDERAL AGENCY REPORTS

Written progress reports are attached in the following order:

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

National Seed Storage Laboratory
Soil Conservation Service
Northern Regional Research Center
National Plant Germplasm System
Tropical Agriculture Research Station
Subtropical Horticulture Research Station
Germplasm Resources Laboratory
Southern Regional Plant Introduction Station

S-9 Technical Committee Report

Agency: Auburn University

Submitted by: J.F. Pedersen

Address: Department of Agronomy and Soils, Auburn University, AL 36849

Accession User: J.F. Pedersen

Address: Department of Agronomy and Soils, Auburn University, AL 36849

Nature of Research: Improved cultivar development from tall fescue P.I. accessions.

Progress to Date: Screening of the collection of tall fescue accessions is continuing at Tallassee and Brewton, Alabama. The following accessions have been selected for disease resistance, vigor, and/or winter yield potential in the extreme southeast: P.I. 283286, 265357, 283287, 283298, 297903, 297909, 315432, 316252, 321676, 422719, 422737, 422744, 422747, 422749, 422750, 422765, 423049, 423050, 325322, 388897, 388898, 418601, 418604, 418606, 418608, 419532, 422621, 422697, 422704, 422705, 422706, 422707, 422714, 423054, 423107, 442117, 442120, and 449300.

Publications: J.F. Pedersen, M.J. Williams, E.M. Clark, and P.A. Backman. 1984. Indications of yearly variation of Acremonium coenophialum in seed from a permanent tall fescue sward. Crop. Sci. 24:367-368.

Cultivar Releases: None

Accession User: J.F. Pedersen

Address: Department of Agronomy and Soils, Auburn University, AL 36849

Nature of Research: Improved germplasm development from Phalaris aquatica L. P.I. accessions.

Progress to Date: A germplasm made up of individuals that are adapted to Alabama conditions was produced and released. Individuals from the following accessions were included: PI 193056, PI 196338, PI 202394, PI 206710, PI 207961, PI 207963, (2 plants selected), PI 207964, PI 219636, PI 223182 (3 plants selected), PI 232088, PI 236542, PI 236543, PI 236545, PI 240227 (2 plants selected), PI 240229, PI 240233, PI 240272, PI 240276, PI 240278, PI 240283, PI 284204 (3 plants selected), PI 284203, PI 284205, PI 284218, PI 284243, (2 plants selected), PI 294263, PI 302437 and PI 308605. The release of this germplasm marks the termination of breeding work with Phalaris aquatica at this station.

Publications: J.F. Pedersen, C.D. Berry, R.L. Haaland, and C.S. Hoveland. 1984. Registration of AU 1 Phalaris Germplasm. Crop Sci. 24:626.

J.F. Pedersen, C.S. Hoveland, R.L. Haaland, and C.D. Berry. 1983. Registration of AU Oasis Phalaris. Crop Sci. 23:597.

Cultivar Releases: AU 1 Phalaris Germplasm

Accession User: J.F. Pedersen

Address: Department of Agronomy and Soils, Auburn University, AL 36849

Nature of Research: Development of improved Trifolium spp. cultivars from P.I. accessions.

Progress to Date: See increase blocks of selections from the following accessions were established: P.I. 304380 (T. nigrescens), P.I. 369053 (T. mutabile), and P.I. 287174 (T. purpureum). The T. nigrescens and T. mutabile blocks were lost due to extreme cold in December-January. Alternate seed handling processes are being explored for the T. purpureum selection since conventional methods of harvest yield few clean seeds.

Publications: None

Cultivar Releases: None

Accession User: J.F. Pedersen

Address: Department of Agronomy and Soils, Auburn University, AL 36849

Nature of Research: Development of a southeasternly adapted birdsfoot trefoil cultivar from P.I. accessions.

Progress to Date: Seed of the experimental line, ATP (selected from P.I. 188556 and 251558) is being increased for release as an improved cultivar. Documents will be presented to the Auburn University variety release committee petitioning for release this summer. Data has been made available from the University of Georgia which support our earlier statements about this line. It is adapted in the southeast and is continuing to give excellent cattle gains in grazing situations.

Publications: None

Cultivar Releases: None

Accession User: J.D. Norton

Address: Department of Horticulture, Auburn University, AL 36849

Nature of Research: Melon breeding

Progress to Date: Continued screening of P.I. material for multiple disease resistance (MDR) is underway. Particularly good MDR has been isolated in P.I. 140471 (cantaloupe), PI 271778 (watermelon), and PI 189225 (watermelon). These disease characters are being incorporated into acceptable commercial varieties. One new cultivar, AU-Jumbo was release in 1984. It is a MDR, large fruited cantaloupe. Besides watermelon and cantaloupe, MDR is being incorporated into Honeydew, with a line being considered for possible release in the near future.

First year demand for AU-Producer and AU-Jubilant watermelon has exceeded supply. Extremely high grower acceptance is anticipated.

Publications: Norton, J.D., J.M. Snell, H.M. Bryce, C.C. Carlton, and M.H. Hollingsworth. 1983. Breeding watermelons for disease resistance. Highlights of Agricultural Research, Vol. 30, No. 2.

Boyham, G.E., Jr. 1984. Inheritance of resistance to Alternaria cucumerina (Ell. and Ev.) Elliot (Alternaria leaf blight) in muskmelon, cucumis melo L. M.S. Thesis, Auburn University.

Norton, J.D. and G.E. Boyhm. 1984. Resistance to Alternaria cucumerina in muskmelon. Abstr. Hort. Sci. 18:88.

Cultivar Release: AU-Jumbo cantaloupe

Accession User: G.C. Sharma, J. Schenk, and J.C. Anderson

Address: Department of Natural Resources and Environmental Studies, Alabama Agricultural and Mechanical University, Normal, AL 35762

Nature of Research: Evaluation of exotic vegetables for their adaptability to small farm conditions in the Southeastern U.S.

Progress Report: Variety trials of the following species, including P.I. accessions, were conducted: Long melon (Cucumis melo), Honey dew (C. melo), Gynoecions cucumber (C. sativus), Yard long bean (Vigna sesquipedalis), Edible Amaranth (Amaranth spp.), Edible soybean (Glycine spp.), Mung bean (Phaseolus aureus), Long radish (Raphanus sativus), Edible pod pea (Pisum sativum) and Seedless watermelon (Citrullus lanatus). Further work on Edible Amaranth and Honey dew's has been decided against. A virus disease common to all Vigna entries has been noted and is in the process of being identified.

A reduction of the numbers of entries in variety tests of the other species is being made based on last year's results.

Publications: G.C. Sharma, J.C. Anderson, and J. Shenk. 1983. The adaptability and production of exotic vegetables on small farms. Biannual report of Vegetable Breeding in the Southern United States, Hawaii, and Puerto Rico.

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S-9 TECHNICAL COMMITTEE REPORT

Agency: University of Arkansas

Submitted by: T.E. Morelock

Address: Department of Horticulture and Forestry, 316 Plant Science Building, University of Arkansas, Fayetteville, AR 72701

Accession User: D.E. Longer
Address: Department of Agronomy, Plant Science Building 115, University of Arkansas, Fayetteville, AR 72701
Nature of Research: Grain Amaranth
Progress to Date: Some of the most promising new crops are the grain amaranths. Amaranths contian the C_4 photosynthetic pathway which is capable of utilizing the sun's energy more efficiently in the fixation of CO_2 than C_3 plants. The C_4 plants require less water than crops possessing the C_3 pathway. Amaranths are also low maintenance crops which are more capable of growing on poor, dry soils than major cereal crops.

Grain amaranths have the potential of becoming a major food source for man and domesticated animals. The grain is particularly valued for its nutritional properties. Its average nutrient composition compares well to those of the conventional cereal grains. With the possible exception of oats, amaranth grain contains higher levels of protein, fat, fiber, ash and minerals, and lower levels of moisture and carbohydrates.

In 1984 a study was undertaken to predict the yield potential and fertility requirements of A. cruentus and A. hypochondriacus in Northwest Arkansas. The purpose of the proposed research was to determine amaranth nitrogen needs and suitable plant densities for optimal grain production in this region of Arkansas
Publications: None
Cultivar Releases: None

1984 S-9 Technical Committee Report

Agency: Florida Agricultural Experiment Stations

Submitted by: G. M. Prine

Address: Department of Agronomy, University of Florida, Gainesville, FL 32611

Number of Pages: 6

Accession User: J. W. Scott

Address: Gulf Coast Research & Education Center, University of Florida, IFAS, 5007-60th Street East, Bradenton, FL 34203

Nature of Research: Evaluation of Lycopersicon germplasm for resistance to bacterial spot (Xanthomonas campestris pv. vesicatoria) and fusarium wilt (Fusarium oxysporum Schlecht F. lycopersici) race 3.

Progress to Date: Nine new accessions were screened with other germplasm for bacterial spot incidence in the field. Only 379032 showed much promise. Other PI's with tolerance were reported last year.

Several hundred PI's have been screened for fusarium wilt race 3. The best PI's for resistance are 129028, 127826 and 126449. The latter 2 also have tolerance to leafminer and pinworm.

Publications: Scott, J. W. and J. B. Jones. 1984. Evaluation of Lycopersicon species for resistance to bacterial spot (Xanthomonas campestris pv. vesicatoria (Doidge(Dows)). Fla. Agr. Expt. Sta. Monograph Series (in press).

Cultivar Releases: None

Accession User: L. S. Dunavin

Address: Agricultural Research and Education Center, Route 3, Box 575, Jay, FL 32565-9524

Nature of Research: Evaluation of forage and biomass crops for utilization in the panhandle of Florida.

Progress to Date: The introduction, PI 300086 Pennisetum purpureum, is being evaluated for biomass in comparison with ten other napiergrass selections and one sugarcane selection in a replicated trial set in December, 1982. This entry yielded 25.5 Mg ha^{-1} of dry biomass in 1983 to rate seventh in the group. Severe stand loss occurred during the very cold winter of 1983-84; however, the remaining plants are growing rather well in 1984.

Publications: None

Cultivar Releases: None

Accession User: A. M. Hibberd

Address: Vegetable Crops Department, University of Florida, Gainesville, FL 32611

Nature of Research: Selection of bacterial leaf spot resistance of pepper (Capsicum annuum L.) derived from several PI lines.

Progress to Date: Hypersensitive resistance (HR) to Xanthomonas campestris pv. vesicatoria races 1 and 2 are controlled independently by single dominant genes in PI 271322. Rapid tissue collapse (HR) can be observed within 24 hr at 30 C after cotyledons or leaves are infiltrated with inoculum containing 10^8 to 10^9 cfu ml^{-1}. Hypersensitivity to race 2 is controlled by the same locus in PI 271322 and cvs Florida VR-2, Florida VR-4, Delray Bell, and PI 163189.

A third race can be distinguished by not initiating HR in any of the above plants. A third dominant gene controls resistance to race 3 in PI 271322, which is characterized by very few and tiny lesions 2 to 3 weeks after infiltrating 10^3 to $3X10^3$ cfu ml^{-1} inoculum into recently fully expanded leaves. PI's 163189, 173977, 244670, and 246331 and others possess highly heritable resistances to races 1, 2, and 3 which can be similarly detected.

Publications: A. M. Hibberd, R. E. Stall, and M. J. Bassett (1984). Three resistances systems to bacterial spot of pepper in a plant introduction line. Phytopathology 74:791 (Abstr.)

Cultivar Releases: None.

Accession User: D. D. Baltensperger and G. M. Prine

Address: 304 Newell Hall, Department of Agronomy, Institute of Food and Agricultural Science, University of Florida, Gainesville, FL 32611.

Nature of Research: Evaluation of subterreanean clover (Trifolium subterreaneum L.) for adaptation to the southeastern U.S.

Progress to Date: Over 550 germplasm sources of subterreanean clover have been evaluated for field resistance to scorch and mildew as well as for their overall yield potential. 100 lines have been selected for further testing. None of the entries were substantially superior to 'Mt. Baker' or 'Woogenellup' in this test, but several lines had individual characteristics superior to the cultivars.

Publications:

D. D. Baltensperger, C. E. Dean, E. S. Horner, L. S. Dunavin. Osceola White Clover. Fla. Agric. Exp. Stn. Circ. S-311, 15 p. (In Press).

Cultivar Releases: None.

Accession User: G. M. Prine

Address: Agronomy Department, University of Florida, Gainesville, FL 32611

Nature of Research: New Crops and Plant Introductions

Progress to Date:

1. Arachis. Florigraze rhizoma peanut (Arachis glabrata) increased in commercial acreage to about 800 acres over the winter of 1983-84. Commercial rhizome growers should have rhizomes available to plant an additional 2000 acres next winter. A shortage of bermudagrass sprig harvesters and planters is hampering the commercial development of Florigraze. Arbrook rhizome peanut (PI 262817) is superior to Florigraze in droughty years and on droughty deep sandy soils. A release committee has been named for Arbrook and it possibly will be released as a named cultivar in cooperation with USDA, SCS, in winter of 1984-85. So far, we have not detected the peanut stripe virus in A. glabrata perennial peanuts.
2. Elephantgrass (Pennisetum purpureum): Eleven of the best elephantgrass accessions collected at Gainesville were planted in replicated trials at Gainesville, and by other researchers at Ona, Quincy and Jay Research Centers. PI 300086 elephantgrass produced highest biomass yield during the 1983 season at Dairy Research Unit. PI 300086 had average annual dry matter yields of 48.1 Mg ha^{-1} (21.5 Tons/A) over three seasons at Energy Park at Gainesville.
3. Pigeonpea (Cajanus cajan): We are testing the top producing lines of crosses received originally from ICRISAT in India at several locations in State. We hope to have a grain pigeonpea cultivar ready for release in late 1984.
4. Ryegrass (Lolium multiflorum): Florida 80 rust-resistant annual ryegrass seed will be on the commercial market in good quantity in fall of 1984. The 1982-83 season saw the worst crown rust epidemic in recent history. The second cycle of recurrent selection of a Marshall-type ryegrass for rust resistence from a 30,000 plant spaced plant nursery was conducted during the 1983-84 season.
5. Lupines (Lupinus spp.): We have selected late-maturing, giant-type plants of showy (C. spectabilis) and slenderleaf (C. brevidens (PI436527)) crotalaria plants for green manure and their continuing control on nematodes in following crops. By proper management it should be possible to prevent these crotalarias from reseeding as a weed in the next crop. Both crotalaria populations probably will be released as germplasm in the next year also.

6. Lupines (Lupinus spp.) and fababeans (Vicia faba): We are studying the lupines and fababeans as possible cool-season grain legumes for Florida. We are trying to develop a seed supply of 'Richey' bitter blue lupine (L. angustifolius) for farmers wanting to grow this crop as green manure.

7. Leucaena spp. accessions, out of 373 accessions studied, with highest biomass yields at Gainesville, FL over 1982 and 1983 were PI numbers: 263695, 443696, 443541, 281607, 286295, 281608, 288005, 443674, 443482, 443610, 370749 and 443483. The average dry matter yield over these 12 accessions was 29.3 Mg ha^{-1} in 1982 and 24.7 Mg ha^{-1} in 1983.

Accession User: G. O. Mott and W. R. Ocumpaugh

Address: Department of Agronomy, Univ. of Florida, Gainesville, FL 32611

Nature of Research: Carrying Capacity and Liveweight Gains of Cattle Grazing Dwarf N-75 Elephantgrass

Progress to Date:

Tropical forages and pastures are usually very low in nutritive value, digestibility, rate of voluntary intake and give very low animal performance. This is particularly true during the hot humid summer months when there is an additional heat stress on the grazing animals. A dwarf type of elephantgrass, a close relative of 'Napiergrass' and 'Merkergrass', may change this situation for Florida and other subtropical and tropical regions of the Americas. A few cuttings of this grass were introduced into Florida in late 1979 from the USDA nursery at Tifton, Georgia. During 1982, 1983, and 1984, many aspects of this grass have been studied including it's morphological and physiological characteristics; regrowth mechanism, growth rate, leaf/stem ratio, digestibility, crude protein content, carrying capacity and liveweight gains of steers. All of these attributes were recorded under five levels of grazing pressure and five lengths of grazing cycle. Increases in grazing pressure (high levels of defoliation) reduced the available grass leaf and growth rates. Increases in length of grazing cycle increased the amount of grass leaf available, the leaf/stem ratio and the growth rate of the grass. Increasing the length of grazing cycle to 42 and 56 days increased the carrying capacity to five - 300 kg steers per hectare. These stocking rates were attained when 1000 to 1500 kg/ha (a stubble height of 40 to 60 cm) of residual leaf dry matter was left at the end of the grazing period. The most striking result occurred in 1983 when an average daily gain of 1.0 kg was recorded from June 20 to December 14, a period of 177 days. Comparable steers on other tropical grasses at the same experimental site during the same period had an average daily gain of less than 300 grams.

Cultivar Releases: None.

Accession User: G. O. Mott

Address: University of Florida, Agronomy Department, Gainesville, FL 32611

Nature of Research: Legumes in Temperate Grass Mixtures.

Progress to Date:

The addition of a mixture of clovers (white, crimson, red and subterranean) to ryegrass-rye pastures increased the grain per steer, the carrying capacity of the pastures and the gain per hectare in North Florida. During the 1982-1983 winter season (181 days), the average daily gain was increased from 590 to 780 g, the carrying capacity from 3.6 to 4.0 steers per hectare and the gain per hectare from 393 to 575 kg/ha when clovers were added to the grass mixture. In the 1983-1984 winter season (126 days), the average daily gains were increased from 570 to 920 g and the gain per hectare from 286 to 446 kg/ha by the addition of clovers. In the two years, the inclusion of clovers increased the daily gain of steers by 46% and the gain per hectare by 51%; each increase of particular significance to the Florida farmer.

Cultivar Release: None

Accession User: Dr. O. C. Ruelke

Address: Department of Agronomy, University of Florida, Gainesville, FL 32611

Nature of Research: Forage Crop Production and Management

Progress to Date:

'Floralta' a limpograss selected for yield and persistence in pastures is a direct release from an increase of USDA plant introduction 364888. A systematic evaluation of performance in small plot and grazing animal experiments has shown Floralta to be superior to the other released limpograss cultivars as shown in Fla Ag. Expt. Sta. Circ. S-312.

Several new bermudagrass hybrids developed at Tifton, Georgia are being evaluated in Florida and show promise. These hybrids are the result of crosses between plant introductions PI 255450 and PI 293606. Another is a cross between Tifton 44 and Callie, both parents being introductions or crosses involving introductions.

Publications:

Quesenberry, K H., W. R. Ocumpaugh, O. C. Ruelke, L. S. Dunavin and P. Mislevy. Floralta - a limpograss selected for yield and persistence in pastures. Univ. of Fla. Agric. Exp. Sta. Circ. S-312. 16 p.

Cultivar Releases: Floralta limpograss (PI 364888).

Accession User: D. W. Gorbet

Address: Agricultural Research Center, Marianna, Route 3, Box 493, Marianna, FL 32446.

Nature of Research: Peanut Breeding

Progress to Date:

The following PI's are planted in a field study this year to evaluate for leafspot resistance (Cercospora arachidicola and Cercosporidium personatum):

PI 415880	PI 145046
196628	145681
196640	203395
196647	203396
196649	259641
196655	259812
196656	259822
196657	259849
196684	261893
196695	261706
196716	264168
196731	268657
196832	268863
200432	268883
277197	268894
338339	268913
365553	268931
372263	274191
272303	300243
384498	300946
415881	300947
121067	

Selections and evaluations are continuing in segregating populations and with advanced selections from crosses made with various PI's. PI's that have contributed the greatest number of promising breeding lines with leafspot resistance include PI 203396, 121067, 145681, 259785, 268894, 262090, 261911, and 306230.

Editors Note: Florida researchers having peanut plots destroyed in 1984 due to stripe virus include: D. W. Gorbet, F. P. Gardner, K. J. Boote, D. A. Knauft, and A. J. Norden. It is apparent that a more vigorous program for screening legumes and other crop introductions for virus is needed.

1984 GEORGIA S-9 TECHNICAL COMMITTEE REPORT

Agency: Georgia Agricultural Experiment Station

Submitted by: Carl S. Hoveland

Address: Department of Agronomy, University of Georgia, Athens, GA 30602

Accession User: A. C. Mixon

Address: USDA-ARS, P. O. Box 748, Tifton, GA 31793

Nature of Research: Peanut breeding and selection.

Progress to Date: Development of improved peanut germplasm lines using P.I. 337409, 337394 (F selection), 246388, and 337432.

Publications:

Mixon, A. C. 1983. Peanut germplasm lines AR-1, -2, -3, and -4. Crop Sci. 23:1021

Mixon, A. C. 1983. Two peanut germplasm lines, GFA-1, and GFA-2. Crop Sci. 23:1020-1021.

Cultivar Releases: Germplasm lines GFA-1, GFA-2, AR-1, -2, -3, and -4.

Need for foreign or domestic plant explorations:

Urgent attention needed to obtain and conserve Arachis hypogaea germplasm in Western Africa, Meso-America, and perhaps China. In Mexico field collection is necessary because man's activities are causing severe genetic erosion among primitive varieties.

Accession User: James W. Demski

Address: Dept. of Plant Pathology, Ga. Exp. Stn., Griffin, GA 30212.

Nature of Research: Determining seed transmission of plant viruses.

Progress to Date:

Developed a procedure to detect peanut mottle and peanut stripe viruses in peanut seed without harming the germination of the seed. Specifically used P.I. 433352, 433351, 442566, 442568, and 442572.

Publications: None

Cultivar Releases: None

Need for foreign or domestic plant explorations:

We do not have resistance to peanut mottle or peanut strips viruses in our commercial types and need germplasm with resistance.

Accession User: B. B. Brantley

Address: Dept. of Horticulture, Ga. Exp. Sta., Griffin, GA 30212

Nature of Research: Breeding for resistance to mosaic diseases in cowpea.

Progress of Date:

The P.I. 186465 is resistant to blackeye cowpea mosaic virus and cowpea chlorotic mottle virus. It is currently being used in crosses to obtain multiple resistance.

Publications:

Kuhn, C. W., S. D. Wyatt, and B. B. Brantley. 1981. Genetic control of symptoms, movement, and virus accumulation in cowpea plants infected with cowpea chlorotic mottle virus. Photopathology 71:1310-1315.

Cultivar Releases: None

Need for explorations: Obtain germplasm resistant to cowpea viruses.

Accession Users: Richard B. Chalfant
J. A. A. Renwick and Frank Messina.

Address: Georgia Coastal Plain Exp. Sta., Tifton, GA 31793-0748.
Boyce Thompson Institute, Cornell, Univ., Ithaca, NY.

Nature of Research:

Locate resistance to the cowpea aphid, Aphis craccivora, the cowpea curculio, Chalocodermes aeneus, thrips and other insects using laboratory and field screening technqiues.

Progress to Date:

(a) Boyce Thompson Institute 194 PI lines were evaluated for resistance to the cowpea aphid in the laboratory. Of these, PI lines 152195, 339572, 339596, 367860, and 205139 show resistance. These lines will be studied further.

(b) Tifton, Georgia: 140 early maturing lines were planted in the field June 27, 1984. Emergence is good and they will be examined for resistance to the major insects. Promising lines will be referred to Boyce Thompson for lab studies.

Publications: None

Cultivar Releases: None

Need for Explorations:

We are interested in obtaining local cultivars from West Africa. We have a researcher located in Cameroon but none elsewhere. We particularly want cultivars adapted to mixed cropping that would have some genes for yield and earlier maturity than the locals in Cameroon. All are photosensitive.

Accession User: Ronald Gitaitis

Address: Dept. of Plant Pathology, Coastal Plain Ext. Stn., Tifton, GA 31793

Nature of Research:

Enchancement of cowpea germplasm with resistance to bacterial blight and canker, which is caused by the bacterium Xanthomonas campestris pv. vignicola.

Progress to Date:

Several sources of specific induced resistance (hypersensitivity) have been discovered in the PI material. These include the following PI numbers of Vigna unguiculata: PI 292870, PI 293467, PI 194206, PI 293520, PI 186386, PI 339572, PI 353057, PI 353089, PI 354667, PI 354821, and PI 382118.

Publications:

Gitaitis, R. D. 1983. Two resistant responses in cowpea induced by different strains of Xanthomonas campestris pv. vignicola. Plant Disease 67:1025-1028.

Cultivar Releases: None

Further Need:

There is a tremendous need in phytobacteriology as well as plant pathology in general for plant introduction explorations. Resistance is often the only acceptable control measure that is practical. Without plant introductions the development of resistant varieties would be dealt a crippling blow. For my own future research we will need to screen plant introductions of Brassica species and species of solanaceous plants with emphasis on the genera Solanum and Lycopersicon as well as continue our efforts with Vigna unguiculata.

Accession User: Carl S. Hoveland

Address: Agronomy Dept., University of Georiga, Athens, GA 30602

Nature of Research: Improved forage legumes for livestock production.

Progress to Date:

A selection of Trifolium mutabile PI 369053 was the only winter annual legume in two trials to survive without stand loss and serious injury from the severe freeze at Christmas 1983. Forage yields of this selection were higher than for any other winter annual clover. Forage yields of two experimental birdsfoot trefoil (Lotus corniculatus) cultivars selected from Mediterranean germplasm, ATP (Auburn Univ.) and Ga-1 (Ga. Exp. Sta.), are the highest yielding entries during the third year of a trefoil cultivar trial. In a grazing trial at Eatonton in central Georgia, the experimental Ga-1 trefoil furnished average daily beef steer gains (2.4 lb/day) and stocking rate (3 steers/ha), equal to that on alfalfa pasture.

Publications: None

Cultivar Releases: None

Accession User: B. R. Wiseman

Address: USDA-ARS, P. O. Box 748, Tifton, GA 31793

Nature of Research: Host plant resistance to insects.

Progress to Date:

Sorghum cultivar AF28 was introduced by me and assigned No. PI 383856. It has the highest level of sorghum midge resistance and has been used in the development of SGIRL-MR-2. A total of 500 PI's were screened in the seedling stage for fall armyworm leaf-feeding resistance.

Publications:

Wiseman, B. R., N. W. Widstrom, and R. R. Duncan. 1984. Registration of SGIRL-MR-2 sorghum germplasm. Crop Sci. 24:627.

Widstrom, N. W., B. R. Wiseman, and W. W. McMillian. 1984. Patterns of resistance in sorghum to the sorghum midge. Crop Sci. 24:791-793.

Cultivar releases with PI numbers:

SGIRL-MR-2 germplasm.

Need for foreign or domestic plant introduction explorations:

Just recently, 10,000 new accessions were introduced from Yemen and Ethiopia with assigned PI numbers. I am in the process of screening these for fall armyworm and sorghum midge resistance.

There is a definite need to search the Sudan for PI 383856 types. The sorghum midge was a problem in that area. Today it is no longer a problem there. We need to know what other high-resistant types exist there and what caused the midge to be a non economic problem.

S-9 TECHNICAL COMMITTEE REPORT

JULY 1984

Agency: Hawaii Institute of Tropical Agriculture & Human Resources
Submitted by: P. J. Ito
Address: 461 W. Lanikaula Street, Hilo, HI 96720

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Accession User: Robert Joy
Address: P.O. Box 236, Hoolehua, HI 96729
Nature of Research: Evaluation of plants for erosion control, wind break, soil improvement, pasture improvement and wildlife.
Progress to Date: Glycine wightii, PI 224980 and Lotus pedunculatus, PI 407473, were primarily selected for their vigorous growth habit and relative drought tolerance. These are in advanced testing plots for ground cover and pasture improvement.
Publications: None
Cultivar Release: Paspalum hieronymii, PI 310108 was released for use as a ground cover in orchards, waterways and other erosion prone areas. It is low growing, low maintenance, mat forming and tolerates traffic well.

Accession User: Richard M. Manshardt
Address: Department of Horticulture, University of Hawaii, 3190 Maile Way, Honolulu, HI 96822
Nature of Research: Evaluation of papaya (Carica papaya L.) germplasm and related Carica species for disease resistance and fruit quality.
Progress to Date: Cuttings of Carica x heilbornii Badillo nm. pentagona (Heilborn), commonly called 'babaco', were obtained from New Zealand in January, 1984. These are currently under one-year quarantine at the Lyon arboretum near the University of Hawaii's Manoa campus. Eleven rooted cuttings are planted on the Aboretum grounds and another ten plants, now in the greenhouse, will soon join them. Several plants have recently been inoculated with papaya ringspot virus (PRV), and these will be evaluated by ELISA to determine whether they are resistant or susceptible to PRV.

Two seed accessions of Carica stipulata Badillo were received from Exotica Seed Company, 8033 Sunset Blvd., Suite 125, West Hollywood, CA 90046, under the names Carica pubescens and Carica chrytopetalus. Carica stipulata seedlings have been planted at several locations on Oahu and Hawaii. This species appears to tolerate low elevations better than C. pubescens, but is very susceptible to root rot. ELISA shows that C. stipulata is resistant to PRV.

Carica papaya lines from Israel, Peru, the Cook Islands and Sri Lanka have been received and will be evaluated for fruit quality and root rot tolerance.
Publications: None
Cultivar Releases: None

Accession User: T. T. Sekioka, K. Y. Takeda and J. S. Tanaka
Address: Department of Horticulture, University of Hawaii, Honolulu, HI
Nature of Research: Evaluation of Cucumis germplasm for horticultural and resistance to watermelon mosaic virus and powdery mildew.
Progress to Date: Twenty-seven commercial varieties and PI lines were screened for fruit traits, maturity, adaptation to "winter" conditions, and resistance to watermelon mosaic virus and powdery mildew. PI's 282447 and 282450 were observed to be resistant to powdery mildew and watermelon mosaic virus. PI's 173889 and 289698 were selected for further evaluation for early maturity, fruit yield and vine vigor. PI's 288990 and 257487 were selected for fruits resistant to soft rot.
Publications: None
Cultivar Releases: None

Nature of Research: Evaluation of Benincasa hispida germplasm for horticultural traits.
Progress to Date: Six commercial varieties and PI lines were screened for horticultural traits. PI 384538 was observed to have good fruit shape.
Publications: None
Cultivar Releases: None

Nature of Research: Evaluation of Momordica charanita germplasm for horticultural traits.
Progress to Date: Nine breeding and PI lines were screened for horticultural traits. PI 414724 was observed to have exceptional plant vigor.
Publication: None
Cultivar Release: None

Accession User: P. J. Ito and C. L. Chia
Address: Department of Horticulture, 461 W. Lanikaula Street, Hilo, HI 96720
Nature of Research: Introduction and testing of Tropical Fruits and Nuts.
Progress to Date: Twenty seven new introductions were added to the collection. An avocado selection appears to be tolerant to phytophthera root rot and is being tested at several locations. High yielding 'African Pride' atemoya from Australia has been propagated for further testing. Three selected good quality pili nuts were successfully propagated and will be tested. Macadamia species are being propagated for testing for resistance to tree decline.
Publication: None
Cultivar Release: 'Kaimana' litchi has been released to interested nurseryman. It has produced fruits when other cultivars failed and has fairly small seeds with good quality fruits.

REPORT TO S-9 TECHNICAL COMMITTEE

Experiment, Georgia July 25 and 26, 1984.

Kentucky Agricultural Experiment Station
Submitted by Roy E. Sigafus, Department of Agronomy, University of Kentucky, Lexington, Kentucky 40546-0091
Accession User: Roy E. Sigafus and N. L. Taylor
Address: Agronomy Department, University of Kentucky
Nature of Research: Yield trials of Trifolium species.
Progress to Date: Yield trials conducted annually with red clover but less often with winter annuals.
Publications: Progress Report 276 "Red Clover Variety Trials Through 1983", and PR 277 "Some Winter Annual Clovers - Kentucky 1980-1983".

Other accession users:

1. Charles F. Gilbert, Manager Quicksand Kentucky Plant materials Center, Obtained in May 1983, 99 tall oatgrass accessions.

2. R. C. Buckner, P. B. Burrus, II, and George Eisenga received Giant Fescue accessions in 1967, 1977 and 1981. Paper in review: "Genetic, morphological, and agronomic characteristics of Lolium-Festuca amphiploids".

3. John Snyder, Horticulture Department. Research effort in last four years has been largely involved with tomoto trichome work with L. hirsutum introductions. In 1981 he received 158 legume accessions in 26 legume species. He has been studying seed proteins and has gathered enough information for a research proposal.

4. G. A. Rosenthal, Biological Sciences, has over 500 legume accessions. From his early work on the toxicity of L-canavanine to insects he has surveyed legume seeds for nonprotein amino acids and has NSF and NIH grants.

5. Bob McNiel, Horticulture Department, is preparing a report on accessions from the National Arburetum and from Iowa, on the performance of these plants in response to stress from heat and drought in 1983 and the very severe winter of 1983-84.

6. Dean Knavel and Hubert Mohr, Horticulture Department, have received numerous Cucurbitaceae accessions over the past dozen years. Dr Mohr's dwarf watermelons do not trace to PI's, but Dr. Knavel has advanced lines with good gummy stem blight resistance from plant introductions.

A comment about time spent on germplasm or new crops topics: Much more time is spent answering letters about ordinary crops than on request for germplasm. Information has been requested on kochia, comfrey, Jerusalem artichoke, sweet sorghum for energy, cassava, broomcorn, sunflowers, sugarbeets, sesame, flax, buckwheat, Austrian winterpea, ginseng, anise hyssop, and button clover.

July 10, 1984

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Aeschynomene falcata
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. Competed well with cv. 'Alicia' bermudagrass, Cynodon dactylon, first year. Some plants survived the very severe 1983-84 winter.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Alysicarpus vaginalis
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. None better than local naturalized ecotype.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Desmodium (barbatum, canadense, heterocarpon, sandwicense)
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. None survived the very severe 1883-84 winter.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Desmodium (canum, intortum, uncinatum)
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. Scattered surviving plants, 6/84.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Centrosema virginanum
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. Scattered surviving plants, 6/84.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Galactia (jussiaeana, striata, sp.)
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. No survivors of the very severe 1983-84 winter.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Lespedeza (cuneata, stipulacea, striata)
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. L. cuneata accessions failed to establish (in grass sward). Annual L. species reseeded well, Spring 1984.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Leucena leucocephala
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. After vigorous start, seedlings weakened and died. Acid soil intolerance is the suspected cause of failure.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Lotononis bainesii
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. All plants survived the very severe 1983-84 winter. Good spring growth and seed set.
Publications: None to date
Cultivar Releases: None to date

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, La 70803
Genus (species): Neonotonia wightii
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana. Screening warm season forage legume accessions for general adaptation to Louisiana.
Progress to date: Planted 6/83. Poor growth, no 1983-84 winter survivors.
Publications: None to date
Cultivar Releases: None to date

1984

S-9 TECHNICAL COMMITTEE REPORT

Agency: Mississippi Agricultural & Forestry Experiment Station

Submitted by: C. E. Watson, Jr.

Address: Department of Agronomy, Mississippi State University, Mississippi State, MS 39762

Accession User: C. E. Watson
Address: Department of Agronomy, Box 5248, Mississippi State, MS 39762
Nature of Research: Breeding tall fescue for resistance to Drechslera.
Progress to Date: PI accessions 231560 and 231561 were previously shown to have high levels of resistance to Drechslera. These lines have been increased for seed and evaluations are continuing in the field. Two genotypes from PI 231560 were utilized as parents in a six parent diallel to determine the inheritance of Drechslera resistance. General combining ability was the only significant source of variation among these lines.
Publications: Linscombe, S.D., C.E. Watson, Jr., and L.E. Trevathan. 1983. Inheritance of resistance to infection by Drechslera sorokiniana in tall fescue. Crop Sci. 23:1085-1087.
Cultivar Releases: None.

Accession User: P. G. Thompson
Address: Department of Horticulture, P.O. Drawer T, Mississippi State, MS 39762
Nature of Research: Breeding watermelons for improved quality, yield and disease resistance
Progress to Date: PI accessions 189225, 270550, 2171775, 271778, 271779, and 299379 with reported resistance to the diseases gummy stem blight and anthracnose were crossed to 6 commercial watermelon varieties with high levels of resistance to the 3 diseases and resistant progenies were selected for high yield and quality. Breeding lines were identified with high levels of disease resistance, high yield and quality. Intermating and selection will continue to maximize these traits in homozygous lines.
Publications: None
Cultivar Releases: None

1984
S-9 Technical Committee Report
North Carolina State University
W. T. Fike - Crop Science Department

Of the 24 campus research personnel who receive information directly from my office, seven cooperators received a total of 174 lines, consisting of 37 species of five plant genera. These are, however, just a very small part of the total number of plant introductions under test in North Carolina, as hundreds of accessions are in various stages of testing and many have been incorporated into the breeding programs of the various field and horticulture crops.

GLEANINGS FROM COOPERATORS

1. Dr. Wanda Collins, Sweet Potato Breeder, Horticulture.

   All collections from her Peru trip during 1983 are presently in quarantine at NCSU under the watchful eye of Dr. J. W. Moyer. She does see them each week and is anxious to get them into her breeding program. Many show promise for resistance to diseases and insects.

2. Dr. Dave Timothy, Grass Breeder, Crop Science.

   Increase fields of flaccidgrass, Pennisetum flaccidum (original PIs) were established this year for the anticipated release of a new grass variety for the 1985 growing season. This warm season grass has shown much promise for the forage program in North Carolina because of high yields of a quality forage. Farmer interest is high in this crop since they have seen it in evaluation tests from the Coastal Plains through the Piedmont and into the Lower Mountains.

3. Dr. Todd Wehner, Cucumber Breeder, Horticulture.

   All cucumber introductions in the USDA collection are being maintained. Selections are being used as germplasm in a large intercrossing base population. Many introductions are showing promise for their resistance to various insects and diseases. North Carolina is the top producer of cucumbers in the country so this is a very important program for our area.

4. Dr. Johnny Wynne, Peanut Breeder, Crop Science.

   He and others in the peanut breeding program are increasingly using PIs as a source of pest resistance. Material has been found that is resistant to both the early and late Cercospora leafspots as well as Aspergillis.

5. Dr. Jim Ballington, Small Fruit Breeder, Horticulture.

   Jim is planning an exploration for 1985 to the Pacific Northwest to collect seed, clonal material and herbarium specimens of Fragaria, Ribes, Rubus, and Vaccinium species. Characteristics sought will be in the areas of upland adaptation and drought resistance, frost tolerance and cold hardiness, large fruit size, improved fruit quality and high acidity, day length neutrality, insect and disease resistance and for ornamental value. Dr. Otto Jahn, Curator for the Northwest Plant Germplasm Repository, will also be a participant.

6. Dr. Tommy Carter, Soybean Breeder, Crop Science.

   Soybean plant introductions (PIs) were evaluated under drought stress conditions in the field and in the greenhouse and to identify physiological-morphological traits genetically related to seed yield under stress conditions. Five hundred PIs (maturity groups 6 and 7) were evaluated for agronomic traits last summer. This year two hundred of these PIs were selected for further evaluation in a natural drought-prone test site. Seed yield, root growth patterns, canopy temperature and morphological traits were examined in a replicated experiment at this site. Preliminary results indicate that about 12 of the 200 PIs show some ability to withstand drought. In other experiments, a rainout shelter was designed and built for controlled timing of drought stess on PIs. Greenhouse techniques for evaluating drought tolerance were improved and greenhouse screenings are underway.

7. Dr. Randy Gardner, Tomato Breeder, Horticulture, stationed at the Mountain Horticultural Research Station, Fletcher, North Carolina.

   His prolific breeding program has released Mountain Pride, Piedmont, and Summit during the past three years. Although PI's are not in the immediate crosses of these varieties, a graduate student, Allan Nash, is working on incorporating the resistance to early blight of PI 126445 Lycopersicon hirsutum, into newer tomato varieties.

INVITATION

We at the North Carolina State Agricultural Experiment Station invite you all to Raleigh for the 1985 S-9 Regional Meeting. It will give our cooperators a chance to explain personally the use of plant introductions in their far-reaching research programs.

1984

S-9 TECHNICAL COMMITTEE REPORT

Agency: Oklahoma Agricultural Experiment Station
Submitted by: James S. Kirby
Address: Department of Agronomy, Oklahoma State University, Stillwater, OK 74078

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Accession User: J. L. Caddel
Address: Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Evaluation of alfalfa (Medicago sativa L.) for resistance to Phytophthora root rot (Phytophthora megasperma f. sp-medicaginis Kuan and Erwin), Blue alfalfa aphids (Acrythosiphon kondoi Shinji), and Spotted Alfalfa Aphids (Therioaphis maculata Buckton).
Progress to date: Evaluated 150 accessions collected in Morocco in 1982 for blue alfalfa aphid and spotted alfalfa aphid resistance. Evaluated 1000 accessions from the world collection of alfalfa for blue alfalfa aphid and Phytophthora root rot resistance. Plants resistant to each of these individual pests are being intercrossed to form new broad gene base populations with increased levels of resistance.
Publications: None
Cultivar Releases: None

Accession Users: J. A. Webster, K. J. Starks and R. L. Burton, USDA-ARS
Address: USDA-ARS, Plant Science Research Laboratory, P. O. Box 1029, Stillwater, OK 74074
Nature of Research: Evaluation of sorghum [Sorghum bicolor (L.) Moench], and sorghum relatives for insect resistance, particularly greenbugs, chinchbugs, sorghum midge and fall armyworms.
Progress to Date: Sorghum germplasm (plant introductions and breeding lines) are continuing to be evaluated for insect resistance.
Publications: Boozaya - Angoon, D. 1983. Sorghum resistance to insect pests. Ph.D. Thesis. Okla. State Univ., Stillwater. 104 pp.
Webster, J.A., K.J. Starks and R.L. Burton. 1983. Biotype E greenbug. Proc. 13th Bien. Grain Sorghum Res. Util. Conf. 144-145.
Merkle, O.G., K.J. Starks, and A.J. Casady. 1983. Registration of pearl - millet lines with chinch bug resistance. Crop Sci. 23:601.
Cultivar Releases: Chinch bug resistant pearl - millet lines. (See third publication listed above).

Accession User: D. E. Weibel
Address: Department of Agronomy, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Sorghum Breeding
Progress to Date: Virtually all our materials can be classified as plant introduction material. Specifically, we are studying six introductions from Yemen that are bloomless.
Publications: None
Cultivar Releases: None

Accession User: J. S. Kirby
Address: Department of Agronomy, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Special student problem on Dolichos species.
Progress to Date: One of our undergraduate students wanted a special problem to gain experience with crops research techniques. We requested accessions of Dolichos biflorus and were sent 21 accessions of Dolichos lablab as well as 27 Dolichos biflorus. The accessions were planted at the Agronomy Research Station near Perkins, OK. Most of the accessions were very late blooming and seed return was very limited.
Publications: None
Cultivar Releases: None

Accession User: D. L. Ketring, USDA-ARS
Address: Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Evaluation of peanut (Arachis hypogaea L.) for heat tolerance and traits to escape drought.
Progress to Date: Peanut germplasm (plant introductions and breeding lines) are continuing to be evaluated for traits (root growth, soil moisture extraction, leaf water potential components, and stomatal resistance) to escape and/or tolerate drought. They are also being evaluated for membrane thermostability to estimate heat tolerance
Publications: Ketring, D. L. 1984. Root diversity among peanut genotypes. Crop Sci. 24:229-232.
Cultivar Releases: None

Accession User: James S. Kirby
Address: Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Peanut Breeding
Progress to Date: Continue to evaluate peanut breeding material for leafspot resistance (crosses with PI 109839) and for early maturity (utilizing Chico as the source of earliness).
Publications: None
Cultivar Releases: None

Accession User: H. A. Melouk
Address: USDA-ARS, Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Peanut disease resistance and germplasm development.
Progress to Date: Peanut germplasm is being evaluated for resistance to peanut mottle virus. Three entries with resistance to PMV have been identified from the Section Arachis. Two of these are A. diogoi from Brazil (P.I. 468141 and 468142, collection no. GK 30001). The third entry with PMV resistance from the Section Arachis has not yet been identified as to species but is Arachis sp. P.I. 468169. In addition, five entries from the Section Rhizomatosae were identified as being resistant to PMV. There were Arachis sp. P.I. 468171, 468174, 468363, 468366, and 468371. PMV resistance from the Section Rhizomatosae has previously been reported, however, the above three sources of PMV resistance are the first to be reported from the Section Arachis.
Publications: Melouk, H. A., M. R. Sanborn, and D. J. Banks. 1984. Sources of resistance to peanut mottle virus in Arachis germplasm. Plant Disease 68:563-564.
Cultivar Releases: None

Accession User: D. J. Banks and R. N. Pittman

Address: USDA-ARS, Department of Agronomy, Oklahoma State University, Stillwater, OK 74078

Nature of Research: Peanut Introduction, Increase, Maintenance, and Evaluation.

Progress to Date: 1) Seed increases and initial field evaluations were made on several new peanut introductions (51 from Ecuador, 62 from Peru, and 69 from Brazil). These are to be distributed to SRPIS later this year. 2) Field evaluations were conducted and plants were selected from segregating progeny involving parents (P.I. 468295-y, 475871, 476029, and 476034) that have shown moderate resistance to early leafspot. 3) A winter nursery consisting of 78 accessions, primarily of tetraploid rhizomatous species of Arachis, has been established at the USDA-ARS Subtropical Research Station, Weslaco, TX. All but 2 accessions (P.I. 338266 and 468177, somewhat weakly established) survived the unusually cold winter of 1983 when temperatures dipped to 17°F. 4) In tissue culture experiments: callus was produced by leaflet cultures of wild species from 7 taxonomic sections of Arachis; plant formation resulted from cultures of species from Arachis and Extranervosae sections; shoots differentiated from branch roots of A. villosulicarpa. 5) Leaf samples of several wild Arachis species were furnished to cooperating scientists at Oklahoma State University for activity analysis of the enzyme superoxide dismutase (a suspect enzyme that may condition leafspot resistance reactions).

Publications:

Banks, D. J. 1984. Collection of peanut, Arachis hypogaea L. (Leguminosae), in Ecuador for germplasm enhancement. Am. J. Bot. 71(5)pt.2:155-156.

Johnson, B. B., and E. D. Mitchell. 1984. Superoxide dismutase level in wild and cultivar peanut leaflets and leaflet callus exposed to cercosporin. Am. J. Bot. 71(5)pt.2:104-105.

Melouk, H. A., D. J. Banks, and M. A. Fanous. 1984. Assessment of resistance to Cercospora arachidicola in peanut genotypes in field plots. Plant Disease 68:395-397.

Pittman, R. N., D. J. Banks, J. S. Kirby, E. D. Mitchell, and P. E. Richardson. 1983. In vitro culture of immature peanut (Arachis spp.) leaves: morphogenesis and plantlet regeneration. Peanut Sci. 10:21-25.

1984

S-9 TECHNICAL COMMITTEE REPORT

Agency: University of Puerto Rico
College of Agriculture
Agricultural Experiment Station

Submitted: Oscar D. Ramírez

Address: Department of Horticulture
College of Agriculture
University of Puerto Rico
Agricultural Experiment Station
Río Piedras, Puerto Rico 00927

Root Crops: O. D. Ramírez, J. J. Green and J. Badillo
Corozal and Isabela Agricultural Research
and Development Center, Agricultural
Experiment Station, Río Piedras, Puerto Rico 00927

Nature of Research: To obtain through plant introduction and selection better root crops with high yielding ability resistant to the prevalent maladies and adapted to our conditions.

Progress to Date: Taniers (Xanthosoma sp.) - none of the cvs. has shown any resistance to "mal seco". Cassava (Manihot esculenta) - At Corozal Substation, three cvs. were selected. They are good yielders and because of its shape are adapted to heavy soils and can be harvested mechanically. They are IAC-12829, PI 12900 and 12902. At Isabela substation cv. PI 12902 was the best yielder with 35.3 T/ha, followed by Jamaica 13 and PI 9570 with 30.5 and 27.1 T/ha respectively of marketable yields. All the above mentioned cvs. were rated very high in a sensory evaluation by appearance, flavor, texture and overall acceptability.

Publications: Ramírez, O. D., Green, J. J. and Caloni, I. B., 1984. Guinea Negro: a high yielding out of season yam cultivar, J. Agric. Univ. P. R. 68(2): 193-98.

Cultivar Releases: None

Bananas and Plantains: O. D. Ramírez, J. J. Green, Corozal Agricultural Research and Development Center, Agricultural Experiment Station, Río Piedras, P. R. 00927

Nature of Research: To obtain through plant introduction and selection better banana and plantain cvs. with high yielding ability resistant to the prevalent maladies and adapted to our conditions.

Progress to Date: Banana cv. Grand Nain (PI 13503) was tested in a ripening experiment at the Food Technology Lab. The fruit was very well accepted by the tasting panel.

Publications: None

Cultivar Releases: None

Fruits: O. D. Ramírez, A. Torres, F. H. Ortiz, L. Vélez, C. J. Torres, Adjuntas Substation and Fortuna Agricultural Research and Development Center, Agricultural Experiment Station, Río Piedras, Puerto Rico 00927

Nature of Research: To obtain through plant introduction and selection better fruit trees with high yielding ability, resistant to the prevalent maladies and adapted to our conditions.

Progress to Date: Introduction, multiplication and evaluation of tropical fruit crops continues. In the soursop (Annona muricata) collection 8 selections were made based on fruit characters. In citrus a high yielding selection was made on the Washington Navel Group, it is know as PR-7. Three high yielding selections were made on the sapodilla (Manilkara sapota) collection. These are Larsen, Black Wood #2 and Mary Fancy. Various products were prepared with sapodilla pulp, custard, fruit cake, rolled cake, e'clairs, paste, and nectar.

Publications: Semidey, N. and Ramírez, O. D., Preliminary evaluation of 21 certified virus free citrus clones. J. Agr. Univ. P. R. (in press).

Cultivar Releases: Washington Navel cv. PR-7

Coffee:

O. D. Ramírez, E. Boneta, Adjuntas Substation, Agricultural Experiment Station, Río Piedras, Puerto Rico 00927

Nature of Research: To obtain through plant introduction and selection better coffee cvs. with high yielding ability, resistant to coffee rust and adapted to our conditions.

Progress to Date: Some of the coffee lines resistant to various races of coffee rust (Hemileia vastatrix) produced coffee beans for the first time. Other lines received has no production as yet.

Publications: None

Cultivar Releases: None

Forages:

J. Vélez Santiago, Corozal Agricultural Research and Development Center, Agricultural Experiment Station, Río Piedras, Puerto Rico 00927

Nature of Research: To obtain through plant introduction and selection better forages in regard to seasonal yield, nutritive value and adaptability to the various climatic and soil conditions of Puerto Rico.

Progress to Date: Five new accessions of dwarf Napier grass and an interspecific cross of napier grass X pearl millet, Survenola digitgrass and 6 varieties of ryegrass were added to the Corozal grass nursery and are being screened for yield and persistance. The interspecific cross SC-444 and dwarf Napier N-76 were the most productive. None of the ryegrass varieties offer potential due to their poor growth. Tropical grasses were evaluated for plant response and grazing at the humid mountainous region, the northern coastal plains and the semiarid south coast. P. maximum PI 249676 and B. humidicola PI 299497 were the most productive in the mountanious region, P. maximum PI 259553 and D. decumbens PI 299752 in the northern coastal plains and P. maximum PI numbers 259553, 349676 and 291047 in the semiarid south coast.

Publications:

Vélez-Santiago, J. and Arroyo-Aguilú, J. A. 1983 Nitrogen fertilization and cutting frequency: Yield and chemical composition of five tropical grasses. J. Agri. Univ. P.R. 67(2): 61-69.

Publications:

Vélez-Santiago, J., Arroyo-Aguilú, J. A., and Torres-Rivera, S., 1983. Yield, crude protein and chemical composition of five napier grass cultivars on the northwestern coastal plains of Puerto Rico. J. Agri. Univ. P.R. 67 (2): 70-78.

Yasman, J. A., Vélez-Santiago, J., Arroyo-Aguilú, J. A. and McDowell, R. E. 1983. Evaluation of five tropical grasses for growing Holstein heifers. J. Agri. Univ. P.R. 67 (2): 79-94.

Cultivar Releases: None

Miscellaneous: Propagating material of 4 pineapple cultivars (Red Spanish, Smooth Cayenne, PR 1-67, Perola) was sent to Mr. Kenneth Laurent USAID/Amman, Jordan.

1984

S-9 Technical Committee Report

Agency: Clemson University
Submitted by: D.W. Bradshaw
Address: Department of Horticulture, Clemson University, Clemson, SC 29631

* * * * * *

Accession User: Perry E. Nugent
Address: U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston, SC 29407
Nature of Research: Breeding muskmelons for multiple disease and insect resistance and eating quality
Progress to Date: See pedigrees and release statements attached
Publications: None
Cultivar Releases: C879-J1, C879-J2, C922-B1, C922-B2, C922-B3, C929A, C929B, C936D

Accession User: Billy B. Rhodes
Address: Edisto Experiment Station, P.O. Box 247, Blackville, SC 29817
Nature of Research: Breeding and genetics of race 2 anthracnose resistant watermelons
Progress to Date: Genetic analysis of resistance to race 2 anthracnose in three watermelon lines. S.L. Love and B.B. Rhodes, Dept. of Horticulture, Clemson University, Clemson, SC 29631.

Several sources, resistant to race 2 anthracnose, have been identified, but no commercial watermelon varieties with acceptable levels of resistance have been developed. Differing levels of resistance are expressed by PI 189225, PI 299379 and R309 (Citrullus colocynthis). A four-parent diallel cross among these lines and New Hampshire Midget, susceptible cultivar, was used to determine inheritance and explore the possibility of obtaining a higher level of resistance by combining genes from these sources.

As reported by Suvanprakorn and Norton, resistance in PI 189225 is governed largely by a single dominant gene. Modifiers shifted the progeny populations slightly toward the susceptible. Resistance in PI 299379 is governed by the same gene, but with different modifiers. Resistance in R309 is due to complete dominance, but controlled by two or more genes. No evidence was found for obtaining higher levels of resistance by combining genes from these sources.

Peroxidase activity in watermelon plants resistant to race 2 anthracnose. S.L. Love and B.B. Rhodes, Dept. of Horticulture, Clemson University, Clemson, SC 29631.

An increase in peroxidase activity follows infection of watermelon plants with race 2 Colletotrichum lagenarium. Experiments were conducted to determine if peroxidase activity was

related to resistance and if the relationship was strong enough to use peroxidase activity to screen for resistant plants. A correlation coefficient of 0.242 existed between higher pre-inoculation levels of peroxidase activity and resistance. Increase in activity following inoculation and infection were not correlated with resistance. The relationship between pre-inoculation levels and resistance was too weak to provide a basis for screening for resistance.

Publications: Two in ASHS (S. Love, senior author)
Cultivar Releases: None

Accession User: Billy B. Rhodes and P.E. Nugent
Address: Edisto Experiment Station, P.O. Box 247, Blackville, SC 29817, and U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston, SC 29407
Nature of Research: Evaluation of Cucumis species for resistance to race 2 anthracnose
Progress to Date: Seed increase of cucumis plant introductions. B.B. Rhodes and D. Linde. In cooperation with the Regional Plant Introduction Station, 74 Cucumis PI's were grown at the Edisto Station for seed increase. PI 30473 from El Salvador, PI 321005 from Taiwan, and PI 442177 from Mexico were C. melo introduction receiving a high rating for resistance to race 2 anthracnose.

These PI's were being incorporated into our Cucumis breeding program.

Publications: None
Cultivar Releases: None

Accession User: Billy B. Rhodes
Address: Edisto Experiment Station, P.O. Box 247, Blackville, SC 29817
Nature of Research: Breeding disease and insect resistant pumpkins for Halloween market and S.E.
Progress to Date: PI 169424 (suspected resistance to pickleworm) has been crossed with a hybrid of C. pepo x C. moschata (resistant to mildews and pickleworm). Selections are being made this year in the F_3 generation.

C. ecuadorensis PI 432442, 432443 and 432444 and 432445 (resistance to downy mildew) has also been incorporated into three-way crosses and F_3 selections will be made this year.

Publications: None
Cultivar Releases: None

Accession User: E.F. McClam
Address: Department of Agronomy and Soils, Clemson University, Clemson, SC 29631
Nature of Research: Development of better-adapted forage germplasm.
Progress to Date: A number clones of forage grasses have been developed using P.O. germplasm (see enclosed tables).
Publications: None
Releases: See attached tables

Table 1. Original seed sources of the parental clones of SCG82C germplasm Syn-1. Tall fescue

Seed source	Number of parental clones	Seed source	Number of parental clones
PI172423	1	PI297900	3
PI184041	4	PI297902	1
PI231555	1	Alta	1
PI234719	1	Aronde	6
PI234906	8	Fawn	4
PI237516	1	Kenmont	1
PI265354	1	Pengreen	3
PI292851	2		

Table 2. Original seed sources of the parental clones of SCG82A germplasm Syn-1. Hardinggrass

Seed source	Number of parental clones	Seed source	Number of parental clones
PI196388	2	PI240279	1
PI207968	3	PI284243	2
PI219636	1	PI292206	3
PI219637	1	PI294253	1
PI233707*	1	PI294256	1
PI236529†	3	PI294262	1
PI240195†	2	PI308605	4
PI240233	7	PI319075 †	2
PI240256	3	TAM Wintergreen	1
PI240275	1		

* AM1491 (*Phalaris arundinacea* x *P. tuberosa*; tillers obtained from Plant Materials Center, Americus, Ga.)

† Seed received as *P. coerulescens* Desf. Seed type corresponded to *P. aquatica* L.

Table 3. Original seed sources of the parental clones of SCG82B germplasm Syn-1. Hardinggrass

Seed source	Number of parental clones	Seed source	Number of parental clones
PI205965	1	PI240272	2
PI207962	2	PI240280	2
PI219637	1	PI292206	4
PI233707	2	PI294268	1
PI236529†	5	PI308605	1
PI240230	2	PI311473	1
PI240246	1	PI319071	3
PI240256	3	PI319075	8
PI240266	1		

† Received as *Phalaris coerulescens* Desf. but appears to be *P. aquatica*.

S-9 TECHNICAL COMMITTEE REPORT

Agency: Tennessee Agricultural Experiment Station
Submitted by: D. L. Coffey
Address: Department of Plant and Soil Science, University of Tennessee, P. O. Box 1071, Knoxville, Tennessee 37901.

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Accession User: D. L. Coffey and R. D. Walters
Address: Department of Plant and Soil Science, University of Tennessee, Knoxville, TN 37901-1071
Nature of Research: Evaluation of amaranth (*Amaranthus* spp.) germplasm for desirable horticultural and agronomic traits and response to nitrogen fertilization.
Progress to Date: Seven species: *tricolor, dubius, cruentus, hypochondriacus, hybridus, blitum, paniculatus, gangeticus* from PI accessions and commercial varieties of amaranth are being studied in 1984 to evaluate the influence of nitrogen fertilization, species/cultivar and date of harvest on horticultural and agronomic traits. Seeding was done in the greenhouse and plants transplanted to field after 14 days. Irrigation immediately after transplanting was found to be essential for plant establishment. A. *hybridus* and A. *hypochondriacus* appear moderately susceptible while A. *gangeticus* cv. bicolor appears highly susceptible to stem rot fungi *Fusarium* spp. and *Phytopthora* spp. Insect problems appear minimal. Lygus bugs are present on inflorescences of most species but no damage has been observed. Competition from annual grasses, redroot pigweed (A. *retroflexus*) and purslane present a major cultural problem in this study. Foliage and grain yields are being recorded and protein content of leaf tissue and grain is to be determined.
Publications: None
Cultivar Releases: None

Accession User: B. V. Conger
Address: Department of Plant and Soil Science, University of Tennessee, P. O. Box 1071, Knoxville, TN 37901.
Nature of Research: Evaluation of orchardgrass (*Dactylis glomerata* L.) germplasm for persistance under East Tennessee conditions.
Progress to Date: A total of 5184 plants from 216 accessions were established in the field in 1978. In 1981, the population was decreased to one-fourth of the original by visual selection. The population has now been reduced to approximately 120 plants which will be carried forward in the orchardgrass breeding program. In 1983, remnant seed from 24 of these accessions were used to establish 2 plants of each to test for an embryogenic response from cultured leaf sections. One of these accessions (PI 315416) from the USSR showed a highly embryogenic response from both plants tested and a total of 19 plants were regenerated from somatic embryos.
Publications: None
Cultivar Releases: None

Accession User: B. N. Duck
Address: School of Agriculture, University of Tennessee at Martin, Martin, Tennessee 38238
Nature of Research: Evaluation of forage legumes
Progress to Date: Accessions of several annual Trifolium species (primarily *T. subterraneum*, *T. compestre*, and *T. hirtum*) were found not dependably winter hardy in northwest Tennessee. Accessions of *Coronilla* spp. and *Lotus* spp. have survived two years under moderate management practices, but productivity of forage has not indicated potential for practical utilization.
Publications: None
Cultivar Releases: None

Accession User: J. M. Stewart
Address: USDA, ARS, Department of Plant and Soil Science, University of Tennessee, P. O. Box 1071, Knoxville, Tennessee 37901.
Nature of Research: Cytogenetics of *Gossypium* and incorporation of potentially useful characters of *Gossypium* species into cultivated tetraploid species.
Progress to Date: Efforts continue toward transferring caducous bract from *G. amourianum* to upland cotton. BC_1S_1 progeny segregated for the trait. Current field plantings of BC_2S_1 are expected to show the trait. Work to transfer wild species cytoplasms to commercial cotton has continued. The following species have been hybridized and are in various stages of introgression into semigametic *G. barbadence:*

G. tomentosum
G. mustelinum
G. lanceolatum
G. darwinii
G. capitis-viridis
G. sturtianum
G. amourianum
G. harknessii
G. klotyschianum
G. davidsonii
G. trilobum
G. turneri
G. stocksii
G. somalence
G. longicalyx

Seed increase for most of the *Gossypium* accessions collected in Australia in 1981 has been accomplished and seed deposited in the Texas A&M collection. A greenhouse nursery of the *Gossypium* seed collected in Australia in 1983 has been started for seed increase of those accessions. A new seed accession of *G. harknessii* has been obtained from a wild population in Mexico but no plants established yet.
Publications: None
Cultivar Releases: None

1984

S-9 Technical Committee Report

Agency: The Texas Agricultural Experiment Station
Submitted by: Oliver E. Smith
Address: Soil and Crop Sciences Department
Texas A&M University
College Station, Texas 77843
Phone: 409-845-5389

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Accession User: C.E. Simpson and others
Address: Texas A&M University Agricultural Research and Extension Center - P.O. Box 292; Stephenville, Texas 76401; phone: (817) 968-4144.
Nature of Research: Testing peanut plant introductions with white testa with three commercial varieties for yield and adaptation.
Progress to Date: Yields of six white testa peanut plant introductions (PI's) were compared with three commercial check cultivars. Value per acre of four PI's was as high as 'Tamnut 74', the best commercial check. The value of all PI's was as high as 'Starr' and 'Toalson', but one PI produced significantly fewer pounds of pods per acre than Tamnut 74. Percentage of sound mature kernels was statistically equivalent for Starr, Tamnut 74, and four PI's.

In the combined analyses for value per acre, only PI-246388 and PI-268974 produced a statistically lower value per acre than Tamnut 74, the highest of the test. All PI's were statistically equivalent to Starr and Toalson for pounds of pods per acre; only PI-306220 produced less yield than Tamnut 74. Percentage sound mature kernels (SMK) for PI-270773, PI-295267, PI-306220, and PI-246388 was as good as Starr and Tamnut 74. Plant introductions PI-270773, PI-295267, and PI-246388 had higher percentages of other kernels (OK) than PI-268678 and PI-268974, but there were no statistical differences between the checks and the plant introductions.
Publications: Yield Test of White Testa Peanut Lines; The Texas Agricultural Experiment Station; PR 4136 - June 1983.
Cultivar Releases: None.

Accession User: C.E. Simpson and others
Address: Texas A&M University Agricultural Research and Extension Center; P.O. Box 292; Stephenville, Texas 76401; (817) 968-4144
Nature of Research: Genetic Diversity In Root Systems of Peanuts
Progress to Date: Nine lines (PI 119075, PI 162596, PI 468211, PI 468223, PI 468225, PI 468226, PI 468267, PI 468247, and PI 468304) accumulated greater shoot weight than Starr and seven (PI 162596,

PI 468267, PI 468283B, PI 468348, PI 468349, PI 468351, and PI 468353) had greater root numbers at the 1 m depth. Only with PI 162596 was greater root number associated with more vigorous shoot growth. None of the 120 lines had longer roots than Starr, but approximately 70 percent had shorter roots. Only one line (PI 468283B) that had root numbers greater than Starr had a shorter taproot than Starr. Therefore, it appears possible to select for high root numbers without sacrificing root length.

Publications: Genetic Diversity In Root Systems of Peanuts; The Texas Agricultural Experiment Station; MP-1526 - February 1983.

Cultivar Releases: None.

Accession User: G.R. Smith

Address: Texas A&M University Agricultural Research and Extension Center; Drawer E; Overton, Texas 75684; (214) 834-6191.

Nature of Research: Kura Clover Studies

Progress to Date: One hundred spaced plants of Kura clover from seven plant introduction lines, were evaluated for survival and spreading through two summer seasons. Thirty-two plants of ladino-type white clover were included as checks in this experiment. Kura clover is native to Turkey, Iran, and other parts of the Middle East.

After 13 months in the field, 65% of the Kura clover was alive. No white clover plants survived the first summer. Significant differences for summer survival were found among Kura clover plant introduction lines, with ranges from 87.5% to 33.3%.

Spreading by rhizome growth was measured in two directions and averaged. Twenty-one percent of the Kura clover plants were rated as fast spreaders.

Significant differences were noted among plant introduction lines for rate of spread. Variation was also observed within lines for survival and rate of spread.

Two plant introduction lines, 277353 and 405122, were superior in both summer survival and rate of spread.

Publications: None.

Cultivar Releases: None.

Accession User: Lloyd R. Nelson

Address: Texas A&M University Agricultural Research and Extension Center; Drawer E; Overton, Texas 75684; (214) 834-6191.

Nature of Research: Breeding Soft Red Winter Wheat.

Progress to Date: Bradford is a new variety of soft red winter wheat developed by the Texas Agricultural Experiment Station. Bradford (USDA accession number PI 470925) was developed as a dual purpose forage-grain variety for East Texas. It will produce excellent forage yields in a grazeout program or excellent grain yields in limited graze (forage plus grain) or in grain only programs. Bradford was selected at the Texas A&M Agricultural Research and Extension Center at Overton from the cross Arthur 71/Siete Cerros//Coker 70-14 made in 1973. The final selection was made from

headrows in 1977 and it has been tested as Tx-73-93. It has the following characteristics:

- High grain yield potential
- High forage yield potential
- Good soft wheat milling quality
- Resistant to powdery mildew
- Adapted in the Central Texas Blacklands and East Texas
- Moderately resistant to leaf rust and septoria glume blotch

Publications: Bradford Wheat; The Texas Agricultural Experiment Station; L-2108 - June 1984.
Cultivar Releases: Bradford Wheat.

Accession User: Jerry E. Quisenberry
Address: Texas A&M University Agricultural Research and Extension Center; Route 3; Lubbock, Texas 79401; (806) 746-6101
Nature of Research: Breeding Cotton for Water Stress.
Progress to Date: The initial observation of original germplasm source P.I.154035 - under water-stressed field conditions at the USDA's research facility at Big Spring revealed the non-wilting nature of the source as compared to 100 other stocks. Additional field and rainout shelter studies showed that the 154035 produced more biomass per unit of water than other stocks.

Dr. Quisenberry, a cotton breeder and researcher said studies on water relations, stomatal behavior and transpiration, photosynthetic rate, soil water use and root growth and development have supported the drouth tolerance of the initial source.

MORE COTTONSEED

"The uniqueness of this germplasm is the potential for producing more seedcotton when water is a limiting factor," Dr. Quisenberry said. "The non-wilting leaf characteristics can be scored in August when the plants are under water stress."

"Each of the lines contain considerable variability in plant and boll types, earliness of maturity and other morphological and growth characteristics."

What one described as a "barn on wheels" is helping researchers on the Plains develop cotton varieties with above-average tolerance to water stress.

And, considering that much of the Plains' water table is dropping sharply as pumping costs rise, that could well play a major role in how well cotton growers in this area survive in the near future.

What gives encouragement -- encouragement and the possibility that varieties can be developed much quicker than in the past -- are rainout shelters.

Those shelters, which normally measure 40 by 60 feet, are simply used by USDA, Texas Agricultural Experiment Station and Texas Tech University researchers to keep rainfall off the experimental germplasm here. That, they feel, gives perhaps the most accurate appraisal of the trials possible because the plants can be stressed to demonstrate their true resistance to drouth.

And, said Dr. Jerry Quisenberry, it's already payed off, pointing to the release this year of seven cotton strains to commercial interests for further work.

Publications: None.
Cultivar Releases: Seven strains to commercial interests.

Accession User: George Tereshkovich
Address: College of Agricultural Sciences; Department of Plant and Soil Science; Texas Tech University; Box 4169; Lubbock, Texas 79409
Nature of Research: Cultural Studies with Chili, Cayenne, Jalapeno and paprika peppers.
Progress to Date: In 1983, fifteen cayenne, fifteen chili and twenty-five paprika pepper Capsicum annuum sp., (P.I.) Plant Introduction selections were planted for observational purposes and screened for potential commercial planting. Data on days to maturity, length of harvest period, marketable yield, and fruit and plant characteristics were recorded. Of the 55 P.I.'s observed, only twelve entries were selected as potential cultivars for West Texas planting. Additional observation (1984) is needed before possible commercial use.

Cayenne Pepper: Acceptable, uniform plant size, good yield, fruit size, and color -- P.I. 176892

Paprika Pepper: Acceptable

P.I.	138563	179200
	140373	204685
	162605	256056
	167361	288958
	172775	357467 (Ornamental)
	174121	

Publications: None.
Cultivar Releases: None.

1984
S-9 TECHNICAL COMMITTEE REPORT

Agency: Virginia Agricultural Experiment Station
Submitted by: R. T. Johnson
Address: Department of Horticulture, VPI & SU, Blacksburg, VA 24061

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Accession User: Chester L. Foy

Address: Dept. of Plant Pathology, Physiology and Weed Science, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

Nature of Research: These accessions are being used in a search for varieties tolerant to glyphosate herbicide and broomrape (Orobanche spp.). Broomrape is a parasitic herb, subsisting on the roots of broadleaf plants, mainly in areas with a hot and dry climate. Orobanche ramosa has threatened the tomato industry of California in the past and has recently been discovered in Texas. O. minor has been found in the eastern U.S. Although the broomrapes are not presently a widespread agricultural problem in the United States, the lack of understanding of the population biology and dynamics of this plant necessitates that it not be dismissed from consideration as a potential parasitic weed of leguminous crops, tobacco and sunflower. The broomrapes, collectively, constitute a very serious pest in many developing countries located in semi-arid regions of the world, causing heavy losses in agricultural production. The broomrapes are also a threat to the tomato crop of Israel, where Dr. Reuven Jacobsohn of the Agricultural Research Organization Volcani Center, Bet Dagan, Israel, is screening for tolerance of broomrape. Screening for tolerance to glyphosate is being conducted by the Department of Plant Pathology, Physiology and Weed Science at Virginia Tech. These efforts are all parts of an international (BARD) research project.

Finding sources of tolerance to glyphosate and/or broomrape, if such exists, would justify the initiation of a breeding program in which those genes could be introduced into new varieties. None of the varieties now being grown commercially are known to have such tolerance, to either the herbicide or the parasite. The existence of such tolerance to both factors, each of which is insufficient to be of practical importance by itself, could lead to an integrated broomrape control approach in which genetic tolerance to the herbicide and parasite would be combined. Success in these objectives would be a major scientific achievement and would provide a gene source for breeding tomatoes in which broomrape could be controlled by means that are both environmentally safe and economically feasible.

Progress to Date: Thus far, about 1,310 tomato lines (most of them obtained through the USDA Regional Plant Introduction, Iowa State University, Ames, Iowa 50011) have been screened or are currently in test for tolerance to a standard dose rate of glyphosate. By February, 1984, testing had been completed on 1,156 lines. A ratio of the fresh weights of treated/untreated plants was used to evaluate glyphosate tolerance. With the weight of the treated plant expressed as a percent of the untreated plant, 576 of the 1,156 varieties were found to fall below 50% and 760 varieties were below 60%. Two hundred and forty-four varieties were found to fall between 61 and 80% and 103 varieties fell between 50 and 100%. In 19 of all varieties tested, glyphosate-treated plants produced growth which appeared to be in excess of 100%, i.e. greater than that of comparable untreated plants. Twenty-nine (out of 574) of the varieties tested initially were found to lie above the 80% mark (see S-9 Technical Committee Report for 1983). Table 1 shows additional varieties tested which were found to be above the 80% mark, and may be useful in breeding programs for glyphosate resistance. As time permits, these accessions may be retested to confirm the results. Additional accessions (from the UC-Davis collection) are being screened for glyphosate tolerance. Dr. Jacobsohn (in Israel) continues to screen these accessions for resistance to broomrape. A request for seeds of a "broomrape resistant" line from the USSR was finally successful; however, when tested it showed no resistance to glyphosate. Thus far, no practically useful resistance to broomrape has been found among the USDA accessions screened. The USSR line requires further evaluation for resistance to broomrape.

Publications: Foy, C. L. and R. Jacobsohn. 1983. Screening tomato lines for glyphosate tolerance. Proc. South. Weed Sci. Soc. 36:165.

Note: Also, presently orally before the Third International Symposium on Parasitic Weeds in Aleppo, Syria in May, 1984, was our report on "Evaluating Tomato Lines for Resistance (Tolerance) to Glyphosate and/or Orobanche."

Cultivar Releases: None

Table 1. Response of Tomato Lines to Foliarly-Applied Glyphosate.

Screening no.	Accession[a] no.	Botanical variety	Country of origin	Cultivar	Fresh weight treated/untreated
576	246585	L. peruvianum	Peru		96
577	247087	L. peruvianum	Ecuador		82
578	251302	L. peruvianum	Peru		107
579	251307	L. peruvianum	Peru		94
611	365953	L. peruvianum	Peru		89
615	365969	L. peruvianum	Peru		85
617	375937	L. pimpinellifolium	USA-Missouri		93
619	379013	L. hirsutum	Peru		96
620	379018	L. peruvianum	Peru		101
623	379025	L. pimpinellifolium	Peru		84
630	379034	L. peruvianum	Peru		80
644	390513	L. esculentum	Ecuador		86
647	390519	L. pimpinellifolium	Ecuador		94
649	390648	L. esculentum	Peru		81
652	390661	L. esculentum	Peru		83
653	390662	L. hirsutum	Peru		87
654	390664	L. peruvianum	Peru		90
655	390667	L. peruvianum	Peru		86
656	390679	L. peruvianum	Peru		95
657	390682	L. peruvianum	Peru		89
684	406861	L. esculentum	Honduras		81
703	406982	L. esculentum	Nicaragua		80

Table 1 Continued.

Screening no.	Accession[a] no.	Botanical variety	Country of origin	Cultivar	Fresh weight treated/untreated
706	406998	L. esculentum	Panama		87
838	118786	L. esculentum x L. pimpinellifolium subsp.	Venezuela	'Jobo'	81
841	118789	L. esculentum	Venezuela		86
842	118790	L. esculentum	Venezuela		87
845	119215	L. esculentum	Venezuela		106
846	119446	L. esculentum	Venezuela		98
847	119776	L. esculentum	Argentina	'Liso Colorado Argentino'	110
848	119777	L. esculentum	Argentina	'Grueso Liso Chemini'	126
849	119778	L. esculentum	Argentina	'Colorado Grueso'	106
850	120253	L. esculentum	Turkey		90
851	120254	L. esculentum	Turkey		115
852	120256	L. esculentum	Turkey		96
854	120258	L. esculentum	Turkey		95
855	120259	L. esculentum	Turkey		90
901	124235	L. esculentum	India		82
905	124582	L. esculentum	India		87
908	126407	L. esculentum	Panama		90
909	126408	L. esculentum	Panama		91
910	126409	L. esculentum	Peru		99

Table 1 Continued.

Screening no.	Accession[a] no.	Botanical variety	Country of origin	Cultivar	Fresh weight treated/untreated
911	126410	L. esculentum	Peru		112
912	126411	L. esculentum	Peru		96
913	126412	L. esculentum	Peru		110
914	126413	L. esculentum	Peru		92
915	126414	L. esculentum	Peru		90
916	126415	L. esculentum	Peru		95
917	126416	L. esculentum	Peru		80
918	126417	L. esculentum	Peru		119
919	126418	L. esculentum	Peru		100
920	126419	L. esculentum	Peru		97
922	126421	L. esculentum	Peru		88
923	126422	L. esculentum	Peru		88
924	126423	L. esculentum	Peru		94
927	126426	L. esculentum	Peru		80
928	126427	L. esculentum	Peru		95
931	126431	L. peruvianum	Peru		86
935	126436	L. peruvianum	Peru		80
936	126440	L. glandulosum	Peru		92
937	126441	L. peruvianum	Peru		100
938	126443	L. glandulosum	Peru		91
939	126444	L. glandulosum	Peru		102
954	126914	L. esculentum	Peru		87

Table 1 Continued.

Screening no.	Accession[a] no.	Botanical variety	Country of origin	Cultivar	Fresh weight treated/untreated
961	126921	L. esculentum	Peru		102
962	126922	L. esculentum	Peru		88
962	126922	L. esculentum x L. pimpinellifolium susp.	Peru		83
964	126924	L. pimpinellifolium	Peru		92
965	126925	L. pimpinellifolium	Peru		90
966	126926	L. peruvianum	Peru		93
967	126927	L. pimpinellifolium	Peru		90
968	126928	L. peruvianum	Peru		90
973	126933	L. pimpinellifolium	Peru		98
974	126934	L. pimpinellifolium	Peru		105
975	126935	L. peruvianum	Peru		84
980	126941	L. pimpinellifolium	Peru		88
996	127468	L. esculentum	Afghanistan		85
1025	127828	L. peruvianum var. humifusum	Peru		80
1029	128215	L. esculentum	Bolivia		86
1144	194561	L. esculentum	Argentina	'Morman 50 Day'	99
1149	196481	L. esculentum	Brazil		93
1151	199016	L. esculentum	USA-OK	'Juan Peron'	81
1155	199237	L. esculentum	England	'Sterling Castle'	87
1156	199380	L. glandulosum	Peru		169

[a]Obtained from the USDA Regional Plant Introduction Station, Iowa State University, Ames, Iowa 50011.

Accession User: Jeffrey H. McCormack

Address: Southern Exposure Seed Exchange, P.O. Box 158, North Garden, VA 22959

Nature of Research: Screening of Allium cepa and A. cepa var aggregatum lines for potential release and use in breeding.

Progress to Date: Preliminary data are being gathered on keeping quality, maturity dates, size, growth habit, and evidence of susceptibility to adverse environmental conditions. Because of the small sample sizes of these accessions, data available as of June 15 is too preliminary to warrant conclusions. Next year, the focus will be on increasing the stock, and evaluating these lines in more detail. Observations will include evidence of any susceptibility to insects or diseases under field conditions. A brief summary of the preliminary data gathered on greenhouse plants appears below:

P.I. No.	Sample Size	Ave. Ht. (cm)	Ave. No. Leaves	Ave. Bulb Diam. Bulbs >1 cm (cm)	% Bulbs >1 cm	% Germ*
229680	1	33	4	---	0	0.7
249898	8	28	3.8	---	0	32
256329	39	27	3.4	1.4	26	90
275964	6	31	4.6	1.5	60	30
321385	26	39	5.1	1.2	20	53
433329	4	35	3.2	2.0	100	16

*Note: Percent germination is the percent obtained under greenhouse conditions. Above data were taken from measurements made 66 days after planting (April 10, 1984).

Publications: None

Releases: None

Accession User: Robert T. Taylor

Address: Virginia Truck and Ornamentals Research Station, 1444 Diamond Springs Road, Virginia Beach, VA 23455

Nature of Research: The ultimate goal of this research is development of Cucurbita maxima lines with Squash Vine Borer resistance and bush form.

Progress to Date: Cucurbita breeding lines with resistance to Squash Vine Borers are being field tested. These are interspecific hybrids, including C. pepo parentage, and were obtained outside of the P.I. system. Cucurbita maxima P.I.'s are also being field tested and evaluated for growth habit. Accessions with good bush form will be used in crosses with the resistant lines.

Publications: None

Releases: None

Accession User: Khirdir W. Hilu

Address: Department of Biology, VPI & SU, Blacksburg, VA 24061

Nature of Research: This research is a study of the genetic relationships of Bromus, Brachypodium and the triticoid grasses. Also, there is little genetic information on the tetraploid Eleusine coracana, finger millet, and the study will hopefully provide this knowledge. The research involves isolation of chloroplast DNA from young seedlings, digestion of the DNA with various restriction endonucleases and comparison of fragment sizes and base sequences for degrees of similarity.

Progress to Date: The research was initiated recently. Preliminary results are promising, but no conclusions are available yet.

Publications: None

Releases: None

1984 Report of the
National Seed Storage Laboratory
to the
National Plant Germplasm Committee
and to the
Regional Technical Committees on Plant Germplasm
by
Louis N. Bass, Director

The National Seed Storage Laboratory experienced another very busy year with the receipt and distribution of numerous seed samples, many requests for tours of the Laboratory, and talks by members of the professional staff. Over 325 visitors from more than 25 states and 14 foreign countries toured the National Seed Storage Laboratory. This includes several grade school, high school, and college classes.

Germplasm Preservation

The 6,718 samples cataloged during 1983 brought the total cataloged accessions in storage as of December 31, 1983, to 183,404. In addition, 1,316 native grass samples were received but not cataloged. Also 3,891 rice samples were received from IRRI. Approximately 22,100 germination tests and 200 special tests were made to monitor viability. Arrangements were made for increase of 113 accessions either low in viability or seed number. Seed-increase samples received totaled 1,320. During 1983, 971 samples including 232 virus indicator accessions were distributed to 120 scientists in 16 countries. Computer print-outs or microfiche listing of seed available of the desired crops were sent to scientists upon request. The information system was modified to include the designated curator for each crop.

One-hundred seventy genetic stocks including the few new acquisitions were grown for seed increase and evaluation of characteristics. Over 40 genetic stocks are established which contain 2 or 3 marker genes in each chromosome or chromosome arm of all 7 barley chromosomes. Crosses were made to develop additional multiple genetic stocks. One-hundred seventy-three genetic stocks and 23 trisomic stocks were distributed. Primary telosomic and acrotrisomic lines were used for improved linkage mapping of barley chromosomes. The gene zb_C2 for zebra Colorado (Utah T41) was associated with chromosome 5. The centromere position was located in the genetic linkage map of chromosome 6 by telotrisomic analysis of o for orange lemma.

During calendar year 1983, over 18,000 samples from the Regional Plant Introduction Stations were tested for germination as part of the program to monitor the viability of the National Plant Germplasm Collection. In some cases, a partial purity analysis was required to provide pure seed for a germination test. Over 2,000 samples were dormant and required use of special test procedures for reliable results.

Facility Needs

The need for an addition to the National Seed Storage Laboratory by 1988 still exists. At present, planning is at a standstill. However, planning needs to move forward if that target date is to be met.

Research Notes

Environmental and Other Factor Effects Upon Seed Viability and Storage

L. N. Bass E. E. Roos P. C. Stanwood

Effects of storage conditions on seed longevity

Seeds of crimson clover, lettuce, safflower, sesame, and sorghum sealed in metal cans at 4% moisture content maintained essentially full viability for from 16 to 21 years when stored at -12, -1, 10, and 21°C. Seeds at 32°C showed a marked reduction in viability. Seeds sealed at 7% moisture retained their viability better than did seeds sealed at 10% moisture, especially at temperatures above freezing. Seeds of several tropical legume species stored under a variety of temperature/relative humidity conditions retained their viability equally well at 5°C/40% RH and -1°C/60% RH. Freeze-dried onion, parsley, and pepper seeds retained their viability well at 21, -12, and -70°C for over 5 years. Air-dried seeds of many kinds of flower, vegetable, and field seeds were subjected to the temperature of liquid nitrogen (-196°C) for at least 3 years with little or no change in viability. Reed canarygrass seeds stored 16 or 17 years under various temperature/relative humidity conditions maintained their viability best at -1°C/60% RH. Seeds of two cantaloupe cultivars, Delicious 51 and Edisto, germinated over 50% in 10 days after 23-1/2 years of storage at 21°C and 30% RH. Foil-laminated packaging materials provided good moisture protection for crimson clover and safflower seeds stored under unfavorable conditions.

Genetic Changes in Seeds During Storage

Preliminary screening for cotyledon storage protein in 85 sublines selected from 10 P.I. lines of *Phaseolus vulgaris* was completed. By polyacrylamide gel electrophoresis, 75 sublines were shown to contain the Sanilac (S) type storage protein; 5 lines contained the Contender (C) type; 1 line contained the Tendergreen (T) type; and 4 lines contained mixtures of C and S or T and S types. Excised embryonic axes from 11 sublines of P.I. 169783 analyzed electrophoretically for total protein and isoenzymes of acid phosphatase, esterase, leucine amino peptidase, and glutamate-oxalacetate transaminase showed variations in total protein within and among cotyledon storage protein types. Embryo protein patterns of sublines having T or C type cotyledon storage proteins were more closely related to each other than to sublines with S type. The same relationship held for the other enzymes except glutamate-oxalacetate transaminase which showed no variability among sublines.

Results from preliminary studies using diploid barley and hexaploid wheat indicate that diploid barley develops fewer chromosomal aberrations than hexaploid wheat when stored under the same conditions. Root tips collected at the second or third mitotic cycles were examined for chromosomal aberrations at the anaphase and telophase stages. Aberrations observed were mostly bridges or fragments.

Cryopreservation of Plant Germplasm

Seed of seven tropical species at various moistures were placed into long-term liquid nitrogen storage. The first evaluations of these exposed seed are scheduled for 1986. Seed samples of 10 additional tropical species were placed in liquid nitrogen for long-term storage. Samples exposed to liquid nitrogen for short durations showed no loss of viability. High-moisture freezing limits for seed of 10 species were determined. The HMFLs were: sugarbeet, 32%; lentils, 28.3%; millet, 17.7%; oat, 21.6%; petunia, 12.0%; zinnia, 20.6%; lovegrass, 21.5%; broccoli, 18.4%; bluegrass, 22.7%; and corn, 20.7% moisture. For *Anthurium* seed, a recalcitrant species, low moistures (18%) were obtained without injury. Subsequent exposure to liquid nitrogen was not successful. Work is continuing in the area of liquid nitrogen exposure of these seeds.

Anthurium was used to determine the feasibility of osmotically drying seed of a recalcitrant species to moisture contents less than 20%. A cryoprotectant was substituted for the extracted water to try to avoid desiccation damage. The objective was to reduce seed moisture enough to avoid freezing damage when the seeds were exposed to liquid nitrogen (-196°C). Drying this type of seed to moisture levels below 35% by conventional methods is usually lethal. *Anthurium* seeds were successfully dried with a 4.5 molar L-proline solution to approximately 17% moisture in approximately 120 hours with nearly 100% survival. Although seed moisture content was decreased enough to remove most freezable water detectable by a DTA examination, only partial success was achieved in exposing the dehydrated seeds to LN_2 without damage to their viability. Following LN_2 exposure, survival was approximately 5%.

Publications

WOODSTOCK, L. W., MAXON, S., FAUL, K., and BASS, L. N. 1983. Use of freeze-drying and aceton impregnation with natural and synthetic anti-oxidants to improve storability of onion, pepper, and parsley seeds. J. Amer. Soc. Hort. Sci. 108(5):692-696.

BASS, L. N. Storage of seeds of tropical legumes. Seed Sci. and Technol. (in press)

BASS, L. N. Longevity of cantaloupe seed. J. Seed Technol. (in press)

MOORE III, F. D., McSAY, A. E. and ROOS, E. E. 1983. Probit Analysis: A computer program for evaluation of seed germination and viability loss rate. Colo. State Univ. Sta. Technol. Bul. 147, Feb. 1983. 7 pp.

ROOS, E. E. 1983. Germination technology. In McGraw-Hill Yearbook of Sci. and Technol. 1984: 395-396.

BASS, L. N. 1984. Report of the ISTA Seed Storage Committee 1980-1983. Seed Sci. and Technol. (in press)

BASS, L. N. 1984. Germplasm preservation. (in press - Special Publication of Crop Science Society)

FURST, E. and TSUCHIYA, T. 1983. Primary trisomic analysis of three mutant genes in barley. Barley Genet. Newsletter 13:44-46.

SHAHLA, A., SHIM, J. W. and TSUCHIYA, T. 1983. Association of the gene o for orange lemma with the short arm of chromosome 6 (6S) in barley. Barley Genet. Newsletter 13:83-84.

TSUCHIYA, T. 1983. Proposed new gene symbol for two different mutant types for zebra Colorado, or zoned leaf. Barley Genet. Newsletter 13:84.

TSUCHIYA, T. 1983. Trisomic and aneuploid stocks. Barley Genet. Newsletter 13:98-99.

TSUCHIYA, T. 1983. Linkage maps of barley 1983. Barley Genet. Newsletter 13:101-106.

TSUCHIYA, T. 1983. List of genetic stocks with BGS numbers. Barley Genet. Newsletter 13:161-177.

BECWAR, M. R., STANWOOD, P. C. and LEONHARDT, K. W. 1983. Dehydration effects on freezing characteristics and survival in liquid nitrogen of desiccation-tolerant and desiccation-senstive seeds. J. Amer. Soc. Hort. Sci. 108(4):613-618.

ROOS, E. E. 1983. Segregation for seed coat color within plant introduction lines. Ann. Rpt. Bean Impr. Coop 26:59-60. (Research Note)

ROOS, E. E. 1983. Report of ISTA Working Group on 'Effect of storage on genetic integrity.' Appendex 2, Preprint No. 56, 20th ISTA Congress, June 1983, Ottawa. 9 pp.

Invitational Presentations

Presented at the Annual Meeting of the American Society of Agronomy. Washington, D. C. August 1983.

Bass, L. N. Germplasm preservation.

Technical Presentations

Presented at the 80th Annual Meeting of the American Society for Horticultural Science. McAllen, Texas. October 1983.

Moore, F. D. and E. E. Roos. Interaction of storage temperature and moisture content on seed deterioration.

Presented at the Annual Meeting of the American Society of Agronomy. Washington, D. C. August 1983.

Stanwood, P. C. and K. L. Conniff. Infiltration of cryoprotectants into seed of *Anthurium schezerianum* L. a recalcitrant species.

Presented at the Association of Official Seed Analysts Annual Meeting. Ottawa, Canada. June 1983.

Bass, L. N. Longevity of cantaloupe seed.

Bass, L. N. Longevity of reed canarygrass seed.

Presented at the 20th International Seed Testing Congress. Ottawa, Canada. June 1983.

Bass, L. N. Storage of seeds of tropical legumes.

Bass, L. N. Report of the ISTA Seed Storage Committee 1980-1983.

Roos, E. E. Report of the Working Group on "Effect of Storage on Genetic Integrity."

Presented at the Biennial Meetings of the Bean Improvement Cooperative, National Dry Bean Council, and National Pea Improvement Association. Minneapolis, Minnesota. November 1983.

Centner, M. S. and E. E. Roos. Protein and enzyme variability in sublines of *Phaseolus vulgaris*.

Roos, E. E. and M. S. Centner. Characterization and maintenance of genetic variability in germplasm collections.

1984 S-9 Technical Committee Report

Agency: Soil Conservation Service

Submitted by: H. Wayne Everett

Address: Fort Worth Federal Center
Bldg. 23, Room A-3
Fort Worth, Texas 76115

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Accession User: Plant Materials Center

Address: Box 236
Hoolehua, Hawaii 96729

Nature of Research: Development of new conservation plants for Hawaii

Progress to Date: For ground cover and pasture improvement purposes, PI-224980, Glycine wightii and PI-407473, Lotus pedunculatus, have been selected based on vigor and drought tolerance. PI-310108, Paspalum hieronymii, has been released for perennial cover in orchards and waterways. It is low growing, requires a minimum of maintenance, and tolerates traffic well.

Publications: None

Cultivar Releases: 1

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Accession User: Plant Materials Center

Address: Route 3, Box 215A
Coffeeville, Mississippi 38922

Nature of Research: Development of conservation plants for Major Land Resource Areas (MLRA) 118, 131, 133, 134, and 135.

Progress to Date: PI-163453, Glycine soja, appears to be the best accession tested for wildlife food. It produces a good seed crop that is not as prone to fall germinate as others, thus, it reestablishes more abundantly the next spring. It has potential as a summer cover crop and is readily foraged by deer. PI-220584, Calamagrostis pseudophagmites, has been selected for field testing beginning in

1984. This cool season, rhizomatous grass can be propagated vegetatively year-round and tests for erosion control potential, and forage production and persistence are underway.

Publications: 1

Cultivar Releases: None

*****

Accession User: Plant Materials Center

Address: Quicksand, Kentucky 41363

Nature of Research: Development of conservation plants for the Appalachian Region.

Progress to Date: 45 accessions of Lotus tenius, 120 accessions of Arrhenatherum elatius, and 38 accessions of Dactylis glomerata are being rated for potential forage uses in the region. Selections will be made in 1985 or later. PI-325489, Trifolium ambiguum, has been selected as the most disease and insect resistant accession at Quicksand and is being field tested for pasture legume purposes. The plant appears to have a wide tolerance to soil drainage conditions and to be adapted to diverse climatic situations to date. PI-78758, Bothriochloa caucasica, continues to show promise for critical area plantings, especially where summer forage is needed or usable. Though the plant was informally released by Kansas many years ago, seed has not been as available through commercial channels as desired. In addition, the evaluations since 1977 indicate adaptation and usefulness in much of the northeastern United States. PI-434285, Salix X cottetii, was released for streambank stabilization purposes in 1983 as 'Bankers.' The variety will be available in quantity in 1985. PI-421739, Castanea pumila, was released as 'Golden' for wildlife food purposes. PI-168939, Quercus acutissima, is a small fruit strain (100 seeds per pound) of sawtooth oak that has wildlife potential in the eastern United States. Because it is capable of acorn production at 6-8 years of age, several wildlife agencies are interested in releasing a variety from PI-168939.

Publications: 1

Cultivar Releases: 2

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Accession User: Plant Materials Center

Address: 14119 Broad Street
Brooksville, Florida 33512

Nature of Research: Development of new conservation plants for MLRA 138, 151, 156, and 270-273 (emphasis on cropland erosion problems).

Progress to Date: 232 introductions were planted in 1983 to determine the most promising cover crop accessions. Selections have not been made to date, but several species demonstrated potential and are receiving additional evaluation in 1984. About 30 accessions of bamboo are being evaluated for gully stabilization at two locations. Based on the early work, a large collection of Phyllostachys purpurata is being considered. Field evaluation of PI-421873, Lespedeza cuneata, and PI-299648, Digitaria macroglossa, for critical areas is continuing PI-364888, Hemarthria altissima, was released as 'Floralta' for forage purposes and PI-262817, Arachis glabrata, will be released in 1985. The peanut is useful for pasture or hay purposes. Both are cooperative releases.

Publications: 2

Cultivar Releases: 1

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Accession User: Plant Materials Center

Address: Route 3, Patton Drive
Americus, Georgia 31709

Nature of Research: Development of conservation plants for MLRA 128-130, 133, 136, and 137.

Progress to Date: PI-304004 and 310131, Paspalum nicorae, continue to be evaluated for forage and critical area planting purposes. Seed production problems and potentials need to be worked out yet, before a release can be planned. PI-166400, Panicum coloratum, 'Selection 75' and PI-301477, Bothriochloa ischaemum, 'WW-477' have been performing well in the Black Belt area of Alabama for critical area and forage purposes.

Publications: 1

Cultivar Releases: None

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Accession User: South Texas Plant Materials Center

Address: Caesar Kleberg Wildlife Research Institute
Texas A&I University
P.O. Box 218
Kingsville, Texas 78363

Nature of Research: Development of wildlife and rangeland plants for South Texas.

Progress to Date: Warm season grasses and legumes of foreign origin are being evaluated for adaptation. The Center is producing seed of some introductions for the S-9 location.

Publications: None

Cultivar Releases: None

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Accession User: East Texas Plant Materials Center

Address: Agriculture Bldg., SFASU
P.O. Box 13000, SFA Station
Nacodoches, Texas 75962

Nature of Research: Development of conservation plants for East Texas.

Progress to Date: About 20 named varieties of warm season grasses and legumes of foreign origin are being evaluated for adaptation to East Texas climatic conditions. This Center is just beginning to evaluate plant materials and, as a first step, many named varieties with commercial availability were planted to determine their usefulness to East Texas conditions.

Publications: None

Cultivar Releases: None

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Accession User: Plant Materials Center

Address: Route 1, Box 155
Knox City, Texas 79529

Nature of Research: Development of conservation plants for MLRA 70, 77, 78, 80, 81, 82, 84, and 85.

Progress to Date: Windbreak evaluations are continuing at Knox City where a number of introduced afghanistan pine and scotch pine are being rated. Selections have not been made to date. Introduced warm season grasses of a number of genera are being evaluated for range, pasture, and critical area stabilization purposes. PI-469254, Eragrostis superba, may be released for use in central Texas for forage and critical area plantings. PI-433946, Bouteloua curtipendula, was released as 'Haskell' and PI-434011, Desmanthus illinoensis, was released as 'Sabine' in 1983. Haskell is a rhizomatous sideoats grama useful for range and pasture seeding in mixtures when rainfall is 18"+ and 'Sabine' illinois bundleflower is useful for forage for domestic animals and wildlife species where rainfall is 20"+. 'Sabine' is adapted to clay through sandy loam texture sites, is drought resistant, and winter hardy from south Texas to northern Oklahoma. It should be used in planting mixtures.

Publications: 3

Cultivar Releases: 2

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6-11-84

Report for 1984 Meetings of the
W-6, NC-7, and S-9 Technical Committees

Northern Regional Research Center

Reorganization--We, like the rest of ARS, have been reorganized. Robert Rhodes has moved from Center Director to Area Director; Bert Princen has taken over the role of Acting Center Director. In an effort to put more funds into research much of the functions of the Region have been taken over by newly formed Areas. Our Center's staff is also slated to be greatly reduced. Hopefully these changes will allow us to make inroads into some new and interesting research areas.

Germplasm Evaluation--The biological screening of extracts from seed of 225 wild species revealed germination inhibitors in 21 of them. Selections from this group will be made for isolation and characterization of active compounds. Benzyl isothiocyanate, an active germination inhibitor of velvetleaf seed at the 4×10^{-4} M level did not affect corn even at moderately high concentrations such as 10^{-3} M but did affect soybean at the 10^{-3} M level. Soybeans were not affected at the 4×10^{-4} M level. The acetone extract of defatted Iva axillaris seeds was found to contain germination inhibitors tomentosin and ilicic acid. Other compounds, such as axivalin, had growth inhibitory properties. This work also resulted in the isolation of a new sesquiterpene, tentatively identified as the isovalerate ester of ivaxillarin. Cryptocaryalactone and deacetylcryptocaryalactone from Cryptocarya moschata were found to be powerful germination inhibitors. Several compounds from Acanthus mollis also inhibited velvetleaf seed germination. These same compounds have found previously in rye straw which could account for the allelopathic affect of this material. Computer programs were written and data entered in order to have searchable files for future reference of germination inhibition data. In cooperation with plant breeders working in the new crop area, analyses for oil, protein, and fatty acids of seed were accomplished. Species included in this program were rape, crambe, Sapium sebiferum, Cuphea, and Vernonia.

Crambe and Vernonia--Cooperative work with Murray State University (Murray, KY), under the direction of Dr. Durwood Beatty, is continuing. One objective, to produce and maintain a small supply of crambe seed for future commercial development, was met last year. Enough seed (ca. 11,000 lb) is stored at Murray, KY, to enable commercial plantings of 500-1000 acres. Other objectives, of evaluating viability of seed under storage conditions and effectiveness of fungicidal treatments in controlling Alternarial infections, are under continuing study under the agreement.

At this time, we are aware of no domestic commercial interest in Vernonia galamensis. Efforts to increase seed in Puerto Rico have had limited success, and nothing is known about the possibility of growing V. galamensis in the southernmost U.S. (e.g., Florida and Texas). A number of years ago, seed was produced in formal plot trials in Maryland. Also, in informal plantings in Kentucky, Illinois, and Oregon, the plants grew well but failed to blossom. Small amounts of seed have been provided to Dr. Robert Perdue (Beltsville), who will arrange for any future formal plot trials.

Two manuscripts, "Processing of Crambe abyssinica Seed in Commercial Extraction Facilities," and "Chemical Epoxidation of a Natural Unsaturated Epoxy Seed Oil from Vernonia galamensis and a Look at Epoxy Oil Markets," are in review and may prompt renewed industrial interest in these two species.

Hydrocarbon Crops--Whole-plant specimens of 625 species were collected. Of these, 350 were evaluated for their potential as energy-producing crops. Oil and hydrocarbon from 85 selected species were partially characterized for lipid classes, for yields of fatty acids and unsaponifiable matter, for rubber, gutta, and/or waxes in hydrocarbon, by IR and ^{13}C NMR, and for MW and MW distribution of rubber and gutta by GPC. Of the 350 species 35 were identified for future study. Promising species yielded as much as 10% oil (Pinus albicaulis), 26% polyphenol (Acer ginnala), 2.3% hydrocarbon (Pittosporum tobira), and 23% apparent protein (Verbesina encelioides), on a dry, whole-plant basis. Two new sources of gutta were discovered (Garrya flavescens and G. wrightii). A GPC technique was developed to quantitate rubber. For a heritability study, 78 leaf samples of Asclepia syriaca were analyzed for oil, polyphenol, hydrocarbon, and protein. For 12 USDA plant scientists, 625 sugar crop samples (1982 harvest) were analyzed for sugars and 580 samples (1980 harvest) for lignin and cellulose. Five species in 25-pound quantities were collected for gasification and biomass quality study for a cooperating university. Hydropulping studies of oil- and hydrocarbon-producing plants (e.g., milkweed, guayule, and sunflower) after solvent extraction were conducted to enhance their multipurpose usefulness.

Smooth sumac (Rhus glabra L.) was identified as a promising source of oil and phenolics, especially tannins. The initial specimen yielded 20% "polyphenol", 6% oil, and 7% protein. An ARS agronomist, Beltsville, MD, evaluating germplasm collected at 17 locations in 3 states, found that, although a perennial, sumac grows well from seed and can be harvested once during the planting year. Subsequent years should allow two harvests. Characteristics such as plant survival, vigor, dry matter yield, and number of secondary shoots showed significant genetic diversity as did polyphenol and oil contents. Significant increases in extractives contents and moderate improvement in yield should be possible by exploiting existing variability.

Quinoa--Quinoa (Chenopodium quinoa Willd.) is a salt-tolerant, arid-land cereal from South America. Its seed proteins are of high nutritional value; however, quinoa flours, which are used in mixture with wheat flours to make bread, have a bitter taste due to the presence of saponins. Since these saponins have antinutritional properties, breeding programs are aimed at developing varieties free of or low in saponins. For such varieties, however, little information exists on the effect of selection on protein composition. Six varieties of C. quinoa have been analyzed. The saponin content of single seeds of these varieties, determined by a hemolytic method, varied from 0.53% to less than 0.02%. Acid hydrolysis of saponins yielded hederagenin and/or oleanolic acid as aglycones, as identified by GC-MS. Soluble storage proteins from these varieties were studied by electrophoresis at basic pH. In addition, SDS-PAGE of reduced glutelins was carried out and revealed more than 20 subunits, some having molecular weights higher than 100,000 daltons. Amino acid compositions of quinoa proteins were also determined. There is no obvious relationship between protein content or composition and saponin content.

A newly-developed analytical method for oleanane-type triterpenes confirmed these results and allowed quantitative analyses of quinoa cell cultures for sapogenin content. Baseline resolution of a mixture of 7 triterpenes and beta-sitosterol (a common contaminant) was achieved by HPLC on silica gel under isocratic conditions using UV detection at 210 nm. Application of this method to hydrolyzed extracts from Chenopodium quinoa seeds gave oleanolic acid and hederagenin levels of 0.25 and 0.05% db, respectively, and levels one-tenth as high from callus cultures.

Cooperative studies with Purdue University have completely characterized one of the saponins as a tridesmoside of hederagenin. The proposed structure is named olean-12-ene-3,23-dihydroxy-28-oic acid, 3-O-β-D-glucopyranosyl, 23-O-β-D-glucopyranosyl, 28-O-β-D-

glucopyranosyl-(1→3)-O-α-L-arabinopyranosyl ester. This is the first report of a trisubstituted saponin in nature.

Quinoa embryoids have been induced using a regeneration medium with 10^{-6} M abscissic acid and gibberellic acid and 5 X 10^{-6} M benzyl adenine. In one experiment normal-appearing embryos developed and germinated after 13 months.

Antitumor Screening and Fractionation--The two major active compounds from Diarthron vesiculosum (Thymelaeaceae) have been identified as simplexin and excoecariatoxin which are daphnane orthoesters. Two additional new compounds, vesiculosin and isovesiculosin, have been characterized. Vesiculosin and isovesiculosin are daphnane esters, rather than orthoesters, and are apparent precursors of excoecariatoxin.

Pest Control Studies--Additional volatile constituents from oats that attract the sawtoothed grain beetle [Oryzaephilus surinamensis (L.)] have been identified as dimethyl succinate, glutarate, and adipate. Dr. W. E. Burkholder (Madison) is performing more detailed and extensive bioassays prior to publication of this work. Screening of plant seed extracts for antifeedant and toxic effects in fall armyworm [Spodoptera frugiperda (J. E. Smith)] larvae has begun and a bioassay to test repellency of these extracts to the sawtoothed grain beetle is also routinely done. A number of active extracts have been detected in each assay. Characterization studies on phytoecdysones of Diploclisia glaucescens (Menispermaceae) have resulted in the characterization of 24-epi-makisterone A (a new compound) in addition to β-ecdysone, makisterone A, 24(28)-dehydromakisterone A, and pterosterone.

Natural Toxicants in Vegetables--Several commercial varieties of carrots grown over a period of four years, at five locations within the USA were examined for falcarinol, falcarindiol, and myristicin. In newly harvested carrots the level of falcarinol and falcarindiol are 24 and 65 ppm, respectively. However, myristicin was detected in only one variety of carrots grown in Wisconsin in 1981. Carrots from the supermarket frequently contain small amounts of myristicin. Perhaps, one or more of the following steps in processing carrots induces the synthesis of myristicin and/or other carrot constituents:

mechanical harvesting (wounding)
brushing and washing (wounding)
bagging (ethylene production)
displaying (ultraviolet light)

Recent NRRC Publications

Carlson, K. D. Crambe. Energy Notes, April 5, 1984, Northern Agricultural Energy Center, USDA, Peoria, IL.

Carlson, K. D., R. L. Cunningham, and A. I. Herman. Sweet sorghum grown on sludge-amended stripmine soil: A preliminary look at yields, composition, and ethanol production. Trans. Ill. State Acad. Sci. 76(1 and 2):111-122 (1983).

Carlson, K. D., M. E. Carr, R. L. Cunningham, M. O. Bagby, and D. M. Palmer. Lignin analyses on sweet sorghum samples. Trans. Ill. State Acad. Sci. 76(3 and 4):265-269 (1983).

Carlson, K. D. and B. K. Jasberg. Sweet sorghum grown on sludge-amended stripmine soils. Sorghum Newsletter 26:68 (1983).

Carlson, K. D. and H. L. Tookey. Crambe meal as a protein source for feeds. J. Am. Oil Chem. Soc. 60(12):1979-1985 (1983).

Burnouf-Radosevich, M. and N. E. Delfel. High performance liquid chromatography of oleanane-type triterpenes. J. Chromatogr., in press.

Ferrigni, N. R., J. L. McLaughlin, R. G. Powell, and C. R. Smith, Jr. Use of potato disc and brine shrimp bioassays to detect activity and isolate piceatannol as the antileukemic principle from the seeds of Euphorbia lagascae. J. Nat. Prod. 47(2):347-352 (1984).

Hagemann, J. W. and J. A. Rothfus. Computer modeling of monoacid theoretical structures of triglyceride α-forms in various subcell arrangements. J. Am. Oil Chem. Soc. 60(7):1308-1314 (1983).

Jasberg, B. K. and K. D. Carlson. Storage of sweet sorghum biomass. Proc. 4th Annual Solar and Biomass Energy Workshop, Atlanta, GA, April 17-19, 1984, pp. 170-172.

Kleiman, R., L. H. Princen, and H. M. Draper. Chemicals and fuels from wild plant oilseeds. Am. Assoc. Adv. Sci., Sel. Symp., Chap. 5, pp. 71-79, Westview Press (1984).

Mikolajczak, K. L., R. V. Madrigal, C. R. Smith, Jr., and D. K. Reed. Insecticidal effects of cyanolipids on three species of stored product insects, European corn borer (Lepidoptera:Pyralidae) larvae, and striped cucumber beetle (Coleoptera:Chyrsomelidae). J. Econ. Entomol., in press.

Mikolajczak, K. L., B. W. Zilkowski, C. R. Smith, Jr., and W. E. Burkholder. Volatile food attractants for Oryzaephilus surinamensis (L.) from oats. J. Chem. Ecol. 10(2):301-309 (1984).

Plattner, R. D., S. G. Yates, and J. K. Porter. Quadrupole MS/MS of ergot cyclol alkaloids. J. Agric. Food Chem. 31(4):785-789 (1983).

Plattner, R. D., H. W. Gardner, and R. Kleiman. Chemical ionization-mass spectrometry of fatty acids: The effect of functional groups on the CI spectra. J. Am. Oil Chem. Soc. 60(7):1298-1303 (1983).

Powell, R. G., C. R. Smith, Jr., R. D. Plattner, and B. Jones. Additional new maytansinoids from Trewia nudiflora: 10-epitrewiasine and nortrewiasine. J. Nat. Prod. 46(5):660-666 (1983).

Princen, L. H. and J. A. Rothfus. Development of new crops for industrial raw materials. J. Am. Oil Chem. Soc. 61(2):281-289 (1984).

Smith, C. R., Jr. and R. G. Powell. Chemistry and pharmacology of maytansinoids. In "The Alkaloids: Chemical and Biological Perspectives," S. W. Pelletier, ed., Vol. 2, John Wiley & Sons, in press.

Spencer, G. F., R. B. Wolf, and D. Weisleder. Germination and growth inhibitory sesquiterpenes from Iva axillaris seeds. J. Nat. Prod., accepted for publication.

Spencer, G. F., R. E. England, and R. B. Wolf. (-)-Cryptocaryalactone and (-)-deacetylcryptocaryalactone--germination inhibitors from Cryptocarya moschata seeds. Phytochemistry, accepted for publication.

Yates, S. G., R. E. England, W. F. Kwolek, and P. W. Simon. Analysis of carrot constituents: Myristicin, falcarinol, and falcarindiol. In "Xenobiotics in Foods and Feeds," J. W. Finley and D. E. Schwass, eds., ACS Symposium Series 234, pp. 333-344, American Chemical Society, Washington, DC (1984).

Wolf, R. B., G. F. Spencer, and W. F. Kwolek. Inhibition of velvetleaf (Abutilon theophrasti) germination and growth by benzyl isothiocyanate. Weed Sci., in press.

Submitted by R. Kleiman
Northern Regional Research Center
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Peoria, IL 61604

The National Plant Germplasm System (NPGS)
Report of the National Coordinator to IR-1, NC-7, NE-9, S-9, and W-6
June 1984

Quentin Jones

Last year, we reached a high-water mark, I believe, with our series of meetings in Des Moines and Ames. For the first time, we had all functional aspects of the NPGS represented in one place at one time. Since our week in Iowa, I have been greatly encouraged to see much more evidence of a common language and better levels of understanding that have contributed to better communication. It has also increased the paper flow across my desk. But the benefits have far exceeded the setbacks and the frustration level has receded!

Germplasm Budgets

It is good to be able to accentuate the positive while trying to eliminate the negative. We can now say that we have had budget increases for germplasm in each of the last 4 years:

1981	$ 400,000
1982	660,000
1983	3,800,000
1984	835,000
Total	$5,295,000

We were not expecting any new money in germplasm in FY 1984, but the very considerable savings that Dr. Kinney was able to effect in reduction of overhead costs resulted in $4,100,000 being released to programs as a permanent increase in base funding. Germplasm got a generous share of that total. It is quite clear that our Administrator is committed to a high priority for plant germplasm.

The new money was allocated as follows:

$250,000: Aberdeen - Small grain cereal germplasm evaluations

200,000: Madison/Sturgeon Bay - Potato germplasm maintenance/evaluation; somaclonal transfer of genotypes across ploidy levels

100,000: Phoenix - Evaluation of Cuphea germplasm as source of lauric acid for soap and detergent industry

100,000: Experiment - Sweet potato germplasm maintenance/evaluation

100,000: Stillwater - Peanut germplasm maintenance/evaluation

50,000: Ames/Logan - Isolation increase of sugarbeet germplasm

35,000: Fargo - Cryopreservation of insect embryos

$835,000: TOTAL

Crop Advisory Committees (CAC's)

Since the meetings in Iowa last year, we have taken action to clarify the role and responsibilities of the CAC's and to facilitate their work. The "job description" for CAC's is in the process of being finalized. Funds have been placed with the Chairman (Al Stoner), Plant Genetics and Germplasm Institute, Beltsville, to help facilitate CAC meetings.

Germplasm Resources Information Network (GRIN)

Most of you must know by now that GRIN is operational. Now that the rather turbulent and sometimes even painful gestation period is over and a remarkably healthy offspring has been delivered, numerous proud parents are in evidence. The Data Base Management Unit (DBMU) for GRIN is doing an excellent job; a lot of work remains to be done; but most importantly, users are "lining up" to get on the system.

National Seed Storage Laboratory (NSSL) Policy

On May 10, 1984, following advice of the Department's legal staff, the policy governing operations of the NSSL was given further clarification. The action triggering this clarification was a request from a private law firm that the NSSL store seed pending receipt of a patent on the material by its client. Until such time as said patent was granted, or refused, distribution of this seed could be only to parties authorized by the company seeking the patent.

The pertinent language defining NSSL policy in this regard is quoted.

"First, the mission of the NSSL, and the reason it receives public funding, is to provide for the long-term preservation of plant germplasm in the form of seed for future use of plant scientists in improving food and fiber crops. It is required that the genetic composition of these seeds be maintained as near their original state as possible. This means that seed from the NSSL is avalable for distribution only when there is no other source of seed of a given genetic line (accession). When it must be made available from the NSSL, it is then available to any bona fide plant scientist who indicates a need for it in his research. We cannot restrict distribution to the original contributor of the seed.

"There are only two exceptions to the policy of 'free availability' of seed stocks held at the NSSL. One is that seed of certain narcotic drug crops can be sent only to holders of permits issued by the Drug Enforcement Administration and the other is voucher samples of seed varieties registered under the Plant Variety Protection Act. The latter is an exception to the 'free availability' principle because seed of these items is commercially available and the voucher seed sample is preserved only to document the genetic composition of a given variety at the time it was approved for registration. It is available as evidence in litigation over infringement of plant variety registration rights.

"The rapidly expanding research activity in genetic engineering is very likely to result in large numbers of applications for patents. Therefore we cannot set a precedent of storing private seed stocks pending issuance of patents. We must use the limited space and staff resources of the NSSL for meeting the demands of long-term preservation of germplasm for future crop improvements."

Plant Exploration

There seems to be a widely held impression that ARS now has funds for most any plant germplasm collecting mission that can be conceived. I must dispell this impression. Funds are available to support four to eight expeditions per year. The number actually funded depends on priority needs of the NPGS as determined by the CAC's and PGOC (Plant Germplasm Operations Committee) and availability of funds.

Gaps in the geographic distribution of accessions now held in collections do not of themselves justify a collecting mission. If there is documented evidence of accelerated genetic erosion of crop species or their wild relatives in given areas, this constitutes strong justification if correlated with gaps in existing collections. The NPGS must give priority consideration to major crop species in allocating its exploration funds.

Perhaps the PGOC should examine the desirability of having a preproposal screening of exploration objectives before so many people go to the time and expense of preparing a full-blown proposal as now required.

1984

S-9 TECHNICAL COMMITTEE REPORT

Agency: Tropical Agriculture Research Station
Submitted by: Francisco Vázquez
Address: U.S. Department of Agriculture, Science and Education, Agricultural Research Service, Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.

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Accession User: Antonio Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Evaluation of sorghum (Sorghum bicolor (L.) Moench) germplasm for yield, in vitro dry matter digestibility (IVDMD) and low hydrocyanic acid potential (HCN-p).
Progress to Date: Many sudangrasses and forage sorghums have been evaluated for yield, IVDMD and hydrocyanic acid content at two locations. Outstanding single crosses producing over 20 tons of dry forage per hectare in 180 days growth, with IVDMD values of over 55% have been obtained.
Publications: Agronomic Comparison and In Vitro Dry Matter Digestibility of Sorghum at Two Locations in Puerto Rico. Presentation at the PCCMCA Meeting, Managua, Nicaragua, May, 1984.
Cultivar Releases: None.

Accession User: Antonio Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Evaluation of grain sorghums (Sorghum bicolor (L.) Moench) germplasm for yield.
Progress to Date: A large group of grain sorghum hybrids were evaluated for yield and a series of agronomic characters at two locations. Outstanding hybrid such as A Tx623 x 76CS490 produced over 6 tons of grain per hectare in the first harvest while an additional 4 tons were obtained in the ratoon crop.
Publications: None.

Accession User: Antonio Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Development of PR5BR Sorghum Germplasm Population.
Progress to Date: The Sorghum bicolor population PR5BR released in 1983 was registered in Crop Science. PR5BR was developed from 'Millo Blanco' a local sorghum and the KOP5BR population.
Publications: Registration of PR5BR Sorghum Germplasm Population. Crop Sci., Vol. 24, May-June, 1984.

Accession User: Antonio Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Increase and evaluation of sorghum collections.
Progress to Date: Two plantings of 1,000 items each were made corresponding to the Ethiopian Collection. The collections are part of Mr. Gilbert Lovell's program. All items were selfed and classified.
Publications: None.

Accession User: Antonio Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Evaluation and improvement of corn (Zea mays).
Progress to Date: Many field corn cultivars have been introduced into Puerto Rico from Mexico and other countries searching for germplasm with high yield potential and resistances to diseases and insects.
Publications: "Response of corn to planting dates in Puerto Rico". Caribbean Food Crops Soc. Annual Meeting, 1983, Mayaguez, Puerto Rico.

Accession User: Franklin W. Martin
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Search for resistance to Early Blight (Alternaria solani) in tomatoes under tropical conditions.
Progress to Date: A collection of tomato accessions (228) were screened for resistance to Alternaria during the 1983 summer rainy season, after inoculation of one plant of each line. The most resistant lines were L. hirsutum f. typicum, PI 390514, 390658, 390660, but other L. hirsutum lines were also resistant. The following L. pimpinellifolium lines also showed useful resistance: PI 365928, 365912, 390519. All of these lines have been hybridized with L. esculentum and many of the crosses will be evaluated in the summer of 1984.
Publications: None.
Cultivar Releases: None.

Accession User: Lehel Telek
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Evaluation of 25 lines of Psophocarpus tetragonolobus (Winged Bean) introduced from the Department of Agriculture, Kuala, Lumpur, Malaysia.
Progress to Date: Introduced from Malaysia, 25 winged bean lines (Psophocarpus tetragonolobus) were planted and harvested. The seeds will be analyzed for oil, protein, and procyanidin content. A new and specific method was developed for the determination of procyanidins which reacts with proteins during cooking and lowers the available protein quantities for nutrition. The development of low procyanidin content varieties by breeding would increase the nutritive value of winged beans.
Publications: Publications in progress.

Accession User: Francisco Vázquez
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Maintenance and evaluation of tropical plant germplasm.
Plant Introductions:

Theobroma cacao - One hundred and fourteen clones introduced from the Miami Subtropical Horticulture Station have been grafted on Amelonado seedlings. At least three plants of each of these clones will be transferred to the permanent field collection.

Copaifera langsdorfii - Seeds of two selections of this species native of Brasil were planted at TARS. The adult tree produces hydrocarbons similar to the diesel oil. It is related to C. officinalis, native of Puerto Rico.

Anacardium occidentale L. - Seeds of this tropical fruit were introduced from the Miami Subtropical Horticulture Station through the cooperative tropical research program.

Polygala cowelli (Britton) - Seeds of this ornamental tropical tree were grown in the greenhouse and will eventually become part of our germplasm collection.

Passiflora edulis - Seeds of six hybrids of Passion Fruit were introduced from the Miami Subtropical Horticulture Station for evaluation in Puerto Rico.

Germplasm Collections:

Fruit trees, vines, and shrubs - Over 380 species of tropical fruits and nuts, ornamental shrubs and trees are maintained on the TARS grounds.

Dioscorea spp. - Eleven selections of Dioscorea alata, five selections of D. esculenta and one of D. bulbifera have been grown at TARS for evaluation and distribution. Requests for plant material were processed during the months of February and March, 1984.

Musa spp. - Forty four selections of bananas have been planted and evaluated at TARS. Requests for vegetative material will be handled next year. Twenty four more selections originally obtained from Honduras and Dominican Republic were recently added to the collection.

Legume seed - Seeds of various species of legumes are available for distribution:

Canavalia ensiformis - Jack bean
Dolichos lablab - Hyacinth bean
Pachyrhizus erosus - Yam bean
Phaseolus vulgaris - Common bean
Psophocarpus tetragonolobus - Winged bean
Pueraria lobata - Kudzu
Vigna unguiculata - Cowpea

Theobroma cacao - In cooperation with the American Cocoa Research Institute (ACRI) a disease-free collection of selected cacao clones which serves as a permanent source of certified budwood for worldwide distribution was established. The collection consists of 372 clones with three mature trees representing each clone. The cacao collection provides plant material for continued breeding research serving also as a source of moderate or large-scale distribution to scientists, cacao breeders, and institutions throughout the world. New clones will be added to the permanent field collection once they are grafted and achieve the proper size for transplanting.

Passiflora edulis - Six passion fruit hybrids introduced from the Miami Subtropical Horticulture Station were planted for evaluation in three different locations in Puerto Rico. Hybrid M-29416 shows promise to Puerto Rico due to its high yields and fruit quality as compared to the locally planted commercial variety P. edulis f. flavicarpa.

Germplasm Distribution:

TARS is directed to answering local, national, and foreign needs for plant germplasm. Requests for vegetable seeds, tubers, yams, cuttings, trees, fruits, nuts, etc., have been handled throughout Puerto Rico, Virgin Islands, continental United States, and foreign countries. A summary of these distributions follows:

Germplasm	Packets	No. of persons	Countries
Vegetable seeds	658	63	37
Tubers, yams, cuttings, etc.	210	37	22
Trees, fruits, nuts	28	15	6
Other seeds	63	30	13
Cacao pods	156	11	2
Cacao budwood	27	2	2

1984

S-9 TECHNICAL COMMITTEE REPORT

Agency: U. S. Department of Agriculture, Subtropical Horticulture Research Station

Submitted by: R. J. Knight, Jr.
Address: 13601 Old Cutler Road, Miami, Florida 33158

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Accession Users: R. J. Knight, Jr. and P. K. Soderholm
Address: U. S. Department of Agriculture, Subtropical Horticulture Research Station, 13601 Old Cutler Road, Miami, Florida 33158.
Nature of Research: Introduction preservation and evaluation of tropical and subtropical plants.

Progress to Date:

During the year ending May 31, 1984, 1,589 distributions were made, 62 percent of which went to recipients in the United States (Table 1). The largest proportion of distributions (44.4%) included tropical fruit crops (Table 2).

Numerous requests continue to come from the Caribbean region for species with commercial potential, as well as miscellaneous species that can be used for replinishing the local plants that have been depleted to meet firewood needs.

During this period 754 accessions were added to the Station's collection, the largest portion of which (42.7%) was made up of cacao introductions (Table 3).

We continue to receive grafted plants of Theobroma cacao germplasm that was collected in the wild in Oriente Province of Ecuador. This is material collected by John Allen under the auspices of the London Cocoa Trade Amazon Project and INIAP. While Dr. Allen is evaluating the material at Napo, Ecuador, the USDA is cooperating by helping to move it into permanent collection sites in Puerto Rico, Costa Rica and Brazil, as well as the original site in Ecuador.

In recent years Monilia roreri has become a serious disease of cacao in Costa Rica. Scientists at CATIE in Turrialba are working to produce resistant hybrids. Recently, we have received seeds of 15 of these hybrids.

A February 1984 estimation of completeness of the Clonal Germplasm collections of fruit at Miami prepared for the National Technical Advisor included the following information: the mango (Mangifera) collection of 185 cultivars encompasses about 74% of the total quantity needed, and the avocado (Persea) collection of 170+ cultivars covers 85% of the total need.

Number of cultivars collected and percent of the total needed for the following fruit crops was: banana (Musa), 40 cvs, 80%; plantain (Musa), 27 cvs, 67.5%; annonas (Annona), 67 cvs, 89.3%; carambola (Averrhoa), 17 cvs, 68%; lychee (Litchi), 21 cvs, 52.5%; guava (Psidium), 19 cvs, 38%. Estimates that had been requested for papaya (Carica), persimmmon (Diospyros) and pomegranate (Punica) could not be given because these crops are not well suited to cultivation at this site. Hawaii was suggested for Carica, California or Texas for Diospyros and Punica sites.

From the initial planning meeting on the subject in 1975, the avocado collection at Miami, which dates back 85 years and has been a source of germplasm to many parts of the world (Table 4), was planned to be and then was included as an integral part of the National Clonal Repository. Then in June, 1983, the National Technical Advisor decided that the avocado Clonal Repository was to be located in Hawaii, and that three additional crops, Carica (papaya), Diospyros (persimmon) and Punica (pomegranate) were to be maintained at Miami or Mayaguez. Considerable discussion followed, after which the Chairman of the National Plant Germplasm Committee appointed an Ad Hoc Committee to work with the National Technical Advisor on the siting of subtropical fruit crops. This committee is currently active and its final report has not been prepared.

Publications: Knight, R. J., Jr., Spalding, D. H., King, J. R., von Windeguth, D. L., Benschoter, C. A., Burditt, A. K., Jr., and Fons, J. 1980. Results of fumigation of fruits and vegetables of southern Mexico to control the Mediterranean fruit fly. Proc. Amer. Soc. Hort. Sci., Trop. Region 24: 117-125.

Knight, R. J., Jr. 1984. Off-beat fruits for dooryard gardens. Fairchild Trop. Garden Bull. 39(1): 20-29.

Knight, R. J., Jr. 1984. Miami avocado germplasm collection: an international resource for plant breeders. Diversity 6 (March/April): 12.

Litz, R. E., Campbell, C. W., Soderholm, P. K., and Norstog, K. 1983. Tropical and subtropical plant germplasm resources in South Florida. Plant Molecular Biol. Rep. 1(4): 44-51.

Litz, R. E., Knight, R. J., Jr. and Gazit, S. 1983. In vitro somatic embryogenesis from Mangifera indica L. callus. Sci. Hort. 22: 233-240.

Soderholm, P. K. 1983. The flowering tree collection at the U.S. Department of Agriculture Horticulture Research Station, Miami, Florida. Proc. 4th Annual Menninger Flowering Tree Conf.: 29-36.

Soderholm, P. K. 1984. The bamboos at USDA, Miami. Fairchild Trop. Garden Bull. 39(2): 7-14.

Soderholm, P. K. and Vazquez, F. 1984. The United States Department of Agriculture cacao germplasm collection at Miami, Florida and Mayaguez, Puerto Rico. Proc. 9th International Cocoa Res. Conf., Lome', Togo.

Table 1. Distributions of Plant Introductions from USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1983 through May 31, 1984

Destination	Number	Percent of total
Florida	673	42.3
California	106	6.7
Rest of Continental U.S. and Canada	221	13.9
Caribbean Region z/	171	10.8
Mexico and Central America	45	2.8
South America	55	3.5
Europe	53	3.3
Asia	38	2.4
Africa	107	6.7
Pacific Basin y/	120	7.6
Total:	1,589	100.0

z/ Includes Puerto Rico and the Virgin Islands

y/ Includes Australia, Malaysia, Guam, Hawaii, New Zealand, Philippines and other Pacific Islands

Table 2. Germplasm Distribution Material from USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1983 thru May 31, 1984

Material	Number of distributions
Miscellaneous ornamentals and shade trees (includes orchids and ferns)	433
Tropical and subtropical fruits	703
Cacao	184
Coffea	94
Medicinal, chemurgic and tropical vegetables z/	175
Total:	1,589

z/ Includes edible palms, nuts, spices, rubber, sugarcane, beverages

Table 3. Germplasm Receipts at USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1983 through May 31, 1984

Material	Number of introductions received
Miscellaneous ornamentals and shade trees (includes orchids and ferns)	112
Tropical and subtropical fruits	232
Cacao	322
Coffea	57
Medicinal, chemurgic and tropical vegetables z/	31
Total:	754

z/ Includes edible palms, nuts, spices, beverages

Table 4. Avocado Germplasm Distributions from USDA/ARS Miami, 1958 - 1983

Destination	Number of distributions	Percent of total
Florida	348	39.5
Africa	182	20.7
California	84	9.5
South America	67	7.6
Asia	66	7.5
Caribbean Basin z/	53	6.0
Continental U.S. (except FL and CA) and Canada	27	3.1
Mexico and Central America	23	2.6
Pacific Basin (except HI) y/	21	2.4
Hawaii	9	1.0
	Total: 880	

z/ Includes Puerto Rico and the Virgin Islands

y/ Includes Australia, Guam, New Zealand, Philippines and other Pacific Islands

REPORT OF THE
GERMPLASM RESOURCES LABORATORY
TO THE
REGIONAL TECHNICAL COMMITTEES ON PLANT GERMPLASM

May 1984

And so it is with many other facts,
which are so obscure that we stand in
awe before the mystery of life.
Darwin

LAB CHIEF'S OFFICE

J. A. Duke

Information summaries on crops represented by crop advisory committee were updated. Drafts of two energy-related books, Handbook of Energy Species (Plenum Press) and Agroenergetic Summaries for Selected Developing Countries (CRC Press), were completed during CY 1983, but still require editorial attention. Both were enhanced to include germplasm information on the major crops. A chapter entitled Proximate Analyses was completed for a CRC book showing proximate analyses for most major crops in the germplasm system. This represents the culmination of efforts to modify a massive nutritional data bank so that it can be converted to a zero-moisture basis. This was necessary, e.g., to show certain Latin American countries that the coca leaf, devoid of cocaine, had little nutritional value. Efforts were made to obtain aluminum tolerant soybean germplasm in collaboration with the Plant Stress Laboratory, to obtain germplasm of Apios americana (formerly Glycine) and A. priceana in conjunction with the Tissue Culture and Molecular Genetics Laboratory, and to obtain Artemisia annua in collaboration with BioMed Inc. and Walter Reed, and Podophyllum spp., in collaboration with Biologically Active Natural Products Laboratory and industry. Collaborative studies of our germplasm of Apios americana, an aluminum-tolerant N-fixing species, showed that on a zero-moisture basis, it was nearly three times as rich in protein as potato, yet would grow in alternately waterlogged and desiccated environments. Cooperative programs were launched to enhance Glycine max germplasm with these attributes. Thus Apios, a source of germplasm for cultivar development, provides five of Quentin Jones' cogent reasons for new crops research in the US:

- Tolerate soils of low pH
- Tolerate poorly drained soils
- Recover mine spoils
- New source of industrial products
- Substitute for crops in chronic surplus

ECOGEOGRAPHICS AND GERMPLASM RESEARCH

A. A. Atchley

Work continued with the Agricultural Ecological and Geographic Information System (AEGIS). This work included (1) reconstruction and amplification of files inherited in 1980, (2) establishment of prototype files for crops of special interest, (3) development of computer graphics capability for display and analysis of spatial data, (4) examination of nutritional values of a wide spectrum of crops, and (5) investigation of ways of predicting occurrence of desirable populations of major crops and their wild relatives. The present level of funding fell somewhat short of optimum graphics hardware acquisition; however, the main drag on progress is lack of personnel, particularly of trained computer support personnel, commensurate with the scope of these activities.

The graphics programs developed in the Ecogeographic Unit now allow the computerized generation of maps displaying locality numbers and classification of meteorological stations (the most promising system will, it is hoped, be found to be the one developed by the Unit). Development of gradient functions is the next step.

More classical uses of AEGIS included the selection of stations likely to have soybean germplasm resistant to aluminum toxicity--five lines have been received as a result and are now undergoing tests, courtesy of Dr. C. D. Foy; the generation of extensive nutrition tables; contributions to a Handbook of Energy Species; and the current revision of the files of ecological attributes for inclusion in a book on crop and varietal selection in the Tropics.

Completion of the initial phase of graphics equipment acquisition should enable serious continuation of earlier efforts to establish a soil database with worldwide, if sparse, coverage. Augmentation of climatic data has concentrated on critical variables not casually available and on the geographic areas of origin of major crops.

EVALUATION OF SMALL GRAINS GERMPLASM

L. W. Briggle

Systematic evaluation of accessions in the USDA-ARS National Small Grains Collection was initiated in 1983. Funding was obtained specifically for this purpose. The present level of support, however, is limited. If additional funding is not forthcoming, the task of evaluating all accessions could take more than 20 years--well into the next century.

Crop Advisory Committees for wheat, barley, oats, and rice each have determined a set of descriptors appropriate for the specific crop species.

A total of 5,000 wheats and 2,500 oats were grown for evaluation at Aberdeen, Idaho, in 1983. Field data were recorded on such descriptors as number of days from planting to anthesis, plant height, spike (or panicle) type, spike (or panicle) density, straw lodging, straw breakage, awn and glume characteristics.

Spikes or panicles were collected from each row at maturity. Seed and more precise spike (or panicle) data will be obtained later in the laboratory. Each row was harvested and the grain weight recorded. Grain will be returned to Beltsville for storage and further evaluation (disease and insect resistance, quality factors, etc.).

Approximately 2,000 additional wheats were evaluated at Mesa, Arizona, in 1983 and handled in much the same manner.

About the same number of wheat and oat accessions will be field evaluated at the same locations in 1984. In addition, we plan to begin evaluating barley accessions at Aberdeen, Idaho, in 1984.

Evaluation for disease and insect resistance was initiated during 1983 and will be expanded as much as possible in 1984. Growth habit (winter or spring type) determination is also underway. Locations for these evaluations are listed below:

1983		1984	
St. Paul, MN	Wheat & Oat Stem Rust	St. Paul, MN	Wheat & Oat Stem Rust
Manhattan, KS	Wheat Leaf Rust	Manhattan, KS	Wheat Leaf Rust
Ames, IA	Oat Crown Rust	Ames, IA	Oat Crown Rust
Urbana, IL	Oat BYDV	Urbana, IL	Oat BYDV
Lafayette, IN	Wheat Hessian Fly	Lafayette, IN	Wheat Hessian Fly
		Corvallis, OR	Wheat Smuts
Bozeman, MT	Wheat Growth Habit	Bozeman, MT	Barley & Wheat Growth Habit
		Davis, CA	Wheat, Barley, & Oat BYDV

NEW CROPS PROJECT

T. A. Campbell

The need for vernalization of Stokes Aster (Stokesia laevis) appears to be absolute in early flowering types and is often necessary in late flowering types. In mature plants, 147 days of vernalization at 0°C (preceeded and followed by 7 days at 5°C), followed by long days and applications of GA-4/7 resulted in maximum flowering. Fourteen day-old seedlings could often be induced to bolt with vernalization at 5°C and applications of gibberellins, but could not be induced to flower. The most vigorous plants were selected in the fall of 1983 from early-flowering nurseries as part of a continuing breeding program designed to develop high yielding, vigorous Stokes aster synthetics. Plants were vernalized and seed is being produced for further screening. A nursery of late flowering plants was established in the field in the fall of 1983.

Development of Potential Multi-use Perennials

Replicated nurseries of Asclepias syriaca half-sibs were seeded in 1983 for chemical and agronomic heritability studies. Growth was poor due to secondary dormancy induced by drought and high temperatures. This phenomenon is under study. In in situ studies of A. syriaca, % polyphenol + oil and % hydrocarbon was lowest at the pre-bud stage (8.9, and 0.8% of dry matter respectively) and highest at the flowering stage (11.7, and 2.3% of dry matter respectively). In a two year study of Rhus glabra germplasm, dry matter yield of single-row plots (extrapolated to Mg/ha) ranged from 0.02 to 1.4, % polyphenol + oil from 19.4 to 31.1, and % gallotannin from 9.8 to 15.7%. In a management study at Beltsville, Maryland, a plant population of 36,000 plants/ha produced the highest dry matter yield (0.98 Mg/ha stems and 2.45 Mg/ha leaves). Mean dry matter yields of Phytolacca americana were 2.14 Mg/ha at Beltsville, Maryland. Populations of 36,000 plants/ha produced highest yields.

The effects of 0, 0.01, 0.02, 0.04, 0.08, and 0.16 M ethyl methane sulfonate and 0, .0005, .001, and.002 M sodium azide on Cuphea tolucana and Cuphea wrightii were studied. Both chemicals were applied to seeds. For the EMS study, mean height ranged from 4.5 cm (0 M) to 3.3 cm (0.04 M) and % emergence from 24% (0 M) to 13% (0.8 M). For the sodium azide study, height ranged from 3.9 cm (0 M) to 2.5 cm (0.002 M) and % emergence from 29 (0 M) to 13 (.002 M). No mutagen-induced, macro-mutations were noted in the M_2 generation and there was no species x mutagen treatment interaction. In a test of the effects of gamma radiation applied to seeds equilibrated at 2% moisture, C. wrightii was more tolerant than C. tolucana. An ideal rate (50% height reduction) for C. wrightii appears to be 15 to 20 Kr and for C. tolucana, ca 12 Kr. A definite temperature x phytochrome interaction was observed in C. tolucana and C. wrightii. An ideal germination temperature was 30°C; red light increased germination markedly. Several weeks of after-ripening at 45°C was necessary before light treatment was effective.

ECONOMICS OF CONVENTIONAL AND NEW CROP GERMPLASM

S. H. Gillette

The Germplasm Resources Laboratory economist was on detail in 1983 to the Needs Assessment Team. Since returning to the lab, she has been laying the groundwork for economic appraisal of some crops being investigated by Germplasm Resources Laboratory scientists. Current major projects, which are all in initial stages, include evaluating the research potential for raising Cuphea to an economic crop, evaluating crambe lines for economic potential, developing a model to study the value of genetic diversity in corn and wheat, and exploring the possibilities of updating ARS Handbook 1 "Extent and Cost of Weed Control with Herbicides and an Evaluation of Important Weeds, 1968." She has also made arrangements with ERS and has on-line access to their data files on commodities, prices, etc. as well as their statistical packages. She has also evaluated the potential costs of a proposal to use leucaena for providing electricity to the state of Malokai.

NEW CROPS (LEUCAENA, ORNAMENTAL GRASSES)

A. J. Oakes

Over 200 perennial ornamental grasses were acquired, propagated, and maintained in the greenhouse for field evaluation in 1984 and thereafter. Additional accessions were increased and maintained in greenhouse plantings.

Analyses of Leucaena germplasm for protein and mimosine was completed and manuscripts are in preparation. Screening Leucaena germplasm for acid tolerance in greenhouse trials was completed and a manuscript is in peer review.

Leucaena literature search has continued. A bibliography containing 691 literature citations was completed and over 600 copies were distributed worldwide.

PLANT PATHOLOGY

M. J. O'Brien

The work on revising AH 165, Index of Plant Diseases in the United States was started during the latter half of 1983. Input and retrieval formats were designed for computerization of the updating entries. Searches by the CALS system (NAL) covered 159 families, 931 genera, and 1,295 species for the lesser-worked-on plants.

During 1983, 25 volumes in three major pathology journals, each containing 12 issues/year, were searched. One year's page-by-page search covered 2,595 pages, providing 74 pertinent articles covering 149 hosts and 74 diseases for the three journals (figures for the remaining 264 issues can be gained by extrapolation). Four important taxonomic sources were selected as aids in revising and updating the entries for phanerogams. The Extension Service in each State was canvassed for its individual State compilations. Source material was also gathered to update the nomenclature/synonymy for bacteria, viruses, and for the current-name data on abiotic disorders.

Flowering data utilizing seven light regimes were determined for five Crambe spp. that incorporated four P.I. accessions. Flowering and seed set were successfully obtained for the species with inderterminate growth habit under 16- and 24-hour light exposures using low- and high-pressure sodium lamps. An important leaf pathogen of Crambe, Alternaria brassicicola, was successfully controlled in in vitro tests by a virulent isolate of Bacillus subtilis, offering the possibility for biological control of A. brassicicola. Attempts were made to develop a detached leaf test to determine the pathogenicity of S. brassicicola on Crambe spp.

To find the perfect-state, heretofore not found, for the acicular spores of Cercospora beticola, we tested 14 light regimes, using the visible plus far red spectra in temperature-controlled chambers. Under these regimes, however, the perfect state did not form on the sterilized sugar-beet root pieces inoculated with spores from the conidial state.

NATIONAL SMALL GRAIN COLLECTION

D. H. Smith, Jr.

The numbers of accessions currently held in the seven different genera making up the collection are shown below. Over three thousand new accessions were added in 1983.

1983 Totals NSGC

	Wheat	39,003
	Barley	25,316
	Rice	19,960
	Oats	19,691
	Rye	2,306
	Triticale	925
	Aegilops	388
Total		107,589

The following table details the distribution activities of the NSGC.

Distributions from the National Small Grain Collection in 1983

CROP	TOTAL	NO. OF ACCESSIONS
Wheat	111,246	24,856
Barley	22,723	8,446
Oats	12,164	3,285
Rye	2,037	1,319
Rice	2,000	1,714
Aegilops	1,765	443
Triticale	1,205	810
Total	153,143	40,873

PLANT INTRODUCTION AND EXCHANGE

G. A. White

For 1983 exchanges, 2,049 shipments of 110,686 plant germplasm items were sent to 121 countries. These figures include 46,269 cereal nursery entries. Cotton nursery entries for winter increase in Mexico are no longer channeled through the Plant Introduction Office as had been done for several years. This activity is now coordinated at the Brownsville Station in Texas.

In support of the Seed and Plant Material Project with AID, the Plant Introduction Office distributed 776 items in 125 shipments to 50 countries. Of these, one-third were cereals and one-third tree species such as Leucaena, Calliandra, and Sesbania.

Seventy accessions of coffee totalling 13,453 plants were shipped to Costa Rica. Seedlings are grown in greenhouses at Glenn Dale, inspected periodically over approximately a 5-month time span for possible pests, and are documented with PI (Plant Introduction) numbers at the time of quarantine release.

During the year, 7,263 items were assigned PI numbers and distributed to curators and research scientists. Cereals made up 22% of the total, corn and sorghum 16%, oilseed 11%, ornamentals 6%, and vegetables 13%. To accomodate these accessions, 155 scientific names were added to the PI nomenclature file. Assistance was given to the Germplasm Resource Information Network (GRIN) team in the formation of a large computerized nomenclatural file of about 6,000 names. PI documentation in 1983-84 includes the following groups:

Crop(s)	Source/Origin	PI numbers
1983		
Ornamentals	Japan Collectors: Kawase, March, Meyer Over 200 species	PI 479246-479652
Medicago & others	Bolivia, Ecuador, Peru Collectors: Rumbaugh, Lehman	PI 478402-478590
Vegetables	People's Republic of China Collector: Orton (vegetable portion) 26 species/subspecies	PI 478310-478397
Corn	Mexico Increased by Pioneer in Florida	PI 478898-479199
Wheat	Bari, Italy Most of Ethiopian origin	PI 479783-480470
Amaranthus sp.	India	PI 480487-481476 483089-483090
Gossypium spp. & *Sorghum* spp.	Australia Collector: Stewart	PI 478749-478770 (1984)483327-483333
1984		
Corn	Mexico Germplasm at NSSL from CIMMYT	PI 483470-485519
Sorghum	Yemen Voigt collection	PI 485721-486126
Corn	Bolivia 765 accessions via IBPGR	PI 486430-487194

Amaranthus spp.	Peru Mostly A. caudatus, grain type	Pending
Vitis spp.	United States Collector: Remaily 4 species	PI 483128-483190

The International Board for Plant Genetic Resources (IBPGR) has been aggressively supporting plant explorations to rapidly collect vanishing crop germplasm. Such materials will provide much of the genetic diversity needed for future improvements in pest resistance, environmental tolerance, and other traits.

In close cooperation with IBPGR, the Plant Introduction Office has established procedures to rapidly document and distribute these plant genetic resources. Mark Perry, IBPGR Documentation Officer, has been instrumental in obtaining missing data and organizing the data and associated plant materials for documentation. During 1983, documentation was completed for 1,878 accessions from IPBGR-sponsored collection missions in Bhutan, Chile, Iraq, Madagascar, Mozambique, Pakistan, Sudan, and Zimbabwe. Most of the accessions were sent to working collections for increase, preliminary evaluation, and distribution to researchers. Increase seed will be deposited at the National Seed Storage Laboratory (NSSL) for long-term storage. NSSL has been designated as a base collection site for a number of important crops.

Documentation is in progress for a large, cucurbitaceae-rich collection from Zambia. We expect to be caught up in 1984 with documentation of IBPGR-sponsored collectons for which information is available.

Dr. White presented a report on Various Aspects and Activities of the U.S. National Plant Germplasm System at the twelfth meeting of the Canadian Expert Committee on Plant Gene Resources on November 17 at the Central Experiment Station, Ottawa. A visit with Dr. Roland Loiselle, who is in charge of the Ottawa program, and observation of facilities proved worthwhile.

Peggy Paciotti, formerly a student assistant, has joined the Plant Introduction Office through broad form cooperative agreement with the University of Maryland. As AID Correspondent, she will work full-time on the AID project after her May graduation in Horticulture. Deanna Burger provides half-time clerical support relative to correspondence, procurement of appropriate plant materials (and associated information), etc. We have already achieved improved timeliness and completness in our responses to requests. Additional emphasis on feedback of information from cooperating missions is expected to identify specific crops/ cultivars that have been adopted or look favorable for production. More familiarization by mission personnel with import requirements is being fostered to minimize delays in shipment.

More and more shipments to be sent abroad are being delayed or cancelled due to the inability to comply with the quarantine regulations of the importing country. The most frequent problem is the need for certification of freedom of disease. To provide this certification, the parent plants must have been field inspected by a state or federal quarantine inspector. For any materials which have been field

inspected, certification should be included with the samples. Questions regarding quarantine requlations, especially of vegetative materials, could be directed to the Plant Introduction Office prior to shipment. Note that all plant materials sent or carried to a foreign country must be accompanied by a phytosanitary certificate.

The importation of corn, sorghum, and certain millets is prohibited from Bulgaria, Russia, Brazil (sorghum and millets), and from all of Africa and Asia. To receive these crops from the areas mentioned, a Departmental permit which specifies greenhouse increase during the winter is required.

Regulations also require a Quarantine 41 permit to import these crops from non-prohibited countries as well. Seeds are admissable with inspection only but the permit is required. Application for Departmental and Quarantine 41 permits should be made to Permit Unit, USDA-APHIS-PPQ, Federal Center Building, Room 638, Hyattsville, Maryland 20782.

Scientists regularly planning to import corn, sorghum, or millets from Mexican sources such as CIMMYT, INIA, or others, are especially urged to obtain Quarantine 41 permits.

When asking our assistance in respect to quarantine problems, assignment of PI numbers to plant germplasm, need of foreign germplasm, and other matters, please provide complete information. Appropriate information such as scientific plant names, names and addresses of source(s)/recipient(s), countries involved, descriptive details, etc., will help us serve you more promptly and completely.

PUBLICATIONS

Adamson, W.C. and T.A. Campbell. 1983. Polkweed as a producer of oil and polyphenol. Agron. Abstracts:131.

Atchley, A.A. 1983. Appendix I: Latin American Localities Suitable for Date Palm Cultivation, pp. 211-213, in: OTA Workshop Proceedings. Plants--The Potentials for Extracting Protein, Medicinal, and Other Useful Chemicals. Congress of the United States, OTA, Washington, DC., 252 pp.

Atchley, A.A. 1983 (in press). Nutritional Value of Palms. Principes.

Baenziger, P.S., D.J. Sammons, and D.H. Smith, Jr. 1983. Soft red winter wheat germplasm segregating for dominant male sterile gene. Crop Sci. 23: 1022.

Baenziger, P.S., J.G. Moseman, J.R. Tomerlin, D.J. Sammons, and D.H. Smith, Jr. 1983. Winter barley Composite Cross XL germplasm. Crop Sci. 23: 1017.

Browder, L.E., D.H. Smith, Jr., and L. W. Briggle. 1983. Potential Sources of Resistance to Wheat Leaf Rust in the 1982 Accessions of the U.S.D.A. World Collection of Wheats. Submitted to Plant Disease.

Briggle, L.W. and D.H. Smith, Jr. 1984. Evaluation of Small Grains Germplasm. Diversity 6: 23.

Briggle, L.W. 1983. Barley Yellow Dwarf Virus (BYDV) Research Program in the United States. Presented at CIMMYT Workshop on BYDV, El Batn, Mexico. December 6-8, 1983. Published in Workshop Proceedings.

Briggle, L.W. 1983. Activities of the Wheat Crop Advisory Committee. Wheat Newsletter, Volume 30.

Briggle, L.W. 1983. Barley Yellow Dwarf Virus (BYDV) Workshop Sponsored by CIMMYT. Wheat Newsletter, Volume 30.

Campbell, T.A. 1984. Chemical and agronomic evaluation of common milkweed, Asclepias syriaca. Econ. Bot. 37:174-180.

Campbell, T.A. 1983. Agronomic and chemical evaluation of smooth sumac (Rhus glabra L.). Agron. Abstracts:58.

Duke, J.A. 1983. Aloe: The Facts Behind the Folklore. Equus 67:14.

Duke, J.A. 1983. The Marvelous Mayapple. The Botanical Grower 1(1):3-4 (Newsletter). Aug. 15.

Duke, J.A. 1983. The USDA Economic Botany Laboratory's Data Base on Minor Economic Plant Species, pp. 196-214, in: OTA Workshop Proceedings. Plants--The Potentials for Extracting Protein, Medicinal, and Other Useful Chemicals. Congress of the United States, OTA, Washington, DC. 252 pp.

Duke, J.A. 1983. Another Billion Dollar Weed? The Botanical Grower 1(2):3-4 (Newsletter).

Duke, J.A. 1983. Incredible Wild Rice (Zizania aquatica) - Native American Food Staple. The Herb Report 3(2):2 (Newsletter).

Duke, J.A. 1983. Nitrogen-Fixing Trees, pp. 48-52, in: The International Permaculture Seed Yearbook. Orange, Mass. 92 pp.

Duke, J.A. 1983. Appendix II: Rating American Localities Suitable for Date Palm, pp. 213-214, in: OTA Workshop Proceedings. Plants--The Potentials for Extracting Protein, Medicinal, and Other Useful Chemicals. Congress of the United States, OTA, Washington, DC, 252 pp.

Duke, J.A. 1983. Seaside Alder (Alnus japonica/maritima), pp. 45-46, in: The International Permaculture Seed Yearbook. Orange, Mass. 72 pp.

Duke, J.A. 1983. Caragana, pp. 41-42, in: The International Permaculture Seed Yearbook. Orange, Mass. 72 pp.

Duke, J.A. 1983. Seedling Variation in Apios. Phytologia 54(6): 409-410.

Duke, J.A., and M.O. Bagby. 1982. Comparison of Oilseed Yields: A Preliminary Review, in: "Vegetable Oil Fuels," Proc. Int. Conf. on Plant and Vegetable Oils as Fuels, Fargo, N. Dak., Aug. 2-4, 1982, ASAE Publ. 4-82, pp. 11-23.

Foy, C.D. and A.J. Oakes. 1984. Tolerance of limpograss (P.I. 364344) to excess manganese in acid soil and nutrient solution. J. Plant Nutrition 7(5):____.

Foy, C.D. and A.J. Oakes. 1984. A winter hardy, aluminium tolerant, perennial pasture grass for reclamation of acid mine spoils. J. Plant Nutrition 7(5):____.

Oakes, A.J. 1984. Leaf/stem ratio in limpograss, Hemarthria altissima (Poir.) Stapf & C.E. Hubb. Turrialba 34:____.

Oakes, A.J. 1984. Scarification and germination of Leucaena leucocephala (Lam.) DeWit. Tropical Agriculture 61(2): 125-127. 1984.

Oakes, A.J. 1984. Leucaena Bibliography. Processed. 110 pp. July 1983.

O'Brien, M.J. 1983. Evaluation of eggplant accessions and cultivars for resistance to Verticillium wilt. Plant Disease 67: 763-764.

Smith, D.H., Jr. 1983. Report from the National Small Grain Collection. Wheat Newsletter.

Smith, D.H., Jr. 1983. Report from the National Small Grain Collection. Barley Newsletter.

Smith, D.H., Jr. 1983. Report from the National Small Grain Collection. Oat Newsletter.

Webster, J.A. and D.H. Smith, Jr. 1983. Methods of developing small grains resistant to the cereal leaf beetle. USDA-ARS Tech. Bull. No. 1673. 12 pp.

Webster, J.A. and D.H. Smith, Jr. 1983. Cereal leaf beetle population densities and winter wheat yields. Crop Protect. 2: 431-436.

Webster, J.A. and D.H. Smith, Jr. 1983. The effect of resistant wheat on cereal leaf beetle populations and damage to adjacent oats. Protection Ecology (accepted for publication).

White, G.A. 1983. USDA Plant Inventory No. 188, Part I, 529 pp., Part II, 608 pp.

White, G.A. and S. Drexler. 1983. USDA Plant Inventory No. 189, 710 pp.

White, G.A. and S. Drexler. 1983. USDA Plant Inventory No. 190, 778 pp.

White, G.A. and S. Kenworthy. 1984. Plant Quarantine Alert. Diversity 6: 12.

PLANT GENETICS AND GERMPLASM INSTITUTE
OFFICE OF THE CHAIRMAN

A. K. Stoner

Since a number of the major functions in support of the National Plant Germplasm System are centered in the Plant Genetics and Germplasm Institute, Dr. Allan Stoner, Chairman, has been asked to assume responsibility for facilitation of the activities of Crop Advisory Committess (CAC's). This involves assisting the Committees in a variety of ways to provide analysis, data, and advice about the activities necessary for effective acquisition, maintenance, evaluation and use of genetic resources within their crop or group of related crops. There are currently 22 CAC's and it is anticipated that several more will be formed during the next year.

Alfalfa
Barley
Clover and Special Purpose Legumes
Cotton
Forage Grass
Maize
Oats
Phaseolus
Pea
Peanut
Potato
Rice
Sorghum
Soybean
Sugar Beet
Sugarcane
Sunflower
Sweet Potato
Tomato
Vigna
Vine Crops
Wheat

GERMPLASM RESOURCES INFORMATION NETWORK

J. D. Mowder

The database is operating in a production mode. All computer software has been developed to load and maintain the data. We are aware of enhancements that must be incorporated into the database to make it a more useful tool for the scientist. We plan to begin this phase in September 1984. Data preparation and loading will continue to be our major priority through this calendar year. We are currently working on data from the National Small Grain Collection, Beltsville, Maryland; Soybean Production Research, Stoneville, Mississippi; Clonal Repository, Corvallis, Oregon; and the Plant Introduction Office, Beltsville, Maryland. We have acquired Dr. Quinn Sinnott and Mr. Wayne Tyndall to assist Dr. Leonard Jansen in the database loading process.

A Grin News Update is to be circulated to anyone on our mailing list. This includes all of the participating sites and any scientist who has contacted us with an interest in GRIN. You may contact the following office to have your name placed on our mailing list, to request access to the database, or to obtain more information:

USDA:ARS:PGGI:GRIN/DBMU
Beltsville Agriculture Research Center-West
Building 001, Room 130
Beltsville, Maryland 20705

GRIN has three important functions to fulfill. First, it serves as a central repository for valuable germplasm information that is accessible by the entire germplasm community. Second, it is a means for the Crop Advisory Committees (CAC's) to begin standardization of crop descriptors. Third, it provides a mechanism for each of the Regional Plant Introduction Stations (RPIS) and other sites to handle daily inventory.

Anyone who can justify a need for accessing the GRIN database can obtain permission to use it. Access to the database can only be gained by submitting a request to the Data Base Management Unit (DBMU) and having a logon and password assigned for the Prime computer. In addition, a password is also required to access the database.

The database is designed to permit flexibility to the users in storing and retrieving the information. GRIN uses a network database design which allows multiple paths to the data but has linkages that connect all the data together. This provides maximum flexibility to the users.

Retrieving information from the database is accomplished by executing a Prime procedure called VISTA. All information stored in the database is accessible, however, access to some data is restricted to the site-owner.

Plant Introduction Office (PIO) has sole responsibility for maintaining accurate passport data (Accession-Record), geographic acquisition, geographic origin, and taxonomy. Only PIO can modify this information, in the database, however, any user possesses retrieval access. Public users are permitted to retrieve information only, while participating sites have owner update and modification rights.

Each RPIS is the owner of the inventory and characteristic data for its respective site. Collectively, the RPIS' are responsible for maintaining accurate characteristic and inventory information. They also have the system procedures available for ensuring data integrity. The public users have permission to retrieve information from the database for all data except inventory, this can only be accessed by its owner.

As stated earlier, the information residing in the database is owned and maintained by sites within the NPGS, while the DBMU acts as the caretaker of the system. The DBMU maintains all application computer software (programs), the database management system (DBMS), liaison with the computer operations (Prime minicomputer), and volume data loading. The DBMU also provides technical assistance to users in preparation of software that is unique for a specific site. Database access and system security are also important system management tasks.

GLENN DALE

B. J. Parliman

Fourteen Malus, 65 Pyrus, 10 Cassava, 29 Citrus, 72 Prunus, 85 Solanum, 48 Ipomoea, nearly 50 miscellaneous fruits and ornamental genotypes, 90 coffee (15,000 seed) seedling populations and several dozen post-entry items were established in quarantine in 1983. Plants of 70 coffee seedling populations were distributed. Virus indexing proceeded on schedule for Pome fruits. Nearly 600 Pome and ornamental genotypes were distributed to nearly 150 researchers and miscellaneous reqeuestors. Nearly 100 older Pome fruit (of more than 800 specimens) accessions were repropagated to prevent germplasm loss. Solanum inventory/virus-index-status lists are now completely computerized and Pome, Prunus, ornamental, etc. inventories and virus-status-lists are 75% completed. In vitro and In vivo propagation projects were initiated and completed for several hard-to-propagate, rare, and/or one-of-a-kind genotypes, including Prunus and Ipomoea. Data collection and/or analysis was completed for four of the above related projects.

Frequently, budwood of Prunus, Malus, Pyrus, and Citrus are dead or in very poor condition when they arrive at the Introduction Station. By updating and improving the establishment procedures (including the containerization of all rootstocks), the percentage of established germplasm has essentially been doubled, as compared to historical values. Germplasm establishment rates for 1983 were (values in parentheses represent guesstimated historical rates): Malus, 100% (100%); Pyrus, 94% (95%); Citrus, 60% (30%); and Prunus, 96% (40%). Rates for other major crop collections were: Solanum, 96%; Ipomoea, 93%; and Cassava, 94%. The above percentages do not include material that was considered to be DOA.

SOUTHERN REGIONAL PLANT INTRODUCTION STATION
Report to S-9 Technical Committee
July 25-26, 1984

This report covers the primary activities of this plant introduction station for the period of July 1, 1983 through June 30, 1984.

Plant Introduction

Germplasm of 2,176 new Plant Introductions (PI's) were added to the regional plant germplasm collections. Sorghum, peahuts, squash, and cowpeas were again the major groups received. The collections of PI's now total 52,325.

Following is a brief 5-year summary of new PI's accessioned into the collections:

1979-80	1,290
1980-81	8,028
1981-82	2,476
1982-83	2,448
1983-84	2,176
Total	16,418

Annual Average = 3,283

Seed Distribution

A total of 35,169 seed samples were shipped in all categories of distribution. In direct response to 354 requests 9,462 seed packets were shipped to the S-9 Region, 3,958 to the other three regional (NC-7, NE-9, W-6), and 5,981 to 55 foreign countries. Shipments in other categories of distribution were: 429 PI's sent to the National Seed Storage Laboratory (NSSL) for long-term storage; 7,231 to NSSL for germination tests; 1,732 to the other three regions for consolidation of genus collections; 2,460 cultivar packets for Forage Legume Field Trials; 3,376 packets for seed increase grow-outs.

Seed Increase

A total of 3,555 PI's composed of 130 genera are included in the 1984 increase plantings. The major crop groups involved are sorghum, peanuts, grasses, forage legumes, cowpeas, sesame, and gourds. The Regional P.I. Station is increasing 980 new and old PI's. Cooperators in several states (Alabama, California, Florida, and Texas) are increasing 570 PI's of melons, peanuts, tropical legumes and forage grasses. The Tropical Agriculture Research Station (TARS), Mayaguez, PR increased 2,000 PI's of Ethiopian sorghum in two plantings during the Fall of 1983 and the Winter-Spring periods of 1984.

Plant Pathology and Genetics Research - W. C. Adamson and Grover Sowell, Jr.

Grover Sowell, Research Plant Pathologist, for the S-9 Project since 1958 has been on extended sick-leave since May, 1983 and was hospitalized several times. His request for Disability Retirement is in the final stages of approval.

Charles Adamson, Research Agronomist, continued two cooperative projects he and Grover had initiated in 1982. Germplasm releases were completed for bacterial spot resistance in peppers. Various combinations of crosses involved 'Yolo Wonder' and PI's 163189, 163192, and 322719. The different sources of resistance combine in a complementary fashion, producing a level of resistance higher than any previously measured. Similar genetic crossing has continued in establishing better resistance to gummy stem blight in watermelon and muskmelon.

Root-Knot Nematode Resistance: In separate projects, Charles Adamson is screening cowpeas, lespedeza, and peanuts for resistance to root-knot nematodes. Populations of cowpeas (*Vigna unguiculata*) and sericea lespedeza (*Lespedeza cuneata*) are being screened for resistance to *Meloidogyne incognita*. A population of peanuts (*Arachis sp.*) is being screened for resistance to *M. arenaria*.

Cold Tolerance in Vetch: Selections of vetch (*Vicia sativa*) were grown in a nursery at Experiment where they experienced cold temperatures down to 0 degrees F in December of 1983. A selection from the segregating population previously established at Eatonton, GA showed a high rate of survival although the overall survival rate for the nursery was very low.

Peanut Stripe Virus: This new virus (PStV) was observed by Grover Sowell in our 1982 increase plantings of new peanut introductions. Research by Dr. Jim Demski, Virologist, Department of Plant Pathology, Georgia Experiment Station established that PStV is a seed transmitted virus and the source of our infection was traced to PI's from the People's Republic of China (PRC) grown for the first time in 1982. In 1983 the only peanuts planted were a new shipment of introductions from the PRC. As suspected these new PI's were also infected with virus. Field surveys were carried out in 1983, in Georgia (July), North Carolina and Virginia (August), and Texas and Florida (September). The virus was identified in all states surveyed, but only in research plots. No infection was found in the commercial peanut fields. All peanuts from the PRC (111 PI's) and 800 PI's grown-out with the PRC material between 1979 and 1982 were placed in a "quarantined" status by the P.I. Station. All this material is scheduled to be assayed in a cooperative program carried out by Dr. Demski and his staff. The assaying of our PI material was begun in the Fall of 1983 as part of a high priority effort to clean the PI material and infected breeding lines of the University and USDA breeders in the states surveyed in 1983. We expect the PI material to be cleared of infected seed by the end of 1985.

Research during the Summer of 1983, established that: PStV is seed transmitted in peanuts; was probably introduced into the U. S. from the People's Republic of China; the exchange of contamination peanut seed is the primary source of inoculum; the virus is aphid transmitted in a non-persistant manner; caused a 20% yield loss in one greenhouse test; is not serologically related to the endemic peanut mottle virus. If PStV does become established in commercial peanuts the potential for annual epidemics is high because of the high seed transmission rate and the abundance of aphid vectors in all peanut growing areas.

PUBLICATIONS

Adamson, W. C. and G. Sowell, Jr. 1983. Inheritance of bacterial spot resistance in pepper. Hortscience 18:905-906.

New Crops for Energy Production: Crosses were made between *Eupatorium capillifolium* (dogfennel) and *E. compositifolium*. The F_1's, F_2's and parent-selections are being evaluated in a field test. Leaves were higher in acetone extractives than stems, and higher percentages were produced in the early growing season. *Eupatorium compositifolium*, the species largely limited to the coastal plain, produced the highest extract yield and populations differed in extract yield from one location to another. A nursery of *Rhus glabra* accessions collected throughout the Southeast was planted at Experiment.

PUBLICATIONS

Adamson, W. C. 1983. Inheritance of leaf shape in roselle, *Hibiscus sabdariffa* L. Journal of Heredity 74:485-486.

Adamson, W. C. 1984. Dog-fennels for oil and polyphenol production. 4th Annual Solar and Biomass Energy Workshop: 134.

Sweet Potato Clonal Repository

The CRIS agreements, necessary to establish the Sweet Potato Repository here at the Regional P.I. Station and to initiate the virus clean-up project with Dr. Jim Moyer, Plant Pathology Department, N. C. State University, were effective October 1, 1983. Dr. Moyer has a full program going and has just received some new sweet potato germplasm through the Glenn Dale P. I. Station.. The selection of a Curator for the Repository has been delayed because of the ARS reorganization and late clarification of the level of recurring support funds.

APPENDIX I

Southern Regional Plant Introduction Station Budget

Source of Funds	FY-84	FY-85
Regional Research Funds (Pooled)	$120,637	$125,206
RRF (Committee of Nine Allocations)	8,435	0
TOTAL	$129,072	$125,206
Expenditures		
Personal Services	101,659	106,228
Travel	317	500
Supplies & Operations	18,661	16,478
Equipment	8,435	2,000
TOTAL	$129,072	$125,206
Source of Funds		
ARS Base (recurring Funds)	$529,200 1/	$529,200 2/
Special Allocations (Non-Recurring)		
Plant Explorations	10,000	21,000
Evaluation of Ethiopian Sorghums	50,000	0
TOTAL	$589,200	$550,200
Expenditures		
Personal Services	$183,140	$201,454
Travel	7,000	7,000
Construction & Repairs	2,000	53,000
Supplies & Materials	73,060	20,946
Support Equipment	21,700	4,000
Vehicle Operations	1,500	2,000
Extramural Services (Curators, BFCA, & CRIS Agree.)	290,800	240,800
Plant Explorations	10,000	21,000
TOTAL	$589,200	$550,200

1/ The FY84 Budget has been affected by a series of special allocation - one as recently as July 3, 1984.

2/ The FY85 Budget are strictly estimates since the FY85 Resource Planning figures have not been released.

APPENDIX II
Plant Explorations 1984 & 1985

I. Explorations Carried Out in FY84

1. *Gossypium spp.*, Cotton; Southern Mexico; Nov. 4-30, 1983; Dr. P. A. Fryxell and Dr. Stephen D. Koch; Feb. 26 - Mar. 7, 1984; Dr. A.E. Percival and Dr. E. L. Turcotte, Costs: $6,859.61

   Objective: Southern Mexico is a principal center of unimproved biotypes of *G. hirsutum* as well as wild species of *Gossypium* subgenus *Houzingenia*. This group of 12 diploid species grouped in the D genome, is the source from which crosses with *G. hirsutum* have produced genotypes with increased fiber strength, resistance to pink boll worm, etc.

2. *Gossypium spp.*, Cotton; Venezuela, South America; Jan. 15 - Feb. 12, 1984; Dr. C. L. Burandt, Jr. and Dr. P. A. Fryxell, ARS, Cotton Genetics Research Unit, College Station, TX. Cost: $3,390.71

   Objective: There are many voids in presently available germplasm collections of the tetraploid species. This collection should fill a major void.

3. This exploration was approved and scheduled but Dr. Schertz's participation was cancelled by the U. S. State Department:

   Sorghum bicolor, Sorghum; Sudan, Africa; November, 1983; Dr. K. Schertz, ARS, Crops Genetics and Improvement Research Unit, College Station, TX. Cost: $3,300.00

   Objective: Sorghum in Sudan is quite diverse and many think that Sudan is the center of origin of *S. bicolor*. There are also many wild types in the Sudan. *S. bicolor* has not been adequately collected in Sudan, especially in the area near the Ethiopian border, and only a very few wild types have been included in past collections.

4. The following exploration is partially funded by the money allocated for the cancelled Sorghum exploration.

   Trifolium spp., Clover; Romania; August, 1984; Dr. Norman Taylor, Trifolium Curator, University of Kentucky. Cost: $3,300.00

   Objective: The collection of *Trifolium* germplasm in Romania at this time became very practical because the *Astragalus* collection by Dr. C.E. Townsend, Colorado State University had been rescheduled from 1983 to 1984. With detailed arrangements confirmed it was simpler to include Dr. Taylor in Dr. Townsend's exploration and benefit from arranged and funded travel costs.

II. Proposals Submitted for Funding in FY85

1. *Vaccinium* (blueberries), *Fragaria* (strawberries), *Ribes* (currants and gooseberries), *Rubus* (brambles); Pacific Northwest (northern California, Oregon and Washington); mid-July to mid-August, 1985; Dr. James R. Ballington, Hort. Science Department, N. C. State University; Dr. Otto L. Jahn, National Clonal Germplasm Repository, Corvallis, Oregon; Julie Kierstead, Berry Botanic Garden, Portland, Oregon; Robert Ross, Biology Department, Linn-Benton Community College, Albany, Oregon. Cost: $6,020.00

   Objective: To significantly broaden the germplasm base in blueberries, strawberries, currants, gooseberries, and brambles, and at the time improve ecological amplitude, fruit quality and pest tolerance or resistance through incorporation of elite wild germplasm from the Pacific Northwest.

2. *Gossypium spp.*, Cotton, (other taxa are *Sorghum, Pennisetum, Glycine, Hibiscus*); Western Australia and Northern Territory; May 17 - June 16, 1985; Dr. James McD.Stewart, USDA-ARS; Dr. P. A. Fryxell, USDA-ARS, Dr. Lyn A. Craven, CSIRO, Australia. Cost: $8,540.00

   Objective: Cotton, a major crop in the U. S., has a relatively narrow genetic base. While some diversity exists within feral *G. hirsutum*, the wild diploid species of *Gossypium* possess the unique diversity that will be important in future improvement. The *Gossypium* of Australia is represented by two divergent groups. Species of the first group occur primarily in the semi-desert areas and are adapted to perennial growth under xeric conditions. Only 1 to 3 accessions of these are in the U. S. germplasm collection. The second group occurs in the wet-dry tropics and consists of 5 known species plus two additional undescribed taxa found during the 1983 exploration trip. The results of that 1981, 1983 exploration have shown that the diversity in the Kimberley region is much greater than previously realized. Each location seemed to have its distinct species and each species was limited in distribution. This same pattern of distribution occurred for Hibiscus and Sorghum and may be a general phenomenon of the area.

3. *Gossypium spp.*, Cotton; Galapagos Islands, Ecuador; Aug. 15 - Sept. 8, 1985; Dr. P. A. Fryxell and Dr. A. E. Percival; USDA-ARS, College Station, TX. Cost: $6,500.00

   Objective: Collections are needed to fill many gaps in the germplasm collection of the tetraploid species *G. barbadense* and *G. hirsutum* indigenous in the Americas. The IBPGR sponsored a 1983 exploration of the northeastern islands, however, the very large islands of Isabela and Fernandina, which lie west and north in the archipelago, need to be collected extensively.

4. *Helianthus* (sunflower); Sept. 23-29, 1984; Southeast and South Texas; Dr. Gerald J. Seiler; USDA-ARS, Bushland, TX. Cost: $800.00

Objective: This proposal was submitted as the first of 5 regional, domestic collections. We have excess funds from the 1984 plant exploration collections to cover this proposal. The second exploration of this series would take place in October, 1985 which places it in the FY86 approval process.

The primary objective of this plant exploration is to collect additional populations of the species in our collections. These species have not been collected extensively, resulting in small number of accessions with only a few seed of these species in the germplasm collection. Also, the demand for seeds of these species has put a strain on the available seed supply. There is also the need to collect as many populations as possible to obtain maximum variability.