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

held at

IOWA STATE UNIVERSITY

on

June 23, 1983

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

Iowa State University
Ames, Iowa

June 23, 1983

Submitted by
Oliver E. Smith, Secretary
S-9 Technical Committee 1982-83

Minutes of the S-9 Regional Technical Committee Meeting on The Introduction, Multiplication and Evaluation of New Plants for Agricultural and Industrial Uses and The Preservation of Valuable Germplasm

1. Call To Order

The 1983 meeting of the S-9 Technical Committee was held at the Scheman Continuing Education Building, Iowa State University, Ames, Iowa on June 23, 1983. The meeting was called to order by Chairman, Bill Fike at 8:00am on Thursday morning in room 204.

2. Introduction of Attendees

Name	Address	Telephone
**John Bowers	University of Arkansas Plant Science Building Fayetteville, Arkansas 72701	501-575-2605
**David W. Bradshaw	Dept. of Horticulture Clemson, University Clemson, South Carolina 29631	803-656-3404
* David Coffey	University of Tennessee Department of Plant & Soil Sci. P. O. Box 1071 Knoxville, Tennessee	615-974-7391
* Bill Fike	Crop Science Department North Carolina State University Raleigh, North Carolina 27650	919-737-3267
**Phillip Ito	Hawaii Agricultural Experiment Sta. College of Tropical Agriculture and Human Resources A61W. Lanikaula Street Hilo, Hawaii 96720	808-935-2885
* James Kirby	Agronomy Department Oklahoma State University Stillwater, Oklahoma 74078	405-624-6417
* Robert Kleiman	ARS, NRRC Northern Region Research Center 1815 N. University Street Peoria, Illinois 61604	309-685-4011
* Richard Johnson	Department of Horticulture Virginia Tech. & State University Blacksburg, Virginia 24061	703-961-7639

* Gilbert R. Lovell	Coordinator, S-9 Project Georgia Experiment Station Experiment, Georgia 30212	404-228-7255
* Warren Meadows	L.S.U. Horticulture Dept. 4560 Essen Lane Baton Rouge, Louisiana 70809	504-766-3471
* Jeff Pedersen	Department of Agronomy & Soils Auburn University Auburn, Alabama 36849	205-826-4100
* Gordon M. Prine	University of Florida Agronomy Department 314 Newell Hall Gainsville, Florida 32611	904-392-1811
* Oscar Ramirez	University of Puerto Rico Agricultural Exp. Station Department of Horticulture Rio Piedras, Puerto Rico 00927	809-767-9705
**Roy E. Sigafus	University of Kentucky Agronomy Department Lexington, Kentucky	606-257-3144
* Oliver E. Smith	Texas A&M University Soil and Crop Sciences Department College Station, Texas 77843	409-845-5389
* Arnold G. Davis	USDA Soil Conservation Service National Tech. Center P. O. Box 6567 Ft. Worth, Texas 76115	817-334-5282
Broadus Browne	University of Georgia Acting Administrative Advisor S-9 Technical Committee Agricultural Experiment Station Athens, Georgia 30601	404-542-2151
Quintin Jones	ARS, NPS Agricultural Research Center Room 417, Bldg. 005 Beltsville, Maryland 20705	301-344-3311
A. Ed Percival	USDA/ARS Cotton Soil and Crop Sciences Dept. Texas A&M University College Station, Texas 77843	409-260-9257

Russel J. Kohel	USDA/ARS Cotton Soil and Crop Sciences Dept. Texas A&M University College Station, Texas 77843	409-846-2419
Francisco Vazquez	USDA/ARS/SR/MITA P.O. Box 70 Mayaquez, Puerto Rico 00709	809-832-2435
Paul Soderholm	USDA/ARS Subtropical Horticultural Research Station 13601 Old Culter Road Miami, Florida	305-238-9321
Dorris Clark	National Seed Storage Laboratory Colorado State University Fort Collins, Colorado 80523	303-484-0402

* Members of the S-9 Technical Committee
** Member of the S-9 Technical Committee absent

3. The minutes of the 1982 meeting and the 1983 Agenda were approved.

4. Agenda

Agenda
S-9 Technical Committee
Scheman Building - Continuing Education
Iowa State University
Ames, Iowa 50011

1. Call to order, 8:00am, June 23, 1983 in Scheman Room 204.
2. Introduction of Attendees
3. Official Welcome
4. Approval of Minutes, 1982 Meeting
5. Additions to and approval of Agenda, 1983 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. State Progress Reports and Research Plans
9. Other Agency Reports and Research Plans
10. Southern Region Plant Introduction Station Report
11. Plant Exploration Proposals
12. Committee Reports:
   A. Nominations
   B. Time and Place of Next Meeting
   C. Resolutions
13. Unfinished or New Business
14. Adjournment, Evening, June 23, 1983
   A. Tour of the Station will be Wednesday afternoon at 3:00
   B. USDA Reports will probably be on Friday
   C. Friday meetings will continue until 5:00

5. Appointment of Committees

Chairman Bill Fike Appointed the following Committees:

A. Nominations	Jim Kirby Warren Meadows Arnold Davis
B. Time and Place of Next Meeting	Gordon Prine Phillip Ito Jeff Pedersen
C. Resolutions	David Coffey Oscar Ramirez Richard Johnson

6. Remarks were made by the Acting Administrative Advisor, Dr. Broadus Brown, Director of the Georgia Agricultural Experiment Station.

7. State Progress Reports and Research Plans. The following State representative presented their annual reports and sent same to be included in the combined reports. Copies are included.

STATE	REPRESENTATIVE
Alabama	Jeff Pedersen - Agronomy and Soils
Arkansas	John Bowers - Horticulture
Florida	Gordon Prine - Agronomy
Georgia	Gilbert Lovell - S-9 Coordinator
Hawaii	Phillip Ito - Horticulture
Kentucky	Roy Sigafus - Agronomy
Louisiana	Warren Meadows - Horticulture
Mississippi	C. E. Watson, Jr. - Agronomy
North Carolina	Bill Fike - Crop Science
Oklahoma	James Kirby - Agronomy
Puerto Rico	Oscar Ramirez - Horticulture
South Carolina	David Bradshaw - Horticulture
Tennessee	David Coffey - Plant and Soil Science
Texas	Oliver E. Smith - Soil and Crop Sciences
Virginia	Richard Johnson - Horticulture

Drs. Russel J. Kohel and A. Ed Percival presented their wild cotton plant exploration and collection proposal.

Dr. Gilbert Lovell, S-9 Coordinator will send the results of the exploration proposals to persons affected.

Other agencies Reports and future plans:

SCS - Mr. Arnold Davis

Mayaquez Institute of Tropical Soils - Dr. Francisco Vazquez

National Program Staff - Dr. Quentin Jones

Plant Introduction - Dr. George White

Subtropical Horticulture Research Station - Dr. Paul Soderhorn

Northern Regional Research Center - Dr. Robert Kleiman

National Seed Storage Laboratory - Dr. Dorris Clark

Southern Regional Plant Introduction Station - Dr. Gilbert R. Lovell

Coordinator presented report for the Southern Region S-9. A copy of the said report is included in the 1983-84 report.

8. Plant Exploration Proposals were submitted and rated for funding as follows:

Priority Recommendations
APPENDIX
Plant Exploration Proposals for FY-84

IV 1. Vernonia galamensis (and related species); Malawi, Tanzania, Zambia, Africa; Feb. 1 - May 15, 1984; Dr. R. E. Perdue, Jr., Plant Exploration Officer, Dr. S. E. Saufferer, Botanist, Plant Exploration and Taxonomy Laboratory, Dr. S. B. Jones, Dept. of Botany, Univ. of GA. Cost: $20,753.

Objective: Collect germplasm to develop a Vernonia species or interspecific hybrid for a new crop for production of epoxy acids used in plastic formulation. The expected production areas are southern Texas and/or dry areas of Puerto Rico.

II 2. Gossypium spp., Cotton; Venezuela & Colombia, South America; Jan. 15-Feb. 15, 1984; Dr. A. E. Percival & Dr. P. A. Fryxell, ARS, Cotton Genetics Research Unit, College Station, TX. Cost: $10,000.

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

III 3. Gossypium spp., Cotton; Southern Mexico; Oct-Nov, 1983 and Feb-Mar, 1984; Dr. A. E. Percival & Dr. P. A. Fryxell, ARS Cotton Genetics Research Unit, College Station, TX. Cost $4,800 (2 trips) & Vehicle (Rough Terrain) $12,000; TOTAL: $16,800.

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. The request of the vehicle is based on the need for continuing explorations in Mexico and Central America as the program of Cotton Genetics Unit requires an average of two trips a year into Mexico. In the past when vehicles were borrowed for germplasm collection the incurred expenses were covered by non-germplasm funds.

I 4. Sorghum bicolor, Sorghum; Sudan, Africa; November, 1983; Dr. K. Schertz, ARS, Crop Genetics and Improvement Research Unit, College Station, TX. Cost: $3,000.

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.

9. Committee Reports:

Nominations - Jim Kirby Chairman, Warren Meadows and Arnold Davis Members, nominated Oliver E. Smith as Chairman and David Coffey Secretary of the S-9 Technical Committee for 1983-84 term. A unanimous vote was received for both nominations.

Time and Place of the next meeting - Gordon Prine, Chairman and Phillip Ito, Jeff Pedersen, members recommended the Plant Introduction Station of S-9 at Experiment, Georgia be the site of the 1984 meeting of S-9. This recommendation was unanimously accepted by all members present.

Resolutions - David Coffey Chairman and Oscar Ramirez, Richard Johnson members, submitted the following resolutions which were unanimously accepted by All members present:

Resolution 1. Be it resolved that the S-9 Technical Committee expresses its appreciation to Dr. Willis Skrdla, the Staff of the North Central Plant Introduction Station, and the members of the NC-7 Technical Committee for their efforts in hosting the Germplasm Workshop and Joint Technical Committee Meetings. Be it also resolved that the S-9 Technical Committee expresses its appreciation to Iowa State University for the use of their facilities during the meeting.

Resolution 2. Be it resolved that the S-9 Technical Committee Expresses our appreciation to Curtis R. Jackson for his long and faithful service as administrative advisor to this committee — We wish him well in his duties as Director for International Cooperation at the International Crops Research Institute for the semi-arid tropics, in Hyderabad, India.

Resolution 3. Be it resolved that the S-9 Technical Committee expresses a special recognition to Jeff Lewis for his excellent service as Virginia's Representative to this committee. We welcome Richard Johnson - Virginia to the Committee. We also appreciate the presence and input of various guests during the meeting.

10. Unfinished or New Business

All unfinished and/or new business was discussed during the business session of the S-9 Technical Committee.

11. Some of the S-9 Technical Committee members participated Monday, Tuesday and Wednesday June 20th-22nd in the National Plant Germplasm Workshop Meetings and toured the Pioneer Hi-Bred International Center at Johnston, Iowa and the NC-7 Plant Introduction Center at Ames, Iowa.

Most members of the S-9 Technical Committee participated in the Joint Meeting of Regional Technical Committees, W-6, S-9, NE9, NC-7 and IR-I on June 24, 1983.

The following agenda was followed:

JOINT MEETING OF REGIONAL TECHNICAL COMMITTEES
W-6, S-9, NE-9, NC-7, IR-1
Scheman Center, Iowa State University
June 24, 8:00am
Ames, Iowa

Chairman:

A.M. Session — R. W. Hougas
P.M. Session — W. H. Foote

Proposed Agenda

1.	Welcome	J. Mahlstede
2.	Introduction and Preliminary Remarks	R. W. Hougas
3.	Overview of the National Plant Germplasm System	Q. Jones
4.	Role, Functions and Actions of the National Plant Germplasm Committee	W. Foote
5.	Activities of the National Plant Genetic Resources Board and Report from CSRS	Clarence Grogan
6.	Role, Functions, and Actions of the Plant Germplasm Operations Committee	Q. Jones
7.	Crop Advisory Committees: Organization, Function and Progress	D. R. Dewey
8.	GRIN: Progress and Future Plans	Gil Hersh Dan Niffenegger
9.	Quarantine Aspects of Plant Germplasm Imports and Exports	R. Kahn
10.	Role of the Plant Exploration and Taxonomy Laboratory	R. E. Perdue
11.	Genetic Diversity in Major Crops	D. N. Duvick, Director of Research, Pioneer HiBred
12.	Clonal Repositories	Mel Westwood

13. Progress Reports (5-10 minutes each):
    - Germplasm Resources Laboratory ---------- G. A. White
    - U. S. Plant Introduction Station, Glenn Dale ----- B. J. Parliman
    - Subtropical Horticultural Research Station ------- Paul Soderholm
    - Northern Regional Research Center ---------- R. Kleiman
    - National Seed Storage Laboratory ---------- Dorris Clark
    - Soil Conservation Service ---------- K. Blan

12. Adjournment

There being no furthr business the meeting was adjourned at 5:00pm June 23, 1983.

APPENDIX

State and Federal Agency Reports

Written reports are attached in the following order:

STATE:

ALABAMA
ARKANSAS
FLORIDA
HAWAII
LOUISIANA
NORTH CAROLINA
OKLAHOMA
PUERTO RICO
SOUTH CAROLINA
TENNESSEE
TEXAS
VIRGINIA

FEDERAL:

TROPICAL AGRICULTURE RESEARCH STATION (TARS)
SUBTROPICAL HORTICULTURAL RESEARCH STATION
NORTHERN REGIONAL RESEARCH CENTER (NRRC)
GERMPLASM RESOURCES LABORATORY (GRL)
NATIONAL SEED STORAGE LABORATORY (NSSL)
SOIL CONSERVATION SERVICE (SCS)
NATIONAL PROGRAM STAFF (NPS)
SOUTHERN REGIONAL PLANT INTRODUCTION STATION (SRPIS)

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, C. S. Hoveland, R. L. Haaland, and C. D. Berry

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: Certified seed of 'AU Triumph', a new, earlier yielding tall fescue cultivar, will become available for public sale this summer (1983).

Publications: J. F. Pedersen, R. L. Haaland, C. S. Hoveland, C. D. Berry, S. P. Schmidt, and R. R. Harris. 1983. Registration of AU Triumph Tall Fescue. Crop Sci. 23:182.

Cultivar Releases: AU Triumph (1981)

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

Progress to Date: Foundation seed of 'AU Oasis', a new cultivar of Phalaris aquatics L., is currently being produced. Certified seed production fields will be established this fall (1983).

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

Cultivar Releases: AU Oasis (1981)

Accession User: J. F. Pedersen, C. S. Hoveland, and R. L. Haaland.

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: One advanced line each of Trifolium mutabile, T. nigrescens, and T. purpureum were established for seed increase. Significant amounts of T. mutabile should be available for testing this fall (1983). Studies to evaluate the purported superior natural reseeding ability of T. mutabile were initiated.

Pbulications: C. S. Hoveland and M. W. Alison, Jr. 1982. Rye-Ryegrass-Legume Trials in Alabama. Alabama Agric. Exp. Sta. Bull. 543.

Cultivar Releases: none

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

Progress to Date : A breeder seed nursery of AT-P trefoil was established at Auburn University's Tennessee Valley Experiment Station in the fall of 1982. Seed production tests are currently underway. AT-P has shown excellent seedling vigor, is competitive with tall fescue, and produced high cattle gains in mixed swards with cool season grasses.

Publications: C. S. Hoveland, R. L. Haaland, R. R. Harris, and J. A. McGuire. 1982. Birdsfoot Trefoil in Alabama. Alabama Agri. Exp. Sta. Bull. 537.

C. S. Hoveland, R. R. Harris, E. E. Thomas, E. M. Clark, J. A. McGuire, J. T. Eason, and M. E. Ruf. 1981. Alabama Agric. Exp. Sta. Bull. 530.

Cultivar Releases: none

Accession User: J. F. Pedersen

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

Nature of Research: Development of tall fescue germplasm adapted to the extreme Southeast.

Progress to Date: 350 P. I. accessions were evaluated at Auburn's Plant Breeding Unit, Tallassee, Alabama, for general adaptation, disease resistance, vigor, and yield. 75 superior accessions were established in space plant nurseries at the above location and at Brewton, Alabama, (near the Florida border). Selections will be made from these nurseries.

Publications: none

Variety Releases: none

Nature of Research: Production of Southeasternly adapted Phalaris aquatica germplasm.

Progress to Date: 37 Phalaris aquatica individuals that have persisted in Alabama for over 25 years and that were the most vigorous were selected from space plants of P. I. accessions that originally numbered over 5000. The selected individuals have been randomly mated for two generations and will be released as an improved or southeasternly adapted germplasm.

Publications: none

Cultivar Releases: none

Accession User: J. D. Norton

Address: Department of Horticulture, Auburn University, AL 36849

Nature of Research: Cantaloupe breeding

Progress to Date: P. I. 140471 (Cucumis melo) is being used in the development of breeding lines that are resistant to gummy stem blight, pickle worm, and Fusarium Wilt Races 1 and 2. P. I. 164364 and P. I. 16475 are being used in the development of breeding lines with resistance to alternaria blight. P. I.'s of C. metuliferus and C. anguria are being utilized to incorporate resistance to the root knot nematode into breeding lines. A breeding line, AC-70-154, is being considered for germplasm release as a source of resistance to D. bryoniae with multiple disease resistance and high quality fruit.

Publications: J. D. Norton. 1981. Cantaloupe. Breeding and evaluation. Biennial report of veg. breeding in Southern U.S., Hi. and Puerto Rico 1981:7.

Cultivar Releases: none

Nature of Research: Watermelon breeding

Progress to Date: P. I.'s 271778, 189225, and 262515 (C. lanatus) are being used in the development of breeding lines that are resistant to gummy stem blight. The above three P. I.'s plus P. I.'s 271775, 299379, 326515, and 203551 are being used in the development of breeding lines that are resistant to Anthracnose Races 1 and 2. P. I. 271778 was used to develop AU-Jubilant, a newly released multiple disease resistant cultivar. P. I. 189225 was used in the development of AU-Producer, another newly released multiple disease resistant cultivar.

Publications: J. D. Norton. 1981. Watermelon. Breeding and evaluation. Biennial report of veg. breeding in Southern U.S., Hi, and Puerto Rico 1981:50-51.

Cultivar Releases: AU Jubilant and AU Producer (1983)

Accession User: G. C. Sharma 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: The following ten vegetables have been direct seeded or transplanted to the field and are currently being evaluated:

1) Long melon (Snake melon or Armenian cucumber C. melo)
2) European type long gynoecious cucumber C. Sativus
3) Yard long bean Vigna Sesquipedalis
4) Edible leaf type Amaranth (Amaranth Spp.)
5) Edible veg. type soybean (Glycine Spp.)
6) Mung bean (Phaseolus aureus)
7) Long radish (Raphanus sativus)
8) Edible pod pea or snow pea (Pisum sativum)
9) Compact, honey dew, and Japanese and Chinese melons (cucumis melo)
10) Seedless watermelon (citrullus lanatus)

S-9 Technical Committee Report

Agency: Arkansas Agricultural Experiment Station
Submitted by: J.L. Bowers
Address: Department of Horticulture and Forestry, University of Arkansas, Fayetteville, AR 72701

Accessions received: Dr. Lance Tharel, USDA, Rt. 2, Box 144A, Booneville, Arkansas 72927 received 5 packets of each of the nine White Clovers, twelve Red Clovers, four Arrowleaf Clovers, two Ball Clovers, four Crimson Clovers, one Persian Clover, six Subterranean Clovers, two Rose Clovers and five Vetch varieties. Ms. Cynthia Rodriquez, University of Arkansas, Department of Plant Pathology, Fayetteville, Arkansas received 20 accessions of Lycopersicon and in this collection was represented these species: L. peruvianum, L. hirsutum, L. parviaflorum, L. hirsutum f. glabatum. J.L. Bowers received 12 accessions of Spinacia oleracea. These same accessions had been reported to possess resistance to Fusarium oxysporum spinaceae by Muriel J. O'Brien, Research Plant Pathologist, Germplasm Resources Laboratory, Northeastern Region Research Center, Beltsville, MD 20705.

Nature of Research: In the spring of 1983 spinach seedlings of the 12 different accessions were grown in a fusarium infected soil from our field screening plots in the greenhouse. The surviving seedlings of each plant accession were potted out and a seed increase was obtained. The progeny from this screening test will be field screened in the nursery on the Vegetable Substation this fall to determine what material will be crossed with our advanced spinach lines which possess a fairly good level of resistance to fusarium.

We are also maintaining some seedstock of Plant Accessions P.I. 165560 and P.I. 217425 to use and as checks in our screening for white rust in spinach.

Accession user: Dr. T.E. Morelock
Address: Department of Horticulture and Forestry, University of Arkansas, Fayetteville, Arkansas 72701
Nature of Research: These plant accessions: P.I. 165426, P.I. 203598 and P.I. 307760 are represented in some of the advanced bean (Phaseolus vulgaris) breeding lines.

1983 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: 9

Accession User: B. Dehgan

Address: Department of Ornamental Horticulture, University of Florida, Gainesville, FL 32611

Nature of Research: Evaluation of hydrocarbon plants suitable for cultivation in the southeastern U.S. and introduction of new ornamental plants to Florida Landscapes.

Progress to Date: A number of taxa have been tried and/or are currently growing for evaluation and eventual recommendation as hydrocarbon plants. These and a number of landscape plants were obtained through the International Seed Exchange Program, U.S. National Arboretum, and Field Collections. A list of taxa and sources can be obtained from Dr. Dehgan.

Publications: 1) Dehgan, B. and C. S. Wang 1982. Evaluation of hydrocarbon plants suitable for cultivation in Florida. Proc. Soil Crop Soc. Fla. In Press. 2) Dehgan, B. 1982. Novel Jatrophas for Florida Landscapes. Proc. Fla. State Hort. Soc. In Press.

Accession User: J. W. Scott, J. B. Jones, and D. J. Schuster

Address: Bradenton Agricultural Research & Education Center, 5007-60th Street East, Bradenton, Fl. 33508

Nature of Research: Evaluation of tomato (Lycopersicon sp.) germplasm for heat tolerant fruit setting and resistance to: bacterial spot, Xanthomonas campertris pv. vesicatoria Doidge, Fusarium wilt race III, Fusarium oxysporum (Schlecht) f. lycopersici (Sacc.) Snyder & Hans, Tomato pinworm Keiferia lycopersicella, and Vegetable leafminer Lirimyza sativae.

Progress to Date: Of the 200 P.I.'s tested for bacterial spot the best for minimal leaf spot were P.I. numbers: 324708, 309666, 127813, 117899, 270217, 159199, 224573 and 203232. The best P.I. for minimal fruit spot was number 270248.

Of the 500 P.I.'s tested for fusarium wilt race 3 several are promising and have been chossed with susceptible lines to obtain hybrids which are presently being tested. Final results will be forthcoming next year.

Both P.I. 126449 and 134417 have shown good tolerance to tomato pinworm and leafminer and were crossed to standard tomatoes. The F_2's will be screened this fall.

Of the 40 newly tested P.I.'s those which show good fruit set under summer (32+°C day/21+°C night) conditions are: 110597, 190256, 193188, 136452, 195784, 202232, 272629, and 289296.

Publications: Scott, J.W. and J.B. Jones. 1983. Breeding for bacterial spot tolerance and heat tolerance. Proc. Tomato Quality Workshop (Abstr.) (In Press)

Accession Collector and User: Albert E. Kretschmer Jr., Ronald M. Sonoda, and Robert C. Bullock.

Address: Agricultural Research Center, P.O. Box 248, Fort Pierce, FL 33454

Nature of Research: Evaluation of world's collected germplasm of Macroptilium atropurpureum Urb. for selection of best agronomic attributes.

Progress to Date: Yield, flowering dates, rust resistence, and mite susceptibility have been evaluated on about 150 accessions for comparison with standard cultivar, 'Siratro'. Yields of about 10 were significantly greater than Siratro. Rust resistance was found in several, and mite damage was variable. Persistence of the best accessions will be tested under grazing for seed increases made this year.

Accession User: L. S. Dunavin

Address: Agricultural Research 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 limpograss P.I. 364888 Hemarthria altissima is being evaluated in comparison with Tifton 44 bermudagrass at low, medium and high fertility levels. It is also being compared with Pensacola bahiagrass, and Tifton 44 bermudagrass when grown in combination with Florigraze Rhizoma Peanut. P.I. 364888 was not as productive as Tifton 44 at high fertility rates in 1982; however, at the medium and low rates it was not significantly different from Tifton 44.

The following introductions of Phleum pratense are under observation: P.I.'s 189166, 204909, 206909, 234444, 25888, 298093, 371957, 381926. These are being observed because of requests from local horsemen for timothy information. Growth of these grasses has not been impressive to date.

The introduction, P.I. 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. On May 16, 1983 this introduction rated sixth with respect to stand.

Publications: None.

Cultivar Releases: P.I. 364888 is being released as 'Floralta' limpograss.

Accession User: David D. Baltensperger

Address: Department of Agronomy, 304 Newell Hall, Gainesville, FL 32611

Nature of Research: Evaluation of Trifolium Germplasm for Agronomic Traits and Adaptability to Florida

Progress to Date: Trifolium vesiculosum from 5 PI. accessions and 3 commercial cultivars were screened in the field for root knot nematode resistance (Meloidogyne spp.). No resistant sources were identified. The entire nursery was severely damaged or killed by the nematodes.

Trifolium incarnatum, T. vesiculosum and 31 Trifolium species not currently utilized in central Florida, represented by 180 PI. accessions, were transplanted and observed in the field for one growing season. Only T. hybridum, T. subterranean, T. nigrescens and T. resupinatum produced forage of comparable quality and yield to T. vesiculosum or T. incarnatum. T. hybridum from all 7 sources was severely galled by Meloidogyne spp. late in the spring. T. michelianum was susceptible to downy mildew in all 6 accessions, suggesting its use as a susceptible check and source of inoculum when screening other Trifolium spp. T. ambiguum showed little to no growth in all 15 accessions tested and appeared susceptible to Meloidogyne spp. as well. Many T. alexandrinum plants were killed by a January freeze, but no difference in freeze tolerance among accessions was noted. Most other species completed their life cycle but produced little or no forage with the exception of T. lupinaster, T. semipilosum, and T. striatum which failed to survive through flowering.

Accession user: A. M. Hibberd

Address: University of Florida, Vegetable Crops Dept., Gainesville, FL 32611

Nature of Research: Evaluation of non-hypersensitive and hypersensitive resistance in Capsicum annuum L. germplasm to bacterial leaf spot incited by Xanthomonas campestris pv. vesicatoria.

Progress to Date: 1) Hypersensitive resistance to a race 2 isolate was found in some, but not all, plants of P.I. 163189 tested.

2) No hypersensitive resistances were observed in P.I. 163192, the source of previously (1963) identified hypersensitivity to race 2.

3) Hypersensitive reactions were observed in P.I. 271322:

a. to a race 2 isolate in some plants.
b. to 2 race 1 isolates alone in some plants.
c. to both the race 1 and race 2 isolates in some plants.
d. to no isolates in some plants.
e. all plants had non-hypersensitive reactions to an additipnal race 1 isolate.

4) No hypersensitivity to any of the 4 isolates was detected in P.I.'s 163184, 164471, 164677, 173877, 182646, 183439, 183440, 18441, 183922, 244670, 246331, 322719, and the C. chinese accessions P.I. 215740, 260509, 281423, and 281444.

Accession user: P. Mislevy

Address: Agricultural Research Center, Ona, Florida 33865

Nature of research: Study the effect of farage crop performance on a dried settling pond following phosphate mining.

Progress to Date: Two stargrass (Cynodon nlemfuensis Vanderyst var. nlemfuensis) entries (Puerto Rico #2341 and Cane Patch), Pensacola bahiagrass (Paspalum notatum) and Floralta (Hemarthria altissima) were planted alone and with legumes on two soil treatments on a dry settling pond. Preliminary results indicated all grasses are performing well especially Floralta.

Variable being measured are yield, with N and with legume, quality, nutrient uptake, Radium 226 and Floride concentration.

Nature of research: Evaluation of Cynodon entries under mob grazing.

Progress to Date: Seven Cynodon entries are being compared for yield, quality, persistence and carbohydrates in stubble when grazed at 2, 4, 5 and 7 week intervals during the warm season. Ona stargrass, PI 224566 and Puerto Rico stargrass (Puerto Rico #2341) are being compared with Cynodon hybrids from Tifton, Georgia. Preliminary data potential for south Florida. Persistence and yield appear good under grazing treatments imposed during the first two years of the study.

Nature of Research: Evaluation of Hemarthria altissima entries under mob grazing.

Progress to date: Six new Hemarthria entries (PI 364888, 349753, 364887, 365509, 367874 and 364884) were compared with presently released varieties. Grasses were grazed on a year-round basis at 3, 6, 9, and 12 week intervals. Data indicated PI 364888 appears to be far superior to any Hemarthria entry tested in south Florida. Persistence and quality appear to be excellent.

Cultivar Release: Floralta limpograss

Nature of Research: Evaluation of grazing management techniques on small paddocks.

Progress to Date: Three stargrass (Cynodon nlemfuensis Vanderyst var. nlemfuensis) entries (Ona stargrass, PI 224566, Puerto Rico have each been grazed under 13 grazing pressure x plant height treatments for two years. Continuous grazing, at the proper grazing pressure resulted in specie persistence as good as rotational grazing. Measurements being made are yield, quality, CHO, leaf-area and persistence.

Publications: Mislevy, P., E. M. Hodges, and F. G. Martin. 1983. Hydrocyanic acid potential in stargrass (Cynodon spp.) In (Edited by J. Allan Smith and Virgil W. Hays) Proceedings of the XIV International Grassland Congress Pg. 732-735.

Mislevy, P., G. O. Mott, and F. G. Martin. 1983. Screening perennial forages by mob-grazing technique. In (Edited by J. Allan Smith and Virgil W. Hays) Proceedings of the XIV International Grassland Congress. Pg. 516-519.

Mislevy, P., G. O. Mott, and F. G. Martin. 1982. Effect of grazing frequency on forage quality and stolon characteristics of tropical perennial grasses. Soil Crop Sci. Soc. of Fla. Proc. 41:77-83.

Accession User: O. C. Ruelke

Address: Department of Agronomy, University of Florida 32611

Nature of Research: Evaluation of forage grasses.

Progress to Date: Limpograss (Hermarthria altissima) introduction P.I. 364888 is well along as a released variety under the name 'Floralta' limpograss. He is working with many bahiagrass and bermudagrass accessions.

Publications: Christiansen, Scott. 1982. Energy reserves and agronomic characteristics of four limpograss Hemarthria altissima (Poir) Stapf et C. E. Hubb for Florida flatwoods, Ph.D. Dissertation Univ. of Fla. 193 p.

Quesenberry, K. H., and W. R. Ocumpaugh. 1982. Mineral composition of autumn-winter stockpiled limpograss. Trop. Agric 59: (4) 283-286.

Ruelke, O. C., K. H. Quesenberry. 1982. Limpograss for off-season forage production for beef cattle. Fla. Beef Cattle Res. Rept. IFAS U of Fla. 39-42.

Ruelke, O. C. and K. H. Quesenberry. 1983. Effect of fertilization timing on the yields, seasonal distribution and quality of limpograss forage. Soil and Crop Sci. Soc. Fla. Proc. Vol.42. In press.

Accession Users: D. W. Gorbet, F. M. Shokes, and A. J. Norden

Address: University of Florida, Agricultural Research Center, Marianna, Florida, Agricultural Research and Education Center, Quincy, Florida, and Department of Agronomy, Gainesville, Florida, respectively.

Nature of Research: Peanut Breeding.

Progress to Date: Selected peanut (Arachis hypogaea L.) plant introductions (PI's) were used as parents with the primary objective of improving leafspot (Cercospora arachidicola Hori and Cercosporidium personatum (Berk. and Curt.) Deighton) resistance. Crosses were made in 1972-74 among selected PI's and certain cultivars and breeding lines. Selection of subsequent progeny (F_2-F_8) were made in the field under unsprayed (no fungicide) conditions. Resulting breeding lines were subsequently evaluated in replicated field tests with no fungicide. Progeny from PI203396 produced the greatest number of

year-entries at 127, the highest mean pod yield at 3790 kg/ha, and the best average leafspot resistance. PI 145681 progeny had the highest average 100-seed weight at 69 g. Progeny from PI 121067 and 259785 produced the highest average shelling percent at 78%.

In crosses with 'Florunner', PI 203396's progeny produced the highest mean pod yields at 3812 kg/ha and ranged from 2602 to 5011 kg/ha. Progeny from PI 121067 x Florunner crosses had the least leafspot, with a mean rating of 4.7 on a 1-10 scale, with 1.0 being no disease. Selections from PI 203396 x F427B- were among the most resistant to leafspot with a mean rating of 3.7. Florunner had a mean pod yield of 1914 kg/ha and a mean disease rating of 9.0.

Publications: Monasterios, T. 1980. Genetic resistance to cercospora leafspot diseases in peanut (Arachis hypogaea L.) Ph. D. Dissertation. University of Florida, Gainesville, 102 p.

Acession 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 rhizome peanut (Arachis glabrata) increased in commercial acreage to about 400 acres over the winter of 1982-83. 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 perennial peanut (PI 262817) is superior to Florigraze in droughty years and on droughty deep sandy soils. However, Arbrook is usually not as easy to establish as is Florigraze. The release of Arbrook has been delayed until commercial development of Florigraze as a crop can be better evaluated. At present, I plan to ask for a release committee in 1983 for Arbrook and possible release as a named cultivar in cooperation with USDA, SCS, in winter of 1984-85.
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. Well-fertilized PI 300086 elephantgrass produced 57 m tons/ha of dry biomass during the 1982 season at Dairy Research Unit.
3. Pigeonpeas (Cajanus cajan): We are testing the top producing lines of crosses received originally from ICRISAT in India at several locations in State. The grain yields of best lines and accessions were above 2200 kg/ha at Gainesville in 1982. 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 1983. The 1982-83 season saw the worst rust epidemic since the 1930's. In the first cycle of recurrent selection

of Marshall ryegrass we found about 600 rust-resistant plants out of the 30,000 plants planted in a spaced plant hursery.

5. Crotalaria (Crotalaria spp.): We are selecting late-maturing, giant-type plants of showy (C. spectabilis) and slenderleaf (C. brevidens (PI 436527)) 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.
6. Lupines (Lupinus spp.) and fababeans (Vicia faba): We are studying the lupines and fababeans as possible cool-season grain legume 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. We increased seed supply for Southern Plant Introduction Station of 30 accessions of white lupine (L. albus).

Accession User: Dan W. Gorbet

Address: Agricultural Research Center, Route 3, Box 493, Marrianna, 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 29067	PI 196713	PI 295233	PI 145046	PI 264168
29089	196714	295311	145681	268657
372576	196716	338339	152144	268863
472579	196731	341885	200444	268883
415878	196732	350680	203395	268894
415879	196768	362129	203396	268913
415880	196769	365553	259596	268931
145050	196832	371961	259599	269056
194246	200431	372263	259641	269063
196621	200432	272303	259671	269114
196628	259692	384498	259673	270844
196640	259835	294650	259678	270848
196647	268619	392579	259812	274191
196649	268648	372582	259822	299470
196655	277197	407677	259849	300243
196656	290581	407687	261893	300946
196657	290597	415876	261896	300947
196675	290599	415877	261906	
196684	290606	415881	261911	
196695	295214	121067	262090	

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

Accession User: S. C. Schank

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

Nature of Research: Forage grass breeding.

Progress to Date: Survenola digitgrass (Digitaria X umfolozi Hall) was released in 1982. This was a cross between D. setivala Stent. PI 299892 and D. valida Stent. PI 299850.

Cultivar release: Survenola digitgrass.

Publication: Schank, S. C., O. C. Ruelke, W. R. Ocumpaugh, J. E. Moore and D. W. Hall. 1982. Survenola digitgrass, a tropical forage grass. Univ. of Fla. IFAS, Agr. Exp. Sta. Circ. S-292 15p.

Accession User: V. E. Green Jr.

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

Nature of Research: Evaluation of sunflower, Helianthus sp., especially annuus, for tolerance or resistance to Alternaria helianthi, black leaf and stem spot.

Progress to Date: The following accessions were found to have some resistance or tolerance to the Alternaria black spot of sunflower:

Collection of: Dr. C. B. Heiser, Jr., Indiana University, Bloomington, IN PI 432510

Dr. Freeman Johnson, Red River Commodities, Fargo, ND 58102 Majak, Chengyonka, Collinguay, Comangir, Guayacan 675, Contiflor 661, Pehuen 677, Charata, Makak 752, Talinay, Aguraibay, all from Argentina, and tall and late. Russian Mammoth, also tall and late, held its leaves almost to maturity and was seemingly resistant to nematodes.

Dr. James A. Robertson, USDA-Athens, GA sent a white confectionery sort named African White, which holds some promise of tolerance to Alternaria black spot disease.

Dr. Gerald Seiler, USDA-Bushland, TX, 79012, sent a collection of about 300 interspecific crosses among species of Helianthus that have been rated for only one year to date, but show promise in certain crosses. These were all from collections by USDA in the continental United States.

Dr. W. Dedio, Research Station, Morden, Manitoba, Canada sent twenty-nine cytoplasmic male steriles which arrived too late for a good test of resistance this year.

Publications: Green, V. E., Jr., J. A. Robertson, G. W. Simone, Shaw-Ming Yang, Gerald Seiler, and W. G. Genung. Oilseed Sunflower Research in Florida--1982. Agronomy Research Report AG 83-03, September 3, 1982. 98 pages.

Accession User: F. P. Gardner

Address: Department of Agronomy, Gainesville, FL 32611

Nature of Research: Crop physiology and ecology.

Progress to Date: For ground cover and turf, P.I. 262840 (Arachis glabrata) was planted as rhizomes in 12" rows in a well prepared seedbed on 5-9-83. Prior to planting sawdust was incorporated ca. 100 t/A to improve soil physical conditions and to discourse weed competition. Survival and establishment have been good to excellent despite several weeks of moisture defeciency immediately following planting. Weed suppression by the sawdust has been excellent. Some weeks will still be required to achieve a complete ground cover and high quality turf.

S-9 AND W-6 TECHNICAL COMMITTEE REPORTS

Agency: Hawaii Institute of Tropical Agriculture and Human Resources
Submitted by: P. J. Ito and R. W. Hartmann
Address: Dept. of Horticulture, 461 W. Lanikaula St., Hilo, Hawaii 96720 and Dept. of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

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Accession User: D. O. Evans
Address: Department of Agronomy and Soil Science, University of Hawaii, 3190 Maile Way, Honolulu, Hawaii 96822
Nature of Research: Evaluation of Sesbania species potential for use in agricultural systems in the tropics and subtropics.
Progress to Date: Twenty-two PI accessions are included in a germplasm collection being evaluated. In an observation planting begun in early August, 1982, S. arabica and S. macrocarpa accessions (PI's 167290, 167069, 212624, 168623, 175006, 296055) exhibited highly determinate growth during this period when daylength decreased from 13 hrs to 11 hrs 37 min (sunrise to sunset) over 10 weeks. Plants flowered within 4-7 weeks from sowing and put on little vegetative growth before pod-fill and senescence. Accessions of S. exasperata (PI's 322626, 337595) were not as strongly determinate and flowered within 3-10 weeks of sowing.

Viability was lost on PI 430522, S. bispinosa, received as original seed from India

Three S. sesban accessions (PI's 279601, 228236, 125608) behaved as annuals, unlike other sesban accessions which were as expected perennial in habit.

Publications: None
Cultivar Releases: None

Accession User: R. J. Joy
Address: USDA Soil Conservation Service, Plant Materials Center, P.O. Box 236, Hoolehua, Hawaii 96729
Nature of Research: Evaluation of plants for erosion control, windbreak, soil improvement, pasture improvement and wildlife.
Progress to Date: Paspalum hieronymii, PI-310108, scheduled for release in 1983 for use as groundcover in orchards, waterways, heavy use areas.

The following species are being evaluated in specific use-groups:

Pasture Improvement and Ground Cover

Dolichos unifloris, PI-364789
Glycine wightii, PI-224980
Lespedeza sp., PI-349426
Lotus pedunculatus, PI-407473
Pueraria phaseoloides, PI-308567
Zornia dephylla, PI-322687

Windbreak and Biomass

Leucaena leucocephala, PI-263695

Accession User: P. J. Ito and C. L. Chia
Address: Department of Horticulture, 461 W. Lanikaula Street, Hilo, Hawaii 96720
Nature of Research: Introduction and testing of tropical fruits and nuts.
Progress to Date: Thirty-six new introductions were added to the collection from Mexico, Costa Rica and Sri Lanka. Four carambola selections with excellent quality, good appearance and shelf life as well as good production have been distributed for testing at various locations. Three pili nut selections have yielded more than 25% kernel with good quality. The lychee selection previously assigned the name 'Poamoha' has been changed to 'Kaimana' in commemoration of the University's 75th anniversity.
Publications: Hamilton, R. A., Ito, P. J. and Cavaletto, C. G. 1981. 'Pahala' a new macadamia variety of outstanding quality. Calif. Macadamia Yearbook. pp. 78-82.

Hamilton, R. A., Ito, P. J. and Cavaletto, C. G. 1981. 'Purvis' Macadamia named for the first importer of M. integrifolia nuts to Hawaii. Calif. Macadamia Nut Yearbook. pp. 83-91.

Cultivar Releases: A dwarf Brazilian banana, 'Santa Catarina Prata' was propagated by meri-culture and released to growers.

Accession User: P. E. Parvin
Address: University of Hawaii, Maui Branch Station, P.O. Box 269, Kula, Hawaii 96790
Nature of Research: Selection of ornamental species of Proteaceae for use as cut flowers and cut foliages.
Progress to Date: 52 improved selections of Proteaceae were collected in South Africa and Australia in 1981-26 Grevillea, 21 Leucospermum and 5 Protea. Both species and hybrids were included. All exhibited vigorous growth in the ensuing 24 months with the exception of the 5 hybrid Protea selections. Leucospermum "Red Sunset", an open pollinated hybrid, suspected to be L. cordifolium x L. lineare, is outstanding. In 18 months, 10 cm cuttings grew into plants 1.2 m in diameter by 0.6 m in height, with an average of 35 flowers per plant on stems 45 cm long. 3 Leucospermum crosses from the experiment station have been selected for propagation and release. 2 share the parent: Hy #1, which was a cross between L. lineare and L. vestitum.

These 2 are: Hy #7 (L. cordifolium x Hy #1) a brilliant red flower head on 50 cm stems with small leaves; Hy #14 (L. conocarpodendron x Hy #1) a large yellow flower head with bright red tipped styles; and Hy #24 (L. lineare x L. glabrum) 150 brilliant coral red flowers on a vigorous plant, 2 m high by 1.5 m in diameter.

Publications: Parvin, P. E. 1982. Evaluation of new protea cultivars from Africa. Proc. 10th Protea Workshop, CES, Honolulu (in press).

Cultivar Releases: Over 2,000 plants of 3 selections: L. "Firefly", L. "Veldfire", and L. "Hawaii Gold" were distributed ot commercial growers.

Accession User: G. Upreti and R. W. Hartmann

Address: Department of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

Nature of Research: Inheritance of different sources of resistance to spotted wilt virus in tomato.

Progress to Date: P.I. 79532 (Lycopersicon pimpinellifolium), P.I. 203229 (L. esculentum cv. Manzana), P.I. 203230 (L. esculentum cv. Rey de los Tempranos) and a line of unknown parentage which originated in Brazil were found to be resistant. The Hawaiian lines Anahu, Kewalo, and breeding line 8248 as well as Floradade were found to be susceptible. Seven resistant x susceptible and resistant x resistant F_1's were all resistant, indicating resistance is dominant. All F_2 populations segregated into both resistant and susceptible plants, indicating the different resistant parents do not have the same genes for resistance. To explain all the results of the different crosses, it was necessary to postulate some dominant genes, some recessive genes, and epistasis.

Publications: Upreti, G. 1983. Inheritance of resistance to tomato spotted wilt virus in tomatoes (Lycopersicon esculentum Mill.) MS Thesis, University of Hawaii, Honolulu.

Cultivar Releases: None

Accession User: B. A. Kim and R. W. Hartmann

Address: Department of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

Nature of Research: Inheritance of resistance to bacterial spot in pepper.

Progress to Date: Pepper lines in the Plant Introduction collection were tested for their reaction to the bacterial spot bacteria, (Xanthomonas campestris pv. vesicatoria). 201 lines were tested, concentrating on lines introduced from Central or South America, the center of orgin, or from India where several resistant lines have been found. 17 lines from India and 3 from Central or South America were found with resistance. An inoculation method was devised using a DeVilbiss air brush to infiltrate the bacteria into the underside of the leaf of a 1 month old seedling. 12 of the resistant lines were crossed with the susceptible 'Keystone' cultivar and F_1 and F_2 populations inoculated and analyzed for the inheritance of resistance. Both qualitatively and quantitatively inherited resistance was found. Two qualitative genes were found, 1 in P.I. 271322 which conferred hypersensitivity and was

dominant. The other was found in P.I. 163192, produced nearly no reaction after inoculation (and was named "immune"), and was recessive. Both these lines also carried genes which were inherited quantitatively. 10 other P.I. lines were found to carry only quantitatively inherited resistance of varying strengths. These lines, in order of decreasing effectiveness of resistance, were: 244670, 369994, 308787, 297495, 163192 (a different accession than above), 224451, 241670, 322719, 377688, and 369998. When both the dominant gene the hypersensity and the recessive gene for immunity were present, the recessive gene masked the dominant one, so these plants were "immune" and the ratio in the F_2 and 9 hypersensitive: 4 immune: 3 neither.

Publications: Kim, B. S. 1983. Inheritance of resistance of bacterial spot (Xanthomonas campestris pv. vesicatoria (Doidge) Dye) in peppers (Capsicum spp.) PhD Dissertation. University of Hawaii, Honolulu.

Cultivar Releases: None

Accession User: R. W. Hartmann

Address: Department of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

Nature of Research: Incorporation of resistance to tomato spotted wilt virus in lettuce cultivars.

Progress to Date: Crosses have been attempted between probably resistant P.I. lines 167128 and 342517 and seed collected off of F_2 plants. These F_2 progeny will be tested for segregation of resistant individuals and the parents will be tested for resistance under field conditions on the island of Maui. If genetically controlled resistance is confirmed, it will be incorporated through backcrossing into the semi-head and head cultivars preferred by Hawaiian farmers.

Publications: None

Cultivar Releases: None

Accession User: R. Manshardt, H. Y. Nakasone, and F. Zee

Address: Dept. of Horticulture, 461 W. Lanikaula St., Hilo, Hawaii 96720 and Dept. of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

Nature of Research: Evaluation of Carica species germplasm for resistance to Phytophthora root, stem and fruit rot, Colletrotrichum fruit rot, Phoma stem-end rot, and Papaya Ringspot Virus.

Progress to Date: Evaluation of local lines and foreign accessions of Carica papaya has shown several local lines to possess relatively high tolerance to the fungal diseases mentioned above. One selection from Florida has shown a higher level of tolerance to the Papaya Ringspot Virus than tolerant local lines. Interspecific hybrid seeds (F_2 of Carica cauliflora x C. papaya) are segregated for tolerance to the virus disease but no definite inheritance ratios are presently evident. C. cauliflora has been reported to being resistant to the Ringspot Virus.

Publications: Mosqueda-Vazquez, R., M. Aragaki and H. Y. Nakasone. 1981. Screening of Carica papaya L. Seedlings for Resistance to Root Rot Caused by Phytophthora palmivora Butl. J. Amer. Soc. Hort. Sci. 106(4): 484-487.

Mosqueda-Vazquez, R. and H. Y. Nakasone. 1982. Diallel Analysis of Root Rot Resistance in Papaya. HortScience. 17(3): 384-385.

Cultivar Releases: Latest selection of 'Waimanalo' showing much higher level of tolerance to Phytophthora root, stem and fruit rot than the current one grown by farmers.

1983 S-9 TECHNICAL COMMITTEE REPORT

Agency: Louisiana Agricultural Experiment Station

Submitted by: Warren A. Meadows

Address: Department of Horticulture, L.S.U. Agricultural Center
Louisiana Agricultural Experiment Station
4560 Essen Lane, Baton Rouge, LA 70809

Accession User: A. M. Thro
Address: Department of Agronomy, Louisiana State University, Baton Rouge, LA 70803
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium canadense
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium barbatum
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Galactia 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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium canum
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium heterocarpon
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium intortum
Nature of Research: Evaluation of species for potential for development as summer pasture legume for Louisiana.
Progress to Date: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.

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
Species: Desmodium 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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Desmodium 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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Galactia jussiaeana
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Galactia 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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Lespedeza cuneata
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: Accessions planted in replicated short rows in two locations in

Louisiana, spring, 1983.
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
Species: Lespedeza stipulacea
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Lespedeza 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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Rhynchosia minima
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Stylosanthes erecta
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Stylosanthes guianensis
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Stylosanthes hamata
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: Accessions planted in replicated hort rows in two locations in Louisiana, spring, 1983.
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
Species: Stylosanthes humilis
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Zornia brasiliensis
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Zornia diphylla
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
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
Species: Zornia spp.
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: Accessions planted in replicated short rows in two locations in Louisiana, spring, 1983.
Publications: None to date
Cultivar Releases: None to date

Accession User: R. W. Taylor, J. L. Griffin, and G. A. Meche
Address: P. O. Box 1429, LSU Rice Res. Stn., Crowley, LA 70526
Nature of Research: Evaluation of annual and perennial clovers for tolerance to 2, 4-D
Progress to Date: Of ten clover species tested, sub clover (Trifolium subterraneum) showed the greatest tolerance to 2,4-D. 'Yuchi' and 'Amclo' arrowleaf clover (T. vesiculosum Savi) were the most tolerant of the arrowleaf clover varieties. Ball (T nigrescens Viv.), berseem (T. alexandrium L.), the crimson clover (T. incarnatum L.) varieties, kura (T. ambiguum Bieb.), and persian clover (T. resupinatum L.) were similar in 2, 4-D tolerance. Some variability existed among the red (T. pratense L.) and white (T. repens L.) clovers. Of the red clover varieties, 'K4-183' showed the most tolerance and 'K4-184' the least. For white clover, 'Lucky' and 'Nolins' exhibited the greatest tolerance and 'Regal' and 'Sacramento' the least.

Publications: Taylor, R. W., J. L. Griffin, and G. A. Meche. 1982. Evaluation of annual and perennial clovers for tolerance to 2,4-D. In Progress Report: Clovers and Special Purpose Legumes Research. 15:46-47.
Taylor, R. W., J. L. Griffin, and G. A. Meche. 1982. Evaluation of annual and perennial clovers for tolerance to 2,4-D. 74th Ann. Prog. Rpt. RES 74:424-425.
Cultivar Releases: None to date

Accession User: R. W. Taylor, J. L. Griffin, and G. A. Meche
Address: P. O. Box 1429, LSU Rice Res. Stn., Crowley, LA 70526
Nature of Research: Evaluation of six vetch varieties for tolerance to 2,4-D.
Progress to Date: Six vetch varieties, hairy (Vicia villosa Roth), 'Woodford' big flower vetch (V. grandiflora L.), 'Cahaba White', 'Nova II', 'Vantage;, and 'Vanguard' (V. sativa L.) were equally susceptible to 2,4-D amine at 2.24 kg ai/ha with none surviving treatment.
Publications: Taylor, R. W., J. L. Griffin, and G. A. Meche. 1982. Evaluation of annual and perennial clovers for tolerance to 2,4-D. 74th Ann. Prog. Rpt. RES 74:424-425.
Cultivar Releases: None to date

Accession User: R. W. Taylor, J. L. Griffin, and G. A. Meche
Address: P. O. Box 1429, LSU Rice Res. Stn., Crowley, LA 70526
Nature of Research: Evaluation of annual and perennial clovers for forage yield.
Progress to Date: 'Winter Hardy' berseem (Trifolium alexandrium L.) clover produced greater dry matter yields earlier than eight other clover species. Total season yield as of 8 June 1983 were greatest for berseem clover. Rankings for total dry matter yield were as follows: Berseem = arrowleaf (T. vesiculosum Savi) (Yuchi > Amclo > Meeche = RRPS-5) > persian (T. resupinatum) (Abon Iranian) = crimson (T. incarnatum L.) (Tibbee = Dixie = Chief = Autauga) = subterannean (T. subterraneum L.) (Mt Barker = Nangeela = Tallarook Miss Ecotype) = red (T. pratense L.) (K4-184 = K4-183 = Redland II = Kenstar) ≥ ball (T. nigrescens Viv.) (Segrest Common) = rose (T. hirtum) (Kondinin = Wilton) = white (T. repens L.) (Regal = Fla XP1 LA S-1 = Sacramento).
Publications: None to date
Cultivar Releases: None to date

Accession User: R. W. Taylor and G. A. Meche
Address: P. O. Box 1429, LSU Rice Res. Stn., Crowley, LA 70526
Nature of Research: Psophocarpus spp for forage production.
Progress to Date: Twenty two introductions of P. tetragonolobus D. C., two introductions of P. palustris, and one of P. scandens were evaluated for forage production and date of flowering. The cultivars, PI 413193, 413201, 413214, and 413199, showed little growth potential. In contrast, TPT-33, LBN-C_3, PI 408347, M13-1, TPT-2, PI 413216, TPT-7, No. 424, amd No. 2545 showed substantial growth potential averaging 141 g/plant after three harvests. Flowering appeared to be strongly related to photoperiod. Only plants of ETH-1 and M13-1 became reproductive during August. Most cultivars did not produce flower buds until mid- to late-September and some not until even by mid-November.
Publications: Taylor, R. W. and kG. A. Meche. 1982. Characterization of the Winged Bean (Psophocarpus tetragonolobus (L.) DC) as a forage legume in Southwestern Louisiana. 74th Ann. Prog. Rpt. RES 74:452-455.
Taylor, R. W. and kG. A. Meche. 1982. Characterization of the winged bean (Psophocarpus tetragonolobus (L.) DC) as a forage legume in southwestern Louisiana. In Progress Report: Clovers and Special Purpose Legumes Res. 15:49-52.

Cultivar Releases: None to date

Accesion User: C. L. Mondart, Jr.
Address: Department of Agronomy, Louisiana State University, Baton Rouge, LA 70803
Species: Red Clover, White Clover, Arrowleaf and Berseem Clover, Alfalfa
Nature of Research: Screening and varietal evaluation of legumes for forage production in Louisiana.
Progress to Date: 1. Red Clover

Eighteen varieties or strains of red clover were evaluated ina a forage yield trial at Baton Rouge, LA. All entries were planted November 3, 1981. Four forage harvests were made on all entries, as shown in Table 1. The three varieties recommended for planting in Louisiana, Kenland, Nolin's and Redland II, produced excellent yields in this trial. Several new varieties or strains appear very promising for growth in Louisiana.

2. White Clover

A forage evaluation trial, with fifteen varieties or strains of white clover, was planted Novermber 3, 1981 at Baton Rouge, LA. Four forage harvests were made on all entries, as shown in Table 2. Nolin's Louisiana white and Louisiana S-1 were superior to other entries for forage yield in the first harvest. However, the ladino types produced highter yields than other entires, in the later harvests. All entries, except Retor, survived the summer and fall in good condition. Yields from second-year growth will be obtained from these varieties or strains in 1983.

3. Miscellaneous Legumes

Five varieties or strains of arrowleaf clover, along with a berseen clover variety, were evaluated in a forage yield trial at Baton Rouge, LA. All entries were planted November 3, 1981. Four forage harvests were made on all entires, as show in Table 3. Berseen clover produced significantly more forage than the arrowleaf clover varieties in the first harvest. In total yield, the berseem clover was superior to all of the arrowleaf varieties with the exception of Yuchi.

4. Alfalfa

An experiment was initiated at Baton Rouge to evaluate twenty varieties or strains of alfalfa for forage production. Prior to planting, lime was applied to obtain a soil pH of 6.8 and two quarts of Eptam per acre were applied for weed control. All entries of alfalfa were planted November 3, 1981. Four forage harvests were made on all entries at aoorixunatekt six-week intervals. Yield data are presented in Talbe 4. No significant differences in forage yield were obtained among entries in any of the cuttings or in total yield. The total forage yields ranged from 4.44 to 6.11 tons of dry forage per acre. Considerable damage to the alfalfa varieties resulted from the three-cornered alfalfa hoppers and army worms. The stnad on all entries survived the late summer and fall. Second-year data will be obtained from the trials in 1983.

Publications: Mondart, C. L., C. R. Chaney, L. B. Brown and F. J. Petterson. 1983. La. Ag. Exp. Sta. Agron. Dept. Rep. proj. for 1982. pg 59-72.
Cultivar Releases: None to date

Table 1. Forage yields of red clover varieties on Olivier silt loam at Baton Rouge, LA, 1982. (C. L. Mondart, Jr.)

Variety	Harvest Dates				
	March 26	May 4	June 3	July 15	Total
	Yield of dry forage, tons per acre				
Redland II	1.11	1.48	1.49	1.01	5.09
K4-183	0.96	1.55	1.52	0.97	5.00
Nolin's	1.54	1.34	1.35	0.68	4.91
K4-184	1.15	1.44	1.43	0.86	4.88
Kenland	1.12	1.52	1.33	0.86	4.83
Mega	0.99	1.43	1.32	1.06	4.80
Tristan	0.91	1.49	1.53	0.85	4.78
Flare	0.99	1.53	1.29	0.96	4.77
Kenstar	1.01	1.43	1.37	0.91	4.72
Florie	0.91	1.49	1.36	0.86	4.62
Redmor	0.94	1.49	1.41	0.76	4.60
Redman	0.97	1.61	1.34	0.66	4.58
Arlington	0.96	1.43	1.27	0.74	4.40
Prosper I	0.82	1.44	1.24	0.77	4.27
Florex	0.92	1.30	1.39	0.62	4.23
Tensas	1.08	1.30	1.21	0.63	4.22
Lakeland	0.94	1.33	1.23	0.71	4.21
Norlac	0.55	1.07	0.78	0.37	2.77
L.S.D. at 5%	0.15	0.20	0.21	0.20	0.43

All plots were fertilized with 550 pounds of 0-20-20 per acre before planting.

Table 2. Forage yields of white clover varieties on Olivier silt loam at Baton Rouge, LA, 1982. (C. L. Mondart, Jr.)

Variety	Harvest Dates				
	March 26	May 4	June 3	Aug. 9	Total
	Yield of dry forage, tons per acre				
Florida XP2	0.96	1.02	0.98	0.84	3.80
C/WL - 8100	0.87	1.09	0.98	0.72	3.66
C/WL - 8101	0.84	0.93	1.07	0.77	3.61
Tillman	0.95	0.92	1.04	0.65	3.56
Fla. XP1	0.84	1.00	0.99	0.72	3.55
Arcadia	0.89	0.97	0.96	0.71	3.53
Regal	0.91	0.93	0.01	0.62	3.47
La.White (Nolin's)	1.09	1.00	0.83	0.52	3.44
K6-8 Ladino	0.78	1.01	0.90	0.73	3.42
La. S-1	1.50	1.06	0.25	0.49	3.30
Lucky	0.64	0.85	0.91	0.71	3.11
Tamar	0.76	1.02	0.68	0.62	3.08
Sacramento	0.78	0.92	0.77	0.45	2.92
California Ladino	0.64	0.98	0.73	0.50	2.85
Retor	0.64	0.70	0.51	0.35	0.20
L.S.D. at 5%	0.20	0.19	0.21	0.16	0.41

All plots were fertilized with 550 pounds of 0-20-20 per acre before planting.

Table 3. Forage yields of clover varieties on Olivier silt loam at Baton Rouge, LA. 1982 (C. L. Mondart, Jr.)

Variety	Harvest Dates: March 5	March 26	May 4	June 3	Total[1/]
	Yield of dry forage, tons per acre				
Winter Hardy II (Berseem)	1.01	0.73	1.44	0.51	3.69 a
Yuchi (Arrowlead)	0.68	1.01	0.48	1.21	3.38 ab
BE-1 (Arrowleaf)	0.44	0.87	1.26	0.34	2.91 b
RRPS-5 (Arrowleaf)	0.43	0.83	1.12	0.47	2.85 b
Amclo (Arrowleaf)	0.42	0.94	1.08	0.40	2.84 b
Meeche (Arrowleaf)	0.39	0.94	0.91	0.57	2.81 b
L.S.D. at 5%	0.19	0.13	0.40	0.35	

[1/] Total yields followered by a letter in common do not differ significantly at the 5% level of probability.

All plots were fertilized with 550 pounds of 0-20-20 per acre before planting.

Table 4. Forage yields of alfalfa varieties on Olivier silt loam at Baton Rouge, LA, 1982. (C. L. Mondart, Jr.)

Variety	Harvest Dates: April 1	May 13	July 1	Aug. 17	Total
	Yield of dry forage, tons per acre				
Cimarron	1.36	1.78	1.46	1.51	6.11
Vangard	1.36	1.75	1.40	1.50	6.01
Classic	1.37	1.61	1.20	1.42	5.60
HiPHY	1.45	1.63	1.24	1.27	5.59
Fla. 77	1.35	1.57	1.41	1.18	5.51
Southern Special	1.43	1.38	1.23	1.43	5.47
Bancor	1.34	1.62	1.23	1.26	5.45
Team	1.54	1.46	1.19	1.25	5.44
79178	1.43	1.44	1.23	1.31	5.41
ARC	1.51	1.66	1.12	1.09	5.38
Gladiator	1.25	1.52	1.16	1.41	5.34
Williamsburg	1.45	1.48	1.24	1.12	5.29
Apollo	1.34	1.45	1.18	1.31	5.28
Saranac AR	1.20	1.57	1.07	1.43	5.27
Raidor	1.24	1.49	1.17	1.31	5.21
K7-28	1.34	1.43	1.19	1.19	5.15
WL-318	1.43	1.35	1.10	1.10	4.98
Weevil Chek	1.30	1.50	1.13	0.87	4.80
WL-512	1.26	1.33	1.03	0.98	4.60
Kanza	1.25	1.35	1.03	0.81	4.44
L.S.D. at 5%					

All plots were fertilized with 550 pounds of 0-20-20 per acre before planting. Four-hundred pounds of 0-24-24 per acre applied as a top dressing during growing season.

1983

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

Of the 26 campus research personnel who receive information direct from my office, only two cooperators, received PI's of four species of two plants genera. These are just a very small part of the total number of plant introductions under test in North Carolina, as many hundreds of accessions are in various stages of advanced testing.

PLANT INTRODUCTION OF SPECIAL INTEREST

1. Dr. D.H. Timothy, Grass Breeder, Crop Science, reports the Pennisetums of previous years are still being tested at more advanced stages for adaptations and yield. Being a sterile bunch-type perennial grass makes release to the farmers a long drawn-out process. The yield and quality of the grass, however, makes the adoptive process worthwhile.

2. Dr. Roy Larson is testing various Glen Dale Azaleas for the commercial pot trade.

EXPLORATIONS

1. A proposal for "Collection of Small Fruit Germplasm in the Pacific Northwest" by J.R. Ballingtan and O.L. Jahn was turned in for evaluation.

2. Dr. Wanda W. Collins collected sweet potatoes in Peru under a grant approved by S-9 in 1982. Her summary of that trip follows.

This collection expedition began on February 21, 1982 and ended March 11, 1983. Fifty-six native Peruvian sweet potato clones which were considered good fuel alcohol types based on local descriptions were collected. Twenty-three of these clones were returned to the U.S. for virus screening. Thirty-three clones are being grown by a scientist at the Universidad Nacional Agraria, LaMolina, Lima, Peru. These will eventually be brought to the U.S. when conditions permit.

Three separate excursions from Lima were made to collect these clones. One involved a trip to the southern coastal desert vallies with a side trip to the mountains in the south; one trip was to the northern coastal desert vallies. The third trip was intended to be to Huaraz, near the Peruvian center of origin of sweet potato; however, landslides prevented this trip. Instead the third trip was by air into the northern Amazon jungle. Clones were collected from each area visited.

This collection excursion was an unqualified success especially as some clones collected have new sources of disease resistance. However the array of native and introduced types of sweet potato in Peru is overwhelming. More excursions to this area should be funded in the future to investigate this clonal diversity. There are scientists in Peru, both government and private, who are interested in a cooperative effort on maintaining sweet potato germplasm diversity.

1983

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: D. J. Banks
Address: USDA-ARS, Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Peanut collections in Ecuador, South America
Progress to Date: During the period May 10 to May 24, 1983, a peanut (Arachis hypogaea) collecting trip was made in Ecuador, South America. The trip was sponsored by the International Board for Plant Genetic Resources (IBPGR), FAO, Rome, Italy, and the respective organizations of the team members. Team members were Donald J. Banks (Oklahoma), José R. Pietrarelli (Argentina), and Hebert Zurita O. (Bolivia). Primary collections of local land races of peanuts were made in the coastal area near Guayaquil where local flooding did not restrict travel; in the Sierra region of Loja, Catacocha, and Macará; and in the San Antonio area north of Quito. In all, 53 collections were made, some consisting of a mixture of genetic types. In addition, 7 collections of Rhizobium nodules were made from fresh peanut roots. These collections add to our germplasm resources and should be useful for future germplasm enhancement endeavors.
Publications: 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 traits to escape drought.
Progress to Date: Peanut germplasm (plant introductions, U.S. numbers, and breeding lines) are continuing to be evaluated for traits (extent of root systems, soil moisture extraction, leaf water potential components, and stomatal resistance) to escape and/or tolerate drought.
Publications: Ketring, D. L., W. R. Jordan, O. D. Smith, and C. E. Simpson. 1982. Genetic variability in root and shoot growth characteristics of peanut. Peanut Sci. 9:68-72.
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, epidemiology and germplasm development.
Progress to Date: Continue to evaluate peanut germplasm for resistance to Cercospora arachidicola, and develop epidemiological criteria for selecting resistant genotypes. Sporulation of C-arachidicola was suggested as a criterion for screening peanut genotypes for leaf spot resistance.
Publications: Govina, S. M., H. A. Melouk and D. J. Banks, 1983. Sporulation of Cercospora arachidicola as a criterion for screening peanut genotypes for leaf spot resistance. Phytopathology 73:556-558.
Cultivar releases: None

Accession User: J. S. Kirby
Address: Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Peanut Breeding
Progress to Date: Evaluation of peanut plant introductions continues to be an important part of our breeding program. Each year a few of the older introductions in our germplasm collection are grown for fresh seed increase and for observation and evaluation under that year's set of conditions. We are continuing the evaluation for leafspot resistance in segregating material of crosses made with PI 109839 although the material has not been particularly promising thus far under our conditions. Work is also being continued on the early maturing germplasm utilizing Chico as the parental source of earliness. Two cultivars have been released from this material as previously reported, Pronto and Spanco.
Publications: Banks, D. J. and J. S. Kirby. 1983. Registration of Pronto Peanut (Reg. No. 28). Crop Sci. 23:183-184.
Cultivar Releases: None

Accession User: D. E. Weibel
Address: Agronomy Department, Oklahoma State University, Stillwater, OK 74078
Nature of Research: Sorghum [Sorghum bicolor (L.) Moench] breeding and genetics.
Progress to Date: All sorghums have been introduced, some more recently than others! In our pedigree nursery 260 of 940 entries have a recently converted sorghum in their pedigree. PI 220248 shows resistance to biotype E greenbug (Schizaphis graminum Rond.) and the nature of resistance is being studied in F_2 populations.
Publications: None
Cultivar Releases: None

1983

S-9 TECHNICAL COMMITTEE REPORT

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

Submitted: Oscar D. Ramírez

Address: Department 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 Substation, 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: Evaluation of cassava cv. continued. Three cv. were obtained that are good yielders and were rated very high in the sensory evaluation. These are P I 12902, Jamaica 18, and MC-22. After evaluation, a new yam cv. was released. It is a high yielder, sprouts rapidly, does not have a long dormant period, can be planted out of season. It belongs to the specie D. rotundata and is known as Negro Yam.

Publications:

Ramírez, O. D., and Green, J. J., Nueva variedad de ñame (Guinea Negro) de alto rendimiento. Adelanto científico núm. 100, Est. Exp. Agrícola, U. P. R.

Ramírez, O. D., Green, J. J. and Caloni, I. B., Guinea Negro, a high yielding out of season yam cultivar. J. Agr. Univ. P. R. (in press)

Cultivar Releases: Guinea Negro Yam

Bananas and Plantains: O. D. Ramírez, J. J. Green, Corozal Substation, Agricultural Experiment Station, Río Piedras, Puerto Rico, 00927

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

Progress to Date: Evaluation of a new banana cv. from Honduras (P R P I 13503, Grand Nain) continued. A ripening experiment is being carried out. No data is available as yet.

Publications: None

Cultivar Releases: None

Fruits: O. D. Ramírez, A. Torres, R. Rodríguez, Fortuna Substation, Agricultural Experiment Station, Río Piedras, P. R. 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: Budwood of two mango selections (M-20222, M-27856) was introduced from the Substropical Horticulture Research Station, Miami, Fla., and one avocado selection (Greengold (R-27T8) from Hawaii. Also seeds of five citron (Citrus medica) cv. were introduced from Greece. All this material is under observation.

Publications: None

Cultivar Releases: None

Coffee: O. D. Ramírez, and E. Boneta, Adjuntas Substation Agricultural Experiment Station, Río Piedras, P. R.

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

Progress to Date A total of 18 lines of coffee (1,109 plants) with resistance to various races of coffee rust were received from Brazil and are under observation.

Publications: None

Cultivar Releases: Pacas

Coffee material received from Brazil with resistance to various races of coffee rust (Hemileia vastatrix)

Cultivar	P. I. No.		Number of trees
	USDA	P. R.	
LC-1668	451695	13509	7
1702-2	451696	13510	20
1715-4	451697	13511	14
2503-2	451698	13512	1
2543-2	451699	13513	5
2543-4	451700	13514	19
LHC-3851-2	451701	13515	5
4782-7	451702	13516	2
4782-10	451703	13517	10
C-1661-1	470229	13550	90
1668-29-2	470230	13551	149
1686-1	470231	13552	110
1699-24	470232	13553	80
1700-9	470233	13554	101
2477-11	470234	13558	121
2498-6	470235	13555	171
LC-1669	470236	13556	126
1662-53	470237	13557	70
		Total	1,109

Forages: J. Vélez Santiago, Corozal Substation, Agricultural Experiment Station, Corozal, Puerto Rico

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

Progress to Date: Three new accessions of Hemarthria altissima (P I 349752, 364861, 364877) were very promising as to drymatter and crude protein yields, when compared to cv. Redalta and Bigalta. In the stargrass (Cynodon sp.) group, P. I. 409746 and 409748 were very promising as compared to cv. Star var. nlemfuensis. In the legumes, the most promising stylos in their preliminary evaluation were P.I. 19755 and 348951; also cv. #7921 and 7954, received from Fort Pierce. In the Buffel (Cenchrus sp.), group P I 263509 outyielded cv. Nueces,

Llano, and T-4464. Six dwarf Napier accessions received from Tifton, Ga. (Coastal Plain Sta.) are under observation.

Publications:

Vélez-Santiago, J., Sotomayor Ríos, A., Torres-Rivera, S. and Méndez-Cruz, V. (1982) Performance of six Cenchrus and four forage grasses under cutting management in the Lajas Valley, Puerto Rico, J. Agric. Univ. P. R. 66 (4): 268-277.

Vélez-Santiago, J., Arroyo Aguilú, J., Corchado Juarbe, N. (1982) Performance and chemical composition of 18 non dormant alfalfa cultivars in the Lajas Valley. J. Agric. Univ. P. R. (in press)

Cultivar Releases:

P R 81-2 (Brachiaria brizantha)
P R 81-3 (Pennisetum purpureum)
P R 81-4 (Pennisetum purpureum))
P R 81-5 (Cynodon dactylon)
P R 81-6 (Digitaria decumbens)
P R 81-7 (Pennisetum purpureum)

Miscellaneous:

Seed of Copaiba (Copaifera officinalis) was sent to: P. Soderholm, Subtropical Horticulture Research Station Miami, Fla., J. T. De Valerio, U. of Florida, Gainesville, Fla.

Also two local varieties of field corn (Mayorbela, Diente de Caballo) were sent to W. H. Martin, Harpers Ferry, West Virginia.

1983

S-9 Technical Committee Report

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

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Accession User: R.L. Fery, P.D. Dukes and M.G. Hamilton
Address: U.S. Vegetable Laboratory, ARS-USDA, 2875 Savannah Highway, Charleston, SC 29407 and Clemson University Edisto Agricultural Experiment Station, Blackville, SC 29817
Nature of Research: Evaluation of Capsicum spp. for resistance to southern stem blight (Sclerotium rolfsii)
Progress to Date: A collection of 92 Capsicum annuum cultivars, breeding lines and PI accessions and 2 PI accessions each of C. baccatum, C. chacoense, C. microcarpum, C. pendulum, C. frutescens, and C. chinese were evaluated in a preliminary inoculated unreplicated field test for resistance to southern stem blight (Sclerotium rolfsii). One single C. frutescens introduction (PI 123474) and a single C. chinese introduction (PI 224428) were among the top 15% of the entries in resistance. Two introductions (PI 163192 and PI 271322) that were previously reported to be resistant to southern stem blight (Dempsey, A.H. Proc. Third National Pepper Conf., Davis, CA., Sept. 20-24, 1976) were very susceptible in this test.
Publications: None
Cultivar Releases: None

Accession User: H.F. Harrison
Address: U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston, SC 29407
Nature of Research: Evaluation of southernpea germplasm for metribuzin tolerance
Progress to Date: Several PI's with relatively high metribuzin tolerance have been identified
Publications: None
Cultivar Releases: None

Accession User: Wesley Witcher and Janet McLeod
Address: Department of Plant Pathology and Physiology, Clemson University, Clemson, SC 29631
Nature of Research: Evaluation of okra Abelmoscus esculentus (L.) Moench PI's for resistance to Fusarium oxysporum f. sp. Vasinfectum (Atlk.) and root knot nematode.
Progress to Date: Project has been completed and results reported in HortScience
Publications: McLeod, J.M., W. Witcher, W.M. Epps, and M.L. Robbins. 1983. Resistance of okra plant introductions to root knot nematode and fusarium wilt. HortScience 18:249-250.
Cultivar Releases: None

Accession User: Jim E. Wyatt
Address: U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston, SC 29407
Nature of Research: Evaluation of winged bean (*Psophocarpus tetragonolobus* (L.) DC) germplasm for adaptation to the southern U.S.
Progress to Date: Eleven winged bean accessions were grown in the greenhouse in the fall of 1982. Plants were grown in a 13 hr. photoperiod until September 27 and then a 12½ hr photoperiod until anthesis. Several plants flowered in late October; others did not flower until December. Crosses were made among the first plants to flower.
Publications: None
Cultivar Releases: None

Accession User: Jim E. Wyatt
Address: U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston, SC 29407
Nature of Research: Evaluation of okra (*Abelmoschus esculentus* (L.) Moench.) for useful horticultural characters
Progress to Date: Twenty-six accessions were grown in 1982. Much variation in plant characters was observed and individual plants within each accession were selfed to obtain a uniform line for further testing. Characters of interest were concentrated pod set, early maturity and spinelessness.
Publications: None
Cultivar Releases: None

one of the activator cations that may be needed by triacontanol in other parts of plant organs. The lesser amount of Mg in leaves could be the result of relocations of Mg in other parts of plant tissues. Triacontanol at 0.10 mg/liter significantly lowered the amount of Fe found in the leaves. The real mechanism for this phenomenon is not known, but the explanation given for Mg may also be applied here. Triacontanol at 1.25 mg/liter applied at the rates stated above as a soil drench increased the yield of Tabasco pepper by 42% in 1979 and 68% in 1980. Triacontanol was effective in promoting growth and development of Tabasco pepper in the greenhouse and in the field.

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HortScience 18(2):249–250. 1983.

Resistance of Okra Plant Introductions to Root Knot Nematode and Fusarium Wilt

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M.L. Robbins[4]
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Additional index words. *Abelmoschus esculentus, Abelmoschus manihot, Fusarium oxysporum* f. sp. *vasinfectum*

Abstract. **Of 260 plant introductions (PI) of okra [*Abelmoschus esculentus* (L.) Moench.] evaluated for disease resistance, 39 were resistant to southern root knot nematode [*Meloidogyne incognita* (Kofoid & White) (Chitwood)], 9 were resistant to fusarium wilt caused by *Fusarium oxysporum* f. sp. *vasinfectum* (A & K) Snyder and Hansen, and 3 were resistant to both. An introduction of *A. manihot* L., a wild relative of okra, was highly resistant to fusarium wilt.**

Commercial cultivars of okra are very susceptible to southern root knot and fusarium wilt which may infest many soils in the South. Production of okra in such soils will continue to be curtailed severely unless some degree of control of these diseases can be achieved.

The development and use of resistant okra cultivars represents the most economically and environmentally sound approach to control, but sources of resistance have not been well-defined. In 1965, Corley (4) reported 15 plant introductions resistant to root knot and 14 resistant to fusarium wilt. We evaluated the entire okra PI collection (6) and identified several accessions with promising levels of resistance.

A total of 260 PI accessions were evaluated for resistance to *M. incognita* Race 3, a dominant race in South Carolina. Four seeds of each PI—'Clemson Spineless' okra, 'Better Boy' and 'Bonnie Best' tomato—were planted in Speedling trays (Model 150-5, Speedling, Inc., P.O. Box 7098, Sun City, FL 33586). Immediately after seeding, each seed was inoculated with 1000 eggs of *M. incognita* Race 3. Eggs were obtained by the extraction method of Hussey and Barker (5). The seedlings were grown 55 days in the greenhouse (22–38°C). The plants were lifted, and the roots were rinsed gently and stained with Phloxine B. The number of galls and egg masses per root system were scored: 0 = 0, 1 = 1–2, 2 = 3–10, 3 = 11–30, 4 = 31–100, and 5 = more than 100 egg masses or galls (3). The experiment was performed 3 times.

The same 260 PIs and a wild relative of okra, *A. manihot* L., were evaluated for resistance to *F. oxysporum* f. sp. *vasinfectum* secured from a wilted okra plant from Dorchester County, S.C. Eight seeds of each PI were planted each in an individual compartment of a Speedling tray in a randomized complete block design in the greenhouse. The roots of 2-week-old seedlings were wounded with a sharpened spatula pressed into the medium adjacent to the stem and inoculated by pipetting 5 ml of an aqueous suspension containing 5000 conidia (both macro- and microconidia) into the wound slit. The inoculum was grown on carnation leaf agar (7). Plants were examined daily and dead ones were harvested and symptoms noted. Forty-two days after inoculation, all surviving plants were harvested and symptoms noted. Plants were rated for wilt using the scale: 1 = no vascular discoloration or wilt symptoms; 2 = vascular discoloration, but no wilt symptoms; 3 = vascular discoloration and wilt symptoms; and 4 = vascular discoloration and death. The experiment was performed 3 times.

There were significant differences in gall and egg-mass ratings among the PIs tested for root-knot nematode resistance (Table 1). Thirty-nine PIs had gall ratings of 3.0 or less and 14 of the 39 had egg-mass ratings of 3.0 or less. There were also significant differences in wilt ratings. Ten PIs had wilt ratings of less than 2.5. Those with gall index ≤ 3.0 or wilt index ≤ 2.5 were considered to be resistant. Three PIs (357990, 357989, 357998) were resistant to both root knot and fusarium wilt.

There were 9 PIs (120835, 169704, 176386, 177238, 179624, 182121, 269495, 357991, and 357998) with at least one plant on which no gall nor egg mass was formed. It is generally known that PIs are heterogeneous. Further evaluation will be necessary to determine

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[1]Graduate Research Assistant.
[2]Professor.
[3]Head Emeritus.
[4]Professor of Horticulture.

Table 1. The root knot and fusarium wilt reaction of okra entries with gall index of ≤ 3.0 or with wilt ratings ≤ 2.5 inoculated in the greenhouse with 1000 eggs of *Meloidogyne incognita* Race 3 or 5000 conidia of *Fusarium oxysporum* f. sp. *vasinfectum*.

Entry	Root knot ratings			Fusarium wilt ratings	
	No. of plants	Gall index[z]	Egg mass index[z]	No. of plants	Wilt index[y]
Clemson Spineless[x]	12	4.2	4.1	18	3.8
120834	12	3.0	3.5	---[w]	--
123451	11	3.0	3.7	--	--
140317	11	3.0	3.6	---	---
165501	12	3.0	3.6	--	--
179157	10	3.0	3.6	---	---
179840	10	3.0	3.3	---	---
274347	7	3.0	3.1	---	---
370026	11	3.0	3.5	---	---
176383	12	2.9	3.4	--	---
274346	12	2.9	3.3	---	--
177238	11	2.9	3.3	---	---
182133	11	2.9	3.4	--	---
169074	12	2.8	3.0	--	--
182121	12	2.8	3.0	---	--
306379	6	2.8	3.2	--	---
164714	11	2.8	3.2	---	---
183252	11	2.8	3.5	---	--
274342	5	2.8	3.4	---	---
120841	9	2.8	3.1	---	---
180406	9	2.8	3.3	---	---
179623	12	2.8	3.4	--	---
370030	11	2.7	3.3	--	---
176387	12	2.7	3.3	--	---
182130	9	2.7	3.3	---	---
183013	9	2.7	3.2	--	--
274352	12	2.7	2.9	--	--
310473	9	2.7	3.1	--	--
357990	6	2.7	2.8	11	1.7
357997	3	2.7	3.0	---	--
142785	10	2.6	3.0	---	---
164652	10	2.6	3.3	--	---
120835	12	2.3	2.9	---	---
167096	9	2.3	2.7	---	---
176386	10	2.3	2.5	---	--
177236	6	2.2	2.8	--	---
357989	1	1.0	1.0	3	1.3
357991	5	0.8	1.0	--	--
357994	1	0.0	0.0	---	---
357998	3	0.0	0.7	3	2.3
379584[v]	---	---	---	16	1.6
379352	---	---	---	3	1.7
379353	---	---	---	12	1.8
357992	---	---	--	3	2.0
357999	---	--	---	3	2.0
174004	---	---	---	13	2.4
LSD 5%		0.6	0.6		0.5

[z]Gall and egg mass index: 0 = 0; 1 = 1 to 2; 2 = 3 to 10; 3 = 11 to 30; 4 = 31 to 100; 5 = > 100 galls or egg masses/plant.

[y]Wilt index from 1 (no vascular discoloration or wilt symptoms) to 4 (vascular discoloration and death)

[x]Susceptible root knot check

[v]*A. manihot*

[w]--- means fusarium wilt ratings were greater than 2.5 or gall index ratings were greater than 3.0.

if the lines are segregating for disease reaction.

We evaluated all the PIs determined by Corley (4) to be root-knot-resistant, except 176852 and 183205; but of these only PI 167096 was resistant to *M. incognita* Race 3. None of the PIs which he reported to be resistant to the wilt pathogen were resistant to the *F. oxysporum* f. sp. *vasinfectum* isolate that we used. However, Corley mentioned neither his criterion for resistance nor which pathogen race(s) was used in his study for either disease. The race of our Fusarium isolate has not yet been determined. There are 6 known races of *F. oxysporum* f. sp. *vasinfectum* (1).

In the fusarium wilt study, *A. manihot* PI (379584) was highly resistant. Arugmugam and Muthukrishnan (2) used *A. manihot* to incorporate resistance to yellow vein mosaic virus into *A. esculentus*, suggesting that the fusarium wilt resistance of *A. manihot* could also be incorporated into *A. esculentus*.

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1983

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, TN 37901-1071

* * * * * *

Accession User: J. M. Stewart
Address: USDA, ARS, Dept. of Plant and Soil Science, University of Tennessee, P. O. Box 1071, Knoxville, TN 37901-1071
Nature of Research: Cytogenetics of *Gossypium* and incorporation of potentially useful characters of exotic diploid cottons into cultivated tetraploid species.
Progress to Date: A second collection trip to the wet-dry tropics of Australia was completed. *Gossypium cunninghamii* seed were obtained to complete the germplasm collection of all the currently recognized species of the cotton genus. In addition extensive collections were made of *Gossypium* in the Kimberly area of Australia including *G. populifolium*, *G. pilosum*, *G. costulatum*, *G. australe*, and a collection related to *G. pulchellum* that may be an undescribed species. Several species of *Sorghum*, 2 of *Pennisetum* and one of *Oriza* were collected. In addition numerous Malvaceae genera, including *Hibiscus*, and a few ornamental genera were obtained.

Work to transfer wild cytoplasms to commercial cotton has continued. The cytoplasms of *G. stocksii*, *G. trilobum*, and *G. longicalyx* are now in the hexaploid with *G. hirsutum*; *G. lanceolatum* is in BC_2; *G. mustelium* and *G. darwinii* are in BC_1. *G. capitis-viridis* is in the 3X as well as in multiple hybrid complex ($B_3xA_2xAD_1$). A trispecies hybrid of *G. davidsonii* x *G. anomalum* x *G. hirsutum* has been made.

Synthetic AD hybrids with caducous bract are now in the BC_1, BC_1S_1 and BC_2 stage with *G. hirsutum* depending on the particular AD combination. For cytological and phyletic study of the species the following hybrids have been made (each for the first time): *G. australe* x *G. bickii*, *G. australe* x *G. nelsonii*, *G. hirsutum* x *G. pulchellum*, *G. hirsutum* x *G. costulatum*, *G. pulchellum* x *G. costulatum*, *G. populifolium* x *G. costulatum*, *G. pulchellum* x *G. populifolium*, *G. therberi* x *G. populifolium* and *G. herbaceum* x *G. populifolium*. The chromosomes of the Kimberley species are 26 and the largest in the genus. Accessions of *Gossypium* collected on the first Australian trip were grown for seed increase. This has been accomplished for all except *G. sturtianum* var. *sturtianum* and var. *nandewarense*, which are only now passing the juvenile stage. Two accessions of *G. populifolium* did not survive and the collection of *G. pilosum* survives as one immature plant.

Additional plant introductions through Dr. J. Schwendiman, GERDAT, France, include *G. aridum*, *G. lobatum*, *G. turneri*, and 2 accessions of *G. laxum*.
Publications: None
Cultivar Releases: None

Accession User: D. R. West
Address: Department of Plant and Soil Science, University of Tennessee, P. O. Box 1071, Knoxville, TN 37901-1071
Nature of Research: Synthesis and evaluation of non-corn belt maize germplasm.
Progress to Date: Latin American maize populations obtained through the North Central Regional Plant Introduction Station were crossed to adapted germplasm in 1982. Additional crosses and matings will be made in 1983 to develop adapted x exotic maize germplasm. Thirty-five inbred lines were received from France. These lines will be grown in 1983 for seed increase and observed for potentially useful characteristics. F_2 seed from crosses made in Zimbabwe was received from U.S. cooperators. These crosses were between U.S. and Zimbabwe inbreds and were made as a means of introducing germplasm from proprietary Zimbabwe lines into the U.S. Public and private breeders in the U.S. advanced the Zimbabwe seed from the F_1 to the F_2 generation under quarantine conditions. Seed quantities were limited and we will be able to make further distribution after the 1983 growing season

The plant introduction facility in Beltsville currently does not have the capability to increase maize germplasm entering the U.S. from restricted areas that require a grow-out under quarantine. We feel strongly that such a facility should be developed to speed the distribution of maize germplasm entering the U.S. from restricted areas.

1983
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

* * * * * *

Accession User: Raymond D. Brigham and Keith Young
Address: Texas A&M University Agricultural Research and Extension Center, Route 3, Lubbock, Texas 79401, Phone 806-746-6101
Nature of Research: Breeding for Soybean Mosiac Resistance.
Progress to Date: PI's 227555 and 200503 are being used as sources of resistance to soybean mosiac.
Publications: None
Cultivar Releases: None

Accession User: Gerald W. Evers
Address: Texas A&M University Agricultural Research Station, Box 728, Angleton, Texas 77515, Phone 409-849-5208
Nature of Research: Subterranean Clover Breeding and Testing
Progress to Date: PI's 209927, 209924, 184692, 168638, and 239907 are being used in breeding programs to identify lines which are best adapted to seed production and reseeding.
Publications: None
Cultivar Releases: None

Accession User: Ethan C. Holt, B.E Conrad, E.C. Bashaw and others
Address: Soil and Crop Sciences Department, Texas A&M University College Station, Texas 77843, Phone 409-845-8795
Nature of Research: Grass breeding for better forage quality and larger seed.
Progress to Date: A new Kleingrass Variety with superior forage quality and larger seed than Kleingrass 75. This new Kleingrass, 'Verde' was derived from PI's 196363, 166400, 142284 and 208000 with interpollination at earlier stages with other introductions not specifically identified.
Publications: 'Verde' Kleingrass - The Texas Agricultural Experiment Station L-2070, 1983.
Cultivar Releases: 'Verde' Kleingrass

Accession User: Lloyd R. Nelson
Address: Texas A&M University Agricultural Research and Extension Center, P. O. Drawer E, Overton, Texas 75684, Phone 214-834-6191
Nature of Research: Breeding Perennial Ryegrass
Progress to Date: PI's 199252, 217439, 231603, and 319017 are used as parents with summer dormancy genes in several ryegrass breeding studies.
Publications: None
Cultivar Releases: None

Accession User: Roy E. Stafford and others.
Address: Texas A&M University Agricultural Research and Extension Center, P.O. Box 1658, Vernon, Texas 76384, Phone 817-552-9941
Nature of Research: Guar Breeding
Progress to Date: Five breeding lines of guar were released to scientists by USDA/ARS, and the Texas and Arizona Experiment Stations in 1983. The five breeding lines are selections from crosses made at Chillicothe, Texas involving PI 338780.
Publications: None
Cultivar Releases: Five - Requests for seed should be sent to Foundation Seed Service, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas 77843

The number of Plant Introductions distributed in Texas during the 1982-83 year was 1069.

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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: Department of Plant Pathology and Physiology, 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 to broomrape. Screening for tolerance to glyphosate is being conducted by the Department of Plant Pathology and Physiology 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 is 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 882 tomato lines have been screened or are currently in test for tolerance to glyphosate. As of January,

1983 preliminary testing had been completed on 573 varieties. A ratio of the fresh weights of treated/untreated plants was used to evaluate glyphosate tolerance. Twenty-nine (5%) of the tested accessions (Table 1) demonstrated less than 20% fresh weight reduction in response to glyphosate, and may be useful in breeding programs for glyphosate resistance. These accessions will be retested to confirm the results. Additional accessions are being screened for glyphosate tolerance. Dr. Jacobsohn (in Israel) continues to screen these accessions for resistance to broomrape. A request for seeds of two "broomrape resistant" lines from the USSR has been made, but to date, no practically significant resistance to broomrape has been found among the accessions screened.

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

Cultivar Releases: None

Accession User: M. Rangappa

Address: Department of Life Sciences, Virginia State University, Petersburg, VA 23803

Nature of Research: Screening of Phaseolus accessions for air pollution tolerance.

Progress to Date: Field plots have been established this spring for observation of the effects of ambient air pollution on 336 P. vulgaris, one P. coccineus and three P. lunatus accessions. The field is located in an area with a history of air pollution, with ozone as the principal pollutant. A separate study involves four accessions in air pollution chambers with controlled exposure to ozone. Results are expected to be available at the end of the growing season.

Publications: None

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
					%
126.	92861	L. esculentum	China		99.0
127.	92862	L. esculentum	China		84.9
129.	92864	L. esculentum	China		93.3
130.	92865	L. esculentum	China		88.4
131.	92866	L. esculentum	China		86.8
132.	93302	L. esculentum	China		105.7
134.	95584	L. esculentum	Manchuria		81.2
138.	95588	L. esculentum	Manchuria		84.1
169.	109837	L. esculentum	Morocco	'Precoce des Halles'	86.3
184.	117898	L. esculentum	Brazil		87.7
194.	118408	L. esculentum	Venezuela		86.4
309.	126920	L. esculentum	Peru		82.2
310.	126921	L. esculentum	Peru		86.6
364.	127814	L. esculentum	Peru		87.3
542.	124037	L. esculentum	Chile		81.9
551.	128663	L. peruvianum	Peru		90.0
553.	128884	L. esculentum	France	'De Marmande'	84.3
556.	129025	L. esculentum	Ecuador		86.1
559.	129135	L. esculentum x L. pimpinellifolium	Argentina		84.2
560.	129145	L. peruvianum	Peru		88.6
561.	129146	L. peruvianum	Peru		98.8
562.	129149	L. peruvianum	Ecuador		112.0
563.	129152	L. Peruvianum	Ecuador		98.7
568.	135909	L. esculentum	Baluchistan		90.1
570.	143679	L. peruvianum	Ecuador		101.4
571.	155368	L. esculentum x L. pimpinellifolium	Peru		82.3
572.	180725	L. esculentum x L. pimpinellifolium	Germany	'Large German Cherry'	96.6
573.	212407	L. peruvianum	Peru		98.3
574.	212408	L. pimpinellifolium	Peru		85.0

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

1983

S-9 TECHNICAL COMMITEE 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: A. 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)) and Maize (Zea mays L.) germplasm for yield and other plant characters.
Progress to date: A large group of forage and grain sorghums, sudangrasses and maize has been evaluated for yield, insect and disease reactions, and HCN-p in case of the forage sorghums. A forage sorghum population (PR5BR) was released which is a potentially good source of resistance to anthracnose, rust, Fusarium root and stalk rot, and zonate leaf spot. Over three thousand sorghums of the Yemen, Ethiopian, Cameroun, Harlan and de Wet, and Damons collections were grown. Plants were selfed and the seed returned to Arizona, Georgia, and Colorado (Ft. Collins). Maize lines and populations were introduced mostly from CIMMYT, Mexico. The germplasm was evaluated in randomized trials and the most outstanding selections were included in our breeding program.
Publications: "Agronomic Performance, Hydrocyanic Acid Potential (HCN-p) and Heterosis in Forage Sorghum Hybrids". J. Agr. Univ. P.R. (Accepted.)

"Agronomic Comparison, Heterosis and Hydrocyanic Acid Potential (HCN-p) of Sudangrass-Sorghum and Sudangrass-Sudangrass Hybrids and Their Parents". J. Agr. Univ. P.R. (Accepted.)

"Registration of PR5BR Sorghum Germplasm Population". Crop Science. (Submitted for publication.)

Cultivar Releases: PR5BR sorghum germplasm population.

Accession User: F. W. Martin
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Tomato prebreeding activities, including search for disease resistance, searches for new genes affecting shelf life of tomato fruits, development of techniques for wide species crosses.

Progress to Date: Long shelf life from one L. hirsutum line has persisted to F_6 generation. Two other lines are under investigation. Shelf lives of 4 months or more found in about 12 red-fruited tomato lines. Genetic studies have begun. Crosses to other species are being made to search for genes affecting shelf life. Selection continues for early blight (Alternaria) and leaf mold (Cladosporium) resistances useful in tropical tomatoes. Populations have been established for recurrent selection for Alternaria and Phytophthora resistance.
Publications: None.
Cultivar Releases: None.

Accession User: J. Sullivan (UPR) and G. F. Freytag (ARS)
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Improvement of bean through interspecific crosses.
Progress to Date: Plants of 260 accessions of 26 Phaseolus species have been grown and seed of most have been increased in the screenhouse. Seventy-one accessions of 21 species were grown in replicated field trials at 3 locations in Puerto Rico. Notes, herbarium specimens, and photographs were obtained for most collections. These results are being analyzed and a written report is being prepared.

SDS electrophoresis of seed proteins of 119 accessions of 15 species was completed and data are being analyzed to determine genetic relationships.
Publications: None.
Cultivar Releases: (Seed is being prepared to deposit in NPGS - Pullman.)

Accession User: G. F. Freytag
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Improvement of multiple disease resistance of beans for the tropics.
Progress to Date: Multi-strains and field testing is being used to determine common blight (Xanthomonas) resistant germplasm and breeding lines in Phaseolus vulgaris, P. acutifolius, and P. coccineus. Field screening shows highly rust resistant lines B-190, IBRN 958, IAN 5091, Fla. 72, BAT-41, and BAT-153. Crosses are being made to incorporate these resistances into more useful bean types for other plant breeders.
Publications: Freytag, G. F., M. J. Bassett, and M. Zapata. Registration of XR-235-1-1 Bean Germ Plasm. Crop Sci. 22(6):1268-1269. 1982.
Cultivar Releases: XR-235-1-1 (Reg. No. GP 42) (from P.I. 273667).

Accession User: G. F. Freytag
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.
Nature of Research: Germplasm Resources: Develop, Evaluate, and Increase Utilization of Tropical Bean Germplasm and Genetic Stocks.

Progress to Date: A trial planting of Phaseolus and Vigna P.I., old collection numbers was made in the winter season to determine the feasibility of seed increase in Puerto Rico. Planting date in February was determined to be too late for best results because of daylength sensitivities. A better time would be in early December. Virus transmission, mostly of apparently rugaceous virus, was also seen to be a problem. Seed increase is being processed to return to the Regional Plant Introduction Stations for further evaluation and storage.

Publications: None.

Cultivar Releases: None.

Accession User: Francisco Vázquez
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico 00709.

Nature of Research: Evaluation and Maintenance of Tropical Plant Germ Plasm.

Introductions:

Theobroma cacao - Sixty clones of cacao introduced from the Miami Subtropical Horticultural Station have been grafted on Amelonado seedlings. Severe losses occurring several days or weeks after the trees were grafted have been observed during this year. Two types of fungi were isolated but not successfully controlled. They were identified as Fusarium latericium and Botriodiplodia theobromai. Control measures have included sterilizing of the beds with formaldehyde, the use of Ferban* to paint the stem surfaces of the stock plants, and foliar applications of Captan* and Benlate*. None of these treatments has controlled the diseases.

Sorghum - Nineteen sorghum varieties were introduced from Texas Agricultural Experiment Station corresponding to the Zerazeras-Gambella Collection. These materials will become part of the Sorghum Conversion Program at TARS.

New Germplasm:

Sorghum collections - Four thousand entries of the Yemen, Ethiopian, Cameroun, Damons, and Harlan and de Wet collections were grown at TARS. Plants were selfed and the seed returned to Arizona, Georgia, and Colorado.

Abelmoschus esculentus - Okra seed (194 entries) were increased at TARS. The seed was returned to Experiment, Georgia.

Collections:

Fruit trees, vines, and shrubs - Three hundred and eighty species of tropical fruits and nuts, ornamental shrubs and trees, and vines are part of the germplasm collection on the TARS grounds.

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* Mention of a trade name does not constitute a warranty of equipment or materials by the Tropical Agriculture Research Station, USDA,ARS, nor is this mention a statement of preference over other equipment or materials.

Seedlings, fruits, seeds, vegetative material, etc. are distributed year round in Puerto Rico, USA, and other soliciting countries.

Dioscorea (yam varieties) - Fourteen selections of Dioscorea alata, D. esculenta, and D. bulbifera have been planted in two different locations at TARS for evaluation and/or distribution. Requests are processed during the months of February and March.

Legume seeds - Seeds of some species are available for distribution.

Vigna unguiculata - Cowpeas
Psophocarpus tetragonolobus - Winged bean
Phaseolus vulgaris - Common bean
Dolichos lablab - Hyacinth bean
Canavalia ensiformis - Jack bean

Theobroma cacao - TARS, in cooperation with the American Cocoa Research Institute, has established a disease-free collection of selected cacao clones which serves as a permanent source of certified budwood for distribution to cacao growers and breeders.

A program has been carried out to maintain this valuable cacao collection. It has also been under continuous expansion with the acquisition of high yielding clones obtained through the USDA, Miami Subtropical Horticultural Station, where they have been kept under quarantine during an 18-24 month period.

The cacao collection consists of 690 trees (275 clones, 4 hybrids, and 31 Amelonado seedlings). It has been expanded with 81 more trees (33 clones). About 73 new clones recently grafted and still in the greenhouse, will be added to the collection as soon as these have the ideal size to be transferred to the field.

Germplasm Distribution:

TARS is directed to answering local, national and foreign needs for germplasm. Requests for vegetable seeds, tubers, yams, cuttings, trees, fruits, nuts, and vegetative material have been distributed throughout Puerto Rico, continental USA, and foreign countries. A summary of these distributions follows:

Germplasm	Packets	No. of persons	Countries
Vegetable seeds	332	92	45
Tubers, yams, cuttings, etc.	137	23	18
Trees, fruits, nuts	249	24	14
Other seeds	940	25	14
Cacao pods	105 pods	9	1
Cacao budwood	98 clones	3	2
Cacao grafted trees	82 trees	1	1

1983

S-9 TECHNICAL COMMITTEE REPORT

Agency: U. S. Department of Agriculture
Subtropical Horticulture Research Unit

Submitted by: Paul K. Soderholm

Address: 13601 Old Cutler Road
Miami, Florida 33158

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Accession User: P. K. Soderholm and R. J. Knight

Address: U. S. Department of Agriculture
Subtropical Horticulture Research Unit
13601 Old Cutler Road, Miami, Florida

Nature of Research: Introduction, preservation and evaluation of tropical and subtropical plants.

Progress to Date:

During the year ending May 31, 1983, 2,735 distributions were made, over 67 percent of which went to recipients in the United States. One major distribution consisting of 21 items was made in September, 1982.

Requests have been more numerous recently for food plants to help increase and improve local food supplies for some of the Caribbean countries. Haiti and Jamaica have been very active in requesting new fruit varieties.

Cooperators in Haiti have also been seeking plants that will rapidly produce an acceptable firewood and will be immune to browsing by domestic animals. One species that we have supplied that we believe will fit their needs is Justica adhatoda (Syn. Adhatoda vasica). Its wood burns slowly with an intense heat, much like charcoal.

Seventeen selections from the Station's 1959 and 1970 seedling mango plantings were distributed this year to one of the local mango growers. These, as yet, unnamed selections will be evaluated for commercial production.

As the result of the visit to the Miami Station in 1979 by an agricultural team from the Peoples' Republic of China, an active exchange of seeds has been initiated, opening an area of subtropical Southeast Asia that has long been closed to us.

During this year 1,028 introductions were recorded. The vast majority were fruit species (Table III), many of which were collected by Dr. Knight in Malaysia (see at end of this report).

During the winter and early spring three shipments of cacao budwood were received from the botanist collecting for the Cocoa Trade Organization in the Oriente Province of Ecuador. This is material collected from the wild over a two year period in cooperation with INIAP, the National Agricultural Research Institute of Ecuador.

Fruits collected by R. J. Knight, Jr. on a cooperative exploration of Malaysia and Thailand in 1973 have become established and are currently under evaluation. Among those fruiting at present are 3 Thai mango (Mangifera indica) cultivars, Nuwun Chan (M-22441), Hong Sa (M-22419), and Pam Kai Mia (M-22416). As a group Thai mangos are very sweet and rich flavored, with a minimum of the strong oily turpentine flavor associated with some Indian cultivars. Kunwichan, a Thai cultivar of jackfruit (Artocarpus heterophyllus, M-22648), is well established and fruiting at Miami, as is E-dol longan (M-22638). Fwang Tung carambola (M-22647), collected on the same trip, has been well accepted in Florida and is now being planted commercially. It is lowest in oxalic acid content of any checked to date.

A cooperative USDA-Rare Fruit Council International plant exploration took R. J. Knight to Hawaii and Malaysia for 5 weeks in July and August 1982 and resulted in 120 plant introductions. Sites visited included the State of Sabah on North Borneo, both coasts and the interior of Western Malaysia, and Langkawi Island off the northwest coast of Malaysia. Collections encompassed a group of seeds, cuttings and plants of more than 35 genera and included familiar fruits such as avocado, mango, prickly pear, tamarind, a disease-resistant lemon from Cameron Highlands, and passion fruit plus other tropical fruit species that may have considerable potential for Puerto Rico, Hawaii and other warm areas. Among fruit of superior quality collected were the tempoi (Baccaurea sapida) and rambai (B. motleyana), both Euphorbiaceae; the champedak (Artocarpus integer, Moraceae), the rambutan (Nephelium lappaceum, Sapindaceae), the langsat, langsat-duku, and duku (all forms of Lansium domesticum, Meliaceae), and durian (Durio zibethinus, Bombacaceae).

Because it still has some relatively undisturbed tropical forest and has long been populated by horticulturally sophisticated folk, Malaysia constitutes a treasure house of valuable fruit germplasm, and this trip did not begin to exhaust its possibilities. Among genera of possible value for warm-climate breeding that were not collected are numerous species of Vaccinium, Castanopsis (chestnut relatives), and a few species of Prunus and Pyrus. Wild forms of mango, lychee and longan occur in the Malaysian forests. A number of potentially valuable wild Mangifera species were collected but unfortunately did not survive transportation home; they merit further efforts to establish them in the western hemisphere.

Two species of Rubus were collected, one adapted to high altitudes and another (R. moluccanus) that prospers in hot humid lowlands. Although this red raspberry's quality is not high, it may be useful in breeding. A wild durian (Durio sp.) that grows on low damp land may have value as a rootstock for durians that will resist patch canker (Phytophthora palmivora) disease. Its red, oily pulp is less appealing than is the cultivated durian. Among interesting plants collected were a species of Canarium (pili nut) from Langkawi Island and a persimmon (Diospyros sp.) from the same site; a vining Allamanda relative (Willughbeia sp.) with an edible fruit, the akabaka, a small-fruited Garcinia species used dried as a curry additive, and an unidentified mulberry relative, a shrub with numerous tiny, sweet, juicy, bright red fruit. Another collection was Melastoma malabathricum, the senduduk (unfortunately called in English "Straits rhododendron"), which has spectacular purple flowers followed by small edible berries. Potential ornamentals collected were Ilex cymosa and Ardisia ridleyana, both of which bear red fruit, that of the Ardisia being edible but not of high quality.

Publications: Knight, R. J., Jr. 1982. Response of carambola seedling populations to Dade County's oolitic limestone soil. Proc. Fla. State Hort. Soc. 95: 121-122.

Wilson, C. W., III, Shaw, P. E., and Knight, R. J., Jr. 1982. Analysis of oxalic acid in carambola (Averrhoa carambola L.) and spinach by high performance liquid chromatography. J. Agric. Food Chem. 30(6): 1106-1108.

Table 1. Distributions of Plant Introductions from USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1982 Thru May 31, 1983

Destination	Number	Percent of Total
Florida	1745	63.80
California	80	2.93
Rest of Continental U.S. and Canada	264	9.65
Caribbean Region[x/]	168	6.14
Mexico and Central America	26	.95
South America	70	2.56
Europe	46	1.68
Asia	135	4.94
Africa	62	2.27
Pacific Basin[z/]	139	5.08
Total:	2735	100.00

x/ Includes Puerto Rico and the Virgin Islands

z/ Including Australia, Malaysia, Guam, Hawaii, New Zealand, Philippines, and Pacific Islands

Table II. Germplasm Distribution Material from USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1982 thru May 31, 1983

Material	Number of Distributions
Miscellaneous ornamentals and shade trees (includes orchids and ferns)	1277
Tropical and Subtropical Fruits	1154
Cacao	126
Coffea	55
Medicinal, Chemurgic, and Tropical Vegetables [z/]	123
Total:	2735

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

Table III. Germplasm Receipts at USDA Subtropical Horticulture Research Station, Miami, Florida from June 1, 1982 thru May 31, 1983

Material	Number of Introductions Received
Miscellaneous ornamentals and shade trees (includes orchids and ferns)	138
Tropical and Subtropical Fruits	654
Cacao	153
Coffea	26
Medicinal, Chemurgic, and Tropical Vegetables [z/]	57
Total:	1028

z/ Includes edible palms, nuts, spices, beverages

6-14-83

Report for 1983 Meetings of the
W-6, NC-7, and S-9 Technical Committees

Northern Regional Research Center

Germplasm Evaluation--Last year we started a new program in which we look for compounds which are natural bioregulators (or allelopathic compounds) in our wild seed collection. We are concentrating on germination inhibitors and have developed a bioassay using velvetleaf seed as the target. Each batch of seed is sequentially extracted with hexane, acetone, and water. These extracts are then assayed for germination inhibition. Of the 200 species assayed, many have significant activity in one or more of the extracts. We have started to isolate and characterize active compounds from several of these extracts. We hope this research will give some insight as to which compounds or structures are important in controlling weeds.

Work is completed on the extracts of papaya seed. Benzyl isothiocyanate was found to be a very active inhibitor of velvetleaf germination. This compound somewhat affected the germination of soybean seed but was not detrimental to corn.

We are continuing to cooperate with plant breeders and taxonomists working in the "New Crops" area. Specifically, we are continuing to analyze *Cuphea* germplasm having examined 26 species collected in Latin America for their fatty acid composition. Rapeseed and crambe seed were also analyzed.

Crambe--Crambe field and plot work continues this summer in Kentucky through cooperation with Dr. Durwood Beatty at Murray State University. Primary emphasis is to produce and maintain viable seed in the event that commercial interest would develop and require seed for up to 1,000 or 2,000 acres. Strong interest in crambe was expressed early this year by representatives of a major fatty acid user and producer. This new interest is related to a need for very significant quantities of erucic acid. Short-term requirements can probably be met by current rapeseed oil supplies according to recent word from a company representative.

Vernonia--Evaluation of physical-chemical properties of oil was initiated by differential scanning calorimetry (DSC). At low temperatures, liquid-to-solid (exotherm) and solid-to-liquid (endotherm) transitions were observed at 227° and 284°K, respectively. No changes in these transitions were observed as a result of heat treatments between ambient and 600°K (10°K/min scans from 300°K to final temperatures of 400, 450, 500, 550, 600°K).

However, the transitions disappeared (exotherm) or changed markedly (endotherm) when the thermal scan was carried to 650°K, the apparent change in oil character (polymerization, decomposition) occurring above 625°K. These thermal treatments bracket the region (423° to 473°K) where films or coatings have been successfully

prepared on steel panels using neat or pigmented (TiO_2) *Vernonia* oil (bake times of 10-60 min).

Hydrocarbon Crops--Plant scientists have been funded for collecting whole plant samples of 900 species from Oregon, Arizona, North Dakota, Colorado, Tennessee, Indiana, Ohio, and Illinois. Samples of 250 species and voucher specimens have been received. Other cooperating scientists have provided 20 species from Florida and Arizona. An additional 100 species from central Illinois have been collected by NRRC scientists. Whole plant samples of 141 species which were collected in 1981 and 1982 by NRRC and cooperating collectors, have been analyzed and evaluated for their potential as oil- and hydrocarbon-producing species. There were 28 species considered promising with NRRC ratings of 8-11 based on their botanical characteristics and contents of oil, hydrocarbon, and apparent protein. Extracted from these promising species were 2-7% oil (dry, whole-plant-weight basis) and 0.01-1.8% hydrocarbon. Polyphenol fractions, which were removed with the oil in acetone extractions, were 4-21%. Promising species and their ratings include, for example, *Asclepias syriaca* L. (common milkweed, 8), *Isocoma drummondii* (goldenweed, 10), *Arctium lappa* L. (Burdock, 10), *Rhus aromatica* Ait. (fragrant sumac, 11), *Quercus rubra* L. (Red oak, 11), *Spirea bumalda* Bury (Spirea, 11), and *Cacalia atriplicifolia* L. (Pale Indian plantain, 11).

The oil obtained from acetone extractives of 15 species were characterized with respect to TLC, unsaponifiable matter, and free acids of the saponified oil. Hydrocarbon (hexane extractives) was characterized by IR spectroscopy and gel permeation chromatography. Acetone extractives of whole plant *Asclepias syriaca* L. (common milkweed) which were immediately freeze dried after collection, contained an average of about 18% acetone extractives (dry-plant-weight basis) compared to about 9% for samples allowed to dry and age 3 to 4 months at room temperature conditions. Major differences were in the amounts of polyphenol extracted from the samples rather than in the amounts of oil and hydrocarbon. Saponification of the oil fractions yielded 66 and 76% unsaponifiable matter and 12.4 and 16.5% free fatty acids from the air- and freeze-dried samples, respectively. Average molecular weights of the hydrocarbons were about one-sixth that of the *Hevea* rubber. A more detailed characterization study was conducted of the oil from freeze-dried milkweed using techniques including TLC, CC, HPLC, GC, IR, and MS. This study revealed that 46% of the whole-plant oil fraction was comprised of lupeol and amyrin (alpha and beta), which are pentacyclic triterpenes.

In cooperative work with USDA agronomists from Georgia and Maryland, 140 samples of *Rhus glabra* and *Rhus copallina* (sumac) and 152 samples of *Ipomoea batatas* L. vines (sweet potato) were analyzed for acetone and hexane extractives. Sumac stem samples had a range of 8-24% total acetone extractives (dry-stem-weight basis), which contained oil fractions of 1-3% and polyphenol fractions of 6-12%. Sumac leaves had 27-66% acetone extractives (dry-leaves-weight basis) containing 6-10% oil and 21-48% polyphenol fractions. Hexane extractives (hydrocarbon) were 0-0.44% in the stems and 0-0.83% in the leaves. In sweet potato vines, the total acetone and hexane extractives were about 3-15% (not partitioned into oil and polyphenol fractions) and 0-0.5% hydrocarbon, respectively.

Antitumor Screening and Fractionation--The complete structure of sesbanimide, the antitumor active compound from *Sesbania drummondii*, has been determined as well as two isomers or analogues that occur with it. The unusual chemistry of these compounds has been explored by acetylation and hydrogenation reactions. The active compound from *Diarthron vesiculosum* (Thymeleaceae) has been characterized partially; it appears to be a daphnane derivative.

Pest Control Studies--Volatile constituents of oats have been fractionated extensively and bioassayed with the saw-toothed grain beetle [*Oryzaephilus surinamensis* (L.)]. The most powerful attractancy was observed in the case of *trans*-2-nonenal and *trans,trans*-2,4-nonadienal. Utility of these compounds as attractants in the "field" is being explored in cooperation with Dr. W. E. Burkholder (Madison). Characterization studies on phytoecdysones from *Diploclisia glaucescens* (Menispermaceae) have been extended. In addition to the predominant ecdysone (β-ecdysone), extracts of the plant also contains lesser amounts of makisterone A, pterosterone, and a fourth ecdysone yet to be identified.

Natural Toxicants in Vegetables--A new potential thyroid toxicant, (+)-5-allyloxazolidine-2-thione, has been isolated from *Berteroa incana* (L) D.C. seed. The new compound was characterized by comparison of its GLC, ORD, NMR, UV, and MS data to those of the previously known levo isomer from turnips and Chinese cabbage.

Water celery (Umbelliferae) is an edible, aquatic herb with hollow stems and small lobed leaves. It is cultivated throughout the Orient and Hawaii. Successful stands have been established in southern Florida, and marketing studies show good acceptance of water celery in Miami markets. It has a delicate flavor and an odor similar to sassafras root. It is used as a garnish, eaten raw, or cooked with rice, meatloaf, or omelettes. It is related to *Oenanthe crocata* L., the roots of which contain the following toxic polyacetylenic alcohols: oenanthotoxin, oenanthetal, and oenanthetone. Water celery has been examined for myristicin (previously reported as present) and the polyacetylenes falcarinol and falcarindiol. These alcohols have been identified as being a part of the disease response mechanism in carrots. Myristicin was detected (51-203 mg/kg fresh weight), as well as falcarinol (15-44 mg/kg) and falcarindiol (188-230 mg/kg). Carrot roots at harvest seldom have myristicin, but contain falcarinol (25 mg/kg fresh weight) and falcarindiol (65 mg/kg).

Falcarinol, falcarindiol, and myristicin contents of carrots, *Daucus carota* L., were determined by a sequence of dichloromethane extraction, column chromatographic purification, and gas-liquid chromatographic analysis. High Color 9, Long Imperator 58, Danvers 126, and Spartan Bonus varieties were grown in Wisconsin (1979-1982), Florida (1980-1982), California (1980-1982), Arizona (1981), and Illinois (1981-1982). Gold Pak, Nantes Half Long, Red Cored Chantenay, and Royal Chantenay varieties were grown in Illinois (1980). The overall mean of falcarinol for 510 observations of these eight commercial varieties was 24.1 mg/kg; that of falcarindiol for 389 observations was 65.1 mg/kg. The standard error of a mean based on 2 samples of 4 carrots, with 2 aliquots per sample, was 2.8 for falcarinol and 4.8 for falcarindiol. Varietal means ranged from 11.3 to 28.2 for falcarinol and 53.3 to 106.9 for falcarindiol. Myristicin was detected in only one variety of carrots (Spartan Bonus) harvested

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

June 1983

I know a bank where the wild thyme blows,
Where oxslips and the nodding violet grows,
Quite over-canopied with luscious woodbine,
With sweet musk-roses and with eglantine.

Shakespeare

Laboratory Personnel

FY 1983 witnessed several dramatic shifts in the organization of our germplasm oriented personnel. On February 6, 1983, the Economic Botany Laboratory was merged into the Germplasm Resources Laboratory with Jim Duke taking on the administrative duties of lab chief. Scientists in the Germplasm Resources Laboratory now are:

A. A. Atchley:	Ecogeographics
L. W. Briggle:	Small Grains Evaluation
T. A. Campbell:	New Crops (Amaranthus, Asclepias, Cuphea, etc.)
J. A. Duke:	Economic Botany
S. H. Gillette:	Economics (economic value of germplasm) (out on detail)
A. J. Oakes:	New Crops (Leucaena, Aromatic and Ornamental Grasses)
M. J. O'Brien:	Pathology; Index of Plant Diseases
D. H. Smith:	Small Grain Collection
G. A. White:	Plant Introduction Office

The GRIN unit, while still administratively within the purview of the Plant Genetics and Germplasm Institute, was moved closer to the National Program Staff to facilitate the internalization of the GRIN program targeted for July 1, 1983, transferring many responsibilities from LISA to GRIN.

The Plant Introduction Station at Glenn Dale, under direction of Bruce Parliman, is also attached to the Institute Office, but working closely with GRL.

Ecogeographics

The Ecogeographic Unit, GRL, has undertaken or planned a number of computer applications to germplasm research. These include, but will not necessarily be limited to, computer graphics applications for the analysis and display of spatial data bearing on germplasm diversity and its distribution on the earth, graphics display of ecological tolerances of taxa as correlated with climate or soil data, and continued development of computer files dealing with yield variations correlated with climate and soils.

Additional activities include such ad hoc short-term efforts as the establishment of a prototype database for orchard-plantation crops which includes provisions for germplasm diversity information, and the testing of hypotheses about genetic diversity of crops on oceanic islands. (A. A. Atchley)

Evaluation

Germplasm activities for FY 1983 include development of preliminary plans for evaluation of accessions in the National Small Grains Collection, including wheat, oats, barley, and rice. Preliminary plans include data collection for agronomic descriptors at "grow out" locations and disease and insect reactions at specified locations wherever the best scientific expertise exists. Preliminary time schedules and cost factors are included.

Actual data will be collected on some wheat and oat accessions in 1983 at two grow out sites, Mesa, Arizona, and Aberdeen, Idaho. Disease and insect tests will be started on both wheat and oats at a few locations in 1983. We anticipate expanding the evaluations in FY 1984. (L. W. Briggle)

New Crops (Crambe, Cuphea, etc.)

Established replicated plots of five, F_6 Crambe abyssinica lines which had been selected on the basis of agronomic and chemical data. F_7 lines which are superior to check varieties will be evaluated regionally. Harvested F_5 seeds from ca 200 agronomically superior, aluminum-tolerant Amaranthus hypochondriacus plants. These lines will be further evaluated for aluminum tolerance and agronomic potential. Evaluated selfed, backcrossed, F_1, and F_2 kenaf (Hibiscus cannabinus) progenies for response to grey mold; preliminary analyses indicate simple inheritance of tolerance. A total of 242 superior late-flowering Stokesia laevis plants were selected from a field nursery of 5,500 plants; selection was based on seed retention, vigor, seed yield, and seed oil content; seed from these plants will be used to initiate a new cycle of screening. A new field nursery of early-flowering plants was established in October, 1982. Vernalization at the young seedling stage for 1 month at 5°C followed by treatment with GA_3 or $GA_{4/7}$ was ineffective in inducting flowering. The most effective and least harmful vernalization regime for mature plants appears to be: 1 month at 5°C (to vernalize and harden), 1 to 2 months at 0°C, and finally 1 week at 5°C. In laboratory studies, Stokes aster seedlings were moderately tolerant to chilling. Tolerance appears to be due to low seed coat permeability. Germination did not occur below 14°C and was very poor below 17°C.

Of the many C_{12} species evaluated, Cuphea wrightii and C. tolucana appear to have the greatest agronomic potential. Accessions of these species are being increased in the greenhouse. The only effective scarification method was cutting the seedcoat with a scalpel. Because seed retention is very poor in Cuphea and natural variation for this trait is very low, a mutation breeding program designed to improve seed retention has been initiated. The mutagenic efficacy of 0.1 M to

.16 M ethyl methanesulfonate and .0005 M to .002 M sodium azide are being evaluated. Preliminary data indicate that sodium azide is substantially more phytotoxic to Cuphea than EMS.

Sixty-six plants from a heterogeneous, random-mating Asclepias syriaca nursery were analyzed for percent polyphenol + oil and hydrocarbon. Seeds were harvested from each plant and progenies will be established in the field and analyzed chemically. Data will be used to compute heritability estimates based on parent-offspring regression. An in situ study of the effects of plant age on percent polyphenol + oil and percent hydrocarbon in Asclepias syrica and Rhus glabra was initiated. The effects of within-row spacings of .3, .6, or .9 meters on yield of Phytolacca americana and Rhus glabra are being studied at Beltsville, Maryland and Experiment, Georgia. Studies at Beltsville indicate a direct relationship between spacing and dry matter yields of P. americana. Harvest of R. glabra will begin in the spring of 1983. Photoinduction at 18 vs 8 hours of light, freezing roots for 2 months at 0°C vs no freezing, and treatment of terminals with kinetin or GA_3 vs no hormone treatment were compared in a factorial experiment. None of these treatments or treatment combinations induced flowering in A. syriaca. (T. A. Campbell)

Economic Botany

The Economic Botany Unit focused from its information files on more than 2,000 economic plants to data collection on the CAC crops. We seek data that might indicate sources for major crop germplasm especially adapted to environmental stresses. Following the approach used in a successful quest for Fe-efficient sorghum for alkaline western soils, the unit launched a search via correspondence, for sorghum tolerant of aluminum toxicities and for rice adapted to deep-well irrigation in Arkansas, where pH has gradually shifted above the optima for the currently used cultivars. The unit will be completing a project involving the compilation of information summaries on 200 potential energy species. Some of them, like beets, corn, sorghum, and sugarcane, are conventional crops in the U.S. (J. A. Duke)

New Crops (Leucaena, Ornamental Grasses)

Analyses of Leucaena germplasm for protein and mimosine is continuing. Protein analyses have been completed. A technique for the extraction and analyses of mimosine has been perfected.

Leucaena literature search has continued. A bibliography containing 1308 literature citations was completed and over 800 copies have been distributed worldwide.

Evaluation of ornamental grasses is continuing. An Agricultural Information Bulletin entitled "Ornamental Grasses Decription-Adaptation-Use" was completed and is in peer review. (A. J. Oakes)

Pathology

A paper on evaluation of 473 eggplant accessions and cultivars for resistance to Verticillium dahliae is in press and will appear shortly in Plant Disease. Three P.I. accessions from India were resistant/tolerant in our tests; two additional P.I.'s, although having higher disease-rating scores in seedling-inoculation tests, withstood the attack and reached plant maturity.

Work continues on (a) the in vitro control of soilborne organisms which are pathogenic on eggplant with a highly disease-suppressant isolate of Bacillus subtilis, and (b) the evaluation of Crambe spp. for resistance to Alternaria brassicicola. A report, or paper, will be forthcoming on the isolation of A. brassicicola from the embryos of Crambe seed.

During the past year, the Justification Statement and an extensive Prospectus for the revision of AH 165, "Index of Plant Diseases in the United States", were prepared. Both the NER and ARS Publication Committies approved these documents, authorized the revision, and Dr. Kinney's approval was obtained. Also, the computer input and retrieval designs were prepared for computerization of the present AH 165 and the updating data. Page-by-page search for the literature has covered approximately five years in two journals. To date, an annotated list of the lesser-worked-on genera/species, covering 62 families in which are listed 377 genera and 836 species, has been prepared. For these, the Information Systems Divisions, NAL, will search title entries for the past 10 years. (M. J. O'Brien)

National Small Grain Collection

The attached table gives a complete summary for the 1982 distributions of small grain germplasm including rice by the National Small Grain Collection.

DISTRIBUTION OF GERMPLASM FROM THE NATIONAL SMALL GRAIN COLLECTION - 1982

CROP	TOTAL	FOREIGN	DOMESTIC	NURSERIES
Wheat	74,182	26,570	37,492	10,120
Barley	20,057	9,535	3,049	7,473
Oats	2,995	1,431	458	1,104
Rice	1,284	42	642	600
Rye	689	33	49	607
Triticale	3,255	1,279	201	1,775
TOTAL	102,460	38,890	41,891	21,679

Number of requests: 521 (D. H. Smith)

Plant Introduction and Exchange

During 1982, PI documentation encompassed 10,970 items in the range of 464864 - 475833. These include 2186 sorghums from Yemen, 247 corns from Chile, 483 domestic wild sunflowers (53 species), and 1,838 pulses (Lens, Phaseolus, Pisum, and Vigna) from the Iran/India Pulse Project. In additon to accessions assigned PI numbers, 566 shipments of 11,088 accessions were received from foreign sources. These materials include samples for international nurseries, items for quarantine increases or data/sample organization such as IBPGR-sponsored collections prior to PI documentation, botanic garden donations to the National Arboretum and Soil Conservation Service, duplicates of earlier introductions and specialized materials not intended for inclusion in NPGS.

For 1982 exchanges, 101,256 items were forwarded in 1,990 shipments to 120 countries. These totals include 40,409 accessions in cereal (37,014) and cotton (3,395) nurseries. Increasingly, requests are for specific U.S. cultivars, germplasm releases, breeding lines, or material with specific traits such as disease resistance, stress tolerance, etc.

USDA Plant Inventories 188 (2-parts) and 189 for 1980 and 1981, respectively, are in print. Number 190 for 1982 has been submitted (April) to the Publications Office. Erick Abadie, National Small Grain Collection, developed a computer program to provide a microfiche version of the Plant Inventory. Microfiche of Inventory 189 will be distributed soon. The current format is identical to the Inventory. It is planned that future distributions will include listings by PI number, species, and country of origin. Released and advanced evaluation germplasm from SCS Plant Materials Centers are being assigned PI numbers and seed samples supplied to NPGS curators. Domestic entries into the National Small Grain Collection (including rice) that previously would be designated as C.I. numbers are now assigned P.I. numbers.

The Plant Exploration and Taxonomy Laboratory now has the main responsibility for coordinating plant explorations. PIO still serves as the primary liaison with APHIS on quarantine matters and coordinates the introduction of prohibited items that must go to Glenn Dale for virus indexing. Potato and sweet potato tubers and cuttings of most fruit trees are involved. Persons involved in explorations which include these and other prohibited species need to address quarantine issues well in advance. PIO will assist in working out suitable arrangements.

Relative to the AID supported "Plant and Seed Materials Project", PIO distributed 1,858 items in 259 shipments to 61 countries. Slightly over half of these items were cereals. Inoculum was provided for most leguminous species. The Glenn Dale Station processed about 1,200 coffee plants comprising 16 different lines/cultivars and received about 14,000 seeds of 70 lines late in the year. About 113 accessions, mostly single plants of Cacao are being held for future distribution to Miami and Puerto Rico. The Miami station provided one coffee accession to Nigeria and 56 other items (mostly scionwood of several subtropical fruits) to AID missions in Jordan, Tanzania, and Zaire. Representative plants of the 16 coffee accessions were sent to Miami as part of the coffee collection.

Mark Perry, a graduate student at the University of Maryland, has been hired by IBPGR through a broad form cooperative agreement between the Agronomy Department and USDA. His three-fold duties at Beltsville which relate directly to IBPGR interests entail (1) assist Dr. C. Chapman, IBPGR Wheat Officer, in compiling and computerizing a worldwide inventory of wheat and related species, (2) assist with reporting the quantity and type of information in the GRIN database and maintain a current awareness of the GRIN network, and (3) organize data and associated information for IBPGR sponsored collections so that PI documentation and appropriate distribution by PIO may proceed.

To update somewhat, PI documentation in 1983 has been completed or is underway for the following groups of plant germplasm:

Arachis spp.	Argentina, Bolivia, Brazil, Peru Sponsored by IBPGR-various collectors	PI 475844-476210
Phaseolus spp.	Guatemala, Mexico ARS sponsored Collectors: Freytag & Vakili	PI 476679-476757
Winged bean (Psophocarpus spp.)	United States Collection assembled from various countries/sources by T. Hymowitz, University of Illinois.	PI 477128-477284
Corn	Chile Collection/increase supported by IBPGR	PI 477372-477536
Corn	Uruguay Received via CIMMYT, Mexico Increased by Pioneer Seed International in Florida.	PI 477537-477762
Ornamentals	Japan ARS sponsored Collectors: Kawase, March, and Meyer Approx. 407 accessions consisting of 223 species.	Pending PI assignment
Medicago & others	Bolivia, Ecuador, Peru ARS sponsored Collectors: Rumbaugh & Lehman Approx. 195 accessions (82 Medicago)	Pending PI assignment
Vegetables	People's Republic of China 1980 U.S. Germplasm Team (T. Orton-Vegetable portion) Approx. 78 accessions of 26 species. (G. A. White)	Pending PI assignment

Glenn Dale Plant Introduction Station

The Station was moved from within the Germplasm Resources Laboratory to an independent status directly under the Institute Chairman of the Plant Genetics and Germplasm Institute.

The Germplasm Resources Laboratory review, including Glenn Dale, was held in 1982. An eleven member meeting was held in October to review the needs of Glenn Dale. Extensive changes in personel are scheduled. The research plant pathologist vacancy is being advertised and a plant pathology research technician will be hired. A greenhouse manager will be hired this summer and as of October 1, 1983, a staff member will be assigned to do heat-therapy/meristem culture, etc., to clean-up superior, prohibited and restricted category, virus infected germplasm. Facility and equipment modifications and purchases are being completed in preparation for the above changes.

Plant inventories of quarantined germplasm are being computerized. The Solanum inventory system has been completed. With the addition of two word processors (with communications capabilities) and one computer terminal, inventories for all groups of prohibited and restricted category plant germplasm will be completed shortly. Inventories include virus indexing status reports for each clone and subclone.

Sixty-three Malus, 25 Pyrus, 10 Prunus, 30 Cassava, 50 Solanum, nearly 60 ornamental and miscellaneous plants, 70 coffee genotypes, and nearly 50 post entry items were established in quarantine in 1982. Readings of virus indicators for virus/mycoplasma infections were initiated on herbaceous materials and are scheduled for woody plants. Six hundred Malus, 167 Pyrus, and 135 ornamental genotypes plus 50 to 200 seedlings of each of 15 rust resistant coffee genotypes were grown, inspected, and shipped. Forty-five miscellaneous genotypes were distributed to 136 other researchers and miscellaneous requestors. Nearly 100 older Pome fruit accessions were repropagated to limit germplasm loss. Additional germplasm in similar quantities as above was propagated for distribution in the coming year. In vivo and in vitro propagation projects were initiated to propagate, rare and/or one-of-a-kind genotypes including various Prunus spp.

Miscellaneous: 1982 Plant distribution lists for Pome fruits, ornamentals, and Vitis were revised and published. Plants were distributed. Distribution lists for small fruits and turf grass were established. Plant distribution lists have been computerized. Active germplasm inventories including quarantine and virus index status have now been computerized for Solanum and ornamental lists. Access to presorted data is now immediately available upon request. (B. J. Parliman)

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1983 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 312 visitors from more than 27 states and 14 foreign countries toured the National Seed Storage Laboratory. This includes several grade school, high school, and college classes.

Germplasm Preservation

The 8,489 samples received during 1982 plus the 2,939 IPC potato samples previously received but not cataloged brought the total of cataloged accessions in storage as of December 31, 1982, to 176,686 after 2,430 duplicate samples received in previous years were renumbered as required by the computer records system now used for inventory control. In addition to the cataloged accessions, 2,819 samples of rice seeds were received from IRRI. Germplasm accessions received from the IBPGR totaled 2,718 accessions from 3 countries.

Arrangements were made for seed increases of 1,712 accessions that were either low in germination or in number of seeds. Seed increase samples received totaled 1,249. Approximately 18,000 germination and 300 special tests were made on stored and incoming seed samples.

Continue to acquire, verify, increase, store, and distribute barley genetic stocks, including trisomics and telotrisomics:

Seven genetic stocks and two (Triplo 7S and Arco $5S^{5L}$) trisomic stocks were received, increased, and added to the collection. Seed increases were made on 200 genetic and 112 trisomic stocks. Characteristics were evaluated on the 370 genetic stocks grown for increase. Various mutant stocks were crossed with primary trisomics for linkage studies. Thirteen F_1, 48 F_2, and 41 F_3 hybrids were grown for isolation of additional multiple genetic stocks. The telocentric chromosome for the short arm of chromosome 7 (the 10th telotrisomic) was obtained and identified by Giemsa banding technique. Three acrotrisomic lines were used for genetic linkage mapping in barley chromosomes. Samples of 35 genetic and 20 trisomic stocks were distributed. A new acrotrisomic line ($5S^{5L}$) was identified morphologically and cytologically and crossed with genetic marker stocks for physical mapping of genes in the long arm of chromosome 5.

During 1982, 1,108 samples, including 288 virus indicator, 138 field crop, and 682 vegetable and miscellaneous crop accessions, were sent to 111 scientists in 16 countries.

Computer printout or microfiche listings, by genus and species, of seed available for the desired crops were sent to 85 scientists who requested them.

The maintenance and control programs were revised to improve their efficiency. Cooperation with GRIP was continued.

Facility Needs

The need for an addition to the National Seed Storage Laboratory still exists, although the urgency for construction has been temporarily eased by switching from metal cans to heatsealable, foil-laminated flexible packages. It appears now that the Laboratory addition will not be needed until about 1988. However, planning needs to move forward if that target date is to be met. At present, planning is at a standstill. No decision has been made as to whether or not an addition or a new building will be built.

Research Notes

Environmental and Other Factor Effects Upon Seed Viability and Storage

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

Study the effects of storage conditions on seed longevity:

Reed canarygrass seed stored 17 and 18 years at -12/70, -1/60, 5/40, and 10°C/60% RH were dead at 10°/60% RH. Seed of all cultivars showed some reduction in germination under most storage conditions. At 5°C/40% RH, 'Mandan 315' showed a reduction of over 50% in viability while 'PM ND 305' showed a reduction of only 18% during 18 years of storage. For some cultivars, the 1964 crop seed retained viability better than did the 1963 crop seed. When the average for all cultivars was considered, reed canarygrass seed stored 17 and 18 years retained germination best at -1°C/60% RH.

Seed of five tropical legume species, *Calopogonium mucunoides*, *Centrosema pubescens*, *Desmodium ovalifolium*, *Pueraria phaseoloides*, and *Stylosanthes gracilis*, stored 16 years at a wide range of temperature/relative humidity conditions retained total viability (normal seedlings plus hard seeds) best at -1°C/60% RH. No tests were scheduled on other kinds of seed stored as part of this project. No seed sample (40 species - 200 cultivars) stored in liquid nitrogen as part of a study on effects of temperature on longevity showed any deterioration during the first 3 years of storage.

Develop a method for predicting relative longevity of seed lots:

Using data from a previous storage experiment with pearl millet seed, a computer program was developed to generate a response surface depicting time to 50% loss in viability (P50) as affected by storage temperature and seed-moisture content. In order to generate the response surface, the appropriate model had to be chosen. The program for model selection encompassed an all sub-set regression analysis and chose from among 32 possible sub-sets. The response was visualized as a contour plot (two dimensions) or as a response surface (three dimensions). In addition, confidence limits were calculated and upper and lower limits plotted as either contours or response surfaces. Additional storage data on carrot, onion, and lettuce seed were combined with the pearl millet data to generate a "general case" for P50 for seed stored under various combinations of temperature and seed-moisture content.

Genetic Changes in Seeds During Storage

Electrophoretic procedures for determining changes in genetic composition of germplasm accessions: Work is about 70% complete on screening 85 sub-lines, derived from 10 heterogeneous PI lines of *Phaseolus vulgaris* for the *Phaseolin* (G_1) storage proteins. Three protein-banding patterns (T, S, and C) of *Phaseolin* have been identified in the literature. Within the 7 germplasm PI's screened, 5 (113367, 142897, 169761, 175825, and 175838) have shown only the S type pattern. PI 169724 showed both S and C patterns, while PI 169783 showed both S and T patterns. In addition to the *Phaseolin* bands, another group of protein bands called the Lectins (G_2) have shown considerable genetic variability within all but two of the seven PI lines. Additional work is needed to clarify the distribution of this group of proteins. Techniques for detecting isoenzymes for esterase, acid phosphatase, amylase, and leucine amino peptidase have been applied to bean cotyledon extracts.

Cryopreservation of Plant Germplasm

P. C. Stanwood

Investigate the effects of cryogenic temperatures on seed viability: High moisture freezing limits (HMFL) and differential thermal analysis (DTA) profiles were determined for: 1) broccoli (3 cultivars), HMFL approximately 14%; 2) petunia (3 cultivars), HMFL in excess of 20%, additional tests being conducted; 3) poppy (1 cultivar), HMFL approximately 13%, and bluegrass, beet, lovegrass, and fescue.

Slow cooling to LN_2, 30-day LN_2 exposure, and LN_2 cycling (15 cycles) has been completed for bluegrass, broccoli, zinnia, lovegrass, beet, and petunia. No damage to germination was noted in any test except for petunia which had some injury in the cycling test.

Determine the value of cryoprotectants on recalcitrant seed subjected to cryogenic temperatures down to -196°C. Infiltration rates of cryoprotectants (DMSO, glycerol, PEG 4000, and L-proline) into *Anthurium* sp. seed were

investigated using radiotracer techniques. DMSO penetrated the seed best when combined with PEG and L-proline or glycerol. L-proline influx was best when seed were exposed only to the proline at 23°C. Glycerol penetration was equal, regardless of combination of cryoprotectants or exposure temperature. Apparently most of the PEG became bound on the seedcoat surface as only small amounts penetrated.

Long-term cryogenic storage of recalcitrant seed of tropical species: Approximately 20 selections are under long-term LN_2 storage. First sampling date for these selections is fourth quarter 1983.

Develop procurement, collection, dehydration, production, and transport procedures for seed of tropical species: Twenty-six new accessions have been investigated, including 13 Hawaiian natives, 5 palms, and several species of economic importance to the tropics, such as *Leucaena leueocephala, Hevea braziliensis, Annona cherimola,* and *Artocarpus heterophyllus*. These investigations included germination at four media temperatures, germination at four desiccation levels, germination response to LN_2 exposure, and grow-out trials using species that survived LN_2 exposure. Data from trials involving over 70 species collected and investigated since the project began were summarized.

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Presented at the NPGC/IBPGR-Sponsored Workshop on "Application of Tissue Culture and LN_2 Storage Techniques in Preservation of Crop Germplasm." Ft. Collins, Colorado. August 1982.

Stanwood, P. C. Seed and Pollen Cryopreservation.

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Presented at the 79th Annual Meeting of the American Society for Horticultural Science. Ames, Iowa. August 1982.

Becwar, M. R., P. C. Stanwood, and K. W. Leonhardt. Freezing characteristics and survival in liquid nitrogen of tropical and temperate seed germplasm.

Presented at the Annual Meeting of the American Society of Agronomy. Anaheim, California. November 1982.

Bass, L. N. Germination of reed canarygrass seed stored 17 and 18 years under 4 conditions.

Stanwood, P. C. Seed freezing limits of agronomic species.

Presented at the Association of Official Seed Analysts Annual Meeting. Corpus Christi, Texas, June 1982.

Bass, L. N. and L. Seip. Viability of lettuce seed stored 21 years.

July 1983

1983 Soil Conservation Service Report to S-9 Regional Technical Committee

The Soil Conservation Service continues to evaluate plant introductions obtained from or through the Agricultural Research Service Plant Introduction Station, Experiment, Georgia. The principal priority problems receiving attention at the five Plant Materials Centers in the southeast are:

Cropland erosion and grassed waterways; compatible legumes to use with conservation cropping systems. (Florida, Georgia, Mississippi)

Gully erosion control; low cost mechanical and vegetative treatment for gullied areas. (Florida, Georgia)

Land conversion; plants to provide an improved economic return when converting marginal cropland to another land use. (Georgia)

Saline soil; improved plants and techniques that will provide an economic return to soils badly damaged by salinity. (South Texas)

Improved plants for range and wildlife; grasses and herbaceaous plants are being developed to reduce erosion and improve productivity of the Southern Plains grassland resource. (Texas)

To accomplish these high priority needs, a widely diverse group of introduced and native plant species have been assembled for study and selection of superior forms. Domestic collections are not addressed. Only plants in advanced testing are mentioned.

Georgia: H. J. Haynsworth, PMS; Mike Owsley, PMC Manager.

Paspalum nicorae, PI-310131, AM-1989 from Brazil. Currently has been subjected to six fertilizer rates to determine effect on seed production. Under category No. 3 - plants for waterways.

Paspalum nicorae, PI-304004, AM-1985 from Brazil. Currently evaluating the different growth habits and characteristics of two growth types from this accession (T30590 and T30591). T30590 is a glaucous, rhizomatous, low growing plant. T30591 is a green semi-bunch type grass that spreads by rhizomes. Under category No. 3 - plants for waterways.

Castanopsis sclerophylla, Chinese evergreen chinkapin, PI-95630.

This planting was made to evaluate the tree's adaptation to deep, sandy soils at the southern boundary of Georgia. Also, information will be sought on the use of the nuts by wildlife.

Ten tree seedlings were planted on a deep, sandy soil in January 1975. Eight plants survived, but growth was very slow until 1980. The trees now average nine feet tall, with a six-foot spread. They are setting a good crop of nuts this year.

Indigofera pseudotinctoria, False anil indigo, PI-198015.

This is a perennial legume. Two plantings made on coal mine spoil in Tuscaloosa County, Alabama, have given good to fair results. Seedlings are slow in establishing in the first year with vigor and growth improving significantly in subsequent years. Plants develop an unusually strong root system and are good competitors with weeds once they are established. However, because of its sprawling, semi-open type growth, weeds tend to grow up through it. In a solitary planting, erosion benefits are good during the warm season, but only fair in the winter since it is a deciduous plant.

Florida: Donald Smith, PMS; Bob Glennon, Assistant PMC Manager.

There are two genera in advanced testing at the Brooksville Plant Materials Center. They are the Arachis and Hemarthria. Following is information on these two genera.

There are two species of Arachis in advanced testing - Arachis glabrata, PI-262817 and Arachis benthamii, PI-338282.

These two species are being evaluated with 'Florigraze' Arachis glabrata as the standard to determine their vigor, forage yield, time of production, relative ground cover, effects of clipping, and response to various rates of fertilization. In January 1983, a supplemental planting of rhizome material, at various rates, was made of PI-262817 to determine the best planting rate of rhizome materials. Plots for advanced testing were planted in April 1980. The first clippings were made in June 1981. The major project is scheduled to be completed in 1983. To date, the production has varied with the rainfall with PI-262817 producing more in periods of less rainfall. This is attributed to its deeper taproot system. The stand of PI-338282 is diminishing and has not completed well with the other accessions and with weeds in test plots and increase plantings. Only one accession of Arachis benthamii has been evaluated at the Brooksville PMC. There are differences in growth habit with this accession. Some selection could be made for a prostate growth that would possibly root from stolons. However, the stand planted for increase material is decreasing.

Six accessions of Hemarthria altissima are in advanced testing at the Brooksville PMC. They are PI-364344, 364875, 364884, 364887, 364888, and 365509. The objective is to select plants superior to presently available varieties for ground cover and forage. The superior accessions from Coffeeville, Mississippi Plant Materials Center; Americus, Georgia Plant Materials Center; University of Florida; and Brooksville, Florida Plant Materials Center were planted in 5 replicated plots 2 meter x 5 meter in size, in May 1982. They were first clipped to a height of 3 inches in August 1982. An additional cutting for yield estimation was made in December 1982. Standards were cultivars 'Bigalta,' 'Greenalta,' 'Redalta,' and bahiagrass.

Results from clipping trials made in December showed PI-364875 to yield higher than the other accessions yielding 17,000+ kg/ha. Production from the three cultivars, PI-364888, 'Bigalta,' and PI-364887 were not

significantly different. Average production for the four-month period was approximately 11,560 kg/ha.

The project is scheduled to be completed in 1985 with three years clipping data. The accession PI-364888 is being released by the University of Florida as 'Floralta' based on superior persistence under grazing. PI-364888 has proven winterhardy at Americus, Georgia.

Mississippi: Dr. James A. Wolfe, PMS; B. B. Billingsley, PMC Manager.

Calamagrostis pseudophragmites, PI-220584. Advanced studies are being conducted on: planting date, depth and position, rate of rhizomatous spread, biomass production, herbicide tolerance. Forage quality is good on this highly rhizomatous perennial grass.

Glycine ussuriensis, PI-163453. Advanced studies are being conducted on: tolerance to herbicides, planting data, and depth for mature seed production, innoculation, and seed production.

Texas: Richard Heizer, PMS; David Lorenz, PMC Manager.
South Texas: Richard Heizer, PMS; Doug Ledbetter, PMC Manager.

The plants advanced into the final testing category at the Knox City, Texas PMC are all native collections.

Extensive number of introduced plant species are being studied in an initial evaluation setting at South Texas PMC, Kingsville, Texas in conjunction with small plot seed increases for the Southern Plant Introduction Station. The South Texas PMC was established by Texas A&I University, Caesar Kleberg Wildlife Institute, and the South Texas Association of Conservation Districts. Doug Ledbetter, Manager, is an SCS employee.

Plant Releases, South NTC, 1982-1983:
'Sabine' Illinois bundleflower
'Haskell' sideoats grama
'Lometa' indiangrass
'T-587' old world bluestem
'Rainbow' wild plum
'Yellow Puff' littleleaf leadtree

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

Q. Jones
6/24/83
Ames, Iowa

Overview of the NPGS

As near as I can figure, we have had some 130 people aggregated in meetings in Iowa during this week for the purpose of discussing plant germplasm.

We had people from the NPGRB, the NPGC, the RTC's, the PGOC, the CAC's, GRIN, and the IBPGR. Ten years ago, only one of these seven groups existed. Now an organization, the NPGS, that can accumulate such an overburden of alphabet soup in less than 10 years cannot be all bad.

Ten years ago, Federal/State support of germplasm may have totaled $4 million; today it is about $12 million. These numbers and nomenclature represent change. But if it is merely change for change's sake, then a lot of time and resources have been wasted.

First, let me say that this week in Iowa demonstrates that the national awareness level of plant germplasm has undergone a quantum increase in the past decade. Ten years ago, only people who were required to attended our meetings. Now we are criticized for not sending out more invitations. You are not with the "in" group if you do not have a "germplasm collection."

Thirty years ago, only a handful of scientists here and abroad were talking, mostly to each other, about the serious need to rescue and preserve germ plasm (two words, they didn't even know how to spell it then) of our principal crop plants. These pioneers, spurred by the impressive earlier work of the Russian botanist, N. I. Vavilov, represent an era that culminated in landmark achievements: the establishment (1958) of the NSSL and the first national

symposium on germ plasm (they still didn't know how to spell it) (AAAS, Chicago, 1959) and, internationally, the establishment in FAO of a Panel of Experts on Plant Introduction in the early 1960's.

Then in 1968 (if memory serves me correctly), the FAO Panel of Experts on Plant Introduction joined forces with the gene pools committee of the International Biological Program (IBP) in an assessment of the status of germplasm of the world's major food crops. In 1972, the International Conference on the Environment was held in Stockholm and for the first time provided, among other accomplishments, a world focus on germplasm. The stage was set for a new era for plant germplasm. Its debut was materially assisted by the 1969-70 corn leaf blight epidemic and the following assessments which revealed the stark reality of the serious genetic vulnerability of our major crops. Now what had been a subject in private conversations among scientists became bandied about in Congress and in the higher executive levels of the Government.

To gear up for action in response to the near disaster of the corn blight, ARS reorganized in 1972. (I say this tongue-in-cheek because the 1972 reorganization must have been in a plannning phase for several years prior to that time and I am not here to comment on the pros and cons of that reorganization.) Suffice it to say that that reorganization caused a further dislocation of what had been an only partially organized plant germplasm system in the United States.

The Federal/State regional program for plant introduction with its system of Regional Technical Committees (RTC's) serving Regional Projects that centered on

Regional Plant Introduction Stations (RPIS's), staffed by State and Federal people and headed by a Regional Coordinator, all tied together nationally by a Branch in Beltsville and by a National Coordinating Committee survived rather well in spite of losing its head, the old New Crops Research Branch. But, in all honesty, it did not emulate a chicken with its head cut off but rather continued to function fairly effectively--illustrating very well, I think, the value of a broadly based organization with considerable diversity in composition and control.

But, unfortunately, in 1972 many important germplasm collections and attendant functions were not in this Federal/State system. They had been administered through other Branches at Beltsville. With those Branches no longer in existence, such units were orphans in a real sense. So a message went out from Mr. Edminster, ARS Administrator at the time, that we had to have a functional national germplasm system. The time was now late 1972. By early 1974, we had some of the main elements of an NPGS in place. We had conceptualized, defined, and described the essential elements and functions of such a system and we had put in place a National Plant Germplasm Committee (NPGC). Involved in these concepts was the role and responsibilities of people in charge of germplasm collections. We called them Curators--people responsible for the care of valuable collections--and linked them into the emerging system as extensions of the Regional Coordinators.

We envisioned that the fledgling system needed a central nervous system that linked the parts together 24 hours a day, year in and year out. So in 1976, a feasibility study was commissioned on the needs, dimensions, functions, and cost of a national germplasm information system. The recommendations of the

feasibility study report were accepted, and in 1977, the Germplasm Resources Information Project (GRIP) was launched. ARS contracted with LISA, CSU, to lead a LISA/ARS team in the design and implementation of what would become a national Germplasm Resources Information Network (GRIN) to serve the NPGS. Another speaker will address this topic so I will not go into details. I will add that one very important outgrowth of GRIP was the concept of another essential component to the NPGS advisory matrix--the Crop Advisory Committees (CAC's) that were enlisted to provide that crop-by-crop expertise needed throughout all functional activities of the NPGS and linking to the functions of germplasm users.

So in 10 years, we have put some blood (say money) and muscle (say people) into and onto a framework (say the State, Federal, Industry coalition), have a brain in place (say the NPGC, CAC's, and RTC's), and are ready to beef-up our central nervous system (say National and Regional Coordinators and PGOC) through the addition of an electronic communication network (say GRIN) and the written word (say DIVERSITY).

The body is moving fairly well and is accomplishing things. But less we get too soon complacent, let me remind you that we have just begun. Much more remains to be accomplished than has been accomplished if we are to fulfill our role as the responsible stewards of this Nation's, and a good part of the world's, irreplaceable treasure which is plant germplasm.

You may have noted that throughout this report I have made liberal use of the pronoun "We." This is not an editorial "we," that usually means "Me," but a "we" who have comprised "Germplasm's Week in Iowa."

Presented at Combined Meeting of NC-7, NE-9, S-9, and W-6; Ames, Iowa, June 24, 1983

Acronyms Used in NPGS

CAC	Crop Advisory Committee
CSU	Colorado State University
FAO	Food and Agriculture Organization of the United Nations
GRIN	Germplasm Resources Information Network
GRIP	Germplasm Resources Information Project
IBP	International Biological Program
IBPGR	International Board for Plant Genetic Resources
LISA	Laboratory for Information Science in Agriculture
NPGC	National Plant Germplasm Committee
NPGRB	National Plant Genetic Resources Board
NPGS	National Plant Germplasm System
NSSL	National Seed Storage Laboratory
PGOC	Plant Germplasm Operating Committee
RPIS	Regional Plant Introduction Station
RTC	Regional Technical Committee

SOUTHERN REGIONAL PLANT INTRODUCTION STATION
Report to S-9 Technical Committee
June 23-24, 1983

This report covers the primary activities of this Plant Introduction Station for the period of July 1, 1982 through May 31, 1983.

Plant Introduction

Germplasm of 2,448 new Plant Introductions (PI's) were added to the regional plant germplasm collections. Along with 28 other genera the major groups of new PI's included peanuts, sorghum (Yemen), mung beans, cowpeas. The collections of PI's now total 51,086.

Seed Increase

A total of 4,488 PI's composed of 30 genera and 136 species are included in the 1983 increase plantings. The Regional P. I. Station is increasing 1,175 PI's. The major crop groups involved are peanuts, grasses, cowpeas, peppers, sesame, and gourds. Cooperators in several states (Alabama, Florida, South Carolina, and Texas) are increasing 729 PI's of melons, tropical legumes, and forage grasses. The Tropical Crops and Germplasm Research Unit (formerly MITA) in Puerto Rico is increasing 2,331 sorghums at Isabella and 253 cowpeas at Fortuna Substation near Ponce.

New funds were added to the ARS budget for "acceleration of seed regeneration of plant introduction collections". This money is expected to be recurring for several years until the backlog of plant introductions of low seed quantity and viability are regenerated. Of the 51,086 PI's in the collection 18,505 (36%) are currently in the "unavailable" status due to low seed inventory. The progress we have made in seed increase in the last three years has been offset by heavy inflow of new collections. Now with the new moneys we will be able to develop multi-year agreements with several new cooperators to regenerate PI's.

Seed Distribution

A total of 23,363 seed packets were distributed in response to requests for plant germplasm. Of this total 20,546 were distributed for basic research and plant breeding and 1,929 packets of forage legume cultivars were distributed as a service function to the Southern Forage Breeders Research Information Exchange Group. Through a new program for updating data on seed viability, S-9 sent 888 clover samples to NSSL for seed germination tests. Another 973 samples were sent to NSSL for long-term storage as back-up collections.

Distribution by Regions

S-9: (Total - 6,834)

Alabama	60	North Carolina	9
Arkansas	139	Oklahoma	3516
Florida	134	Puerto Rico	6
Georgia	1314	South Carolina	182
Hawaii	7	Tennessee	46
Kentucky	0	Texas	1069
Louisiana	347	Virginia	0
Mississippi	5	Virgin Islands	0

NC-7: 3,878 NE-9: 1,827 W-6: 1,012

In addition to the domestic distribution 6,022 seed packets were shipped to 59 foreign countries.

Computer Data Base Activities

The S-9 Project has had an active computerized storage and retrieval system for data of the plant introductions in the S-9 collections. In September, 1980 James Walden, Computer Technician, transferred from our Plant Introduction Department to the position of Programmer III in the Department of Agricultural Economics. Mr. Walden was able to adequately service the computer needs of the PI Department on a part time basis for the 1980-81 period. However, the work load of his primary position grew until he no longer had spare time to service our needs. Another staff member, Merrelyn Spinks, (who had been Research Assistant to Dr. Grover Sowell, Plant Pathologist) was reclassified to Programmer I. She is now handling our immediate needs of inventory update and nomenclature corrections. With assistance from the Experiment Station's Computer Operations staff, Merrelyn is learning the detail procedures of Data Base Management using the Statistical Analysis System (SAS) language.

The GRIP (Germplasm Resources Information Project) has reached its final days and the development of our national germplasm information system will continue under GRIN (Germplasm Resources Information Network) which will be solely an ARS operation. In the summer of 1982, through the GRIP-GRIN transition, each of the Regional PI Stations were provided with a computer terminal unit complete with key-board, screen, and printer. This CRT unit is now on a direct line to the GRIN computer in Beltsville, Maryland.

The training session provided by GRIP to integrate the S-9 germplasm data was scheduled for September, 1982. However, a series of delays during the past 10 months has resulted in essentially no progress on our level. The need to be fully operational has resulted in our unit purchasing (with the use of Regional Research funds) a second computer terminal that will have a "hard line" connection to the Georgia Experiment Station computer. This will allow us to continue full inventory, updating, report writing, and data searches during the estimated two years that may be required for GRIN to become fully operational.

Sweet Potato Clonal Repository

A sweet potato repository is being established as a unit under the Southern Regional Plant Introduction Station. Start-up funds of $52,800 has been allocated in this FY83 budget. These funds will be placed in two CRIS Projects. The University of Georgia will cooperate by providing the Curator position and technicians as needed. North Carolina State University will cooperate through a five-year plan to carry out the virus clean-up of the germplasm material before it is presented to the Repository. Dr. James W. Moyer, Dept. of Plant Pathology, will be the Principal Investigator for the N. C. State University participation. Attached to this report as an Appendix is a copy of the proposal in a somewhat abbreviated form.

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

Pepper, Bacterial Spot: Pepper lines derived from the cross of 'Yolo Wonder' with PI 322719 and its backcross to Yolo Wonder are being evaluated for release. They have fruit size approaching that of commercial bell pepper and the bacterial spot resistance of PI 322719. Pepper lines carrying the resistance of PI 322719 with the resistance of PI 163189 and PI 322719 with the resistance of PI 163192 are being evaluated. Initial tests indicate that the different sources of resistance combine in a complementary fashion, producing a level of resistance higher than any previously measured.

Watermelon, Gummy Stem Blight: The inheritance of the resistance to gummy stem blight from PI 189225 is being evaluated in crosses with 'Crimson Sweet', utilizing F_1, F_2 and backcrosses to Crimson Sweet. The F_2 generation of crosses of PI 271778 with Crimson Sweet is being produced for future testing.

Muskmelon, Gummy Stem Blight: 'Planters' Jumbo', PI 140471, PI 266935 and PI 296345 were crossed in all possible combinations, excluding reciprocals. Crosses involving the susceptible parent, Planters' Jumbo, were backcrossed to Planters' Jumbo and all F_1's were selfed to produce an F_2 generation for genetic evaluation.

PUBLICATIONS

Adamson, W. C. and G. Sowell, Jr. 1982. Inheritance of three sources of resistance to bacterial spot of pepper. Phytopath. 72:999 (Abstract).

Research Projects - W. C. Adamson, Research Agronomist

Legumes: Segregating populations of *Vicia sativa* crosses of 'Cahaba White' with PI 289491, PI 289500, PI 286470, PI 202524 and PI 277369 are maintaining themselves at a low level in pasture plots at the Central Georgia Experiment Station at Eatonton. Seed of surviving plants will be harvested for increase and establishment at this and other locations.

New Crops for Energy Production: *Eupatorium capillifolium* and *E. compositifolium* and *Ambrosia trifida* selections are being progeny-tested to study the heritability of variation in acetone extract production.

A Phytolacca americana test of different accessions at varied planting densities was established at Experiment, GA and Beltsville, MD and is being harvested for the first time this year. It will evaluate differences in production and extract yield at various points in the growing season.

PUBLICATIONS

Adamson, W. C., M. O. Bagby and W. B. Roth. 1982. Oil, polyphenol, and hydrocarbon content in culms of Phyllostachys species. J. Am. Bamboo Soc. 3:29-32.

Menzel, M. Y., S. G. Goetz and W. C. Adamson. 1983. Some pieces of the african genome puzzle in Hibiscus sect. Furcaria (Malvaceae) Amer. J. Bot. 70:285-297.

Adamson, W. C., M. O. Bagby and W. B. Roth. 1983. Variation in acetone extractions among populations of Rhus glabra and R. capallina. Sou. Br. ASA (Abstract).

Adamson, W. C., F. L. Long, G. M. Prine and J. A. McGuire. 1982. Removal of nitrogen and potassium by kenaf. Tappi Non-wood Plt. Fiber Pulping Rept. 13:99-103.

Campbell, T. A. and W. C. Adamson. 1982. Response of kenaf to selected herbicides and herbicide combinations. Tappi Non-wood Plt. Fiber Pulping Rept. 13:1-4.

Adamson, W. C. 1983. Weeds for oil, polyphenol, or hydrocarbon production in the southeast. Third Ann. Solar and Biomass Workshop Proc. 155. (Abstract).

Adamson, W. C. and T. A. Campbell. 1983. Pokeweed as a producer of oil and polyphenols. Agronomy Abstracts, 1983 (Abstract).

Screening for Disease Resistance - G. Sowell, Jr., Research Plant Pathologist

Microflora of Sorghum Seeds: Fusarium moniliformae was the only pathogen isolated from seed of sorghum PI's with poor (0-17% germination). Curvularia geniculata and Helminthosporium spiciferum were isolated from a few PI's. All sorghum PI's less than 2 meters in height (258 PI's) are being screened for resistance to Fusarium moniliformae seed mold in the field.

Cucumber Mosaic Virus in Cowpeas: In cooperation with J. W. Demski approximately 350 cowpea PI's were screened to attempt to find single plants with resistance. A single plant each of two PI's remained symptomless with repeated inoculation.

Unidentified Virus in Peanuts: An unidentified virus produced a mosaic on new peanut PI's in the 1982 nursery. All peanut seed from this nursery is being held until the virus is identified.

Southern Regional Plant Introduction Station Budget

Source of Funds	FY-83	FY-84
Regional Research Funds (Pooled)	$115,001	$120,637
Regional Research Funds (Georgia Station)	-0-	-0-
TOTAL	$115,001	$120,637
Expenditures		
Personal Services	95,762	101,659
Travel	270	317
Supplies & Operating	15,269	18,661
Equipment	3,700 1/	-0-
TOTAL	$115,001	$120,637
Source of Funds		
ARS (Base)	217,100	248,400
Special Allocations:		
*Sweet Potato Clonal Repository (Start-Up Funds)	52,800	52,800
*Forage Crop Maintenance (non-recurring)	40,000	20,000
*Acceleration of Seed Regeneration (recurring)	88,000	88,000
*Plant Explorations (non-recurring)	17,503	-0-
TOTAL	$415,403	$409,200
Expenditures		
Personal Services	161,600	214,670
Travel	4,000	4,000
Construction & Repairs	2,000	2,000
Supplies & Materials	23,800	44,730
Support Equipment	31,400 2/	21,300
Vehicle Operations	1,500	1,500
Extramural Services	191,103 3/	121,000
TOTAL	$415,403	$409,200

1/, 2/, 3/ These categories are itemized on attached Budget Appendix.

BUDGET APPENDIX

Itemization of Extramural Services and Major Equipment Purchases

Broad Form Cooperative Agreements

Alabama - Watermelon Increase	$ 3,800
Florida - Ft. Pierce Exp. Sta., Tropical Forage Legumes	5,000
Georgia - Temporary Labor	16,000
Kentucky - Curator, Perennial Clovers	5,000
North Carolina - Curator, Tripsacum Collection	10,000
Oklahoma - Peanut Increase	5,000
Puerto Rico - Cowpea Increase - Pilot Project for Seed Quality & Virus Levels	3,000
South Carolina - Cantaloupe Increase	3,000
Texas A&I (and S. Texas PMC) - Forage Increase	5,000
Texas A&M (Stephenville) - Peanut Increase	5,000
Sub-Total	$60,800

CRIS Agreements:

General:

UGA Cooperative Extension Service, Temporary maintenance of Bamboo Collection, Savannah, GA	15,000

Specific:

University of Puerto Rico - Tropical Forages & Special Legumes (3 years)	12,000
University of Florida (Ft. Pierce)	18,000
University of Georgia - Sweet Potato Repository	40,800
N. C. State University - Sweet Potato Virus Research	12,000
Texas A&I University (and S. Texas PMC) Forage Increase	15,000
Sub-Total	$112,800

Plant Explorations:

Ipomoea batatas, Sweet Potato; Peru, Feb., 1983 Dr. Wanda Collins, N.C. State University	2,068
Gossypium barbodense, Cotton; Peru, Mar., 1983 Dr. J. Vreeland & Dr. B. Simpson, Univ. of Texas	3,435
Gossypium spp., Cotton; Australia, Apr. & May, 1983 Dr. J. Stewart, ARS, Knoxville, TN & Dr. P. Fryxell, ARS, College Station, TX	12,000
Sub-Total	$17,503
Extramural TOTAL	$191,103

Major Equipment Purchases

WANG Office Information System	$ 20,000
Truck - 3/4 Ton	8,000
Equipment Trailer	2,300
Seeder/Spreader	1,100
Computer Terminal (R.R. Funds)	3,700
TOTAL	$ 35,100

APPENDIX

Plant Exploration Proposals for FY-84

1. Vernonia galamensis (and related species); Malawi, Tanzania, Zambia, Africa; Feb. 1 - May 15, 1984; Dr. R. E. Perdue, Jr., Plant Exploration Officer, Dr. S. E. Saufferer, Botanist, Plant Exploration and Taxonomy Laboratory, Dr. S. B. Jones, Dept. of Botany, Univ. of GA. Cost: $20,753.

   Objective: Collect germplasm to develop a Vernonia species or interspecific hybrid for a new crop for production of epoxy acids used in plastic formulation. The expected production areas are southern Texas and/or dry areas of Puerto Rico.

2. Gossypium spp., Cotton; Venezuela & Colombia, South America; Jan. 15-Feb. 15, 1984; Dr. A. E. Percival & Dr. P. A. Fryxell, ARS, Cotton Genetics Research Unit, College Station, TX. Cost: $10,000.

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

3. Gossypium spp., Cotton; Southern Mexico; Oct-Nov, 1983 and Feb-Mar, 1984; Dr. A. E. Percival & Dr. P. A. Fryxell, ARS, Cotton Genetics Research Unit, College Station, TX. Cost $4,800 (2 trips) & Vehicle (Rough Terrain) $12,000; TOTAL: $16,800.

   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. The request of the vehicle is based on the need for continuing explorations in Mexico and Central America as the program of Cotton Genetics Unit requires an average of two trips a year into Mexico. In the past when vehicles were borrowed for germplasm collection the incurred expenses were covered by non-germplasm funds.

4. Sorghum bicolor, Sorghum; Sudan, Africa; November, 1983; Dr. K. Schertz, ARS, Crop Genetics and Improvement Research Unit, College Station, TX. Cost: $3,300.

   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.