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

SOUTHERN REGIONAL PLANT INTRODUCTION STATION
UNIVERSITY OF GEORGIA EXPERIMENT STATION
GRIFFIN, GEORGIA

JULY 18-19, 1989

SUBMITTED BY
FRANCISO VAZQUEZ, SECRETARY
S-9 TECHNICAL COMMITTEE 1988-1989

AGENDA

S-9 Technical Advisory Committee

Georgia Experiment Station
Griffin, Georgia
July 18-19, 1989

1. Call to Order, 8:00 AM, July 18, 1989.

2. Introduction of Attendees.

3. Official Welcome - Dr. Gerald Arkin, Resident Director and Associate Director of Georgia Experiment Station.

4. Approval of Minutes, 1988 Meeting.

5. Additions to and Approval of Agenda, 1989 Meeting.

6. Appointment of Committees
   A. Nominations
   B. Time & Place of Next Meeting
   C. Resolutions

7. Remarks from the S-9 Adminintrative Advisor

8. National Program Staff Reports

9. Special Issues for Discussion

10. Tour

11. State Progress Reports and Research Plans

12. Other Agency Reports

13. Plant Exploration Proposals

14. Committee Reports and Acceptance
   A. Nominations
   B. Time and Place of Next Meeting
   C. Resolutions

15. Unfinished or New Business

16. Adjournment, July 19, 1989

1. CAll TO ORDER

The S-9 Technical Committee meeting was called to orer by Chairman Dr. Phil Ito at 8:00 a.m., July 18, 1989.

2. INTRODUCTION OF ATTENDEES

	Name	Address	Phone
	Gerald Arkin	GAES Griffin, GA 30223-1797	404/228-7263
	Vickie Binstock	USDA/ARS, Germplasm Res. Lab Bldg. 001,Rm. 322, BARC-West Beltsville, MD 20705	301/344-3328 FAX: 301/344-3036
*	David W. Bradshaw	Clemson University Dept. of Horticulture Clemson, SC 29631	803/656-3404 656-4949
*	William Branch	UGA/Dept. of Agromony Coastal Plains Exp. Sta. Tifton, GA 31793-0748	912/386-3561
	Michael L. Cagley	USDA/NCGR/Citrus Route 2, Box 375 Groveland, FL 32736	904/787-5078
*	Ruben Velez Colon	Agri. Exp. Sta.,HC 02 Box 7115 Juana Diaz, PR 0665-9601	809/842-9196 837-3905
	Wayne Everett	USDA/SCS,Ft.Worth Fed. Center Ft. Worth, TX 76115	817/334-5282 FTS 334-5282
*	W. T. Fike	N. C. State University Dept. of Crop Science Raleigh, NC 27695-7620	919/737-3267
*	Phillip T. Ito	Univ. of Hawaii College of Tropical Agric. 461 W. Lanikaula St. Hilo, HI 96720	808/935-2885
*	James S. Kirby	Oklahoma State University Dept. of Agronomy Stillwater, OK 74078	405/744-6417
	Robert Kleiman	USDA/ARS Northern Reg. Res. Center 1815 N. University Street Peoria, IL 61604	309/685-4011

	Gilbert R. Lovell	USDA/ARS,S. Reg. Plt. Intro. Sta. Ga. Exp. Sta.,1109 Experiment St. Griffin, GA 30223-1797	404/228-7255 FAX: 404/228-7270
*	George G. McBee	Texas A&M University Dept. of Soil & Crop Science College Station, TX 77843	409/845-8796 FAX: 409/845-0456
*	Gordon M. Prine	Univ. of Florida,Dept. Agronomy 304 Newell Hall Gainesville, FL 32611	904/392-1811
	Raymond J. Schnell	USDA/ARS Subtropical Hort. Res. Sta. Miami, FL 33158	305/238-9321
	Henry L. Shands	USDA/National Program Staff BARC-West, Bldg. 005,Rm. 140 Beltsville, MD 20705	301/344-3311 301/344-3191
*	Norman Taylor	University of Kentucky Dept. of Agronomy Lexington, KY 40506	606/257-2644
*	Ann M. Thro	Louisiana State University Dept. of Agronomy Baton Rouge, LA 70803-2110	504/388-2110
	Francisco Vazquez	USDA/ARS Tropical Agric. Res. Sta. P. O. Box 70 Mayaguez, PR 00709	809/831-3435 /831-3439
*	C. E. Watson	Mississippi State Univ. Dept. of Agronomy Mississippi, MS 39762	601/325-2311
	Loren Weisner	USDA/ARS NSSL, Colorado State Univ. Ft. Collins, CO 80523	303/484-0402

* Members of the S-9 Technical Committee

3. WELCOME

Dr. Gerald Arkin, Resident Director and Associate Director of Georgia Experiment Stations, welcomed the group.

4. APPROVAL OF MINUTES

Jim Kirby moved that the Minutes be approved as circulated. The motion was seconded and approved.

5. APPROVAL OF AGENDA

The 1989 Agenda was approved as circulated.

6. APPOINTMENT OF COMMITTEES

A. Nominations - Ann Marie Thro and C. E. Watson

B. Time and Place of Next Meeting - Franciso Vazquez and Ray Schnell

C. Resolutions - Bill Fike and David Bradshaw

7. REMARKS FROM ADMINISTRATIVE ADVISOR

Dr. Gerald Arkin commented on the following:

a. Emphasis was placed on communication from state committee members to their respective Experiment Station Directors and with Dr. Arkin. The members should discuss germplasm needs and issues with their Directors to maintain their awareness. Their responses are important when Dr. Arkin addresses the Southern Directors regarding the S-9 Project and related germplasm issues.

b. It was suggested that the annual S-9 meetings involve less details from the Progress Reports and leave more time for presentation and responses to current germplasm issues.

c. The review and assessment document on the S-9 Project, as prepared in November 1988 for the Southern Directors, was distributed to the members. Dr. Arkin emphasized this review was the first assessment in recent history of the S-9 Project and can provide a base-line for future reviews. It should help the S-9 TAC and the staff of the Plant Introduction Station in setting practical goals for the Project.

d. The plant germplasm program is vital in continuing this country's agricultural leadship.

e. In the future Dr. Arkin will provide copies of the Synopsis of the NPGC meetings. This should inform the S-9 Committee of the national and international concerns regarding plant germplasm.

8. NATIONAL PROGRAM STAFF REPORTS

a. Dr. Henry Shands, National Program Leader for Plant Germplasm, acknowledged Dr. Gerald Arkin's efforts in behalf of the S-9 Regional Project.

b. He reported that the Plant Patent problem still exists and is a complex situation. Patents could conflict with plant germplasm use and distribution in some cases. The U. S. Patent and Trademark Office is using the Germplasm Resources Information Network (GRIN) database as a reference when considering claims for plant and utility patents. Therefore, Agency scientists need to periodically examine the germplasm lines in their possession, describe them, publish their findings, and enter unique material into the National Plant Germplasm System repository and GRIN database. Otherwise, non-ARS breeders developing genetic material similar to that held by our Agency could file for patents and block further use.

c. Dr. Shands recommended that state reports to the S-9 Project should include news on any special germplasm collections in the individual states.

d. Germplasm funding for FY 89 is $28,503,000 which is a $2 million increase over FY 88. No increases are expected for FY 90.

9. SPECIAL ISSUES FOR DISCUSSION

a. Dr. Gerald Arkin recommended the listing of memberships of the Crop Advisory Committees (CAV) be provided to all S-9 TAC members. Gil Lovell will work with GRIN Staff to see that this is carried out.

b. Dr. Stan Schank, representing Florida, asked for a policy for the host-state member of each year's meeting to extend invitations to plant scientists in the host-state to attend the S-9i Project Meetings. Members gave general approval.

c. Dr. Arkin will provide to the committee a synopsis of each of the National Plant Germplasm Committee meetings. This would keep the members informed on other regional and national problems and the action taken to resolve the problems.

10. TOUR

A tour of ongoing research at the S-9 Regional Plant Introduction Station was conducted on the afternoon of July 18, 1989. The following projects were reviewed by the researchers.

Speaker	Subject
Pamela Reece	Procedures in Sweet Potato Clonal Repository.
Graves Gillaspie	Research of virus problems in peanuts and watermelons.

Gil Lovell	Status of seed storage unit and planned improvements.
Graves Gillaspie	Review of new greenhouse complex, construction progress, and planned uses.

11. STATE PROGRESS REPORTS AND RESEARCH PLANS

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

Representative	State
(no report)	Alabama
(no report)	Arkansas
Gordon M. Prine	Florida
William Branch	Georgia
Phillip T. Ito	Hawaii
Norman Taylor	Kentucky
Ann M. Thro	Louisiana
C. E. Watson, Jr.	Mississippi
W. T. Fike	North Carolina
James S. Kirby	Oklahoma
Ruben Velez Colon	Puerto Rico
D. W. Bradshaw	South Carolina
(no report)	Tennessee
George G. McBee	Texas
(no report)	Virginia

12. OTHER AGENCY REPORTS

The following agency reports were made and are included in Appendix I:

Representatives	Agency
Vickie Binstock	Germplasm Resources Lab
Michael L. Cagley	National Clonal Germplasm Repos. - Citrus
Henry L. Shands	National Program Staff
Loren Weisner	National Seed Storage Lab
Robert Kleiman	Northern Regional Res. Center
Wayne Everett	Soil Conservation Service
Gilbert R. Lovell	Southern Plant Intro. Sta.
Raymond Schnell	Subtropical Hort. Res. Center
Francisco Vazquez	Tropical Agriculture Res. Sta.
Francis T. Zee	National Clonal Germplasm Repos.-Tropical Fruit

13. PLANT EXPLORATION PROPOSALS

The following plant exploratiopn proposals from the S-9 Region were reviewed and approved for submission to the Plant Germplasm Operations Committee (PGOC). The PGOC meets in September each year and sets national priorities and recommends funding for approved proposals.

Carya
PARTICIPANTS: L.J. Grauke (ARS) Somerville,TX; Bruce Wood (ARS) Bryon,GA; Jerry Payne (?); local host country botanists.
LOCATION: Peoples Republic of China and VietNam.
SPECIES: Carya (six species).
DATES: September 15 - October 17, 1990.
FUNDING: $16,624 requested.

Mango
PARTICIPANTS: R.J. Schnell,R.J. Knight (ARS) Miami, FL; (? C.R. Sperling (ARS) Beltsville).
LOCATION: Malaysia
SPECIES: Mangifera spp. and mango cultivars.
DATES: August 12 - September 1, 1990.
FUNDING: $ ca. $11,800 requested.

Vaccinium and Rubus
PARTICIPANTS: James R. Ballington (North Carolina State Univ.); James Luteyn (New York) Botanical Garden); Nicholi Vorsa and Leo P. Bruederle (Blueberry/Cranberry Research Center) Chatsworth, NJ.
LOCATION: Ecuador
SPECIES: Wild and cultivated Vaccinium spp., wild and cultivated Rubus spp.
DATE: Last week of October - third week of November.
FUNDING: $11,834 requested.

14. COMMITTEE REPORTS AND ACCEPTANCE

A. Nominations
Chairman - Francisco Vasquez; Secretary - Dr. Norman Taylor.

B. Time and Place of Next Meeting
Mayaquez, P.R., July 26 - 27, 1990.

C. Resolutions

Be It Resolved That The S-9 Technical Committee Approves The Following Resolutions.

1. Expresses its appreciation to Gil Lovell for his many efforts on our behalf throughout the year and in making our stay in Georgia a happy occasion (the weather was great and ever so comfortable).

2. Special thanks go to Dr. Gerald Arkin for his role as Adminstrative Advisor and his "PR" efforts on behalf of S-9. Perhaps for Puerto Rico each of us can have the results from our "In-State Survey" of interests and/or lack of interests in the Germplasm Program.

3. Appreciation to the entire staff of the Plant Introduction Station specifically to: Rella Castile as our special consultant; Jim Strickland and Lebus Kilgore for their continuous assistance when needed; Dr. Caywood Chapman and John Roberts for their efforts in identifying PI's; to Drs. Graves Gillaspie and Roy Pittman for their overall view and insite into the building program and operation of the germplasm center; and to Pamela Reece, LeeAnn Chalkley and Merrelyn Spinks for their explanations into the operation of the germplasm and tissue culture storage, increase and distribution.

4. A special welcome to Vicki Binstock, Bill Branch, Michael Cagley, Sam Schank, Don Surrency and Loren Wiesner as new members or visitors to our project. May their associations and cooperative spirits make our future meetings as candid and as informative as this one.

5. Special thanks go to Dale Lovell for her cakes, to the Director's office for the drinks and to Phil Ito for the macadamia nuts all of which make our meetings run ever so smoothly.

15. UNFINISHED OR NEW BUSINESS

Dr. Gerald Arkin proposed the development of a Newsletter on a quarterly or six month basis for communication among the S-9 Project members. Gil Lovell volunteered to Chair a sub-committee including Ray Schnell, C. E. Watson, and Jim Kirby. Gil will initiate development and submit ideas to the sub-committee.

16. ADJOURNMENT

The meeting was adjourned by Chairman Phil Ito at 12 o'clock, July 19, 1989.

APPENDIX I

STATE AND FEDERAL REPORTS

Written progress reports are attached in the following order:

Flordia

Georgia

Hawaii

Kentucky

Louisiana

Mississippi

North Carolina

Oklahoma

Puerto Rico

South Carolina

Texas

Germplasm Resources Laboratory

National Clonal Germplasm Repository - Citrus
Groveland, FL

National Clonal Germplasm Repository - Tropical Fruit
Hilo, HI

National Program Staff

National Seed Storage Laboratory

Northern Regional Research Center

Soil Conservation Service

Southern Regional Plant Introduction Station

Subtropical Horticultural Research Station
Miami, FL

Tropical Horticultural Research Station
Mayaquez, PR

1989 S-9 TECHNICAL COMMITTEE REPORT

University of Florida
Institute of Food and Agricultural Sciences
Florida Agricultural Experiment Stations
and USDA Cooperators

Submitted by: G. M. Prine and S. C. Schank

Address: Department of Agronomy
University of Florida
304 Newell Hall
Gainesville, FL 32611-0311

Accession User: David Knauft
Department of Agronomy
University of Florida
402 Newell Hall
Gainesville, FL 32611-0311
904-392-1811

Nature of Research: Peanut (*Arachis hypogaea* L.) breeding and genetic work are being conducted to understand and improve yield, quality, and pest resistance. Some work on other *Arachis* species is being initiated.

Progress to Date: Crosses involving PIs are an integral part of the program and are in various stages of study and development. A group of 33 PIs from China, received through Dr. T. A. Coffelt, is being evaluated for late leafspot resistance and other desirable characteristics. These are PIs 420334, 420335, 433349, 433352, 476821, 476823-476829, 476831, 476834-476847, 502908-502910, and 503556-503558.

RFLP libraries and appropriate probes are being constructed to examine genetic variability for DNA sequences. Several wild species of peanut are being used in this study. We are also conducting research on the fatty acid composition of seed and these, and other, wild species.

Publications:

Chiteka, Z. A., D. W. Gorbet, D. A. Knauft, F. M. Shokes, and T. A. Kucharek. 1988. Components of resistance to late leafspot in peanut. II. Correlations among components and their significance in breeding for resistance. Peanut Sci. 16:76-81.

Gorbet, D. W., and D. A. Knauft. 1988. Response of peanut genotypes with resistance to leafspot to fungicide treatments. Agron. Abstr. 80:81.

Knauft, D. A., and D. W. Gorbet. 1988. Agronomic performance and composition of genetic mixtures in peanut. Agron. Abstr. 80:86.

Knauft, D. A., and D. W. Gorbet. 1989. Analysis of peanut production in stress and non-stress environments. Tropical Agric. 66: (in press).

Knauft, D. A., and D. W. Gorbet. 1989. Genetic diversity among peanut cultivars. Crop Sci. 29: (in press).

Knauft, D. A., and D. W. Gorbet. 1989. Variability in growth characteristics and leafspot resistance in peanut lines. Crop Sci. (accepted for publication).

Accession User: K. H. Quesenberry
Agronomy Department
University of Florida
2183 McCarty Hall
Gainesville, FL 32611
904-392-1823

Nature of Research: Forage legume breeding and genetics including the species red clover (*Trifolium pratense*), aeschynomene (*Aeschynomene americana*), carpon desmodium (*Desmodium heterocarpon*), and rhizoma peanut (*Arachis glabrata*). Primary objectives are to develop varieties which have perenniality under conditions in Florida or have good reseeding ability. Specific objectives include selection for root-knot nematode resistance, leaf spot resistance, and herbicide tolerance.

Progress to Date: A southern U. S. adapted red clover population was approved for seed increase and future release. This population has several plant introductions (PI's) in its background. During the past year, over 400 PI's of various *Trifolium* spp. have been screened for response to four species of root-knot nematode (*Meloidogyne* spp.) as part of a program of germplasm evaluation under the direction of the Clover and Special Purpose Legume crop Advisory Committee. Eight advanced lines of *Aeschynomene americana* which trace to crosses with plant introductions are currently in regional test for selection of an improved cultivar. An extensive evaluation of *Desmodium heterocarpon* plant introductions was completed in 1988-89. A summary of this work will be presented at the 16th International Grassland Congress in October 1989. Selected F_4 lines from crosses among this material are currently being evaluated for agronomic potential. The second growing season evaluation of a collection of over 100 plant introductions of perennial *Arachis* spp. was completed in 1988-89. This germplasm demonstrates a wide range of variability for traits of agronomic importance. Superior lines from this collection will be moved into advance evaluation experiments in 1990 and the balance of the germplasm will be maintained.

Publications:

Christiansen, S., O. C. Ruelke, W. R. Ocumpaugh, K. H. Quesenberry, and J. E. Moore. 1988. Seasonal yield and quality of 'Bigalta', 'Redalta', and 'Floralta' limpograss. Trop. Agric. (Trinidad) 65:49-55.

Kouame, C. N., D. D. Baltensperger, K. H. Quesenberry, and R. A. Dunn. 1988. Evaluation of *Trifolium* spp. germplasm for resistance to root-knot nematodes. Progress Report Clovers and Special Purpose Legume Research 21:12-19.

Niles, W. L., and K. H. Quesenberry. 1988. Factors influencing seed production in Florigraze (*Arachis glabrata* Benth.) Agron. Abstracts. p. 90.

Quesenberry, K. H., D. D. Baltensperger, S. R. Hardy, and C. J. Wilcox. 1989. Selection for tolerance to root-knot nematodes in red clover. Crop Sci. 29:62-65.

Quesenberry, K. H., D. S. Wofford, and D. D. Baltensperger. 1988. Genotype by *in vitro* media interaction for callus production and plant regeneration in *Desmodium* and *Aeschynomene*. Agron. Abstracts. p. 92.

Ruttinger, A. E., K. H. Quesenberry, G. M. Prine, and G. A. Moore. 1988. Germplasm evaluation of wild perennial *Arachis* introductions. Agron. Abstracts. p. 94.

Wofford, D. S., D. D. Baltensperger, and K. H. Quesenberry. 1988. Response of six genotypes of alyceclover and hairy indigo to four *in vitro* culture media. Agron. Abstracts. p. 101.

Accession User: L. E. Sollenberger
Agronomy Department
University of Florida
IFAS - 0681
Gainesville, FL 32611
904-392-1924

Nature of Research: Forage grass and legume management and utilization.

Progress to Date: A grazing trial was completed comparing steer gains on 'Floralta' limpograss (fertilized with N) at three levels of protein supplementation with those on an association of limpograss and aeschynomene. Results over two years showed higher daily gains on protein supplemented vs. unsupplemented steers, and gains on the association were similar to those on the supplementation treatments. In a plant response to grazing management trial, 'Florigraze' rhizoma peanut persisted well and was very productive if residual dry matter after grazing was more than 1500 kg ha $^{-1}$. Rest periods of 42 days were near optimum in terms of herbage accumulation, and forage nutritive value declined much more slowly with increasing maturity than is typical for most grasses and legumes. Establishment studies with 'Mott' dwarf elephantgrass have been underway for three years. Results indicate that establishment was best if vegetative material was well fertilized before being harvested for planting, if leaves of vegetative material were not grazed or physically removed from the stems prior to planting, and if stems were planted during mid- to late-summer (1 August to 10 September) or late fall (November 15 to time of first heavy frost) in shallow furrows and covered with less than 3 cm of soil.

Publications:

Canudas, E. G., K. H. Quesenberry, L. E. Sollenberger, and G. M. Prine. 1989. Establishment of two cultivars of rhizoma peanut as affected by weed control and planting rate. Trop. Grassl. (in press).

Moore, J. E., L. E. Sollenberger, K. A. Albrecht, P. T. Beede, and W. F. Brown. 1989. Effect of regrowth interval upon canopy structure and utilization of aeschynomene=limpograss pastures. Proc. 16th Int. Grassl. Congress, Nice, France. (in press).

Rusland, G. A., L. E. Sollenberger, K. A. Albrecht, C. S. Jones, Jr., and L. V. Crowder. 1988. Animal performance on limpograss-aeschynomene and nitrogen-fertilized limpograss pastures. Agron. J. 80:957-962.

Sollenberger, L. E., and C. S. Jones, Jr. 1989. Dry matter accumulation, herbage nutritive value, and animal performance on Mott dwarf elephantgrass and Pensacola bahiagrass pastures. Trop. Grassl. (in press).

Sollenberger, L. E., C. S. Jones, Jr., and G. M. Prine. 1989. Animal performance on dwarf elephantgrass and rhizoma peanut pastures. Proc. 16th Int. Grassl. Congress, Nice, France. (in press).

Sollenberger, L. E., W. R. Ocumpaugh, V. P. B. Euclides, J. E. Moore, K. H. Quesenberry, and C. S. Jones, Jr. 1988. Animal performance on continuously stocked 'Pensacola' bahiagrass and 'Floralta' limpograss pastures. J. Prod. Agric. 1:216-220.

Sollenberger, L. E., G. M. Prine, W. R. Ocumpaugh, W. W. Hanna, C. S. Jones, Jr., S. C. Schank, and R. S. Kalmbacher. 1989. Registration of 'Mott' dwarf elephantgrass. Crop Sci. (in press).

Sollenberger, L. E., G. M. Prine, K. R. Woodard, and C. S. Jones, Jr. 1988. Planting methodology for 'Mott' dwarf elephantgrass. International Conference on Livestock and Poultry in the Tropics. Univ. of Fla., Gainesville. pp. A9-14.

Sollenberger, L. E., G. A. Rusland, C. S. Jones, Jr., K. A. Albrecht, and K. L. Gieger. 1989. Animal and forage responses on rotationally stocked 'Floralta' limpograss and 'Pensacola' bahiagrass pastures. Agron. J. (in press).

Cultivar Release:

'Mott' dwarf elephantgrass was released by the Florida Agricultural Experiment Stations and USDA in February 1988. (Circular S-356 entitled 'Mott' dwarf elephantgrass: a high quality forage for the subtropics and tropics was published in June 1988).

Accession User: S. C. Schank
Agronomy Department
University of Florida
2183 McCarty Hall
Gainesville, FL 32611-0311
904-392-1823

Nature of Research: Breeding and evaluation of *Pennisetum* spp. for biomass yield and quality for methane production.

Progress to Date: Most recent intraspecific hybrids in the genus *Pennisetum purpureum* has been between PI 300086 and cv. Mott (N-75) (and the reciprocal cross, which was accomplished in the greenhouse in December 1988. Over 400 seedling plants were obtained, which were subsequently transplanted into the field at Hague, Florida in April and May 1989. One hundred of these plants were used in RFLP analysis prior to transplanting them into the field. Further analyses of these F_1 hybrids will be made during the 1989 season.

Publications:

Smith, Rex L., M. K. U. Chowdhury and S. C. Schank. 1989. A unique RFLP Mapping system in *Pennisetum*. Jour. Cell. Biochem. 13D:344.

Schank, S. C., Rex L. Smith and Sandra L. Russo. 1989. Characterization of genetic variability among accessions and crosses of napiergrass, *Pennisetum purpureum*. XVI Intern. Grass. Cong. (in press).

Accession User: M. J. Williams
USDA, ARS, STARS
P. O. Box 46
Brooksville, FL 34605
904-796-3385

Nature of Research: Evaluating tropical forage legumes for adaptation, quality, and dry matter production. Species being evaluated include: *Leucaena leucocephala*, *Stylosanthes guianesis*, and *Arachis glabrata*.

Progress to Date: A range of preemergence (norflurazon, metribuzin, imazaquin, flumeturon, atrazine, and cyanazine at 0.9, 0.28, 0.1, 1.12, 0.56, and 0.56 kg a.i ha^{-1}, respectively) and postemergence herbicides (a medium and high rate of bentazon at 0.56 and 1.12 kg a.i. ha^{-1}, and single rate applications of aciflourfen and 2,4-DB at 0.56 kg a.i. ha^{-1}) were evaluated for efficacy and phytotoxicity on direct-seeded *Leucaena leucocephala* K8 (PI263695) plantings. Only slight foliar phytotoxicity symptoms were noted for any of the preemergence herbicide treatments. Metribuzin gave the best control of the weed species present, but effective weed control with any of the preemergence herbicides lasted for only 6 wk post-application. The medium rate of bentazon applied to 2-3 leaf seedling leucaena was the only postemergence herbicide tested that provided significant weed suppression without significant foliar phytotoxicity symptoms.

Publications:

Williams, M. J. 1989. Herbicide tolerance and efficacy during the establishment phase of phase of *Leucaena leucocephala* plantings in Florida. Proceedings, Soil Crop Sci. Soc. Florida. 48: (in press).

Williams, M. J. 1989. Non-destructive determination of *Leucacena leucocephala* dry matter production. Leucaena Res. Rep. 10: (in press).

Accession User: P. Mislevy
Agronomy Department
University of Florida
AREC
Ona, Florida 33865
813-735-1314

Nature of Research: Test perennial forage grasses (Cynodons) under grazing to determine daily gain and live weight gain ha^{-1}. Test 'Floratam' and FX-33 St. Augustinegrass on sandy soils of central Florida. Test tall perennial grasses and develop management practices for biomass crops.

Progress to Date: Grazing studies are in progress to compare Florico stargrass (*Cynodon nlemfuensis* Vanderyst var. *nlemfuensis*) Puerto Rico #2341 with Florona stargrass (*C. nlemfuensis* Vanderyst var. *nlemfuensis*), Callie 35-3 bermudagrass (*C. dactylon*) and Brazos bermudagrass (*C. dactylon*) under a rotational grazing system. A three and five paddock rotational system is being studied. Preliminary results indicate daily gains increased by an average of 18% in favor of a five pasture over a three pasture rotation. Lower quality forages tend to respond more favorably to the faster rotation than forages of higher quality.

Both Florico and Florona have been released to commercial growers in 1988. Planting material will again be available in 1989.

A study will be established in the summer of 1989 to compare two St. Augustinegrasses [*Stenotaphrum secundatum* (Walt.)] on sandy Spodosol soils of central Florida.

Management practices are being developed for elephantgrass (*Pennisetum purpureum* Schum) PI 300086, (*Erianthus arundinaceum* Retz. Jesw.) 'IK 76-110' and energy cane (*Saccharum spontaneum* L.) var 'L79-1002' and US 72-1153. Data indicate that harvest frequency (1.2 m) is detrimental to the above biomass grass entries. Harvest frequency of 4 m or beyond appears desirable.

Publications:

Mislevy, P., J. P. Gilreath, G. M. Prine and L. S. Dunavin. 1987. Alternative production systems: Nonconventional Herbaceous Species. *In* Methane from Biomass: A System Approach (Wayne H. Smith and James R. Frank) (eds.). Elsevier Applied Science London and New York, pp 261-276.

Mislevy, P., A. Larbi, M. Adjei. 1988. New stargrass varieties for south Florida. Proc. 37th Annual Beef Cattle Short Course, University of Florida, GAinesville, FL pp. 91-98.

Prine, G. M., S. C. Schank, P. Mislevy, R. L. Stanley, Jr. and L. S. Dunavin. 1988. Production of elephantgrass and other tall grasses for energy use in subtropical and warmer temperate climates Southern Biomass Conf. July 26-28.

Mislevy, P., W. F. Brown, A. J. Overman and R. M. Sonoda. 1988. 'Florona' stargrass. AREC, Ona Research Report RC-1988-7. 5 pg.

Mislevy, P., W. F. Brown, A. J. Overman and R. M. Sonoda. 1988. 'Florico' stargrass. AREC, Ona Research Report RC-1988-6. 6 pg.

Adjei, M. B., P. Mislevy and R. L. West. 1988. Effect of stocking rate on the location of storage carbohydrate in the stubble of tropical grasses. Tropical grasslands 22:(2)50-56.

Mislevy, P., O. C. Ruelke, and F. G. Martin. 1988. Grazing evaluation of *Cynodon* species. Soil and Crop Sci. Soc. of Fla. Proc. 47:207-212.

Adjei, M. B., P. Mislevy, K. H. Quesenberry, and W. R. Ocumpaugh. 1988. Grazing-frequency effect on forage production, quality, persistence and crown total non-structural carbohydrate reserves of limpograsses. Soil and Crop Sci. Soc. of Fla. Proc. 47:233-236.

Accession User: F. P. Gardner
Agronomy Department
University of Florida
304 Newell Hall
Gainesville, FL 32611
904-392-1811

Nature of Research: Perennial peanut (*Arachis* glaborata) PI 262840. Objective is to test the efficacy of this genotype in lawn/turf situations.

Progress to Date: Excellent quality of turf that is resistant to heat, drought, and pest stresses. It has not received any pesticide, fertilizer, or supplemental water for over two years and quality continues to improve. Requires little mowing after August 15. Combines well with ryegrass for quality winter turf.

Publications:

None

Accession User: Dan W. Gorbet
Agricultural Research Center
Route 3, Box 383
Marianna, FL 32446
904-594-3241

Nature of Research: Peanut breeding

Progress to Date: We are still using PIs and progeny from PIs in our (*Arachis hypogaea* L.) peanut breeding program as indicated in our 1987 and 1988 reports. The PIs listed below were grown in our 1988-89 greenhouse planting to check for virus and provide seed for field plantings to be made in 1990.

1. PI 405132	3. PI 341879	5. PI 390565	7. PI 215696
2. PI 350680	4. PI 381622	6. PI 270806	8. PI 393516

We are continuing to evaluate some other PIs previously reported on and a large number of progeny from a number of PIs used as parents in crosses for leafspot resistance. These include:

PI 415990	PI 196731	PI 145046	PI 268657
PI 196628	PI 196832	PI 145681	PI 268863
PI 196640	PI 200432	PI 203395	PI 268883
PI 196647	PI 277197	PI 203396	PI 268894
PI 196649	PI 338339	PI 259641	PI 268913
PI 196655	PI 365553	PI 259812	PI 268931
PI 196656	PI 372263	PI 259822	PI 274191
PI 196657	PI 272303	PI 259849	PI 300243
PI 196684	PI 384498	PI 261893	PI 300946
PI 196695	PI 415881	PI 261706	PI 300947
PI 196716	PI 121067	PI 264168	PI 259785
PI 262090	PI 261911	PI 306230	PI 383424

Publications:

Chiteka, Z. A., D. W. Gorbet, D. A. Knauft, F. M. Shokes, and T. A. Kucharek. 1988. Components of resistance to late leafspot in peanut. II. Correlations among components and their significance in breeding for resistance. Peanut Sci. 15:76-81.

Knauft, D. A., D. W. Gorbet, and A. J. Norden. 1988. Yield and market quality of seven peanut genotypes as affected by leafspot disease and harvest dates. Peanut Sci. 15:9-13.

Gorbet, D. W., D. A. Knauft, and F. M. Shokes. 1988. Response of peanut genotypes with resistance to leafspot to fungicide treatment. Agron. Absts. 80:81 (Abstract).

Shokes, F. M., and D. W. Gorbet. 1988. Management of late leafspot on a partially resistant cultivar. Proc. Amer. Peanut REs. & Ed. Soc. 20:31 (Abstract).

Accession User: P. L. Pfahler
Agronomy Department
University of Florida
304 Newell Hall (0311 IFAS)
Gainesville, FL 32611-0311
904-392-6186

Nature of Research: Crop: Sesame (*Sesamum indicum* L.). To examine the nature and extent of genetic variability in this crop for potential basic research involving all aspects of pollen formation, germination, and transmission studies.

Progress to Date: In August 1988, I received 984 sesame accessions from the Plant Introduction Station at Experiment, Georgia. These accessions will be planted in the field in June 1989 and observed during the summer of 1989 for genetic variability and useful genetic characters.

Publications:

None

Accession User: J. W. Scott
Gulf Coast Research & Education Center
University of Florida, IFAS
5007 60th Street East
Bradenton, FL 34203
813-755-1568

Nature of Research: Breeding for improved fruit set, multiple disease resistance, and quality of fresh market tomatoes (*Lycopersicon esculentum* Mill).

Progress to Date: Heat-stable nematode resistance is being introgressed from *L. peruvianum* accessions PI 126443 and PI 129152. This has involved embryo rescue of the first two crosses. Eighteen F_1BC_1 plants have been obtained. If successful, this will be the first new source of nematode resistance in tomato since the *Mi* gene became available in the 1940's. Advanced testing of Fusarium wilt race 3 resistant hybrids is underway and a release next year is possible. The resistance was derived from PI 2246502. We are also working with PI 414773 which also has Fusarium wilt race 3 resistance.

Publications:

None

Accession User: Philip Busey
Ft. Lauderdale Res. Educ. Center
University of Florida
3205 College Avenue
Ft. Lauderdale, FL 33314
305-475-8890

Nature of Research: Breeding of warm-season turfgrasses, especially *Stenotaphrum secundatum*, St. Augustinegrass; and *Paspalum notatum*, bahiagrass. Applied goals are drought resistance, chinch bug resistance, dwarfness, and shade tolerance (not necessarily concurrently). Basic interests are mowing energy, sod production, establishment of new cultivars, stability of resistance, and taxonomy and preservation of germplasm.

Progress to Date: FX-33 St. Augustinegrass was discovered to be capable of being grown without irrigation. FX-33 is second generation hybrid of polyploid African introductions (PI 3000127 x 300130) x (293666 x 290888). When established, plots underwent irrigation curtailment, FX-33 had 99% survival, compared with 36% for Floratam. FX-33 also resistant to the PDP cinch bug which kills Floratam.

Introduced African germplasm (PI 365032) was involved in the pedigree of dwarf St. Augustinegrass FX-313, which is under consideration for cultivar release.

Introduced South American germplasm (PI 404637, from Paraguay) was involved in the pedigree of RCP-1 (Rapid Coverage Polycross) bahiagrass, which is under consideration for cultivar release.

Introduced African bermudagrass PI 291586 was discontinued for possible cultivar release, at the present time, because of high mowing energy requirement.

Publications:

Fluck, R. C. and P. Busey. 1988. Energy for mowing turfgrass. Trans. of the ASAE 31:(in press).

Accession User: L. S. Dunavin
Agricultural Research and Education Center
Route 3, Box 575
Jay, Florida 32565-9524
904-994-7373

Nature of Research: Evaluation of forage and biomass crops for Northwest Florida.

Progress to Date: The introduction, PI 300086, *Pennisetum purpureum*, is being evaluated for biomass. In 1988, it produced 8.8 Mg ha^{-1} of dry biomass. This was much lower than in previous years because of loss of stand. The following introductions of Giant Reed, *Arundo donax*, produced the indicated dry biomass yields (Mg ha^{-1}) in 1988: PI 432425 (51.6), PI 432427 (48.9), and PI 432432 (40.8).

The following introductions of rose clover have been crossed with a white-flowered rose clover and seed have been gathered in 1989: PI 120131, PI 120135, PI 121232, PI 206761, PI 311483, and PI 311484.

Publications:

None

1988-89 GEORGIA S-9 TECHNICAL COMMITTEE REPORT

AGENCY: University of Georgia
SUBMITTED BY: Wm. D. Branch
ADDRESS: Department of Agronomy, Coastal Plain Experiment Station, P. O. Box 748, Tifton, GA 31793-0748

ACCESSION USER: Wm. D. Branch
ADDRESS: (same as above)
NATURE OF RESEARCH: Peanut Breeding and Genetics
PROGRESS TO DATE: Some 16 new crosses were made in the greenhouse this past winter involving peanut introductions. Numerous plant selections were made in 1988 which resulted from different combinations for disease and insect resistance. Several of these also included PI's in their pedigree and others will be evaluated in advanced yield trials in 1989.

Genetic studies just completed have revealed the interaction of red testa color loci ($\underline{R}_1$, $\underline{R}_2$, and $\underline{R}_3$) and the inheritance of another dominant white (PI 408735) testa color in peanut. Genotypic characteristics have also been identified which influences calcium concentrations in the peanut pod. All of these tests likewise included various peanut introductions.

Peanut stripe virus (PStV) was not found to significantly influence growth, yield, or grade of 'Florunner' peanuts, and seed infection averaged less than 2% under field conditions over two years of intensive evaluation. Thus, USDA resource allocations merits re-evaluation with regard to screening the peanut germplasm collection for PStV at the Southern Regional Plant Introduction Station.

PUBLICATIONS:

Branch, W. D. and C. C. Holbrook. 1988. Genic relationship between $\underline{R}_1$, $\underline{R}_2$, and $\underline{R}_3$ for red peanut testa color. Peanut Sci. 15:13-14.

Kvien, C. S., W. D. Branch, M. E. Sumner, and A. S. Csinos. 1988. Pod characteristics influencing calcium concentrations in the seed and hull of peanut. Crop Sci. 28:666-671.

Lynch, R. E., J. W. Demski, W. D. Branch, C. C. Holbrook, and L. W. Morgan. 1988. Influence of peanut stripe virus on growth, yield, and quality of Florunner peanut. Peanut Sci. 15:47-52.

Branch, W. D. 1989. Inheritance of dominant white peanut testa color. J. Hered. 80:155-156.

Holbrook, C. C. and W. D. Branch. 1989. Additional locus with a recessive allele for red testa color in peanut. Crop Sci. 29:312-314.

CULTIVAR RELEASES: None
GERMPLASM RELEASES: None

****

ACCESSION USER: C. Corley Holbrook
ADDRESS: USDA-ARS, P. O. Box 748, Coastal Plain Experiment Station, Tifton, GA 31793-0748.

NATURE OF RESEARCH: The primary objective of this research is to screen peanut germplasm for resistance to the peanut root-knot nematode (Meloidogyne arenaria). All peanut cultivars are highly susceptible to this pathogen which caused approximately $18.5 million in losses to the 1988 Georgia peanut crop. The development of resistant cultivars should greatly reduce production costs and yield losses for Georgia peanut growers.

Secondary objectives for this research are to screen peanut germplasm for resistance to late leafspot (Cercosporidium personatum) and white mold (Sclerotium rolfsii). Costs associated with losses and control for late leafspot and white mold in the 1988 Georgia peanut crop totaled approximately $30 and $38 million, respectively. A few genotypes with some resistance to late leafspot have been identified. However, there has been no systematic search of the germplasm collection for genotypes with resistance to late leafspot or white mold. Such a search is necessary in order to identify the most promising resistant parents to use in developing high yielding peanut cultivars with resistance to late leafspot and/or white mold.

PROGRESS TO DATE: Three thousand P.I.'s have been screened in the greenhouse for resistance to the peanut root-knot nematode. Numerous P.I.'s have been identified which have moderate levels of resistance. Work is underway to continue screening the germplasm collection for high levels of resistance to the peanut root-knot nematode.

Two thousand-five hundred P.I.'s have been screened in the field for resistance to late leafspot. Numerous P.I.'s (PI 215696, PI 215724, and PI 215695) have been identified which have very high levels of resistance. Genetic and agronomic studies are ongoing to determine the potential of these resistant P.I.'s to serve as parents in cultivar development.

Five hundred P.I.'s have been screened in the field for resistance to white mold. Twenty percent were selected and are undergoing further study in the field and greenhouse.

PUBLICATIONS: Holbrook, C. C., J. P. Noe, T. B. Brenneman, and W. D. Branch. 1989. Identification of new sources of resistance to Meloidogyne arenaria and Cercosporidium personatum. Proc. Amer. Peanut Res. and Educ. Soc. Vol. 21: (In press).

CULTIVAR RESLEASES: None
GERMPLASM RELEASES: None

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ACCESSION USER: Robert E. Lynch
ADDRESS: USDA-ARS, Insect Bio. & Pop. Management Res. Lab, P. O. Box 748, Tifton, GA 31733-0748.
NATURE OF RESEARCH: Screening peanut genotypes for resistance to insects.
PROGRESS TO DATE: Identified several accessions (ICG 2741, PI 196675, and PI 234423) with resistance to thrips, leafhoppers, or corn earworm.
PUBLICATIONS: One in progress.
CULTIVAR RELEASES: None
GERMPLASM RELEASES: None

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ACCESSION USER: James W. Todd
ADDRESS: University of Georgia, Department of Entomology, Coastal Plain Experiment Station, Tifton, GA 31793-0748.
NATURE OF RESEARCH: Evaluation of peanut plant introductions (both hypogaea and other Arachis species) for resistance to various insects in the field, greenhouse, and laboratory.
PROGRESS TO DATE: Several promising accessions (PI 196654, PI 196665, and PI 306223) have been found to exhibit a high level of resistance to velvetbean caterpillar and possibly other defoliating insects. Many of these accessions have also shown resistance to mites, thrips, leafhoppers and possibly others.
PUBLICATIONS: None.
CULTIVAR RELEASES: None.
GERMPLASM RELEASES: None.

****

ACCESSION USER: Ronny R. Duncan
ADDRESS: University of Georgia, Department of Agronomy, Georgia Experiment Station, Griffin, GA 30223-1797.
NATURE OF RESEARCH: Sorghum breeding: Tolerance to acid soil/drought stress. Foliar and stalk rot disease resistance. Resistant to midge and the lepedoptera worm complex.
PROGRESS TO DATE: Screening world sorghum collection for tolerance to pH 4.3, 50% aluminum saturation. Have released first germplasm (PI 531231) developed in U.S. to tolerate this level of stress. Released first fusarium-resistant sorghum germplasm (PI 509050) and will release second germplasm for anthracnose resistance in November 1989.
PUBLICATIONS: Goodroad, L. L. and R. R. Duncan. 1988. Nitrogen fertilizer management of ratooned grain sorghum. J. Plant Nutr. 11:209-216.

Duncan, R. R. 1988. Sequential development of acid soil tolerant sorghum genotypes under field stress conditions. Commun. Soil Sci. Plant Anal. 19:1295-1305.

Gerik, T. J., W. D. Rosenthal, and R. R. Duncan. 1988. Simulating grain yield and plant development of ratoon grain sorghum over diverse environments. Field Crops Res. 19:63-73.

CULTIVAR RELEASES: None.
GERMPLASM RELEASES Duncan, R. R., D. T. Rosenow, and R. A. Frederiksen. 1988. Registration of sorghum disease-resistant fertility restorer germplasm line, 87BL2598. Crop Sci. 28:1037.
Wiseman, B. R., R. R. Duncan, and N. W. Widstrom. 1988. Registration of SGIRL-MR-3 and SGIRL-MR-4 midge resistant sorghum germplasms. Crop Sci. 28:202-203.

****

ACCESSION USER: Billy R. Wiseman
ADDRESS: USDA-ARS, Insect Bio. & Pop. Management Res. Lab, P. O. Box 748, Tifton, GA 31793-0748.
NATURE OF RESEARCH: Resistance to sorghum to leaf-feeding by fall armyworm larvae, Spodoptera frugiperda.
PROGRESS TO DATE: Four-hundred eighty-five newly introduced PI's were evaluated at the seedling stage of development. Field evaluations at the whorl stage of development are in progress.
PUBLICATIONS: None.
CULTIVAR RELEASES: None.
GERMPLASM RELEASES: Wiseman, B. R., R. R. Duncan, and N. W. Widstrom. 1988. Registration of SGIRL-MR-3 and SGIRL-MR-4 midge resistant sorghum germplasms. Crop Sci. 28:202-203.

****

ACCESSION USER: Neil W. Widstrom
ADDRESS: USDA-ARS, Insect Bio. & Pop. Management Res. Lab, P. O. Box 748, Tifton, GA 31793-0748.
NATURE OF RESEARCH: To identify sources of resistance and select for resistance in corn to corn earworm, fall armyworm, maize weevil, and infection by Aspergillus flavus and contamination by aflatoxin. To identify sources of resistance and select for resistance in sorghum to the sorghum midge and other head feeders. To study inheritance of these kinds of resistance and develop germplasm for release to the public.
PROGRESS TO DATE: Corn synthetics and two breeding populations (PI 518769 and PI 518770) and several inbred lines (PI 511313, PI 511314, PI 511315, PI 511316, PI 511317, and PI 511318) with resistance to corn earworm have been developed. Four sources of resistance in sorghum to sorghum midge have been released. Two populations (PI 520609 and PI 520610) developed as breeding populations for sweet-stalk corn with high soluble solids have been released, and ten waxy inbreds have been developed for special-purpose breeding work.
PUBLICATIONS: Wiseman, B. R., W. W. McMillian, and N. W. Widstrom. 1973. Registration of SGIRL-MR-1 sorghum germplasm. Crop sci. 13:398.
Widstrom, N. W., W. J. Wiser, L. F. Bauman, K. J. Starks, W. W. McMillian, and B. R. Wiseman. 1975. Registration of GT-CEW-RS8 maize germplasm. Crop Sci. 15:738.

Widstrom, N. W., B. R. Wiseman, and W. W. McMillian. 1975. Registration of elite maize germplasm lines. Crop Sci. 15:890.

McMillian, W. W., N. W. Widstrom, B. R. Wiseman, and K. J. Starks. 1980. Registration of GTS1 and GTS2 parental lines of maize. Crop Sc. 20:420.

Widstrom, N. W., B. R. Wiseman, and W. W. McMillian. 1984. Registration of GT-R14 maize germplasm. Crop Sci. 24:626.

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

Widstrom, N. W., B. R. Wiseman, and W. W. McMillian. 1988. Registration of six corn earworm resistant germplasm lines of maize. Crop Sci.28:202.

Wiseman, B. R., R. R. Duncan, and N. W. Widstrom. 1988. Registration of SGIRL-MR-3 and SGIRL-MR-4 midge-resistant sorghum germplasms. Crop Sci. 28:202-203.

Widstrom, N. W., B. R. Wiseman, and W. W. McMillian. 1988. Registration of GT-DDSA(C5) and GT-DDSB(C5) maize germplasms. Crop Sci. 28:1036-1037.

Widstrom, N. W., M. O. Bagby, and M. E. Carr. 1989. Registration of GT-SSRS-SX and GT-SSRS-PX maize germplasms. Crop Sci. 29:243.

CULTIVAR RELEASES: None.

GERMPLASM RELEASES: SGIRL-MR-1, GT-CEW-RS8, GT201 wx thru GT210 wx, GTS1 AND GTS2, GT-RI4, SGIRL-MR-2, GT113 THRU GT115, GT117 THRU GT119, SGIRL-MR-3 AND SGIRL-MR-4, GT-DDSA(C5) AND GT-DDSB(C5), GT-SSRS-PX and GT-SSRS-SX.

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ACCESSION USER:Joseph H. Bouton

ADDRESS: 3111 Miller Plant Science Building, Department of Agronomy, University of Georgia, Athens, GA 30602.

NATURE OF RESEARCH: Screen alfalfa PI's for acid soil tolerance. This work is under contract with USDA-ARS Pacific West Area Regional Plant Introduction Station, Pullman, WA as part of the Medicago evaluation program of the Alfalfa Crop Advisory Committee.

PROGRESS TO DATE: Currently screening 100 PI's.

PUBLICATIONS: None

CULTIVAR RELEASES: None

GERMPLASM RELEASES: None

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ACCESSION USER: A. Graves Gillaspie, Jr.
ADDRESS: USDA-ARS, Plant Introduction Station, Experiment, GA 30212.
NATURE OF RESEARCH: Evaluation of watermelon germplasm for resistance to watermelon mosaic virus 2.
PROGRESS TO DATE: Twenty-five seeds of each accession were grown in greenhouse, inoculated, and plants showing symptoms or testing positive by ELISA were discarded. Remaining plants were selfed and seeds collected. Thus far, about 100 accessions have been evaluated. The next step for these seeds will be field tested to determine whether usable resistance is present. Testing of additional accessions as described above will also be done.
PUBLICATIONS: None
CULTIVAR RELEASES: None
GERMPLASM RELEASES: None

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ACCESSION USER: Harbans Bhardwaj
ADDRESS: The Fort Valley State College, Agricultural Research Station, Plant and Soil Sciences, Fort Valley, GA 31030.
NATURE OF RESEARCH: Relative comparison of pepper production potentials of Cayenne, Chilli, and Parika genotypes.
Study the feasibility of economic production of Guar (Cyamopsis sp.) and Chickpeas (Cicer sp.) in Georgia.
PROGRESS TO DATE: Genotypes of Chickpea have been identified that show promise as base population to select/improve for commercial production. Peppers and Guar experiments have been planted in summer of 1989.
PUBLICATIONS: None
CULTIVAR RELEASES: None
GERMPLASM RELEASES: None

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1989 S-9 Technical Committee Report for Hawaii

Agency: Hawaii Institute of Tropical Agriculture
and Human Resources

Submitted by: P. J. Ito

Address: 461 W. Lanikaula St.
Hilo, HI 96720

ACCESSION USER: Richard W. Hartmann and Patrick J. O'Malley

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

NATURE OF RESEARCH: Search for, characterization of, and incorporation into useful lettuce cultivars of tomato spotted wilt virus resistance.

PROGRESS TO DATE: There is little progress to report for the last year. A new technician started testing germplasm on Maui on May 15, 1988 and continued until she quit in August 1988. Some germplasm lines were clearly identified as susceptible, but others are only questionable. A new technician was finally hired in January 1989 but has been unsuccessful with his incoulations apparently because the inoculum source was contaminated with with tobacco mosaic virus (the virus is maintained in tobacco plants). A new source of inoculum obtained from a farmer's lettuce field worked very well, so hopefully results can now once again be obtained from our inoculm trials. We are also somewhat suspicious that the inoculum that has been maintained in tobacco plants may have lost some of its virulence on lettuce.

Selections from F3 progeny of crosses between Green Mignonette (Manoa) and the partially resistant Tinto and Ancora (PI 342517) which seem to have some resistance have been backcrossed to Manoa. Seed will will be increased and then sent to Maui for testing. We continue to have problems keeping lettuce on Oahu free of the virus long enough to make crosses or collect selfed seed.

PUBLICATION: O'Malley, P. J. and R. W. Hartmann. 1989. Resistance to tomato spotted wilt virus in lettuce. HortScience 24: 360-362.

CULTIVAR RELEASE: None.

ACCESSION USER: P. J. Ito and C. L. Chia

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

NATURE OF RESEARCH: Introduction, selection and testing of tropical fruits and nuts.

PROGRESS TO DATE: Thirty seven new introductions including macadamia nut, rambutan, longan and durian were made from Thailand, Australia and Israel

PUBLICATION: Ito, P. J. 1988. Mango. World Book Encyclopedia, Vol. 13. p. 140.

Ito, P. J. 1988. Sapodilla. World Book Encyclopedia, Vol. 17. p. 121.

Ito, P. J. 1989. Litchi. World Book Encyclopedia, Vol. 12. p. 350.

CULTIVAR RELEASE: None.

ACCESSION USER: Richard M. Manshardt

ADDRESS: Department of Horticulture
3190 Maile Way
Honolulu, Hawaii 96822

NATURE OF RESEARCH: Guava Improvement

PROGRESS TO DATE: Guava Isozyme

RESULTS: Table 1 and Figure 1

PUBLICATION: None.

CULTIVAR RELEASE: None.

FIGURE 1

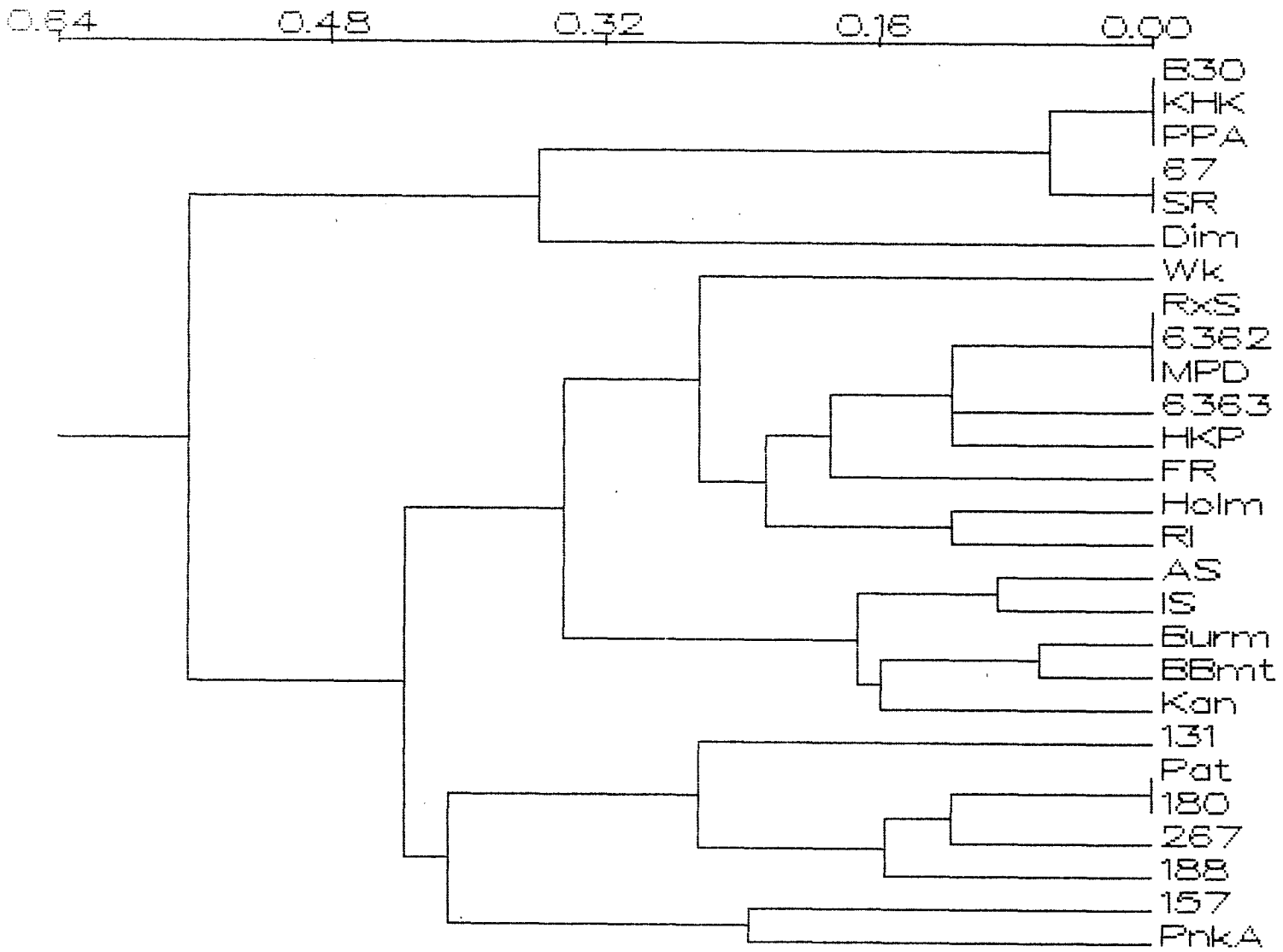
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Table 1 GUAVA ISOZYME DATA

	CLONE	ACO	ALD	IDH	LAP-1	LAP-2	MDH	PGI	PGM	GENOTYPE
1.	Allahabad Safeda	F	SN	S	F	F	F	F	F	1
2.	Beaumont	S	S	F	F	S	S	FS	MS	2
3.	Burma	F	S	S	F	F	F	S	F	3
4.	Burmese 'Beaumont'	F	-	S	F	F	F	S	FM	4
5.	Diminutive	S	N	F	F	F	S	S	M	5
6	Fan Retief	FS	S	F	FS	F	S	FS	F	6
7	Holmberg	S	S	FS	F	FS	FS	FS	F	7
8	Hong Kong Pink	FS	S	FS	F	F	S	FS	F	8
9	Indonesian Seedless	-	-	S	-	F	F	FS	F	9
10.	Ka Hua Kula	S	S	F	F	S	S	FS	MS	2
11.	Kansri	S	S	S	F	F	F	S	F	10
12.	Manoa Pink Dessert	FS	SN	FS	F	F	FS	FS	F	11
13.	Patillo (7197)	F	SN	F	FS	F	S	F	FM	12
14.	Pink Acid (7198)	F	N	FS	F	S	F	F	F	13
15.	Poamoho Pink Acid	S	-	F	F	S	S	FS	MS	2?
16.	Red Indian	S	SN	FS	F	FS	FS	F	F	14
17.	Ruby x Supreme	FS	SN	FS	F	F	FS	FS	F	11
18.	Stone Ruby	S	S	F	F	S	S	F	MS	15
19.	Waiakea	FS	S	FS	F	FS	S	F	FS	16
20.	67	S	S	F	F	S	S	F	MS	15
21.	131	F	SN	F	S	F	FS	FS	F	17
22.	157	F	N	FS	S	FS	FS	F	F	18
23.	180	F	SN	F	FS	F	S	F	FM	12
24.	188	F	S	F	S	F	S	F	FM	19
25.	267	F	N	F	FS	F	S	F	M	20
26.	6362	FS	SN	FS	F	F	FS	FS	F	11
27.	6363	FS	S	FS	FS	F	FS	FS	F	21

CODE FOR ALLELES GOVERNING ISOZYME MIGRATION RATE:

F = FAST
M = MEDIUM
S = SLOW
N = NULL

1989

S-9 Technical Committee Report

Agency: Kentucky Agricultural Experiment Station
Submitted by: Norman L. Taylor
Address: Department of Agronomy
University of Kentucky
Agr. Sci. Bldg. North
Lexington, Ky. 40546-0091
Phone 606-257-5856

* * * * * * *

Accession User: Norman L. Taylor
Address: Department of Agronomy
University of Kentucky
Agr. Sci. Bldg. North
Lexington, Kentucky 40546-0091

Nature of Research: Exploration of Trifolium germplasm

Progress to Date: Approximately 100 accessions of forage species seeds were collected in Yugoslavia in August - September, 1988. The Trifolium species in the collection are being identified as to species by morphological and cytological examinations. Number of accessions per species and chromosome numbers are as follows: 21 T. pratense (2n = 14); 15 T. montanum (2n = 16); 8 T. alpestre (2n = 16); 5 T. repens (2n = 32); 5 T. scabrum (2n = 10); 5 T. rubens (2n = 16); 4 T. campestre (2n = 16); 4 T. medium (2n = 64); 3 T. fragiferum (2n = 16); 2 T. angustifolium (2n = 16); T. ochrolecum (2n = 16); 2 T. longidentatum (2n = 16); 1 T. arvense (2n = 16); 1 T. hybridum (2n = 16); 1 T. trichopterum (2n = 12) and 1 T. pannonicum (2n = 128). Four Trifolium accessions remain to be identified. In conclusion, it appears that Yugoslavia is very rich in Trifolium species, and a contract is being negotiated for further collection.

Publications: Taylor, N.L. 1988. The True Clovers, First Nat. Symp. - New Crops - Research, Development, Economics. Abst. of Invited Presentations. p 11. Indianapolis, IN.

Cultivar Releases: Rhizo Kura Clover. Cooperative with Plant Materials Center, SCS, Quicksand, Ky.

1989 LOUISIANA S-9 TECHNICAL REPORT

AGENCY: Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center
SUBMITTED BY: Ann Marie Thro
ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803

* * * * * *

ACCESSION USERS: William J. Blackmon
ADDRESS: Horticulture Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Domestication of Apios americana
PROGRESS TO DATE: In-vitro systems are in use for clonal propagation of .A americana. Accessions have been identified for use as breeding lines.
SELECTED PUBLICATIONS: Johnson, H. E., M. Hegsted, and W. J. Blackmon. 1988. Protein quality evaluation of Apios americana as a wetland tuber crop. First National Symposium on New Crops Program :25.

Musgrave, M. E., A. G. Hopkins, Jr., and W. J. Blackmon. 1988. Evaluating the potential of Apios americana as a wetland tuber crop. First National Symposium on New Crops Program :27.

Picha, D. H., W. J. Blackmon, P. W. Wilson, L. P. Hanson, and B. D. Reynolds. 1988. Compositional changes in Apios americana tubers during storage. First National Symposium on New Crops Program :26.

Reynolds, B. D. and W. J. Blackmon. 1988. Progress in domesticating Apios americana. HortScience 23(3):768.

Reynolds, B. D., W. J. Blackmon, E. Wickremesinhe, M. H. Wells, and R. J. Constantin. 1988. Strategy for the domestication Apios americana. First National Symposium on New Crops Program :25.

Wells, D. W., R. J. Constatin, W. J. Blackmon, and B. D. Reynolds. 1988. Evaluations of pre-emergence herbicides for use in Apios americana. First National Symposium on New Crops Program :26.

Wickremesinhe, E. R. M., W. J. Blackmon, and B. D. Reynolds. 1988. An efficient regeneration system for Apois americana. HortScience 23(3):753.

Wickremesinhe, E. R. M., W. J. Blacmon, and B. D. Reynolds. 1988. In vitro clonal multiplication of Apios americana. HortScience 23(3):753.

Wilson, P. W., F. J. Pichardo, W. J. Blackmon, and B. D. Reynolds. 1988. Protein quality in Apios americana tubers and seeds. First National Symposium on New Crops Program :26.

CULTIVAR RELEASES: None

ACCESSION USERS: Christopher A. Clark
ADDRESS: Plant Pathology and Crop Physiology Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Sweet potato pathology
PROGRESS TO DATE: Screening of heirloom cultivars for resistance to Streptomyces ipomea, Fusarium solani, Eriwinia chrysanthemi, and Diplodia gossypina has been completed (2 years). Advanced breeding lines and a large number of plant introductions were screened for resistance to the above pathogens in 1988, some for the second year. Several new sources of resistance have been identified for each pathogen.

SELECTED PUBLICATIONS: Manuscript in preparation.
CULTIVAR RELEASES: None

ACCESSION USERS: James Fontenot
ADDRESS: Horticulture Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Okra breeding and production
PROGRESS TO DATE: Seventy-one lines derived from plant introductions are being used as parents to confer desirable horticultural traits including spinelessness, good culinary quality, and very green pod color; disease and drought resistance, and high yield.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: None

ACCESSION USERS: James Fontenot
ADDRESS: Horticulture Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Pepper (Capsicum) breeding and production.
PROGRESS TO DATE: Plant introduction materials are being used to confer high yield, ease of abscission, improved fruit shape, color, cooking quality; shipping and storage quality; and disease, insect, and stress resistance.
SELECTED PUBLICATIONS: Manuscripts submitted and in preparation.
CULTIVAR RELEASES: None

ACCESSION USERS: James F. Fontenot
ADDRESS: Horticulture Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Potato breeding
PROGRESS TO DATE: Plant introduction materials are being evaluated for tolerance to drought, air pollution, heat and frost; for disease and insect resistance, high solids, and improved ulinary quality.
SELECTED PUBLICATIONS: Fontenot, J. F., G. Shaver, P. W. Wilson, W. A. Young, W. A. Meadows. 1988. In: National potato germplasm evaleration and enhancement report (USDA Vegetable Lab, Beltsville): 56-64.
CULTIVAR RELEASES: None

ACCESSION USERS: Donald E. Groth
ADDRESS: Rice Research Station, Box 1429, Crowley, LA 70527-1429
NATURE OF RESEARCH: Rice Pathology
PROGRESS TO DATE: One hundred addition lines (600 in. all) have been introduced into the U.S., assigned PI #'s, and screened for resistance to sheath flight, brown spot, narrow brown leaf spot, leaf smut, and blast.
SELECTED PUBLICATIONS: Groth, D. E., and E. M. Nowick. 1988. Rice plant introductions of the Rice Research Station, 1984 - 1987. Rice Research Station Report #3. 34pp.
Nowick, E. M., and D. E. Groth. 1989. Registration of PR 6555 Rice Germplasm with moderate resistance to Sheath Blight. Crop Science (July/August).
CULTIVAR RELEASES: None

ACCESSION USERS: Stephen Harrison
ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Wheat Breeding.

PROGRESS TO DATE: The program has about 20,000 lines representing 700 crosses made since 1985. The lines are all in the segregating generations (F1 - F5). Sources of parents include: 1) USDA Uniform Soft Red Winter Wheat Nursery, 2) Uniform Eastern Soft Red Winter Nursery, 3) USDA Winter Wheat Powdery Mildew Nursery, 4) USDA Winter and Spring Wheat Leaf Rust Nurseries, 5) USDA Stripe Rust Nurseries, 6) International Septoria Nursery, 7) USDA Hessian Fly Nursery, 8) USDA Septoria Nursery, and 9) material from CIMMYT, and 10) lines obtained from other breeders. Source #6, coordinated from Montana State University, has been discontinued. Several of the USDA disease nurseries are not certain to be continued in the future and this is cause for concern.
SELECTED PUBLICATIONS: None (Several in preparation or submitted)
CULTIVAR RELEASES: None

ACCESSION USERS: Bob Harville
ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Soybean breeding
PROGRESS TO DATE: Several plant introductions are being used as sources of increased seed protein content, increased seed oil content, or Phomopsis resistance.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: One line is in the final stages of testing for release as a germplasm. This line has high seed protein content derived from a plant introduction.

ACCESSION USERS: Charles Johnson
ADDRESS: Calhoun Research Station, P. O. Box 539, Calhoun, LA 71225
NATURE OF RESEARCH: Watermelon Breeding
PROGRESS TO DATE: This is a cultivar development program with objectives including improved horticultural traits and disease resistance. Plant introduction materials have been used in crosses for five to ten years. Every two or three years, a new group of accessions are evaluated for usefulness as parents. PI material is presently contributing resistance to gummy stem blight and watermelon mosaic virus.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: Release of a breeding line is planned in one or two years.

NEED FOR ADDITIONAL GERMPLASM COLLECTIONS: Additional sources of disease resistance are needed. Germplasm with low - temperature germination ability would be valuable.

ACCESSION USERS: Jack Jones
ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Cotton breeding
PROGRESS TO DATE: The cotton germplasm collection, presently held at College Station , TX, has been used extensively for many years as a source of genotypes that contribute fiber quality traits, disease resistance, earliness, reduced pubescence, nematode resistance, glandlessness, and open canopy (reduces ball rot). Most importantly, lines from the collection contribute resistance to numerous insects including boll weevil (red plant color, frego bract, other traits); plant bugs (nectariless).

SELECTED PUBLICATIONS: Jones, J. E. , J. P. Beasley, J. I. Dickson, and W. D. Caldwell. 1988. Registration of four cotton germplasm lines with resistance to reniform and root-knot nematodes. Crop Sci. 28:199-200.

Jones, J. E., J. I. Dickson, E. Burris, D. F. Clower, W. D. Caldwell, J. G. Marshall, and S. J. Stringer. 1988. Registration of three insect resistant cotton germplasm lines. Crop Sci. 28:200.

Jones, J. E., J. I. Dickson and R. G. Novick. 1988. Another look at effects of leaf shape trait on agronomic performance of cotton. p. 94-95. In J. M. Brown (ed). Proc.Belt.Cot.Prod.Res.Conf. N. O. , LA 3-8 Jan., Nat.Cot.Cou. of Amer. M. T.

Jones, J. E., R. G. Novick, and J. I. Dickson. 1988. Boll weevil resistance in day-neutral converted primitive race stocks of Gossypium hirsutum L. p.99-100. In J. M. Brown(ed). Proc.Res.Conf. N.O. LA 3-8 Jan, Nat.Cot.Cou. of Amer.

Kennedy, C. W., J. E. Jones, and R. L. Hutchinson. 1988. Soil moisture extraction, plant growth, and yield of cotton genotypes. (Abst) p. 107 In J. M. Brown(ed). Proc.Belt.Cot.Prod.Res.Conf. N.O. LA 3-8 Jan., Nat.Cot.Cou. of Amer.

McCarty, J. C., Jr. and J. E. Jones. 1989. Boll Weevil (Coleoptera: Curclulionidae) nonpreference for primitive cotton. J. Econ. Entomol. 82:298-300.

Novick, R. G., J. E. Jones, J. I. Dickson, W. Aguillard, and W. S. Athony. 1988. Effects of leaf shape, bract type, and leaf pubescence on non-lint trash and nep content of upland cotton. p.126-131. In J. M. Brown(ed) Proc. Belt.

Muhammad, N. and J. E. Jones. 1989. Genetics of resistance to reniform nematode in upland cotton. Crop Sci. (in press, accepted).

Jones, J. E., J. I. Dickson, J. B. Groves, A. M. Pavloff, B. R. Leonard, E. Burr, W. D. Caldwell, S. Micinski, and S. H. Moore. 1989. Agronomically enhanced insect - resistant cottons. Proc. Beltwide Cot. Rod. Res. Conf. Jan. 1989 (in press).

CULTIVAR RELEASES: Two lines with nematode resistance and high fiber quality are two years from release. Recently, 4 lines have been released as reniform - nematode resistant, and 3 lines as boll worm resistant.

NEED FOR ADDITIONAL GERMPLASM COLLECTIONS: The germplasm collection lacks lines tolerant to acid subsoils and other soil stresses. Additional germplasm collection should seek this type of material.

ACCESSION USERS: Mangit Kang

ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803

NATURE OF RESEARCH: Maize (corn) germplasm improvement

PROGRESS TO DATE: The germplasm 'Fino' is being used as a parent in a genetic study the heritability of aflatoxin production, stalk quality, and dry-down rate. Six new PI's from the Ames, Iowa, USDA plant introduction station are being screened for adaptation to Louisiana and any traits of interest to the breeding program.

SELECTED PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USERS: Don LaBonte

ADDRESS: Horticulture Department, Louisiana State University, Baton Rouge, LA 70803

NATURE OF RESEARCH: Sweet Potato breeding
PROGRESS TO DATE: Five or six sweet potato lines were obtained from the USDA Vegetable Research Lab in Charleston, S. C. Two of these are being used in the breeding program to contribute insect/disease resistance. Two PI lines from the USDA Sweet Potato Repository in Georgia are being used this summer in crosses to determine the genetic basis of a chlorotic leaf distortion.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: None

ACCESSION USERS: Freddie Martin and Scott Milligan
ADDRESS: Agronomy Department, Louisiana State University, Baton Rouge, LA 70803
NATURE OF RESEARCH: Sugarcane cultivar development
PROGRESS TO DATE: The cooperation between State and Federal programs in sugarcane breeding dates back to the development of the sugarcane breeding station at Canal Point, Florida in 1919. Initially seed was produced in Florida for germination and selection in Louisiana. There was a written agreement between the federal, state and grower's agencies to outline the cooperation in variety testing. The Louisiana Agricultural Experiment Station developed methods for sugarcane hybridization in Louisiana during the late 1940's early 1950's. During the 1960's and 70's the state and federal programs duplicated the objectives of basic germplasm introgression and development of commercial cultivars. The state program discontinued basic germplasm introgression in 1980. Currently a cooperative program has been developed with the USDA/ARS sugarcane research units in Houma, LA, and Canal Point, FL. Introduction of exotic and wild germplasm and its introgression into a commercial-type genetic background is the responsibility of the USDA station. The Louisiana (L) program uses the introgressed material as parents in a cultivar development breeding program.
SELECTED PUBLICATIONS: Bessin, R., T. E. Reagan and F. A. Martin. 1987. Integrated management of the sugar cane borer. Sugar y Azucar 82:

French, A., C. B. Sverzut, L. R. Verma, and F. A. Martin. 1987. Use of NIR spectroscopy for the analysis of sugarcane quality. JASSCT Abst. 7:104.

Gravois, K. A. and F. A. Martin. 1987. Path-coefficient analysis of plant cane yield components in sugar cane. Sugar y Azucar. 82:(6)33.

Milligan, S. B. and F. A. Martin. 1987. The effects of year and locations on the repeatabilities of sugarcane yield components in Louisiana. JASSCT Abst. 7:106.

Milligan, S. B. and F. A. Martin. 1987. The effect of selection and environment on sugarcane genetic variance estimates in the plant cane crop. Sugar y Azucar 82:(6)33.

Milligan, S. B. and F. A. Martin. 1987. The effect of selection on sugarcane variances and the relationship of traits. Agron. Abst. 79:72.

Reagan, T. E. and F. A. Martin. 1987. Interdisciplinary utilization of multiple management tactics for sugarcane borer pest management. Entomological Society of American Annual Meeting Abst.

Quebedeaux, J. P. and F. A. Martin. 1987. Synchronization of flowering in the LSU sugarcane breeding program. JASSCT Abst. 7:106.

Chao, C. P., J. W. Hoy, and F. A. Martin. 1988. Evaluation of Sugarcane Traits Associated with Resistance to Smut. Sugar y Azucar Abst.

Gravois, K. A. and F. A. Martin. 1988. The Role of Stalk Density, Pith and Tube in Sugarcane Selection. Sugar y Azucar Abst.

Martin, F. A., S. B. Milligan, K. A. Gravois and K. P. Bischoff. 1988. Improving Sugarcane Varieties - What are our Options? Sugar y Azucar Abst.
Milligan, S. B. 1989. Inbreeding in the Louisiana sugarcane variety development program and the utility of inbreeding coefficients and pedigrees in the variety selection program. Sugar y Azucar. (June).
CULTIVAR RELEASES: CP52-68, L60-25, L62--96, L65-69 were selected at the Louisiana Agricultural Experiment Station. Several promising lines are in the final testing stages

ACCESSION USERS: Ron Robbins
ADDRESS: Calhoun Research Station, P. O. Box 539, Calhoun, LA 71225
NATURE OF RESEARCH: Okra breeding
PROGRESS TO DATE: Several breeding lines incorporate plant introduction material conferring various desirable horticultural characteristics.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: None

ACCESSION USERS: Ann Marie Thro
ADDRESS: Louisiana State University, Agronomy Department,Baton Rouge, LA 70803
NATURE OF RESEARCH: Development of summer pasture legumes.
PROGRESS TO DATE: Arachis glabrata: In a nursery of 20 accessions, very few persisted into 1989, their third year, and none were comparable to Arbrook or Florigraze in spread or apparent forage productivity.
Stylosanthes: 12 new accessions were evaluated for winter hardiness. None survived the 1988-89 winter. A total of about 70 Stylosanthes introductions, from of seven or more species, have been screened for winter - hardiness in Louisiana. No useful winter-hardiness has been found.
Desmodium: plans for a comprehensive screening of Desmodium germplasm have been laid aside until resources are available. This genius may be a source of perennial pasture legumes for Louisiana. Two genotypes have now persisted for 6 years in Louisiana.
Aeschynomene: In a replicated small - plot experiment, five Louisiana collections of Aeschynomene americana were lower-yielding, finer-stemmed, and earlier - flowering than Florida common and five Florida experiment lines.
Lotonois: research on this species has been terminated due to its chiefly spring growth habit.
SELECTED PUBLICATIONS:
Wier, A. T, A. M. Thro, H. E. Flores, and J. M. Jaynes. 1988. Transformation of Lotonois bainesii Baker with a synthetic protein gene using the leaf disk transformation - regeneration method. Phyton 48:123-131.
Thro, A. M. 1988. Late summer legumes being developed. Delta Farm Press (March 11, 1988) 45(11):36.
Pillay, M. and A. M. Thro. 1988. Chromosome morphology in the pasture legume Lotononis bainesii Baker and the related species Lotononis angolenis Welwitsch ex Baker. Cytologia 53:617-625.
CULTIVAR RELEASES: None
NEED FOR ADDITIONAL GERMPLASM COLLECTIONS: Winter - hardy Stylosanthes; Desmodium.

ACCESSION USERS: Elizabeth Zimmer
ADDRESS: Biochemistry Department, Louisiana State University, Baton Rouge, LA

70803

NATURE OF RESEARCH: Biochemical genetics of Maize (corn).

PROGRESS TO DATE: Restriction enzyme polymorphisms that can serve as markers were identified in maize and teosinte plant introductions and used to study genes coding for ribosomal RNA.

SELECTED PUBLICATIONS: Hamby, R. K., and E. A. Zimmer. 1988. Ribosomal RNA sequences for inferring phylogeny within the grass family (Poaceae).

Zimmer, E. A., E.R. Jupe, and V. Walbot. 1988. Ribosomal gene structure, variation, and inheritance in maize and its ancestors. Genetics 120:125-136.

CULTIVAR RELEASES: None

1989
MISSISSIPPI
S-9 TECHNICAL COMMITTEE REPORT

AGENCY: Mississippi Agricultural & Forestry Experiment Station
SUBMITTED BY: C. E. Watson, Jr.
ADDRESS: Department of Agronomy, Box 5248,
Mississippi State, MS 39762

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ACCESSION USER: L. M. Gourley
ADDRESS: Department of Agronomy, Box 5248, Mississippi State, MS 39762
NATURE OF RESEARCH: Evaluation of sorghum (Sorghum bicolor L. Moench) Ethiopian collection germplasm for tolerance to aluminum toxic tropical acid soils
PROGRESS TO DATE: Sorghum germplasm (over 2500 PI accessions) has been screened for tolerance to aluminum toxicity (65% Al saturation) in field trials at Quilichao, Colombia. Lines were rated from 1 = tolerant to 4 = dead or severely stressed plant. Data are available on request. Advanced lines from the INTSORMIL program are also being examined for tolerance to aluminum and manganese toxicity.
PUBLICATIONS: Chintu, E. M. 1989. Genetic variability for manganese tolerance in sorghum. M.S. Thesis. Mississippi State University. 42p.
CULTIVAR RELEASES: None

ACCESSION USER: W. P. Williams and F. M. Davis
ADDRESS: USDA-ARS Crop Science Research Laboratory, P. O. Box 5248, Mississippi State, MS 39762
NATURE OF RESEARCH: Evaluation of corn (Zea mays L.) germplasm for resistance to southwestern corn borer, Diatraea grandiosella Dyar, and fall armyworm, Spodoptera frugiperda (J. E. Smith).
PROGRESS TO DATE: As a part of a cooperative project with scientists at CIMMYT (Mexico) and several U. S. universities, 200 full-sib families were screened at Mississippi State in 1988 for southwestern corn borer and fall armyworm resistance. Approximately 30 of the families most resistant to each insect were selected for intermating for the next cycle of selection. In 1989, 210 additional lines obtained from CIMMYT were evaluated for southwestern corn borer resistance. Several appeared to have promise as potential sources of resistance.
PUBLICATIONS: Davis, F. M., W. P. Williams, J. A. Mihm, B. D. Barry, J. L. Overman, B. R. Wiseman, and T. J. Riley. 1988. Resistance to multiple lepidopterous species in tropical derived germplasm. Miss. Agric. and Forestry Exp. Stn. Tech. Bull. 157.
CULTIVAR RELEASES: Mp708 germplasm line of corn.

ACCESSION USER: C. E. Watson, Jr.
ADDRESS: Department of Agronomy, Box 5248, Mississippi State, MS 39762
NATURE OF RESEARCH: Evaluation of tall fescue (Festuca arundinacea Schreb.) for rust resistance
PROGRESS TO DATE: Evaluation of several tall fescue cultivars for stem rust (Puccinia graminis) and crown rust (P. coronata) resistance revealed that mediterranean types were sources of high levels of resistance to both rusts. These included 'Fortune' (derived from PI 231563 & PI 231564) and 'Oregon 1000' (derived from several Algerian introductions). These two lines along with six other cultivars were subjected to two cycles of selection for improved crown rust resistance and a single cycle of selection for stem rust resistance. Selected plants were increased for seed during the 1985-86 season. The resulting populations were evaluated for stem rust resistance in the greenhouse in the fall of 1988. The selections from this screening are to be increased for seed and the progeny reevaluated.
PUBLICATIONS: Linscombe, S. D., C. E. Watson, Jr., and L. E. Trevathan. 1989. Evaluation of tall fescue plant introductions for resistance to Cochliobolus sativus. Crop Sci. 29:665-667.
CULTIVAR RELEASES: None

ACCESSION USER: G. E. Scott
ADDRESS: USDA-ARS Crop Science Research Laboratory, P. O. Box 5248, Mississippi State, MS 39762
NATURE OF RESEARCH: Evaluation of corn (Zea mays L.) germplasm for resistance to maize dwarf mosaic virus
PROGRESS TO DATE: We have obtained resistance to maize dwarf mosaic virus strain A (MDMV-A) from the following material:

accession	Number
Pojoso Chico	ECU611
Cubano Tuson	ECU542
Puya Grande	VEN481
Puya	VEN780
Pira	VEN457
Early Carribean	MAR3

where ECU = Ecuador, VEN = Venezuela, and MAR = West indies through Brazil.
PUBLICATIONS: None
CULTIVAR RELEASES: None

S-9 TECHNICAL COMMITTEE REPORT

New Crops Research Station
Experiment, Georgia
July 18 and 19, 1989

Agency: NORTH CAROLINA STATE UNIVERSITY

Submitted By: William T. Fike

Address: Crop Science Department, North Carolina State University, Raleigh, North Carolina 27695-7620

Four cooperators from a pool of 22 cooperators received 811 PIs from 4 species of 4 genera.

A listing of accession users, the nature of their research and their progress to date follows.

1. Accession User - Dr. Bill Anderson, Crop Science Department, North Carolina State University, Raleigh, North Carolina 27695-7620

   Nature of Research: Breeding peanut cultivars with quality fruit and pest resistance.

   Progress to Date: The peanut PIs that are presently of use in our program have been compiled. The material listed under large seed is being used in a 50-parent partial diallel program for a genetic study on the inheritance of the large seed character as well as for practical purposes. They are presently in early generation evaluation. The remainder of the PIs used are in crosses in advanced generation that have survived selection processes.

   A list of peanut plant introduction used over recent years by the peanut breeding and genetics program at North Carolina State University are listed in the Appendix.

2. Accession User - Dr. T. C. Wehner, Horticulture Department, North Carolina State University, Raleigh, North Carolina 27695-7609.

   Nature of Research: Improving cultivar development from cucumber PI accessions.

   Progress to Date: I am maintaining the following lines of Cucumis in my cucumber breeding and research program. In future explorations and exchanges, it would be useful if we could obtain cucumber germplasm from India, China, and the USSR. There have been no recent releases from this program that contain PI germplasm.

2. Accession User - Dr. T. C. Wehner (Continued)

The following Cucumis PI lines are being maintained in 1989:

Good Fruit Keeping Ability (Cucumis sativus)

PI 220171
PI 279469
PI 321006
PI 211962
PI 422177

Good Combining Ability for Yield

PI 174172
PI 169397
PI 339250
PI 175696
PI 206425
PI 205995
PI 342950
PI 178888

Anthracnose Resistant

PI 163216
PI 163218
PI 167223
PI 164433

Gummy Stem Blight Resistant

PI 200818

Belly Rot Resistant

PI 109063
PI 109483
PI 165509
PI 105340
PI 414159
PI 105263
PI 197085
PI 197086
PI 197087
PI 197088
PI 357852
PI 280096
PI 271328

2. Accession User - Dr. T. C. Wehner (Continued)

Study of Nematode Resistance (Cucumis metuliferus)

PI 414716
PI 482435
PI 482439
PI 482441
PI 482443
PI 482446
PI 482448
PI 482450
PI 482451
PI 482452
PI 482453
PI 482454
PI 482456
PI 508300

3. Accession User - Dr. Wanda W. Collins, Horticulture Department, North Carolina State University, Raleigh, North Carolina 27695-7609.

Nature of Research: Breeding sweet potatoe for improving dry matter and disease resistance.

Progress to Date: Wanda is presently in Peru. The PI's obtained in Peru 5 years ago are now out of quarantine and are being evaluated in the breeding program.

4. Accession Users - Drs. Thomas E. Carter and Joe Burton, Crop Science Department, North Carolina State University, Raleigh, North Carolina 27695-7631.

Nature of Research: Identification and subsequent breeding with PI's to improve drought and Al tolerance, oil and protein quality in soybean.

Progress to Date: In our drought research, we are currently using PI 416937 as a parent in combination with southern cultivars. Pure lines have been developed and are being tested this year. Forty other PI's of southern maturity are being tested for drought tolerance this year.

To improve oil quality in soybean, we are using PI 123,440, PI 408,159, and PI 407,892B as parents in our selection and SSD populations. Simultaneously, we are using materials from crosses of Ransom with PI's 398724, 417216, 123439, and 323569 to improve and study the inheritance of protein composition of soybean seed. We are not currently maintaining a large working collection of soybean germplasm.

4. Accession Users - Drs. Thomas E. Carter and Joe Burton (Continued)

Future Plant Exploration: It is my impression that a serious attempt to collect soybean germplasm in southern China is needed. Prof. Gai at Nanjing would like to do it, but does not have the resources. I suggest that we (USA) support a Chinese collection effort.

APPENDIX

The following is a list of plant introductions in peanut that have been used over recent years by the peanut breeding and genetics program at North Carolina State University:

Introductions in Continued Maintenance

PI no.	Reason of Continued Maintenance
261924 (C_1)	Preliminary isozyme work on diverse germplasm
262000 (C_2)	" "
275751 (A_1)	" "
262090 (B_1)	" "
259649	Large-seeded types
262108	" "
262109	" "
270921	" "
355287	" "
372317	" "
442602	" "

PI's Used in Crosses

PI no.	Crosses Made	Character Transferred
162858	(FG x Val.), NC 17165	Parents in recurrent selection program for yield
138870	NC 5	" "
170236	Georgia 194R	" "
152122	Frost resistant	" "
262090	NC 4, NC 5	" "
138870	NC 7, NC 5 (FG x FR)	" "
121067	NC Bunch	Insect resistance
109839	(NC 17921) , NC 7, NC 6, Florigiant	Early leafspot resistance
270806	Florigiant, NC 6, NC 7	" "
269685	" "	" "
350680	PI 269685, PI 270806, PI 109839	Late leafspot resistance
341817	ICGS-4	" "
259747	NC 17	Biological nitrogen fixation
337394F	NC 7	Aflatoxin resistance
337409	" "	" "
221068	PI 282706, Jenkins Jumbo, S.A. Jumbo, Argentine, NC 17, PI 221068, PI 288211, PI 315626, NC 17, Fla 393-8-1-1-1-1-2	Large seed
261924(C_1)	NC 18411, PI 262090	Isozyme patterns
262090(B_1)	PI 261924, Tennessee Red, Comet	Isozyme patterns
269080	PI 268882, PI 315630, 4144, NC 9	Large seed
269081	PI 269080, PI 291985, Japan. Jumbo, PI 315631, GK 3, NC 6, S.A. Jumbo, NC 9	" "
269723	Japan. Jumbo, PI 298845, PI 325079, Egyptian Giant, Holland Jumbo	" "

APPENDIX (CONTINUED)

PI no.	Crosses Made	Character Transferred	
270818	PI 343365, Jumbo 13, NC 18411, Jumbo Runner	"	"
275751 (A_1)	NC 18411	"	"
279953	PI 372572, NC 18417, S.A. Jumbo, Fla 393-8-1-1-1-1-2	"	"
282706	PI 279953, PI 315620, PI 442604, PI 221068, Rhod. Giant, Chico, NC 17, GK 3	"	"
288211	PI 259861, PI 268882, PI 269080, PI 269081, PI 221068	"	"
289620	PI 269723, PI 270818, PI 279953, PI 282706, Jumbo Runner, NC 9	"	"
290686	PI 288211, PI 289620, PI 291985, PI 298845, NC 17, Jumbo, Rhod. Giant	"	"
291985	PI 314897, PI 315616, PI 315620, PI 315622, PI 315626, S.A. Jumbo, NC 6	"	"
296559	PI 315629, PI 318740, PI 325079, Japan. Jumbo, Fla 393-8-1-1-1-1-2	"	"
298845	PI 372572, PI 442604, NC 17, NC-Fla 14, NC 9	"	"
314897	NC-Fla 14, 4144, GK 3, Jumbo Runner, Chalimbana, Egypt. Giant, NC 9	"	"
315616	Jumbo 13, Jumbo Runner, Rhod. Giant S.A. Jumbo, Fla 393-8-1-1-1-1-2	"	"
315620	NC 9, Holland Jumbo, NC-Fla 14	"	"
315622	GP-NC 343, NC 18411, NC 18417, Chico, Fla 393-8-1-1-1-1-2	"	"
315626	PI 221068, PI 268882, PI 269081, PI 269723, PI 279953, Jumbo Runner	"	"
315629	PI 288211, PI 290686, PI 296559, PI 314897, PI 315620, NC-Fla 14, Rhod. Giant	"	"
315630	PI 315626, PI 315631, PI 325079, NC 6, PI 372572, Jenkins Jumbo, Egypt. Giant, S.A. Jumbo, Fla 393-8-1-1-1-1-2	Large seed	
315631	NC-Fla 14, GK 3, Egypt. Giant, Jumbo Runner, S.A. Jumbo	"	"
318740	GP-NC 343, NC 6, Holland Jumbo, NC-Fla 14, NC 18417, Argentine, Japan. Jumbo, NC 9	"	"
325079	PI 259861, PI 269080, Japan. Jumbo, PI 270818, PI 282706, Holland Jumbo	"	"
343365	PI 289620, PI 291985, PI 298845, PI 315616, PI 315622, Egypt. Giant, NC 18411	"	"
372572	PI 325079, PI 442602, NC 17, NC-Fla 14, NC 7	"	"
442604	Jumbo 13, Rhod. Giant, Fla 393-8-1-1-1-1-2, NC 18417, Argentine	"	"

AGENCY: Oklahoma Agricultural Experiment Station
SUBMITTED BY: James S. Kirby
ADDRESS: Department of Agronomy, Oklahoma State University, Stillwater, OK 74078

* * * * * * *

ACCESSION USERS: B.F. Carver
ADDRESS: Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK 74078-0507
NATURE OF RESEARCH: Recurrent selection for improved dehydration avoidance in winter wheat.
PROGRESS TO DATE: Several strains selected for improved drought tolerance at CIMMYT were intermated with nine hard red winter cultivars adapted to the Southern Great Plains. Following an additional year of intermating, S_0 plants were evaluated under a rainshelter to initiate a recurrent mass selection program (2 years/cycle). The selection criterion was based on an average of two measurements of relative water content (RWC) during the early to mid-grain filling period. One cycle has been completed. Following an additional two cycles, selections will be evaluated for genetic gain in RWC and associated agronomic characters.
SELECTED PUBLICATIONS: Tahara, M., B.F. Carver, R.C. Johnson, and E.L. Smith. 1986. Relationship of relative water content at successive reproductive growth stages to grain yield and yield components of winter wheat. Agron. Abst. p. 84.
CULTIVAR RELEASES: None

ACCESSION USERS: B.F. Carver
ADDRESS: Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK 74078-0507
NATURE OF RESEARCH: Development and evaluation of 1B/1R wheat-rye translocation stocks.
PROGRESS TO DATE: To determine the genetic effect of the 1B/1R translocated chromosome on milling and baking attributes and on agronomic performance, genetic stocks are being developed which differ predominately in the presence or absence of the translocation. The source of the translocation is 'Aurora' (PI167407), an unadapted winter wheat cultivar from the USSR. The "near-isochromosome" stocks were developed by continued selfing through the F_5 of plants heterozygous for the 1B/1R translocation, as confirmed by Giesma N-banding of seedling roottips. Several pairs of lines homozygous for either the normal 1B chromosome or the translocated 1B/1R chromosome are currently being increased in each of two adapted backgrounds (Chisholm and Arkan) for possible release in 1990.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: None

ACCESSION USERS: R.M. Hunger and J.L. Sherwood
ADDRESS: Plant Pathology Department, Oklahoma State University, Stillwater, OK 74078-9947
NATURE OF RESEARCH: Determine the resistance of selected entries from the1986 International Winter Wheat Rust Nursery (86 IWWRN) and the 1987

Modified Winter Wheat Rust Program (87 MWWLRP) to single pustule isolates (SPI) of leaf rust (Puccinia recondita f. sp. tritici) which occur in Oklahoma. Entries with resistance effective against these SPI will be crossed with wheats resistant to wheat soilborne mosaic virus (WSBMV) in order to combine resistance to leaf rust with resistance to WSBMV in wheats adapted to Oklahoma.

PROGRESS TO DATE: Three entries from the 86 IWWRN (#82, 189, and 271) and one entry from the 87 MWWLRP (#111) have been used in crosses with the hard red winter wheat Hawk, Mesa, Tam 108, Thunderbird, and Victory. F1 plants with resistance to leaf rust and WSBMV were identified and selfed. Individual F2 plants will be evaluated for resistance to leaf rust and WSBMV during 1989-90.

SELECTED PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USERS: J.F. Gough

ADDRESS: USDA-ARS, Plant Science Research Laboratory, 1301 N. Western, Stillwater, OK 74075

NATURE OF RESEARCH: Evaluate wheats for receptivity to colonization by epiphytic bacteria that suppress foliar diseases.

PROGRESS TO DATE: Greenhouse and field studies have indicated that wheat cultivars differ in response to colonization by an applied epiphytic bacterium that suppresses septoria tritici leaf blotch. Introduced cultivars used in the study originated in Europe and Northern Africa. Several of the cultivars also are being analyzed for inheritance of resistance to septoria tritici blotch.

SELECTED PUBLICATIONS: Gough, F.J. and El-Nashaar, H. 1989. Evaluating wheats for ability to host a bacterial antagonist of Septoria tritici. Proc. 3rd Int. Workshop on Septoria Diseases of Cereals. (In Press).

ACCESSION USERS: J.L. Caddel and R.C. Berberet

ADDRESS: Departments of Agronomy and Entomology, Oklahoma State University, Stillwater, OK 74078-0507.

NATURE OF RESEARCH: Evaluation of alfalfa (Medicago spp.) introductions for resistance to the blue alfalfa aphid (Acyrthosiphon kondoi Shinji) and for resistance to the spotted alfalfa aphid [Therioaphis maculata (Buckton)]. This work is carried out as a cooperative effort with the USDA-ARS Plant Introduction Program to characterize traits of accessions in the alfalfa world collection. In addition to the evaluation of accessions, resistant plants are used to form wide gene base germplasm, resistant to these aphids.

PROGRESS TO DATE: An additional 200 accessions were evaluated for resistance to the blue alfalfa aphid during the past year. This brings the total to over 1100 accessions over the last several years. During this year, 200 accessions were evaluated for resistance to the spotted alfalfa aphid. Four populations have been formed with resistance to the blue alfalfa aphid and will be described for registration and germplasm release during the upcoming months.

SELECTED PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USER: Helen H. Fagbenle
ADDRESS: Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.
NATURE OF RESEARCH: Plant growth regulators and their relationship to nematode resistance.
PROGRESS TO DATE: Preliminary results suggest that there is a relationship between northern root-knot nematode resistance and cytokinin content of the peanut plant. Identification of cytokinins is in progress and their relationship to resistance will be determined.
SELECTED PUBLICATIONS: Fagbenle, H.H., and A.B. Filonow. 1986. Endogenous cytokinin activity in roots of peanuts susceptible and resistance to Meloidogyne hepla. Phytopathology 76:1138.
CULTIVAR RELEASES: None

ACCESSION USERS: H.A. Melouk
ADDRESS: USDA-ARS, Department of Plant Pathology, Oklahoma State Univ., Stillwater, OK 74078-9947
NATURE OF RESEARCH: Determine the transmission of sclerotinia blight of peanut from infected seed.
PROGRESS TO DATE: Four Sclerotinia minor-susceptible peanut genotypes were planted in infested field plots. Disease incidence (DI) values of 98-100% were reported for all genotypes, and S. minor was recovered from 12.3, 11.2, 9.6, and 6.4% of seed from cv. Florunner, TX 833841, cv. Okrun, and TX 771174, respectively. Two hundred seeds from each genotype were planted on July 8, two seeds/pot, in a pasteurized soil mix. Pots were placed closely on a greenhouse bench to obtain a thick canopy. Plants were watered daily and fertilized semi-monthly with ammonium nitrate. Typical sclerotinia symptoms appeared on plants in mid September. DI was recorded at five times, with highest DI values of 0.0, 1.0, 3.5, and 4.5% recorded for TX 833841, TX 771174, cv. Okrun, and cv. Florunner, respectively.
SELECTED PUBLICATIONS: Melouk, H.A. and C.N. Akem. 1989. Transmission of sclerotinia blight of peanut from infected seed. Phytopathology 79: (In press).

ACCESSION USER: D.J. Banks
ADDRESS: USDA, ARS, Department of Agronomy, Oklahoma State University, Stillwater, OK 74078
NATURE OF RESEARCH: Peanut Introduction, Increase, Maintenance and Evaluation
PROGRESS TO DATE: Maintenance of the wild Arachis germplasm in greenhouses and in nurseries at Weslaco, TX and Brooksville, FL continued. Additional plant selections, based on large seed size, early maturity, compact plant form, favorable harvest indices and improved seed production potential were made at Ft. Cobb, OK. Seeds of wild and cultivated peanut accessions and vegetative materials of wild peanuts were distributed to various investigators in support of their research.
SELECTED PUBLICATIONS: Banks, D.J. 1988. Characteristics of a rare, monosomic peanut (Arachis hypogaea L. Leguminosae), with implications for haploidy discovery. Am. J. Bot. 75(6)Part 2:97-98. L. (Abstract).
Banks, D.J. 1988. Origin and evolution of peanut, Arachis hypogaea L. (Leguminosae). Am. J. Bot. 75(6)Part 2:158-159. (Abstract).
Banks, D.J. and Springer, T.L. 1988. Estimation of pollen fertility of Arachis (Leguminosae), Paspalum and Andropogon (Graminae) species and hybrids using an electronic particle counter. Am. J. Bot. 75(6)Part 2:219. 1988. (Abstract).

Banks, D.J. 1988. Living wild peanut (Arachis) collection, USDA-ARS, Stillwater, OK. Assoc. Systematics Collections Newsl. 16(3):8-9.
CULTIVAR RELEASES: None

ACCESSION USER: James S. Kirby
ADDRESS: Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078
NATURE OF RESEARCH: Peanut Breeding
PROGRESS TO DATE: Peanut introductions of all market types continue to be evaluated for adaptation to the growing season and conditions in Oklahoma. In 1988, 451 peanut P.I.'s were planted for seed increase and preliminary evaluation for the Regional PI Station. A few had no viable seed, and several others had very poor stands resulting in a very small increase. These were planted again this year in addition to 325 other introductions scheduled for increase this year.
SELECTED PUBLICATIONS: None
CULTIVAR RELEASES: None

ACCESSION USERS: J.A. Webster, R.L. Burton, C.A. Baker, and S.D. Kindler
ADDRESS: USDA-ARS, Plant Science Research Laboratory, 1301 N. Western St., Stillwater, OK 74075
NATURE OF RESEARCH: 1. Evaluation of sorghum and sorghum relatives for resistance to greenbugs and the yellow sugarcane aphid. 2. Evaluation of small grain accessions for resistance to the greenbug and the Russian wheat aphid. 3. Evaluation of green accessions for resistance to the Russian wheat aphid.
PROGRESS TO DATE: The Ethiopian sorghum collection consisting of about 5000 accessions was previously tested for resistance to the yellow sugarcane aphid. PI 453951, PI 457709, and PI 457715 were resistant in these mass screening tests. Further tests showed that they possess antibiosis based on aphid fecundity. The Russian wheat aphid control costs and damage for 1988 amounted to over $123 million. A large number of small grain and grass entries from the Plant Introduction System have been evaluated for Russian wheat aphid resistance. Additional entries will be evaluated next year. More detailed tests are being conducted on triticale, barley, and grasses that exhibited Russian wheat aphid resistance in the screening tests.
SELECTED PUBLICATIONS:
Carver, B.F., G.H. Morgan, L.H. Edwards, and J.A. Webster. 1988. Registration of four pairs of greenbug-resistant vs. -susceptible near-isolines of winter barley. Crop Sci. 28:1034-1035.

Merkle, O.G., A.C. Guenzi, R.A. Veal, and C.A. Baker. 1988. Comparison of embryo rescue with callus induction and plant regeneration for recovering interspecific wheat hybrids. Agron. Abstr. p. 170-171.

Webster, J.A. 1987. Evaluating sorghum lines for resistance to the yellow sugarcane aphid. Proc. 15th Bien. Grain Sorghum Res. Util. Conf. pp. 196-197.

Webster, J.A. and C. Inayatullah. 1988. Assessment of experimental designs for greenbug (Homoptera:Aphididae) antixenosis tests. J. Econ. Entomol. 81:1246-1250.

Webster, J.A., O.G. Merkle, and R.L. Burton. 1988. Russian wheat aphid plant resistance research in Oklahoma. pp. 46-47. In S. Coppock and W. Massey (eds.) Proc. 1st Russian Wheat Aphid Conf., Okla. State Coop. Ext. Serv. Bul. E-875.

University of Puerto Rico
College of Agricultural Sciences
AGRICULTURAL EXPERIMENT STATION
Río Piedras, Puerto Rico

S-9 Technical Committee Report 1989

July 18, 1989
Griffin, Georgia

Submitted by:
Rubén Vélez Colón
Fortuna Agricultural Experiment Station
HC 02 Box 7115
Juana Díaz, PR 00665-9601

ACCESSION USER : Sonia L. Martínez, Octavio Colberg, Rubén Vélez and Alvaro Acosta.

ADDRESS : Department of Horticulture
College of Agricultural Sciences
University of Puerto Rico
Mayaguez, PR 00709

NATURE OF RESEARCH : To obtain throught plant introduction, increase, evaluation, documentation and maintenance, better fruit crops (sapodilla - Manilkara zapota (L.) P. v. Rogen, soursop - Annona muricata L., avocado - Persea americana Mill.) with high yielding ability, resistant to prevalent maladies and adapted to our climatic conditions.

PROGRESS TO DATE : Data of production per tree was recorded in the soursop experiment. The data recorded from January, 1986 to December, 1988 is being tabulated and the results will be published. Fruits of some of the selections in this experiment were evaluated by the Food Technology Laboratory in relation to brix, pH, % citric acid, % reducing sugars and % total sugars. The drip irrigation system originally installed in this orchard was improved by changing all the water emitters located near the trees.

Prunning of the lower branches of the trees in the avocado 32 varieties experiment was finished. Aereation of the orchard and general management was improved by this practice. A formation prunning was done in the new avocado (7 varieties) experiment, also a drip irrigation system was installed in the experiment.

PUBLICATIONS : Vélez, R., I. Caloni and S. L. Martínez, 1988. Sapodilla (Manilkara zapota (L.) P. v. Rogen) trials at Southern Puerto Rico. J. Agric. Univ. P. R. July, 1989.

CULTIVAR RELEASES : None.

ACCESSION USER : Sonia L. Martínez, Octavio Colberg, Rubén Vélez and Alvaro Acosta.

ADDRESS : Department of Horticulture
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PUBLICATIONS : Vélez, R., I. Caloni and S. L. Martínez, 1988. Sapodilla (Manilkara zapota (L.) P. v. Rogen) trials at Southern Puerto Rico. J. Agric. Univ. P. R. July, 1989.

CULTIVAR RELEASES : None.

ACCESSION USER : Agenol González Vélez, Miguel A. Santiago and Dora Ramos.

ADDRESS : Corozal Agricultural Experiment Station
HC 02 Box 10322
Bo. Padilla
Corozal, PR 00643

NATURE OF RESEARCH : Plantains and Bananas - Their introduction, increase, evaluation, documentation, maintenance and distribution.

PROGRESS TO DATE : Th the banana collection the average bunch weight for the Valerie, Clon 3A and Grand Nain cvs, were 20, 21 and 18 kg respectively. The average number of fruits per bunch were 137 for Valerie and 129 for clon 3A and Grand Nain. The average heiht of these three cvs, at flowering was 2.16 m which represents and appropiate height for the windy condition of the island.

The average bunch weight in the first ratoon crop of four local banana selection (1A, 2A, 3A and 4A) was 15 kg compared to 14.2 kg for Grand Nain. Clon 3A produced the highest yield with 15.4 kg/bunch with 107 fruits.

In the plantain collection the Dwarf plantain cv. showed more susceptibility to the mosaic virus than the others cvs.

PUBLICATION : None.

CULTIVAR RELEASE : None.

ACCESSION USER : Agenol González Vélez, Miguel A. Santiago and Dora Ramos

ADDRESS : Corozal Agricultural Experiment Station
HC 02 Box 10322
Corozal, PR 00643

NATURE OF RESEARCH : Root crops-their introduction, increase, evaluation, documentation, maintenance and distribution.

PROGRESS TO DATE : New plants cultivars of tanier were introduced from Venezuela and Florida. Tanier plants showed less symptoms of "mal seco" when they were propagated using axillary buds and planted in soil not previously planted with tanier. Practically all cultivars of tanier showed roots damage, with the exception of the Palma cv. and two cvs. from Venezuela.

An increase of 68 and 18 percent on the yield of the Binugus and Gunung cvs. of yam, respectively, was observed when they were harvested at 11 months instead of 7 months. A production of 64 Tm/ha was obtained with the Binugus cv. when harvested at 11 months compared to 55 Tm/ha for the Gunung cv.

The Forastera, Llanera, Serrallés and Tremesiana cvs. of cassava preserved good up to 15 days when the tubers where storage in plastic bags. The best results were obtained when the storage temperature was ^{o}C 31 or up.

PUBLICATION : González, Agenol and Miguel A. Santiago, 1989. J. of Agric. Univ. P. R., Rendimiento y Resistencia a la Antracnosis de Cinco Cultivares de Ñame. (In press).

CULTIVAR RELEASE : None.

H-94E

ACCESSION USER	:	Gerardo Ruiz and Mildred Cortés
ADDRESS	:	Agricultural Experiment Station P. O. Box 21360 Río Piedras, PR 00928
NATURE OF RESEARCH	:	To obtain through plant introduction and selection, high yielding ornamentals, resistant to prevalent maladies and adapted to local conditions.
PROGRESS TO DATE	:	Aglaonema commutatum (schott) "Silver Queen" and "María" were planted under 63, 80 and 92% nylon fiber and polyetilene shades to determine optimum light intensity levels for its production. "Silver Queen" and "María" number of offsets increased consistently as shade decreased. The highest number of offsets was produced by "Silver Queen" at 63% shade and the lowest was produced by "María" at 92% shade. Light intensity at 63% nylon fiber shade increase offset production in aglaonema "Silver Queen" and "María".
PUBLICATIONS	:	Cortés-Pérez, M. y G. Ruiz Sifre. 1989. J. of Agric. Univ. P. R., Evaluación del ingreso bruto generado por aglaonemas "Silver Queen" y "María" a diferentes intensidades de sombra. (In press).
RELEASES	:	None.

ACCESSION USER : Wigmar González, Evelio Hernández, Osvaldo Bosques and Carlos Flores

ADDRESS : Adjuntas Agricultural Experiment Station
HC 01 Box 4508
Adjuntas, PR 00601

NATURE OF RESEARCH : To obtain, through plant introduction, increase, evaluation, documentation and maintenance, new coffee varieties, resistant to prevalent maladities and adapted to local conditions.

PROGRESS TO DATE : The dreaded disease coffee rust (Hemileia vastatrix) was finally identified in Puerto Rico, in the west central part of the island. Its is of extreme importance to keep introducing resistant varieties to Puerto Rico. Coffee is a sixty million dollar commodity. Seventeen rust resistant selections are been evaluated in a replicated experiment at the Adjuntas Substation and in a private farm in the town of Ciales. Another experiment is being conducted with eight Catuai selections.

PUBLICATIONS : None.

CULTIVAR RELEASES : None.

ACCESSION USER : Guillermo Fornaris and Elvin Caraballo

ADDRESS : Department of Horticulture
Agricultural Experiment Station
P. O. Box 21360
Río Piedras, PR 00928

NATURE OF RESEARCH : To introduce and evaluate under local conditions cultivars of tomatoes (Lycopersicon esculentum) and peppers (Capsicum annuum), in order to find germplasm with outstanding characteristics such as higher yield and superior product quality.

PROGRESS TO DATE : From April to October, 1988, 17 fresh market tomato cultivars were grown (2 plots/cv.) and evaluated under hot and humid conditions in 3 consecutive monthly plantings. Cultivars PSR-39686. Whirlaway, Bingo, Olé, Flash and Line 324 showed a good overall performance. This took place in coordination with Research Project CBAG-35, which at present is evaluating the same 17 cvs. for a second year.

During our main vegetable crops growing season (November, 1988 to May, 1989), the best performing cooking (frying) pepper cultivars from previous trials during the past two years were grown (4 plots/cv.) and evaluated. This trial included Cayman, Key Largo, Blanco del País, Cubanelle (Harris Moran), Cubanelle (Ferry-Morse) and Cubanelle (Petoseed). Final data analyses are in progress.

PUBLICATIONS : None.

CULTIVAR RELEASES : None.

ACCESSION USER : Pedro Márquez

ADDRESS : Isabela Agricultural Experiment Substation
P. O. Box 506
Isabela, PR 00662

NATURE OF RESEARCH : To obtain, through plant introduction, increase, evaluation, documentation and maintenance, new pineapple varieties, resistant to prevalent maladities and adapted to local conditions.

PROGRESS TO DATE : The pineapple collection has been moved from Finca La Montaña, in Aguadilla, to the Isabela Substation. Currently, we are evaluating the varieties as to commercial use (fresh market and processing) and as a source of plant breeding material. The 39 genotypes of Ananas sp. we currently have are:

1. Cayena Lisa "Libby"
2. Cayena Lisa "L-11 B-5"
3. Cayena Lisa "Hawaii 1266"
4. Cayena Lisa "Champaca 180"
5. Cayena Lisa "Champaca 153"
6. Cayena Lisa "White Honey"
7. Cayena Lisa "Masatepe"
8. Cayena Lisa "Oahu"
9. Cayena Lisa "Hilo"
10. Cayena Lisa "Monte Lirio"
11. Mordilona (PI 12810)
12. Española Roja sin espinas
13. Española Roja
14. PR 1-56
15. PR 1-67
16. 14-3 E
17. Perola or Pernambuco (PI 12387)
18. Piña de Azúcar de Honduras
19. Black Antigua
20. Pan de Azúcar (Río Grande)
21. Blanca de Cuba (op)
22. Venezolana Cultivada
23. Natal Queen
24. Rippley Queen
25. Normal African Queen (PI 12387)
26. V. C. Queen
27. Z. Queen (PI 6702)
28. Baron Rotchild #29
29. Kendall (PI 6699)
30. PI 6587

31. PI 6705
32. Amarelo Boituba
33. Eleuthera (PI 2404)
34. Ananas microphelia (PI 6690)
35. Huitota (PI 7315)
36. PI 13344
37. PI 13388
38. 12 A
39. 18 A

PUBLICATIONS : None.

CULTIVAR RELEASES : None

ACCESSION USER : Gerardo Ruiz Sifre, Agenol González, Félix Román and Carlos Flores

ADDRESS : Agricultural Experiment Station
P. O. Box 21360
Río Piedras, PR 00928

NATURE OF RESEARCH : To obtain through plant introduction and selection, better high yielding citrus trees, resistant to the prevalent maladies and adapted to local conditions.

PROGRESS TO DATE : Twenty-nine orange (Citrus sinensis L.) selections grafted on sour orange (Citrus aurantium L.) and Cleopatra mandarin (Citrus reshni Hort) were evaluated in terms of fruit production per tree and rootstock effect at Adjuntas Substation in 1986-87 and 1987-88. Selections 54 Rico 6, 24 Rico 2 and 334 Pietri had higher yields than the other 26 selections during the last two harvesting season. Those orange selections grafted on Cleopatra mandarin were better producers than those grafted on sour orange.

Ten chironja (Citrus sinensis x C. paradisi) selections at Corozal Substation and four Valencia (Citrus sinensis L.) selections at Adjuntas Substation were pruned April 1987. Unpruned chironja trees were better yielders than the pruned trees in 1987. In 1988, the production of pruned and unpruned trees are almost the same; with some pruned selections with higher yields than the unpruned. In general, chironja and Valencia pruned trees looked more vigorous than the unpruned trees.

PUBLICATIONS : None.

RELEASES : None.

ACCESSION USER : Gerardo Ruiz Sifre and Octavio Colberg

ADDRESS : Agricultural Experiment Station
P. O. Box 21360
Río Piedras, PR 00928

NATURE OF RESEARCH : To obtain through plant introduction and selection, high yielding vegetable crops resistant to prevalent maladies and adapted to local conditions.

PROGRESS TO DATE : Replicated trials on: five cantaloupe (Cucumis melo var. reticulata L.) cultivars and five honey dew (Cucumis melo var. inodorus L.) cultivars, were conducted at Fortuna Substation from December 1987 to March 1988. A preliminary trial on 14 cucumber (Cucumis sativus L.) cultivars was also conducted at Fortuna from January to March 1988. In the cantaloupe trial, the best commercial yielders were Hy Mark and Planters Jumbo, which had the best brix. In the honey dew trial, Honey Dew Greenfleshed of Ferry Morse and Tam Dew Improved of Harris Moran were the best producers, but Tam Dew Improved had the biggest fruit and highest brix. The cucumber cultivars Tropi-Cuke, Sprint 440, Dasher II, Raider and Gemini 7 were the best yielders. All yielded high during the whole harvesting season.

PUBLICATIONS : None.

RELEASES : None.

ACCESSION USER	:	Elvin Caraballo and Guillermo Fornaris
ADDRESS	:	Agricultural Experiment Station Fortuna Substation HC 02 Box 7115 Juana Díaz, PR 00665
NATURE OF RESEARCH	:	To obtain germplasm with high yielding and good quality through and introduction and evaluation of cabbage (Brassica oleracea group capitata) and Onion (Allium cepa) cultivars.
PROGRESS TO DATE	:	Preliminary trials on cabbage (28 cultivars with 2 plots/cv.) and onion (22 cultivars with 2 plots/cv.) were conducted at Fortuna Agricultural Experiment Substation from December 1988 to April 1989. Cabbage cultivars such as superette (Ferry Morse), Pennant (Northrup King) and Vedette (Sunseeds) and onion cultivars such as yellow Granex Improved (Sunseeds), were the best yielders.
PUBLICATIONS	:	None.
CULTIVAR RELEASES	:	None.

ACCESSION USER : Gerardo Ruiz Sifre, Rubén Vélez and Pedro Márquez

ADDRESS : Agricultural Experiment Station
P. O. Box 21360
Río Piedras, PR 00928

NATURE OF RESEARCH : To obtain through plant introduction and selection, high yielding papaya trees, resistant to prevalent maladies and adapted to local conditions.

PROGRESS TO DATE : Carica papaya L. "Cariflora" was planted under drip irrigation at the Isabela and Fortuna Substations on May 1987. Papaya plants were harvested from January to April 1988 at Fortuna and from December 1987 to March 1988 at Isabela. The number of fruits per plant was 16 at Fortuna and 13 at Isabela. The average fruit weight was 0.62 kg. at Fortuna and 0.71 kg. at Isabela, and fruit size was 10 cm. x 10 cm. at Fortuna and 11 cm. at Isabela. Few incidence of Papaya Ringspot Virus and papaya bunchy top disease was found at Isabela but no incidence of the virus and the disease was found at Fortuna.

PUBLICATIONS : None.

RELEASES : None.

ACCESSION USER : Hernán Ruiz

ADDRESS : Fortuna Agricultural Experiment Substation
HC 02 Box 7115
Juana Díaz, PR 00665-9601

NATURE OF RESEARCH : Evaluation of resistance of six sweet pepper varieties to bacterial spot (Xanthomonas campestris var. vesicatoria).

PROGRESS TO DATE : Six cultivars of cooking peppers were evaluated under field conditions to determine their resistance to the bacterial spot. None of the six cultivars displayed a symptomless reaction or hipersensitivity to the bacteria.

The cultivars were severely dofoliated after heavy rains ocurred during flowering and fruit setting of the plants. Yield losses were high in some of the cultivars (table 1). Cultivars two and four showed some recovery and the new shoots were free of the disease . However the size of the marketable fruits was reduced.

Cultivars number 1, 3, 5 and 6 never recovered once defoliation ocurred.

Cultivar	Index of defoliation
1. Cubanelle (Petoseed)	78%
2. Cayman (Petoseed)	70%
3. Cubanelle (Harris Moran)	78%
4. Key Largo (Harris Moran)	57%
5. Cubanelle (Ferry Morse)	66%
6. Blanco del país (EEA-UPR)	65%

PUBLICATIONS : None.

CULTIVAR RELEASES : None.

1989

S-9 Technical Committee Report

Agency: Clemson University
Submitted By: D.W. Bradshaw
Address: Department of Horticulture, Clemson University, Clemson, S.C. 29634-0375

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Accession User: Harban S. Bhella (deceased, report submitted by Claude E. Thomas)
Address: USDA, ARS, U.S. Vegetable Laboratory
2875 Savannah Highway
Charleston, S.C. 29414
Nature of Research: Leaf tissue analysis of PI accessions of Cucumis melo (muskmelon) to determine efficiency of nitrogen utilization.
Progress to Date: Dr. Bhella had completed sampling but not tissue analysis on 500 accessions prior to his death.
Publications: None
Cultivar Releases: None

******

Accession User: Richard L. Fery and Howard F. Harrison
Address: U.S. Vegetable laboratory
2875 Savannah Highway
Charleston, S.C. 29414
Nature of Research: Evaluation of PI accessions of Capsicum spp. (pepper) and Vigna unguiculata (cowpea) for tolerance to bentazon herbicide.
Progress to Date: During the 1988 growing season all available accessions of Capsicum spp. (totaling 2850) and Vigna unguiculata (totaling 1600) were field tested at the Charleston station for tolerance to bentazon herbicide. Currently replicated greenhouse and field evaluations of tolerant accessions are being conducted.
Publications: None
Cultivar Releases: None

******

Accession User: Alfred Jones
Address: U.S. Vegetable Laboratory
2875 Savannah Highway
Charleston, S.C. 29414
Nature of Research: Sweet potato breeding - Over the past 25 years PI's have been used to widen the gene pool by open pollination and mass selection rather than pedigree techniques.
Progress to Date: A germplasm release is in progress for mass selection Population I/13 (13th generation or cycle). A total of 18 PI's (not listed) contributed as seed parents to this population. Selections from this and other Mass Selection Populations have been used in our breeding program from which multipest resistant materials have been released.
Publications: None
Cultivar Releases: None this year.

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Accession User: Billy B. Rhodes
Address: P.O. Box 247
Blackville, S.C. 29817
Nature of Research: Anthracnose and fusarium wilt resistance in development of watermelon cv. and genetic studies.
Progress to Date: Line 7 (Southpaws, 1990) has resistance from PI189225 to race 2 anthracnose and race 1 fusarium wilt. Other resistance levels not tested.
Publications: None since last report.
Cultivar Releases: None (release projected within a year)

******

Accession User: Claude E. Thomas
Address: USDA, ARS, U.S. Vegetable Laboratory
2875 Savannah Highway
Charleston, S.C. 29414
Nature of Research: Evaluation of U.S. PI collection of Brassica oleracea for resistance to race 2 of downy mildew (Peronospora parasitica) to generate data for entry into GRIN.
Progress to Date:
1987-88: All 240 Brassica botrytis (broccoli and cauliflower) accessions available for distribution were evaluated for resistance to race 2 of downy mildew in growth chambers and data submitted to GRIN.

1988-89: All 348 Brassica oleracea var. capitata (cabbage) and 43 B. oleracea var. gemmifera (Brussels sprouts) accessions available for distribution plus 43 B. oleracea var. botrytis (broccoli and cauliflower) increased at the U.S. P.I. Station - Geneva in 1987 were evaluated for resistance to race 2 of downy mildew and data submitted to GRIN.
Publications: See attached abstract #667
Cultivar Releases: None

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667

EVALUATION OF BROCCOLI AND CAULIFLOWER PLANT INTRODUCTIONS FOR DOWNY MILDEW RESISTANCE. C. E. Thomas and E. L. Jourdain. ARS, USDA, U. S. Vegetable Laboratory, Charleston, SC 29414.

The 240 available U. S. Plant Introductions (PI) classified as Brassica oleracea var. botrytis (consists of both broccoli and cauliflower types) were evaluated for resistance against downy mildew. Plants at the two expanded leaf stage were inoculated with a suspension of 5.0×10^3 conidia per ml of a local isolate of Peronospora parasitica. Inoculated plants were incubated in dew chambers at 16C for 24 hours and were then placed in a 22C growth chamber with a 12 hr photoperiod. On the seventh day after inoculation, plants were returned to the 16C dew chamber for 30 hr and ratings for downy mildew reaction classes were made at nine days on a 0-9 scale of increasing disease severity. A disease index (DI) was calculated for each line. No lines had a high level of resistance (DI < 3). PIs 181860, 204765, 204768, 204772, 204773, 204775, 204779, 241612, 291567, 343481, 462225, 264656, and 373906 were moderately resistant (DI of 3.1-5).

1596 PHYTOPATHOLOGY 78(1988).

Accession User: Claude E. Thomas
Address: USDA, ARS, U.S. Vegetable Laboratory
2875 Savannah Highway
Charleston, S.C. 29414
Nature of Research: Evaluation of PI collection of Cucumis melo for resistance to downy mildew (Pseudoperonospora cubensis) to generate data for entry into GRIN.
Progress to Date: Field and growth chamber-glasshouse evaluations have been completed on 500 accessions and the field evaluation of 500 more is currently in progress.
Publications: None
Cultivar Releases: None

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Accession User: E.B. Beard
Address: 100 Kirkwood Lane
Camden, S.C. 29020
Nature of Research: To investigate the culture of kenaf (Hibiscus cannabinus) in the sandhills of Kershaw County, S.C.
Progress to Date: Planted 15 seed in late March which were killed by a late frost. Second planting of 15 seed on May 21 - no results at time of reporting just a few days later. (Investigator received Everglades 41, Everglades 71 and Guatamala 45 but did not report which variety was killed by frost nor which variety is growing today.)
Publications: None
Cultivar Releases: None

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Accession User: W.A. Dabbs
Address: Route 1 Box 300
Mayesville, S.C. 29104
Nature of Research: Evaluate the culture of kenaf (Hibiscus cannabinus) as a possible new crop for S.C.
Progress to Date: Planted 10 seed of each of the following varieties: (no planting date given.) Everglades 41, Everglades 71, Guatamala 45. Planted as with cotton with Treflan incorporated into the soil. As of July 10, seven plants of Guatamala 45 were 2.5 feet tall and growing well. Other plants may be growing as well, but does not recognize what kenaf should look like.
Publications: None
Cultivar Releases: None

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Accession User: Ruby Dixon
Address: Route 1 Box 298-B
Eastover, S.C. 29044
Nature of Research: Interested in growing kenaf (Hibiscus cannabinus) as a source of stakes for use in the home vegetable garden.
Progress to Date: On April 4th planted 15 seed of the following varieties: Everglades 41, Everglades 71, Guatamala 45. Planted in the row with okra and bell peppers. April 10 a late frost killed germinated okra and peppers but did not harm Everglades 71 nor Guatamala 45. As of May 29 seven plants of Guatamala 45 and 9 plants of Everglades 71 were 2.5 feet tall. Everglades 41 did not germinate.
Publications: None
Cultivar Releases: None

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Accession User: Don H. Harvey
Address: P.O. Box 262
Allendale, S.C. 29810
Nature of Research: Evaluation of the adaptability of kenaf (Hibiscus cannabinus) to the soils and climate of the coastal plains of S.C.
Progress to Date: Planted Everglades 41, Everglades 71, Guatamala 45. (no dates nor germination % given, only that germination occurred.)
Publications: None
Cultivar Releases: None

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Accession User: C.B. Rush
Address: P.O. Box 619
Bennettsville, S.C. 29512
Nature of Research: Evaluate the adaptability of kenaf (Hibiscus cannabinus) to the soils and climate of S.C.
Progress to Date: In May planted 9 seed of each of the following varieties: Everglades 41, Everglades 71, Guatamala 45. As of reporting, all seed appear to be germinating and growing well.
Publications: None
Cultivar Releases: None

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Accession User: Phillip S. Watson
Address: R.M. Watson & Sons, Inc.
P.O. Box 407
Ridge Springs, S.C. 29129
Nature of Research: To evaluate the growth of kenaf (Hibiscus cannabinus) in S.C. and to explore possible uses.
Progress to Date: On May 20 planted the following varieties: Cubano, Everglades 41, Everglades 71, Guatamala 4, Guatamala 45. As of May 29th there is a good stand and growing well. (No germination % nor size given.)
Publications: None
Cultivar Releases: None

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Accession User: Ernest E. Woodham
Address: Route 2 Box 143-A
Bishopville, S.C. 29010
Nature of Research: Evaluate the growth of kenaf (Hibiscus cannabinus) as a possible source of fishing poles to be sold in a fishing supply store.
Progress to Date: Planted seed on May 11. Near the end of May germination of Guatamala 45 is 70%, Everglades 41 is 40%, Everglades 71 is 20%. Plants are 6 inches high.
Publications: None
Cultivar Releases: None

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Accession User: Mrs. Ruth H. Woodham
Address: To-Co-Co-Be Farms
Route 2 Box 150
Bishopville, S.C. 29010
Nature of Research: To evaluate the culture, growth, and seed production potential of kenaf (Hibiscus cannabinus) in S.C.
Progress to Date: Planted Everglades 41, Everglades 71 and Guatamala 45 on March 16 in containers indoors over a heat source. Everglades 71 and Guatamala 45 germinated 70% in three days. Everglades 41 did not germinate. Cold weather delayed transplanting to the field until May 11. By the end of May plants ranged from 8" to 28" tall.
Publications: None
Cultivar Releases: None

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1989
S-9 TECHNICAL COMMITTEE REPORT

AGENCY: The Texas Agricultural Experiment Station
SUBMITTED BY: George G. McBee
ADDRESS: Soil & Crop Sciences Department
Texas A&M University
College Station, TX 77843-2474
PHONE: (409) 845-8796
FAX #: (409) 845-0456

****

ACCESSION USER: James M. Phillips
ADDRESS: Triumph Seed Co., Inc.
P.O. Box 1050
Ralls, TX 79357
PHONE: (806) 253-2584
FAX #: (806) 253-2820
TELEX: 9102408618
NATURE OF RESEARCH: Sorghum
PROGRESS TO DATE: Will plant sorghum introductions at Crosbyton during 1989 for evaluation.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: Gerald W. Evers
ADDRESS: TAMU Agric. Res. Stn.
P.O. Box 728
Angleton, TX 77515
PHONE: (409) 849-5708
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Subterranean clover
PROGRESS TO DATE: Has evaluated several P.I.'s of subterranean clover for growth, disease and insect resistance plus reseeding ability over 2 year period for southeast Texas. Currently increasing seed of 5 P.I.'s.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: Brook G. Milligan
ADDRESS: University of Texas
Department of Botany
Austin, TX 78713
PHONE: (512) 471-3530
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Several Trifolium species have been studies for DNA chloroplast content.
PROGRESS TO DATE: none reported
PUBLICATIONS: none reported

CULTIVAR RELEASES: none reported

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ACCESSION USER: Keith F. Schertz
ADDRESS: USDA - Soil & Crop Sciences
Texas A&M University
College Station, TX 77843-2474
PHONE: (409) 260-9252
FAX #: (409) 845-0456
TELEX: 7400668
NATURE OF RESEARCH: Sorghum
PROGRESS TO DATE: Currently evaluating 260 Chinese accessions, 150 wild sorghum types from India and Africa, and 150 grain sorghum types from India and Africa. Lines from China are expected to possess characteristics for cold and drought tolerance.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: A. Bruce Maunder
ADDRESS: DeKalb-Pfizer Genetics
Route 2, Box 56
Lubbock, TX 79415
PHONE: (806) 763-3336
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Sorghum
PROGRESS TO DATE: Received 3 lines that supposedly contains acid tolerance and anthracnose resistance and possibly photoperiod insensitivity. They are being introgressed into breeding program.
PUBLICATIONS: Have prepared a description of sorghum plant introductions for use by Board on Agriculture (NAS) for early year introductions.
CULTIVAR RELEASES: Will increase 180 lines received from Italian collection from Mediterranean area and plan to make germplasm available next year to Regional Plant Introduction Center.

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ACCESSION USER: Mark A. Hussey
ADDRESS: Soil & Crop Sciences Department
Texas A&M University
College Station, TX 77843-2474
PHONE: (409) 845-8795
FAX #: (409) 845-0456
TELEX: none reported
NATURE OF RESEARCH: Legume and grass evaluation
PROGRESS TO DATE: Cenchrus ciliaris - PI 409704 is one of approximately 50 pentaploid (2N = 5x = 45) buffelgrass accessions collected by Dr. E.C. Bashaw in S. Arica in 1976. Three years of extensive field evaluations throughout Texas indicate that PI 409704 has significantly greater winterhardiness than the commercially available cultivars Common, Llano, or Nueces. A 3-yr field evaluation of 409704 at College Station suggests that this genotype does not significantly differ from commercial buffelgrass cultivars in terms of yield or forage IVDMD. Seed of PI 409704 is currently being increased and will be placed in multi-location clipping grazing evaluations in 1990.

Medicago sp. - Thirty-three plant introductions representing 9 annual Medicago species (M. littoralis, M. lupulina, M. orbicularis, M. polymorpha, M. rigidula, M. rugosa, M. scutella, M. truncatula, and M. turbinata) were evaluated at College Station, TX during 1988-1989. These 33 PI's were previously selected from 459 accessions grown at College Station and Beeville, TX in 1986. On February 3, 1989 the temperature dropped from 77°F to 27°F and remained below freezing for 4 days. Complete winterkill (100%) was observed for the commercial cultivars (Circle Valley, Jemalong, Paragosa, Paraggio, Sava, and Serena) and for 17 of the 33 plant introductions. Five accessions of M. orbicularis (PI 199258, 308054, 311440, 385009, and 459123) suffered less than 20% winterkill. Seed of these five accessions is currently being increased and for further testing.

PUBLICATIONS: none reported
CULTIVAR RELEASES: Plans to release PI 409704 as a cultivar at a later date.

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ACCESSION USER: James A. Glueck
ADDRESS: Garst Seed Company - Research Department
Route 3, Box 236C
El Campo, TX 77437
PHONE: (409) 543-1850
FAX #: (409) 543-1856
TELEX: none reported
NATURE OF RESEARCH: Sorghum
PROGRESS TO DATE: Acquired 483 PI accessions in 1988 and will plant at Plainview during 1989 for seed increase and evaluation.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

****

ACCESSION USER: Keith Arnold
ADDRESS: Holden's Foundation Seeds Inc.
Box 1308
Idalou, TX 79329
PHONE: (806) 892-2415
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Forage sorghum hybrids
PROGRESS TO DATE: Have received and are evaluating 46 P.I.'s for possible use as forage hybrid parents. Material was planted this year and thus far, general type of agronomic data is being obtained. Material has generally shown decent standability.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: K.S. Porter
ADDRESS: Pioneer Hi-Bred International, Inc.
Plant Breeding Division - Dept. of Sorghum Breeding
Box 1506
Plainview, TX 79073-1506
PHONE: (806) 293-4377
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Sorghum
PROGRESS TO DATE: Are using several sorghum lines to cross with their own germplasm, but

none have been incorporated into commercial hybrids.

PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: Charles A. Pety, Jr.
ADDRESS: Valley Chili - Div. of Santa Maria Chili, Inc.
P.O. Box 1711
Anthony, New Mexico 88021
PHONE: (915) 886-3777
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Have received and are working with 13 accessions of Capsicum annuum. None have been reported as being commercially useful to the organization.
PROGRESS TO DATE: none reported
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: John W. Sij
ADDRESS: Texas Agric. Exp. Stn.
Route 7, Box 999
Beaumont, TX 77713
PHONE: (409) 752-2741
FAX #: (409) 752-5560
TELEX: none reported
NATURE OF RESEARCH: Have been researching with kenaf, wheat, oats, lupine, sorghum, corn, and pigeonpeas.
PROGRESS TO DATE: Kenaf and sorghum studies have been expanded. Have also released significant information on research with soybean.
PUBLICATIONS: Sij, J.W. 1988. Grain sorghum performance studies in the Texas upper gulf coast - 1987. TAES-PR-4554. pp. 1-7.

Sij, J.W. and F.T. Turner. 1988. Varietal evaluations and fertility requirements of kenaf in southeast Texas. TAES-PR-4560. pp. 1-5.

Sij, J.W., G.W. Evers, and N.G. Whitney. 1989. Small-grain performance studies in the Texas upper gulf coast, 1988. TAES-PR-4651. pp. 1-10.
CULTIVAR RELEASES: none reported

****

ACCESSION USER: Richard A. Frederiksen
ADDRESS: Texas A&M University
Department of Plant Pathology & Microbiology
College Station, TX 77843-2132
PHONE: (409) 845-7311
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Received 186 sorghum accessions.
PROGRESS TO DATE: The sorghum accessions are being processed through their quarantine program.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

****

ACCESSION USER: J. Craig
ADDRESS: USDA/ARS
Plant Pathologist
College Station, TX
PHONE: (409) 845-1288
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Sorghum germplasm evaluation for downy mildew resistance.
PROGRESS TO DATE: 857 accessions of the Ethiopian sorghum have been tested for resistance to Peronoscclerospora sorghi in Texas. From the test entries, 248 were resistant to pathotype 1 and 151 were resistant to both pathotype 1 and 3. Only 13 of these accessions were resistant to pathotypes of P. sorghi in Zimbabwe.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

****

ACCESSION USER: David R. Huff
ADDRESS: B Four Corporation
3334 Richmond
Houston, TX 77098
PHONE: (713) 529-1018
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Turf
PROGRESS TO DATE: 14 P.I.'s have been evaluated in plastic pots in the greenhouse. No materials have demonstrated immediate turfgrass applications at this date.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

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ACCESSION USER: Gerald Seiler
ADDRESS: State University Station
P.O. Box 5677
Fargo, North Dakota 58105
PHONE: none reported
FAX #: none reported
TELEX: none reported
NATURE OF RESEARCH: Oilseeds
PROGRESS TO DATE: Scientist is in the process of releasing several interspecific germplasms based on wild sunflower species accessions. This includes 15 P.I.'s. Evaluations include tolerances for water stress, insect and diseases, high oil content, and salt.
PUBLICATIONS: none reported
CULTIVAR RELEASES: none reported

****

ACCESSION USER: George G. McBee
ADDRESS: Texas A&M University
Soil & Crop Sciences Dept.
College Station, TX 77843-2474
PHONE: (409) 845-8796
FAX #: (409) 845-0456
TELEX: none reported
NATURE OF RESEARCH: New and alternate crops.

PROGRESS TO DATE: Selected and forwarded six new introductions of sesame to the Introd. Station at Griffin, GA. P.I. numbers are 531236-531241. Eleven introductions of pigeonpeas from ICRISAT were evaluated for yield and photosensitivity last year. Thirty entries of rapeseed were also tested in a replicated trial during the past season. Research is continuing of numerous lines of sesame for desirable market traits, yield, disease resistance and ability to be mechanically harvested.

PUBLICATIONS: Progress report is being prepared on performance of pigeonpeas.

CULTIVAR RELEASES: none reported

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1989 ANNUAL REPORT TO THE REGIONAL TECHNICAL COMMITTEES

NATIONAL PLANT GERMPLASM QUARANTINE LABORATORY
PLANT SCIENCES INSTITUTE
AGRICULTURAL RESEARCH SERVICE
11601 OLD POND DRIVE
GLENN DALE, MARYLAND 20769

Some 60 genera of higher plants are categorized by the Quarantine Agency (APHIS) as prohibited, but unlike some countries these genera may be brought into the U.S. at any time from any country in small quantities for research and educational purposes. Most of these genera are vegetatively propagated (except the grain crops) and may be infected with submicroscopic pathogens such as viruses, viroids, mycoplasmas, and other uncharacterized infectious entities. All of the vegetatively propagated crops except citrus, grapevines and strawberries are processed by the National Plant Germplasm Quarantine Laboratory (NPGQL) at Beltsville. Twenty eight of these genera (which include deciduous fruits, small fruits, some woody ornamentals and shade trees, grasses, cacao, sugarcane, potatoes, sweet potatoes, peanuts, cassava) are subject to a battery of tests to detect internal pathogens as required by APHIS regulations or USDA policies. The normal procedure is not to release any accession from quarantine until viruses, etc. have been eliminated.

Scientists in the NPGQL interact regularly with others in the germplasm system including the PIO, CAC's, GRIN, various operational and technical committees, germplasm repositories, users of imported germplasm and APHIS in an effort to be responsive to the views of others and to insure an orderly flow of new germplasm consistent with the requirements of quarantine regulations. You are invited to contact the staff of the NPGQL on matters of interest to you (Phone: (301) 344-3003). It is the policy of ARS and it will be rigorously pursued by the NPGQL to process every accession as rapidly as possible under the conditions explicitly described for each crop by APHIS.

Personnel and Facilities

We continue to make progress with our move from the old Glenn Dale Station into the beautiful new facilities at Beltsville-East. Most of the stone fruit, sweet potatoes and white potatoes and some of the pome fruit virus tests are now performed at Beltsville. We plan to include the rice this next year. Field irrigation is being installed and we plan to add another 1200 pome and stone fruit virus indicator trees to the field plantings this year. We are exploring options to accommodate the remaining staff from Glenn Dale at BARC-East, a move that may be possible within a year.

There have been several changes in staff during the past year. Technicians in charge of stone fruit and sugarcane programs resigned. On the plus side two technicians for the stone fruits have been hired and are making excellent progress on these crops. Another technician will be on board to process small fruits, grasses and ornamentals by mid-summer as will a second person for data processing. A second pathologist has also been hired to share the total virus indexing management activities and to serve as the Unit's Leader. Recruitment actions are in process to hire a support scientist for heat therapy, tissue culture, and a technician for the sugarcane program.

Solanum

Since June, 1988 we distributed 82 new potato accessions. An additional 54 genotypes will be released from quarantine this fall if the final pathogen tests are negative. We received 97 new vegetatively propagated potato introductions; 39 as tissue cultures and 58 as tubers. Eighteen of the new accessions were from CIP and require one year of virus indexing, the remainder will undergo two years of testing before health status can be accessed. Germplasm collected by expeditions to Chile and Mexico constitute a major part of the present quarantine inventory. Our inventory also contains 103 infected accessions which will undergo heat therapy and re-indexing before they can be released.

We released 31 lots of true potato seed (TPS) since last June. The lots consisted primarily of germplasm from CIP and USSR. We received 227 new lots of TPS; 114 of which are in testing. The germplasm is primarily that collected by an expedition to Mexico. The remaining 78 TPS lots collected by an expedition to Chile will enter the testing cycle late this summer.

Ipomoea

Sweet potato germplasm was received primarily from Taiwan, Japan, Puerto Rico, and Nigeria. A total of 53 genotypes were acquired - 44 in tissue culture, 7 as vine cuttings, and 2 as roots. All 74 will begin the two year testing process in June, 1989. Testing will be concluded this summer on 26 genotypes received last year. Twenty-four clones were released from quarantine during the last year. We are holding 46 virus-infected clones for therapy and re-indexing.

Dr. Y. H. Hsu from National Chung Hsing University, Taiwan will visit NPGQL in June as part of an OICD sponsored grant to standardize the indexing of sweet potato and characterize viral pathogens. Other cooperators are Dr. S. Green of Asian Vegetable Research and Development Center, Taiwan and S. Hurtt, NPGQL.

Sugar cane

The sugar cane inventory now contains about 600 accessions. Three hundred and fifty clones were distributed since the last reporting. We continued to distribute germplasm to be used in the international smut test and dispatched sugar cane to seven locations. We received germplasm of about 450 new clones. Foreign accessions were primarily from Australia (175 clones), India (45), Brazil (24), and Columbia (17). Ratoon stunt and sugar cane mosaic continue to be the primary diseases detected among accessions. A cooperative agreement with Dr. M. Davis, Florida was implemented to improve the serological detection of Xanthomonas albilineans, the causal agent of leaf scald in sugar cane.

Pome Fruits

Over 100 new pome accessions were received in the past year. Many were the result of an expedition to Pakistan. Pears continue to constitute a major portion of the germplasm. Interest in oriental pears and apples remained at a high level. Importations from the USSR increased.

We continued our greenhouse indexing approach to pome virus indexing for the second year. Tests were conducted on 22 apples and 61 pears/quinces by this route. The incidence of apple viruses was high and only three accessions gave negative results in the initial tests for the common viruses. Approximately one-third of the pear accessions were infected. Field tests for pome fruits were continued for all accessions entering the indexing cycle since 1983.

Ten apple and pear accessions were heat treated to eliminate viruses. Preliminary tests indicate that the therapy was successful.

Prunus

A considerable effort is being placed on these crops because of the accumulation of accessions that has occurred during the past 10 years or so. Prunus is the only genus in which a backlog of accessions for indexing has occurred. In 1986 APHIS transferred the Prunus virus indexing program to ARS with an inventory of c. 500 accessions to be processed. APHIS also prescribed some 14 tests that must be performed on each accession, most of them twice, in an effort to detect any and all of the 30 or so internal pathogens that they may be infected with. Tests include mechanical transmission to herbaceous indicators, ELISA, EM, and graft transmission to sensitive woody indicators in the greenhouse and others in the field to inspect for fruit-deforming viruses.

During the past year ELISA serological tests were performed on 200 accessions, mechanical virus transmission tests on c. 100, and grafts to greenhouse woody indicators on c. 150 introductions. Nearly 1000 indicator trees in the field were "inoculated" with buds from c. 100 accessions. These must be observed for at least 3 years before release from quarantine will be permitted by APHIS. Those selected for indexing were taken from prioritized lists from the Prunus CAC. During the past year 115 new accessions were received from Pakistan; most were apricots. We anticipate releasing 50 Prunus accessions this year. We will continue to invite input from CAC's on what is most urgent to them.

Oryza

The NPGQL has been assigned the responsibility for Oryza quarantine processing. Cathy McLean was hired to run the program. At that time, 350 plant accessions (no seed) were turned over to NPGQL. Labeled accessions were grown-out, seed was harvested, and quarantine-released seed was sent to recipients and the National Small Grains Germplasm Research Facility. Unidentifiable accessions were eliminated from the program. Seed from 30 remaining plant accessions will be harvested this summer. The NPGQL automated Data Processing system is being adapted to the rice program. Communications procedures between NPGQL and the rice germplasm community are being revamped. Quarantine processing procedures have been revised completely and an Oryza Procedures Manual has been written. Seed accessions that arrived after October were planted in May of 1989 with expected harvest to occur in November.

Other Quarantined Crops

Current inventory includes c. 300 accessions of 25 other prohibited genera. Many are grasses, some are Ribes, Rubus, and shade trees. There are also a few introductions of woody ornamentals, tropical fruits, bamboo, cassava, etc. With a technician recently on board and assigned to these crops we expect to begin releasing them within a year.

Thermal Therapy Program

An appreciable number of accessions are infected with one or more viruses - especially among the deciduous fruits, small fruits and potatoes. Environmental chambers have been purchased; however, only recently were funds available to retrofit a room to accommodate them. We anticipate the equipment will be ready to operate by this summer and if successful in hiring a support scientist now in progress, this program will deal with the accumulation of virus-infected accessions on inventory.

ADP

A comprehensive ADP plan covering 1989 through 1992 has been developed. A contract computer programmer has been hired to assist Helen-Jean Talbott in developing the NPGQL ADP program. A temporary, full-time biological technician was hired to help automate NPGQL germplasm data.

A new pome fruit field inventory was taken for 1989. With a few exceptions, all wanted, nonquarantined apple accessions have been moved to the repository and all unneeded apple trees have been marked for removal from the NPGQL orchards. The apple pathogen-testing operation now has been stripped to essential, quarantine procedures, only. In cooperation with the pear CAC, unneeded and duplicate pear accessions are being eliminated from NPGQL orchards (several hundred accessions were removed in 1988). Bar coding activities continue to progress. Using new materials, new bar code labels were designed and ordered and the use of bar code labels for pathogen-testing operations was initiated. The data entry phase of the NPGQL passport system, for all crops, was developed. Data base and data entry screens for sugar cane pathogen-testing and inventory activities were established. The range data for PI'd apples were updated in preparation to load apple passport data onto GRIN during the summer of 1989.

Pathogen Detection Research

Recombinant cDNA clones of apple scar skin viroid and Prunus stem pitting isolate of tomato ringspot virus have been constructed. These clones were utilized to generate high specific activity ^{32}P-labeled cRNA probes. Probes were used to detect these pathogens in nucleic acid extracts of infected tissue by molecular hybridization. Testing period for apple scar skin viroid can now be reduced from several years by fruit symptoms on grafted woody indicators to a few days by hybridization assay. Comparison of molecular hybridization assay with enzyme-linked immunosorbent assay (ELISA) has revealed that the hybridization assay is more sensitive and accurate than ELISA for detecting tomato ringspot virus in infected nectarine or apple trees.

Professor C. Huang, a visiting scientist fom The People's Republic of China, participated in the apple scar skin viroid research project (November 1987 - October 1988).

- Howard E. Waterworth
Research Leader, NPGQL

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

June 1989

"Asleep within the seed the power lies,
Foreshadowed pattern, folded in the shell,
Root, leaf, and germ, pale and half-formed.
The nub of tranquil life, kept safe and dry,
Swells upward, trusting to the gentle dew,
Soaring apace from out the enfolding night.
Artless the shape that first bursts into light--
The plant-child, like unto the human kind--
Sends forth its rising shoot that gathers limb
To limb, itself repeating, recreating,
In infinite variety."

Goethe

LABORATORY LEADER OFFICE

Allan K. Stoner

The Germplasm Services Laboratory includes a number of important supporting elements that are essential to the effective functioning of the NPGS. These include the Plant Exploration Office, the Plant Introduction Office, and the Database Management Unit of the Germplasm Resources Information Network. Reports on major activities of these units and the Laboratory's activities in small grain evaluation, biotic diversity research, plant ecogeographic research, and Crop Advisory Committee facilitation follow. A significant change in the Laboratory during the year involved the physical transfer of the National Small Grain Collection to Aberdeen, Idaho, in September and October 1988.

Crop Advisory Committees - Mark A. Bohning The National Plant Germplasm System (NPGS) is currently supported by 39 Crop Advisory Committees (CACs) which provide crop specific advice on plant genetic resources. The activities of these committees are facilitated by the Germplasm Services Laboratory (GSL). During the past calendar year, all committees met at least once and a representative from the GSL attended all but one meeting.

The CACs are involved in numerous activities including 1) compiling lists of germplasm sources in the U.S. and worldwide (both collected and wild); 2) working with the plant exploration office to determine needs for additional germplasm and developing proposals to obtain material either through exchange or exploration; 3) advising germplasm curators on maintenance and increase techniques, etc.; 4) determining evaluation and enhancement priorities for their crops and developing proposals to accomplish these tasks; 5) working with the GRIN DBMU and germplasm curators to ensure that evaluation data entered into the database is accurate and standardized; 6) developing special reports for the ARS National Program Staff (NPS), the National Plant Germplasm Committee (NPGC), etc.

A few crops important to U.S. agriculture are not currently represented by a CAC and the possibility of incorporating these into an existing committee is being explored.

All of the CACs have been requested by the NPGS to develop a report addressing the status and needs of germplasm for their crop(s) with respect to: genetic vulnerability, collection, preservation, evaluation, and enhancement. These reports are being updated on an annual basis, or as priorities change.

Each of the CACs have also been asked to develop a report on the subject of 'Core Collections', and to determine its applicability to the U.S. germplasm collections. As the reports are received, they will be compiled and summarized by the Germplasm Services Laboratory.

The 2nd CAC Chair Workshop was held on July 18-20, 1988 in Beltsville, Maryland. All the CACs were represented and topics discussed included ARS budget process, plant exploration, evaluation and enhancement, core collections, and plant patents.

PLANT EXPLORATION OFFICE

Calvin R. Sperling

In order for the NPGS to become more proactive instead of reactive in germplasm acquisition, an initial list of national priorities for plant exploration was developed. This list was developed following an assessment of the germplasm in the current NPGS collections, what wild progenitors and relatives exist in nature and their potential value to agriculture. Input from Crop Advisory Committees was also sought. In addition, a new program was developed to search the GRIN database to provide information on what germplasm exists in any given country, so that it is possible to produce within hours a "hit list" of wild crop relatives desired from any country.

The following list of plant explorations was approved for FY89:

Plant Exploration	Country	Principle Contact	Funding
Solanum	Chile	D. Spooner	$13,702
Cuphea	Brazil	W. Roath	22,300
Food Legumes	Turkey	C. Sperling	18,325
Lotus	Morocco	P. Beuselink	15.550
Vaccinium	U.S.	N. Vorsa	8,982
Fragaria	U.S.	J. Luby	6,846
Allium	USSR	P. Simon	15,429
Forage Grasses	China	J. Chatterton	2,000
Forage Grasses	USSR	D. Dewey	4,000
Solanum	Mexico	D. Spooner	12,597
Forage Legumes and Grasses	India	D. Johnson	3,846 1/
Amaranthus	U.S.	D. Brenner	9,000
Helianthus	U.S.	G. Seiler	3,000
Ipomoea	S.E. Asia	D. Austin	21,924
Forage Grasses	U.S.	K. Vogel	5,000
Beta	Europe	D. Doney	12,179
Malus	USSR	C. Sperling	0 (ARS)
Cuphea	U.S.	W. Roath	3,200
Fruits and Nuts	India	M. Thompson	3,846 1/

1/ P.L. 480 Funds

A checklist has been developed to assist the PEO and the traveler in tracking progress as plans are developed for an exploration.

The Plant Exploration Office (PEO) continues to respond to the needs of scientists planning plant explorations. It can help scientists to develop the specific information required for a plant exploration proposal; review proposals for format and completeness; assist in making official contacts and/or obtaining necessary permits; provide maps or atlases; provide names of organizations or individuals who can provide information of value in planning plant explorations; and provide a list of do's and don'ts for germplasm collectors abroad.

Research activities involve collaboration in an in-situ study on the biology of wild wheat in northern Israel. An experiment is underway to study the effect of seed biology in the soil and how this will effect long term efforts to preserve genetic resources in-situ. Also, a collaborative project to increase and evaluate wild wheat germplasm was initiated between the Cereal Rust Laboratory in Tel Aviv, the Department of Plant Pathology, University of Minnesota, and the Germplasm Services Laboratory. Finally, a proposal has been submitted to the U.S. Agency for International Development for funding a joint research project to inventory the crop genetic resources of Manu National Park, southeastern Peru. Collaborators in the project will be the PEO, the World Wildlife Fund, and Fundacion Peruana para la Conservacion de la Naturaleza.

PLANT INTRODUCTION OFFICE

George A. White & Staff

There have been several staff changes in the Plant Introduction Office (PIO) during 1988-89. In late March of 1988, Maryann Loftus replaced Peggy Paciotti. Maryann is a Horticulturist; she handles many of the quarantine problems, responds to many requests for germplasm, oversees the records of plant material shipments, and carries out various other assignments. Dan Harmon, a technician previously assigned to the international cereal disease nursery program, was reassigned to PIO after the cereal collection was moved to Aberdeen, Idaho. Dan prepares the Crop Science Registration data for computer input and subsequent PI number assignment, prepares data on cereal crop germplasm for documentation and oversees our cold storage facility. Sharon Stern (Faculty Assistant-Botanist) returned to PIO after an absence of about two years. She coordinates our Plant and Seed Materials Project with AID.

Other staff members include:

Vicki Binstock - Faculty Assistant (Botanist)
David Manning - Shipment Assistant
Ruth Panesci - Clerk Typist
Jean Neal - Plant Introduction Program Clerk
Grace Garner - Computer Assistant
Becky Norris - Data Transcriber
Linda Wong - Bio-Aid (Student)

PI documentation - The 13,231 Plant Introduction (PI) numbers assigned to germplasm entering the U.S. National Plant Germplasm System during 1988 included corn from Peru & Mexico; sugarbeets from the United Kingdom; Ethiopian forages; pecans and hicans from the Brownwood Clonal; the flax collection from North Dakota; Kentucky Trifolium; Moroccan forages; and Triticum, x Triticosecale elite rust mildew lines from the International Wheat & Powdery Mildew Nursery progam. IBPGR-sponsored collections accounted for 4,958 items. Crop Science registrations totalled 277 PIs for the year. The assignment of 1,583 species to proper maintenance sites was made. Interaction with plant taxonomists resulted in the addition of many species to the taxonomy file.

The number of PIs assigned through May 31, 1989 is 4,967. A few examples are listed at the end of the PIO Section. USDA Plant Inventory No. 196 (parts I & II) for 1987 has been published and No. 197 (parts I and II) has been submitted for publication. With the close out of the IBPGR Liaison Officer for Documentation position at Beltsville, PIO assumed responsibility for handling all IBPGR-sponsored exploration collections that come to the U.S. These materials are logged in by PIO personnel in Database III. Inquiries regarding collection dates, plant materials, field data, etc. can be made through dialcom to the Board or the international centers. After PI assignment, a letter indicating the PI numbers, number of accessions, and species accompanies the records to Rome.

Exchanges - Foreign exchanges consisted of 30,697 items shipped to 82 countries in 1,101 shipments. Exchanges with several countries were delayed/hampered, or in extreme cases cancelled because of rigid quarantine requirements. Import permits had to be secured before shipment and additional declarations on permits were often impossible to meet. Dissemination of information about plant germplasm exchange was accomplished through invited presentations, reports to committees, visitors, invited papers, and program aids. The coordination of germplasm exchange between the U.S. and other countries benefits scientists working to develop improved crops and cropping systems and ultimately farmers in all countries.

Remember that PIO has two addresses as follows:

1. Requests for information/assistance with importing or exporting plant materials should be addressed to

   Dr. George A. White Phone (301) 344-3328
   Bldg. 001, Rm. 322
   USDA Agricultural Research Center
   Beltsville, MD 20705

2. Send all plant materials for overseas shipment to:

   Mr. David Manning Phone (301) 344-2048
   USDA Plant Germplasm Quarantine Center
   Bldg. 320, BARC-East
   Beltsville, MD 20705

   Include two copies of the transmittal letter/listing with the plant materials. Identify the plant materials by scientific name. Be sure to provide complete mailing addresses for the recipient and sender.

Persons involved in foreign plant explorations/travel that will result in the importation of plant materials need to check on quarantine entry requirements. PIO has heavy involvement in the quarantine arena and can assist.

Plant & Seed Materials Project (AID-funded) - During 1988, 571 accessions were dispatched to 35 countries in 63 shipments. In addition, 30 pending shipments of 114 items from 1988 await quarantine permits (Madagascar, Pakistan), inoculum for legume species, and in some cases, more seed. The main recipients of plant materials included Morocco, Pakistan, Indonesia, Bangladesh, India, and Madagacar. Forages (39%), cereals (22%), and vegetables (18%) accounted for most of the accessions. An article about the project was published in DIVERSITY. Greater usage was made of FAX and telex than in previous years. Project expansion is anticipated in 1989 through hiring a botanist and increased activities with several countries especially Madagascar, Pakistan, and Nepal. Continued efforts are needed to resolve quarantine-related problems and to obtain timely feedback of results.

So far in 1989, there have been 73 shipments of 583 accessions shipped to 40 countries. In order to fully automate shipment records pertaining to this AID project, we request that plant materials be sent to either Sharon Stern or George White. Sharon has captured electronically the information about all shipments for 1989. This effort is a prelude to doing the same for all overseas shipments.

General - PIO has extensive contacts in the States and abroad. Hence we make considerable use of telexes, telegrams, international phone calls, FASTOs and FAX. NPGS sites are encouraged, if not already done so, to obtain FAX capability. It's a great way to communicate. The FAX number for the Germplasm Resources Laboratory is (301) 344-3036.

Indexing of quarantined importations including tree fruits (Malus, Prunus, and Pyrus), vegetative accessions of grasses, sugarcane (vegetative and seed), potato, sweet potato, rice, and misc. species is done by the National Plant Germplasm Quarantine Laboratory-NPGQL (Glenn Dale and Bldg. 580 Beltsville) in close cooperation with personnel of the Animal Plant Health Inspection Service (APHIS). PIO assigns "Q" numbers and enters skeletal data to all items except sugarcane and rice at the USDA Plant Germplasm Quarantine Center (Bldg. 320). NPGQL assigns different quarantine identifiers to sugarcane and rice accessions and enters skeletal data on GRIN. PIO "dresses up" these data so that PI number assignments as appropriate upon quarantine release can be accomplished quickly. Except for sugarcane, PIO coordinates the foreign solicitation of germplasm that must be indexed by NPGQL.

Some examples of PI number assignments for 1988 and 1989 are given below:

Year	Crop(s)	Origin country/collector/other	PI range
1988	Sorghum/Pennisetum	Kenya IBPGR-sponsored	520775-521655
	Sorghum, misc. species	Malawi IBPGR-sponsored	521656-522095
	Sorghum	Gambia IBPGR-sponsored	522096-522161

	Linum	Loading of flax collection data, previously non PI'd accessions	522273-524420
1989	Gossypium	Loading of cotton collection data, previously non PI'd accessions	527985-530992
	Helianthus	U.S., Seiler, Pomeroy, Marinkovic	531009-531060
	Bothriochloa	People's Rep. of China Taliaferro	531200-531227
	Sesamum indicum	U.S., Texas A&M Univ. McBee, shatter resistant	531236-531241
	Helianthus/Zea misc. species	Hungary For Ames Station	531250-531498
	Hordeum/Triticum	Egypt PL 480 Project Moseman. Disease resistant	531863-532148
	Grasses	China, USSR, other Dewey Collection	531533-531835
	Arachis, Capsicum, other species	Northern Bolivia Williams	pending

EVALUATION OF SMALL GRAIN GERMPLASM

L. W. Briggle

Systematic evaluation of accessions in the USDA-ARS National Small Grains Collection (NSGC) was initiated in 1983. The entire Collection was moved from Beltsville, MD, to Aberdeen, ID, in the fall of 1988. Evaluations conducted during FY 1989 and thereafter will be directed by Dr. D. M. Wesenberg from the new Small Grain Germplasm Research Facility located at Aberdeen, ID.

A set of descriptors appropriate for each of the principal small grain crop species - wheat, barley, oats, and rice - was established in collaboration with the appropriate Crop Advisory Committees (CAC's) prior to 1983. A few minor changes have been made since that time.

Data on field descriptors have been obtained on approximately 33,000 wheat accessions, 11,000 oat accessions, and 9,000 barley accessions during the 1983-88 period. Special nurseries were grown for that purpose at Aberdeen, ID, and at Mesa or Maricopa, AZ. Grain was harvested from each field evaluation nursery to replenish seed stocks at Beltsville (and now Aberdeen) for distribution to research personnel, both domestic and foreign.

Field evaluation data were recorded on such descriptors as number of days from planting to anthesis (heading), plant height, spike (or panicle) type, spike (or panicle) density, straw lodging, straw breakage, seed shattering, and awn and glume characteristics, including color.

Spikes or panicles were collected from each evaluation or nursery plot at maturity to facilitate detailed laboratory analysis for seed characters and

for more precise spike or panicle descriptors than can be obtained under field conditions.

Weight of grain harvested from each evaluation plot was recorded. That grain will be used for further evaluation (for disease and insect resistance, quality factors, etc.) in addition to distribution as referred to above.

Duplicate oat and wheat accessions (named varieties that appear two or more times in the NSGC) have been grown and studied for identification at Aberdeen, ID. True duplicates were bulked and that "new" seed lot will be carried under the lowest CI or PI number involved in the bulk.

Evaluation for disease and insect resistance was initiated in 1983 and expanded each year since. Accessions evaluated so far are as follows:

Barley Yellow Dwarf Virus	1983-88	Davis, CA 15,000 wheats 7,000 barleys 4,500 oats	Urbana, IL 15,000 wheats 10,000 oats
Soilborne Mosaic Virus:	1985-88	Urbana, IL 10,000 wheats	
Hessian Fly:	1983-88	Lafayette, IN 24,000 wheats	
Crown Rust:	1983-85	Ames, IA 9,250 oats	
	1986	2,000 Avena sterilis	
Leaf Rust:	1983-88	Manhattan, KS 28,000 wheats	
Spot Blotch	1985-88	Fargo, ND 9,000 barleys	Athens, GA 2,200 barleys
Net Blotch	1985-88	Fargo, ND 7,000 barleys	Athens, GA 2,200 barleys
Barley Stripe Mosaic Virus	1986-88	Aberdeen, ID 8,700 barleys	
Common and Dwarf Bunt	1985-86	Pendleton, OR 5,000 wheats	
Stripe Rust:	1984-88	Pullman, WA 21,500 wheats	
Stem Rust:	1987-88	St. Paul, MN 4,700 wheats 184 Aegilops	Fargo, ND 290 Aegilops
Karnal Bunt	1988	Ludhiana, India 503 wheats	

Growth habit (winter, facultative, or spring type) determinations originally were done at Bozeman, Montana from a late spring planting made in June. Data were also recorded on field evaluation plots at Aberdeen, Idaho and Maricopa, Arizona when growth habit was apparent. In 1987 the growth habit evaluation nursery was shifted to Aberdeen, ID. Approximately 21,600 wheats, 3,400 oats, and 5,000 barleys have been tested for growth habit to date.

Many wheat accessions and some Triticum species in the NSGC are misclassified. Some misclassification occurs in the oats and Avena species, but to a lesser extent. The problem is minor in the barleys and Hordeum species, but all accessions need to be carefully checked. This is done at the time an accession is grown in any evaluation nursery.

Mixtures occur in some accessions in all NSGC crop species. Some accessions were actually heterogeneous populations when obtained, and will be retained as populations. Where appropriate, accessions are rogued and every effort made to clean them up, including establishment of special "Purity Nurseries" at Aberdeen, Idaho and Maricopa, Arizona. Those which cannot readily be rogued are grown in thinly planted 2-row plots bordered by another species. Spaced plants facilitate selection of only the original type plants.

An extremely valuable part of the National Small Grain Collection is that of the related species. For example, some 700 accessions of Aegilops species make up part of the wheat collection. There is a real need for taxonomic expertise so that all new introductions can be correctly classified upon entry into the NSGC. By far most of our current botanical classification problems could have been averted if there had been appropriate taxonomic input from the beginning. We do use ploidy analysis where possible, but that is expensive and time-consuming. Since 1983, 775 ploidy analyses hae been obtained. Most were used to differentiate between Triticum aestivum and T. durum when morphological characters overlapped. The need for taxonomic input as an integral part of the NSGC program cannot be overemphasized.

BIODIVERSITY

James A. Duke

Since reassignment to the laboratory, Jim, an Economic Botanist, has devoted most of his time to:

1. New Crops Symposium, Indianapolis, Indiana, October 23-26, 1988, where he presented two papers, "Promising Phytomedicinals" and "New Crops Survey." Duke was instrumental in getting Howard Scott Gentry, Dean of the Living New Croppers, invited as as speaker, and is preparing a survey for the magazine Diversity.

2. A Tropical Biodiversity project, collaborating with AID and Forest Service, in developing an economic survey of tropical non-timber forest products. This catalogs the diversity of products such as medicines, rattans, palm hearts, brasilnuts, rubber, resins, waxes, etc., one might obtain from extractive reserves of tropical agroforests.

3. An introductory chapter for a book on the insects and pests of five major tropical legumes, bean, cowpea, peanut, pigeon pea, and soybean.

4. Proactive Procurement of Unusual Germplasm, e.g.: Rauwolfia serpentina, source of an Asian Indian tranquilizer; Huperzia lucidula, American clubmoss, potential source of anticholinesterace activity; Castanospermum australe, Australian chestnut, with some antiAIDS activity; Hypericum spp., contains hypericin, an antivetroviral compound. (Note that hypericin is found in the klamath weed, star of a recent conquest by USDA biocontrol out west.)

   Trichosanthes kirilowii and Momordica charantia, famous for Compound Q, under clinical trial for AIDS.

5. Duke also prepared for an NAS workshop on Biodiversity and Folklore.

6. Working with Cal Sperling, the lab has developed a proposal to collaborate with Peruvian germplasm specialists on a triumvirate-sponsored (AID, USDA, WWF) collaborative effort to evaluate in-situ and ex-situ methods for the preservation of germplasm of tropical economic plants and their wild relatives.

ECOGEOGRAPHIC STUDIES

A. A. Atchley

During CY 1988, my support scientist (K. Williams) and I continued to develop applications of Artificial Intelligence to the National Germplasm Program. By the time of the Beltsville Symposium, the general theme of which was germplasm conservation, we had a working prototype (GAPP) of an "expert system" that can be used to guide efforts to improve germplasm collection coverage.

We continued to evaluate different software mapping packages for the breadth of their application, given the increased availability of microcomputers, to determining and displaying the coverage represented in current collections. Negotiations with our mathematical consultants in Denver on developing truly quantitative systems for estimating coverage using such statistical techniques as "bootstrapping" resulted in new efforts to involve the local Statistical Support Group. We began attempts to familiarize a member of the group with GRIN.

During 1989, I assumed responsibility for abstracting and transferring core collection technology from CAC's relatively advanced in core collection development to those less advanced, or at least to keep track of the 40 different systems that might be developed. In late March, I traveled to the NSSL and to the Phaseolus CAC meeting (Pullman, Washington) to investigate these matters. I also conferred with our mathematical consultant (Brenner) in Boulder, Colorado concerning an expert system for predicting the location of desirable germplasm using quantitative models.

The Phaseolus CAC appointed a subcommittee that includes me, to suggest criteria for setting up a core collection. The mathematical consultant seems to have made satisfactory progress.

K. Williams continued the downloading of AEGIS datasets to the microcomputer during this period. This should be completed in the next few weeks.

A writeup and/or hypertext system is being developed to keep track of the many different approaches to core collections being adopted by the various CAC's. I will work closely with the Phaseolus, Alfalfa, Wheat, and Tomato CAC's to facilitate their approaches in particular.

GERMPLASM RESOURCES INFORMATION NETWORK (GRIN)

J. D. Mowder

1. Data Recently Entered into GRIN:

   Aberdeen, ID (NSGC) - 437,467 observations on the Small Grains Collection were entered. These observations involved a variety of descriptors (agronomic and disease resistance) for each of the seven crops.

   Pullman, WA (W-6) - 54,341 horticultural characteristics were entered for the bean collection. A total of 15 descriptors were involved.

   Griffin, GA (S-9) - The entire sorghum data set was converted to the CAC approved list of descriptors and 3 new descriptors and their data were entered.

   Fargo, ND (Flax) - 2,148 flax accessions were given Plant Introduction numbers if needed and entered into the GRIN system.

   Glenn Dale, MD (GD) - Data for 1,500 quarantined Solanum samples were loaded.

   College Station, TX (Cotton) - 3,008 cotton accessions were converted to the Plant Introduction Office data format and loaded with new PI numbers.

   Davis, CA (CR-DAV) - Accessions and inventory data were entered for Vitis (grapes) and Prunus.

   Germplasm Services Laboratory - corrected countries of origin for all tomato accessions.

2. Data Being Prepared for Entry

   Aberdeen, ID (NSGC) - Approximately 150,000 new observation entries were submitted for keyentry and will be loaded into the Small Grains data sets when they become available.

   About 2200 rice accessions are being prepared for assignment of PI numbers and loading.

   Riverside, CA (CR-RIV) - The citrus collection is being verified and organized for assignment of PI numbers and loading.

Ft. Collins, CO (NSSL) - A systematic attempt to verify and assign PI numbers to thousands of cultivars is underway.

Oxford, NC (TOBAC) - A complete review of existing nicotania data will be undertaken.

3. Training Sessions Held in Beltsville or at the Site:

Aberdeen, ID (NSGC) - (2 separate sessions), National Arboretum, Orlando, Riverside, Mayaguez, Miami, National Seed Storage Laboratory, Glenn Dale, and Corvallis.

4. Major GRIN Demonstrations:

ASA Meeting, Anaheim, CA, December 1988

ASHS Meeting, Lansing, MI, August 1988

International Sorghum Meeting (SICNA), Lubbock, TX, February 1989

Rice Technical Working Group, Stuttgart, AR, February 1989

Phazeolus CAC, Pullman, WA, March 1989

Special Purpose Ford Legumes, Spokane, WA, January 1989

University of Maryland, College Park, MD, May 1989

Genetic stock data

Stoner, Mowder and Sinnott attended a comprehensive genetic stock center workshop in Urbana, Illinois. Suggestions and procedures outlined there will be incorporated into the genetic stock database prototype.

Patent database -

This database is expected to be completed in late 1989.

GRIN database enhancement

We have completed the major enhancement efforts started in 1988. This includes:

Consistency in the appearance and operation of maintenance modules.

Faster access to taxonomy, origin, and cultivar data.

Add an alternate inventory ID and 7 generic inventory data fields.

Change the data field in the previous name record to a creation date instead of the date it was updated.

Added new data fields to the range record.

Add counters to batch loaders and have better error handling.

Future database activities

Become familiar with other database management systems (i.e. Sybase, Ingres)

Computer hardware

Installed two new 19.2 Kbs Telebit asynchronous modems that have increased speed dramatically while keeping the transmission cost to a minimum. Have ordered four V.32 standard 9,600 baud modems because of several requests from Public users for this speed modem.

We have finally received authorization for a satellite communication test, however, it will still require several months to accomplish the test.

Personnel

Two senior programmer/analyst have left GRIN for career advancement. We are currently in the process of filling these positions to get the Database Management Unit fully staffed.

GRIN public access

The new public access are currently being prepared for release to the 400+ users by the end of June. New documentation will be distributed with the system that provides much better on-line assistance and a more simplified user manual. This system was developed with excellent support from a core of scientists selected to work with the data processing personnel during the analysis and design phase. We have made every effort to ensure it could be easily used by personnel unfamiliar with data processing.

Visitors

GRIN is constantly being visited by personnel from other countries who are interested in developing plant germplasm databases. We currently have a Korean visitor for 3 months who is interested in enhancing their plant germplasm information system.

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THE NATIONAL CLONAL GERMPLASM REPOSITORY FOR CITRUS

Michael L. Cagley, Curator
USDA-NCGR-Citrus
Route 2, Box 375
Groveland, FL 32736
904-787-5078

The National Clonal Germplasm Repository for Citrus is located near Leesburg, FL, at the A.H. Whitmore Foundation Farm, and is affiliated with the U.S. Horticultural Research Laboratory in Orlando, FL. The Repository itself is in its infancy at present, although there has been a Variety Collection maintained in the field at this site for some time. We are currently in the process of procuring equipment and staff, and are hoping to become fully operational within the next two years or so. Priority goals in the immediate future include entering accession data into the GRIN System, and developing pathogen-free materials for distribution.

Trees will be field grown for seed production and to evaluate for trueness to type. The accessions will also be maintained as trees grown in a screen house environment to reduce the incidence of insect vectored pathogens. Distributions will then be made from these trees in the form of budwood. We will soon begin a thorough cleanup of each accession prior to being placed into the screen house to assure pathogen-free distribution materials. This cleanup will be carried out via shoot tip grafting and thermotherapy, and verified predominately via indexing. We anticipate a period of two years or more to complete and verify pathogen elimination of the entire collection, although there will be pathogen free materials produced continuously throughout this time.

Distributions of accession material will be made free of charge to bona fide researchers around the world. We do not anticipate large scale distribution of budwood for quite some time. We will honor requests for diseased budwood provided the requestor is willing to receive such materials and provides the proper paperwork. We can honor requests for seeds as seeds have not been shown to transmit bacteria or viruses. Seeds will typically be collected and distributed once per year during late winter to early spring. The number of budwood and/or seeds per accession and request will be limited.

We are presently maintaining approximately 400 accessions. Of this total, we have 123 sweet oranges and hybrids, 46 mandarins and hybrids, 46 grapefruits and pummelos, 48 lemons, limes, citrons, etc., 27 sour oranges and hybrids, 74 trifoliate oranges and hybrids, and 33 citrus relatives.

There are two Clonal Citrus Repositories, one near Leesburg, FL, and another at Riverside, CA. The reason for this is that the quarantine restrictions between the states are so rigid that interstate distributions of citrus germplasm are severely restricted, and require long time periods. Thus having two Clonal Citrus Repositories helps to assure timely flow of citrus germplasm to researchers within the U.S.

Please direct any requests, comments, or questions to the address above.

NATIONAL CLONAL GERMPLASM REPOSITORY - HILO

Progress Report to the S-9, W-6 Regional Technical Committee

Prepared by: Dr. Francis Zee, Curator

The Hilo repository was officially dedicated on August 11, 1987. It was designated as the maintenance site for pineapple (Ananas comosus), breadfruit (Artocarpus altilis), papaya (Carica papaya), macadamia nut (Macadamia integrifolia), acerola cherry (Malpighia glabra), passion fruit (Passiflora edulis f. flavicarpa), guava (Psidium guajava) and related species. In March 1988, upon recognizing the diversity in tropical crops and the increasing potential usage of non-traditional crops in the market, the United States Congress requested that seven additional tropical genera be assigned to Hilo. The new crops are the atemoya (Annona squamosa and A. cherimolia hybrid), carambola (Averrhoa carambola), peach palm (Bactris gasipaes), pili nut (Canarium ovatum), lychee (Litchi chinensis), rambutan and pulasan (Nephelium lappaceum and N. mutabile), and related species.

1) Collection and Distribution

   a) In 1988, the NCGR - Hilo made 51 distributions of 169 plant accessions to scientists in the U.S. and foreign countries. In the same period the repository received 64 accessions from U.S., China, Taiwan and Thailand contributors. Fifteen litchi and rambutan cultivars at the Kona station are being air-layered for the repository.

   b) The NCGR - Hilo has provided tropical seeds, such as macadamia, jaboticaba, longan and litchi for Dr. S. Sowa at the National Seed Storage Laboratory (NSSL), Colorado, to conduct seed storage studies using nitrous oxide. The repository supplied black and brown citrus aphid colonies for the USDA - ARS entomologists at Beltsville, MD and Gainsville, FL (Dr. Ray Yokumi) for virus transmission studies. The repository supplied young 'Kapoho' papaya fruits (90 - 100 day old) for Dr. Richard Manshardt, U.H. Manoa, during November and December 1988, and January, 1989, for studies of incorporating cross-protection of papaya ringspot virus into papaya genome.

2) Maintenance and Evaluation - The repository is currently maintaining 536 accessions of plant germplasm as seeds or plants.

   a) At the Poamoho farm, 162 accessions of pineapple are field grown for fruit quality evaluation. An identical set of this collection is kept in the NCGR - Hilo greenhouse for maintenance and to be initiated into tissue culture. Over 100

of these accessions are in IN VITRO culture and are distributed to scientists and plantsmen in Hawaii, the U.S. mainland and China.

b) Forty-six accessions of breadfruit, seven accessions of acerola cherry, twenty-two accessions of macadamia and thirty-eight accessions of guava are being prepared for field planting.

c) Eighty-five of a total 209 accessions of papaya are at different stages of maturity in a continuous seed regeneration and evaluation program. All papaya lines are selfed of sibbed to maintain the diversity or trueness-to-type of the population.

d) Seventeen of the 52 passion fruit accessions were field planted and qualities evaluated in 1988.

3) Germplasm Resource Information Network (GRIN) - The repository recently adopted a batch transfer program to submit local germplasm information from DBase III files to GRIN, this significantly reduced the time and cost of data input and transmission to GRIN. Accession records from 329 NCGR - Hilo accessions have already been loaded into GRIN using this program.

List of Publications

Zee, F., Nishina, M.S., Chan, H. Jr., and Hishijima, K.A. 1989. Blossom end defects and fruit fly infestation in papayas following hot water quarantine treatment. HortScience 24(2) : 323 - 325.

List of Published Abstracts

Zee, F. 1988. The National Clonal Germplasm Repository for macadamia and tropical fruits in Hawaii. HortScience 23(3) : 725 Abst.

Zee, F. 1988. The relationship between the occurrence of blossom end defects and fruit fly infestation in hot water double dip quarantine treated papayas. HortScience 23(3): 806 Abst.

National Program Staff Report
June 20, 1989
Henry L. Shands

FY 1989 Budget: Congress approved $2.75 million of the $11 million requested for construction of the National Seed Storage Laboratory at Ft. Collins, CO. New funding was provided by Congress for two new germplasm projects at Aberdeen and Fargo. ARS has requested $8.75 million for the balance of the construction funds for NSSL. At this point in the budget cycle, we are awaiting the action of the conference committee.

Germplasm Funding:

Activity	FY 1987	FY 1988	FY 1989
Acquistion	$ 2,153,000	$ 3,184,000	$ 3,762,000
Preservation	6,484,000	9,497,000	10,175,000
Evaluation	5,504,000	8,142,000	8,537,000
Enhancement	4,209,000	5,633,000	6,029,000
TOTALS:	18,350,000	26,456,000	28,503,000

FY 1990 Funding: Germplasm activities are not scheduled to receive increases in the FY90 budget.

NSSL Planning and Design. Merrick & Co. of Denver was selected as the Architectural and Engineering firm to develop a cost estimate for the construction of the NSSL expansion. The plan to construct new vaults and laboratories would be complete in the fall of 1992 if funding and construction proceed on schedule. Remodelling of the existing NSSL building will take place after that move and will be ready in the fall of 1993. The design portion is expected to be completed in February.

CAC Chair Workshop. A workshop meeting of the CAC Chairs with members of the National Program Staff of ARS and curators throughout the NPGS will be held in Beltsville on July 17-18, 1990. Meetings have been held in 1986 and 1988.

Rifkin Lawsuit on Germplasm. The Foundation on Economic Trends' (FOET) suit against the Department of Agriculture charging mismanagement of the germplasm program and asking that the department be required to file an environmental impact statement has not been resolved. A request for oral argument by FOET was denied by the court in December 1988. USDA did provide additional discovery data requested in April 1989 after a series of Associated Press articles in late March presented some NSSL data. No date has been set when the case will be decided.

Plant Explorations. Eighteen plant explorations were funded during the FY89 year, a significant increase over the past. Difficulties are expected to increase in conducting explorations as a result of the international debate on the ownership of plant genetic resources. Several explorations were funded to support the collection of endangered or threatened species within the U.S.

NAS/Board on Agriculture study. The Academy study on managing genetic resources is expected to be completed during the 1989 calendar year. The several independent reports will be available from the NAS Press at that time.

Crop Science Society of America Symposium. The Symposium will be held at the annual meeting of the societies at Las Vegas, NV October 19, 1989. It will deal with the use of plant introductions in cultivar development.

National Plant Germplasm Committee special review. The NPGC conducted a special review of the major genetic stock collections during their May meeting at Urbana, Illinois. A special report will be distributed later in 1989.

ASA/CSSA Plant Patenting Workshop. The ASA and CSSA sponsored a plant patenting workshop in Anaheim, CA in January 1989 to bring together a multidisciplinary group to consider the effect of patenting on germplasm related issues. The workgroup report is available for purchase from ASA Headquarters, 677 S. Segoe Rd., Madison, Wisconsin 53711. A summary will be presented at the annual meeting at Las Vegas in October and review papers (6) will be published in combination with the papers(5) presented in the symposium at the ASA meeting in Anaheim, CA in November 1988.

Keystone Dialogue on Plant Genetic Resources. The dialogue was held at Keystone, CO in August 1988 to address the contentious issue of international ownership and stewardship of plant genetic resources. Attendees from many nations spent 3 1/2 days in work groups examining various solutions and reaching reasonable consensus on most. See DIVERSITY for a summary.

FAO Commission Meeting. The third session of the FAO Commission on Plant GGenetic Resources was held in Rome in April to consider its progress in addressing the FAO resolution 8/83 (the International Undertaking) dealing with plant genetic resources. Modifications to the original Undertaking were offered through "agreed interpretations" which must be approved by the FAO conference in November.

New Personnel. Since the 1988 meetings we have welcomed several new people into the NPGS activities: Calvin Sperling (Plant Exploration, GSL, Beltsville); Ned Garvey (Woody Landscape Repository, NA, Washington); Mike Cagley (Citrus Repository, Orlando); Howard Waterworth (National Plant Germplasm Quarantine Laboratory, Beltsville); Harold Bockleman (National Small Grains Collection, Aberdeen); Kathleen Rigert (National Clonal Germplasm Repository, Davis).

July 5, 1989

TO: National Plant Germplasm Committee

FROM: National Seed Storage Laboratory
Steve A. Eberhart, Director
Loren E. Wiesner, Curator

SUBJECT: Progress Report

We were very pleased that Dr. Loren Wiesner accepted the Supervisory Plant Physiologist/Curator position in January. Toni Pisano and Julie Fleming were shifted from temporary to permanent Computer Clerk/Assistant positions, September, 1988, to fill one new position and to refill a vacancy from a resignation. The number of Biological Laboratory Technician positions in the Germination Laboratory was increased from five to seven. Frank Dickey was transfered from a temporary to a permanent position and Vicki Hermandez was a new hire. With the expanded use of computers, we added a Computer Programmer position. Freda Thomas was hired in this position February, 1989.

During 1988, 13,184 new accessions were added to the Base Collection and 4, 804 accessions were regenerated. These additions increased the Base Collection to 232,210 samples. Many of the new accessions were duplicate samples of germplasm from the Working Collections at the RPIS not previously stored at NSSL. Of the 13,264 samples evaluated in the germination laboratory in 1988, 5,859 initial germination tests were made and 7,405 accessions were retested. An additional 7,236 germination tests were completed for the RPIS under contract with the CSU Seed Testing Laboratory. Shipments were made to 74 scientists totalling 865 accessions. 1,962 accessions were shipped to RPIS for regeneration. Seed of 2,112 sorghum accessions from Africa were sent to St. Croix for seed increase under a quarantine permit.

The Associated Press recently prepared and widely distributed an article on the National Plant Germplasm System containing misleading information. The reliability and sample size status can be summarized as follows:

Germination Status*	TESTED FOR GERMINATION Sample size above 550	Sample size below 550	Sub-total	NOT TESTED Sample Size below 550	Total
Above 65%	114,534 89%	50,069 91%	164,603 90%		
Below 66%	13,558 11%	5,042 9%	18,600 10%		
Total	128,092	55,111	183,203	49,007	232,210

*Based on germination tests in the past 10 years

The increased base for operating funds beginning in FY88 for NSSL and the
Regional Plant Introduction Stations makes possible an accelerated regeneration schedule for accessions with sub-standard viability or seed number. The RPISs also are making seed increases of unique accessions in their working collection and are providing duplicate samples for the Base Collection at NSSL. Both of these activities are increasing the requirement for storage space in the NSSL seed vaults, and increasing the work load to process this incoming seed.

Completion of the NSSL expansion on schedule in 1992 is critical. Merrick and Company, Denver, Colorado, has been awarded the design contract. The Program of Requirements, the Investigative Report, and the 15% and 35% Design Reports have been completed. (Appendix A, attached, includes a preliminary version of the floor plans and site elevations). Congress appropriated 2.75 million dollars in FY89 for construction and the remaining 8.75 million has been requested in the FY90 budget.

In the present facility eight of the nine seed storage vaults are full and the last vault will be filled in the near future. We have purchased movable carts that will be stored in the aisles. Although labor costs will be higher, use of the carts will increase the capacity of the current vaults until the expanded facility has been funded and constructed. The design of the work stations in the germination laboratory limited the capacity for germination tests. These were redesigned and replaced to accommodate an expanded staff (14 vs 8) to process the increased work load. The data processing room has also been rearranged and expanded into other offices to provide space for the additional staff. High speed personal computers and a local area network have increased the capacity of this section.

NSSL Progress Report/Eberhart & Wiesner

Theoretical and empirical results from the Plant Germplasm Research Unit indicate that cryopreservation will extend the life of seeds in storage. Routine storage in liquid nitrogen of small seeded species of the Base Collection has been initiated. A small temporary cryo-annex was added to provide space for 16 cryotanks to permit the implementation of this technology. This will supplement the limited space available in the conventional cold storage vaults during the next three years. 432 wheat and 19 barley genetic stocks, 100 wheat accessions, 53 sugarcane accessions and 300 rye accessions were placed in liquid nitrogen.

The attached tables show the changes in the budget and staffing since 1983. The 232,000 accessions include 2000 different species. However, the cereal crops represent approximately half of the total accessions.

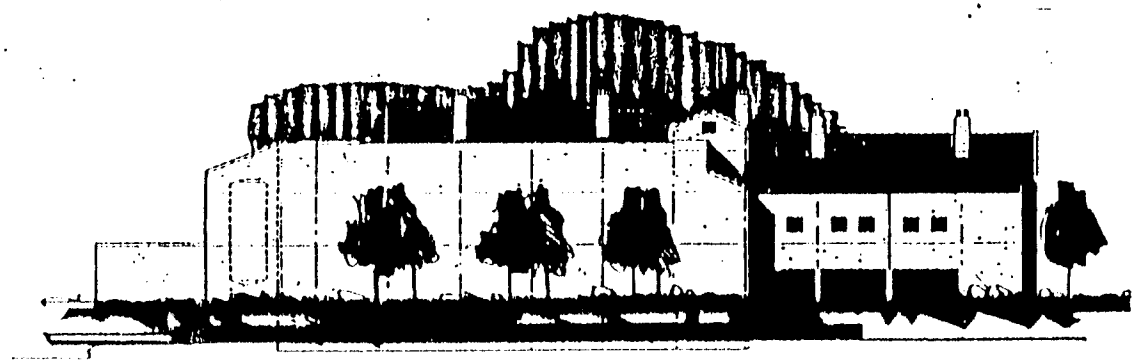
NSSL Budget

Year	Seed Viability and Storage	Plant Germplasm Research	Total
FY 83			585,900
FY 84	444,400	451,600	896,000
FY 85	425,300	456,100	881,400
FY 86	454,000	527,300	981,300
FY 87	421,915	505,665	927,580
FY 88	1,230,692	773,704	2,004,396
FY 89	1,228,614	777,719	2,006,333

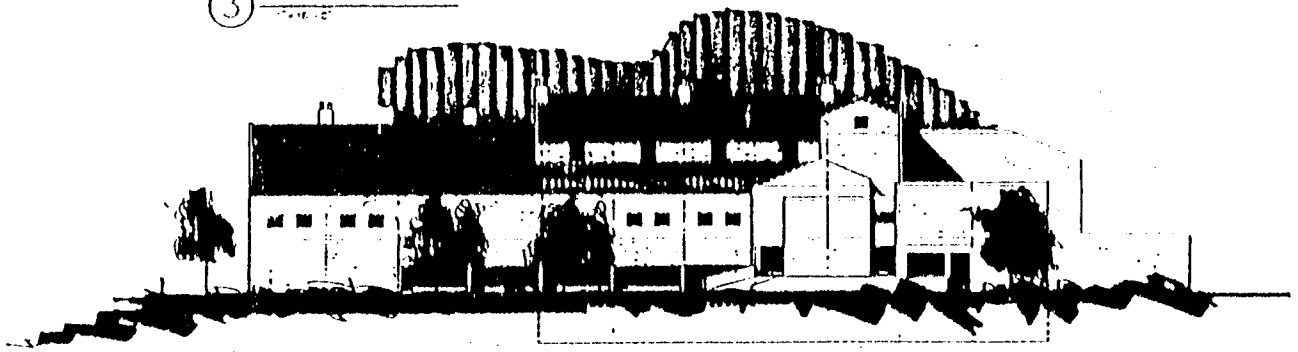
NSSL STAT. ICL

NSSL Staffing

	Seed Viability and Storage				Plant Germplasm Research				
Year	Scientist	Technicians	Tempo-rary	Sub-total	Scientists	Technicians	Tempo-rary	Sub-total	Total
FY 83	3	10	3	16	1	2	2	5	21
FY 84	2	11	2	15	2	2	2	6	21
FY 85	2	10	2	14	3	6	1	10	24
FY 86	2	10	1	13	3	5	5	13	26
FY 87	2	11	2	15	4	5	2	11	26
FY 88	2	12	4	18	4	6	2	12	30
FY 89	2	15	6	23	5	5	1	11	34



3 NORTH ELEVATION



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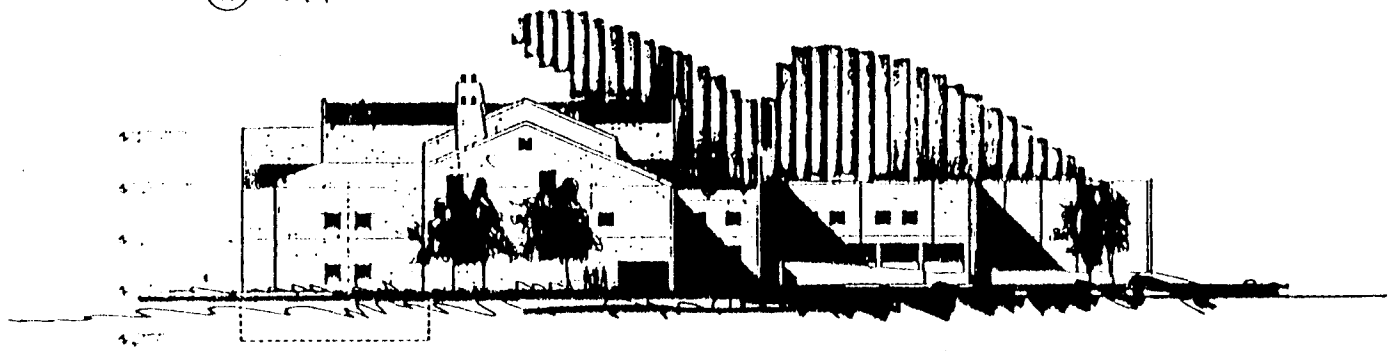

1 WEST ELEVATION

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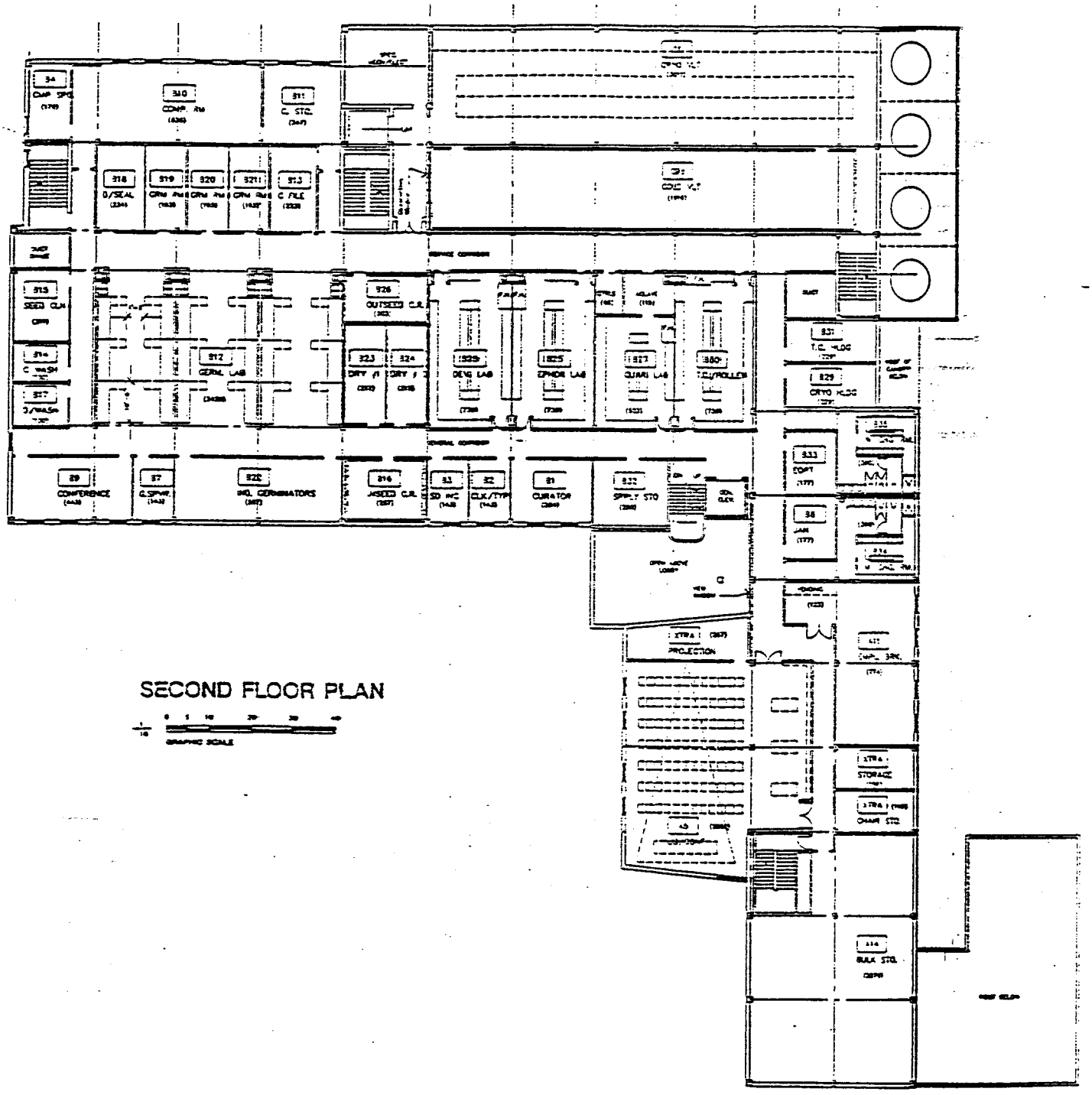

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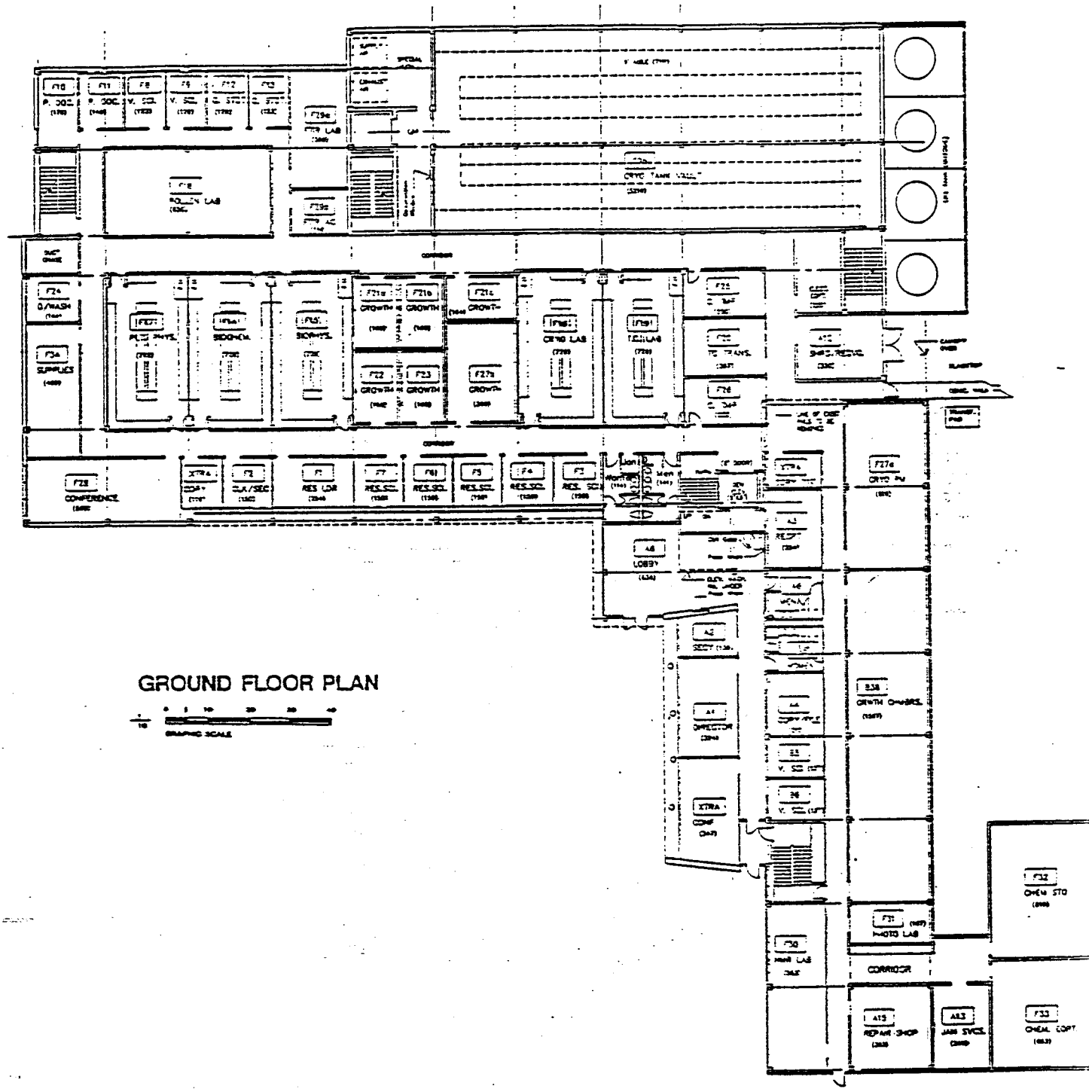

GROUND FLOOR PLAN

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April 27, 1989

TITLE: REPORT - PLANT GERMPLASM PRESERVATION RESEARCH UNIT CY 1988

TO: National Plant Germplasm Committee
Regional Technical Committees on Plant Germplasm

FROM: Eric E. Roos, Research Leader
PGPR, National Seed Storage Laboratory, Fort Collins, CO 80523

INTRODUCTION

The following significant events occurred during 1988:

1. Sharon Sowa, Research Chemist, completed her Ph.D in biochemistry in May and joined the PGPR unit as a recipient of an ARS Research Associate Fellowship.

2. In September RJR-NABISCO awarded a $100,000 grant (renewable for 2 additional years) to Drs. Roos, Sowa and Vertucci for research on early detection of seed deterioration, methods for reinvigoration of deteriorated seeds, and the role of lipids in the preservation of seed and plant germplasm.

3. Leigh Towill was awarded an ARS Research Associate Fellowship for work on cryopreservation of pollen. Dr. Kristina F. Connor accepted the position and joined the PGPR unit in January, 1989.

RESEARCH PROGRESS

Kristina F. Connor (Plant Physiologist):

Newly hired January, 1989. A bibliography has been compiled on plant species having pollen which has been successfully exposed and retrieved from liquid nitrogen (see attached). Future work will emphasize methodologies to determine pollen viability and evaluation of the effects of cooling rate, cryoprotectants and other factors affecting the survival of pollen at liquid nitrogen temperatures.

Eric E. Roos (Plant Physiologist):

The severe drought conditions which prevailed in the summer of 1988 suggested the possibility of obtaining seeds produced under unusual conditions. Various seed companies were contacted to obtain lots of soybean and corn seeds produced under irrigated and non-irrigated conditions. In soybeans seed size was greatly reduced under non-irrigated conditions (9.03 vs 14.28 g cwt) vs irrigated. Germination was about the same (80% vs 83%) in non- vs irrigated. Irrigated soybean seeds produced fewer splits and half seeds and fewer immature seeds than non-irrigated.

Differences were less dramatic in corn seeds for seed weight (20.65 vs 19.85 g cwt, irrigated vs non-irrigated). There were many more insect damaged seeds in the irrigated corn (10.0% vs 1.95%, irrigated vs non-irrigated). This probably accounted for the lower germination in the irrigated corn (87.5% vs 96%). These seed lots are being prepared for storage under various temperature regimes.

Cooperative research with Dr. Frank Moore, Department of Horticulture, CSU has focused on the use of seed leachates to measure seed quality (in this case germinability). By measuring conductivity of the leachate solution from individual seeds a frequency distribution can be plotted. Various parameters have been evaluated and correlated with germination. Internal slope, which is defined as the slope of a line tangent to the inflection point of the cumulative frequency distribution (an S-shaped curve). Using 31 seed lots of red clover, varying in germination from approximately 5 to 95%, we found that the model $Y = a - b/X$ (a rectangular hyperbola), where Y = germination and X = internal slope, was highly significant (R^2=0.81).

Preliminary results on leaching of Phaseolus vulgaris seeds indicates that leaching data may be obtained after as little as two hours of soaking. If very short time periods can be employed this test

may approach our goal of a non-destructive assay of seed quality. Much more effort is needed before this can be demonstrated.

Sharon Sowa (Research Chemist):

Studies were conducted regarding correlation of effects of external respiratory modifiers on bean seed germination, mitochondrial activity of isolated particles, and activity of partially purified cytochrome oxidase. The modifiers include carbon monoxide, ethanol, nitrous oxide, and deuterium oxide. An extremely close correlation was seen between the inhibition of mitochondrial respiration and reduction in seedling root length. The more specific the effect of the modifier on cytochrome oxidase, the closer the correlation was between enzyme activity and vigor.

The completely reversible inhibition of mitochondrial respiration under nitrous oxide was applied to testing storage longevity of recalcitrant seeds. Samples of seed obtained from Francis Zee, NCGR, Hawaii, were stored under 80% and 100% N_2O and under air as control. Longan seeds showed a definite increase in germination under anesthetic storage. Experiments are currently in progress with macadamia and passionfruit. These studies will be continued as more seed becomes available. Similar experiments were conducted on cell suspension cultures in collaboration with Leigh Towill. The reversible inhibition of respiratory activity by N_2O has been observed at the enzyme, organelle, whole cell, and whole seed levels.

An extensive literature survey was conducted to provide a basis for the spectroscopic observation of plant biochemical metabolism. An FTIR spectrophotometer was selected and purchased, and as soon as it is operational, will be used to pursue the investigations described above, i.e. early detection of seed deterioration. A grant proposal to IBPGR was prepared in hope of initiating a collaborative NMR project with the CSU chemistry department to provide complementary spectroscopic analysis of plant metabolism.

Philip C. Stanwood (Research Agronomist):

FTIR analysis of wild rice embryos conducted at UC Davis suggested that membrane lipid phase changes were closely associated with desiccation damage. The preliminary results also suggest that a full lipid phase diagram could be developed for wild rice embryos which would greatly aid the overall understanding of desiccation damage in seeds.

Seed samples in the research pilot project were determined to be of greater importance in the NSSL base collection and were begun to be transferred to them. A large amount of effort and time (in excess of 50% of my groups time) was devoted to transferring these materials, training the preservation staff in cryopreservation handling procedures, developing routine protocols for cryopreservation, setting up a local area network for data transfer and developing hardware interfaces and software to facilitate moisture testing of LN2 materials. This is part of an ongoing effort of the research staff to support the preservation group in implementing new technologies to the preservation group activities.

Seed borne pathogens of lentils were just equally viable after four years in storage at 5, -18 and -196 C. Seed deterioration had begun in the infected seeds at the warmer temperatures.

Corn seed from differing genetic sources showed varying responses to drying from 14% to 7% moisture. Thirty percent of the selections indicated some sensitivity to drying. Approximately 10% of the selections showed sensitivity to liquid nitrogen exposure, however, it was not clear if it was due to drying or LN2 exposure. This study is scheduled to be continued for at least four years.

Preliminary results from seed materials held in liquid nitrogen for 10 years suggest that the materials are in better physiological condition than seeds stored at warmer temperatures. Differences were most noted in seeds stored at 5 C compared to -196 C. In-depth physiological evaluation of these materials are to be conducted this year.

Leigh E. Towill (Plant Physiologist):

A number of problems for application of cryopreservation to diverse species were identified from past experiments on the cryobiology of plant cells and organs. We have examined how LN-treated buds

from several species develop in vitro. Most tips did not directly develop into shoots, but first formed a small proliferation (callus) prior to the rather quick appearance of organized meristems. Qualitative traits such as leaf shape and color, leaf hairs, vine characteristics, flower inflorescence type, and flower morphology and color were examined in 1200 regenerants from control and LN-treated mint samples. No abnormal individuals were observed. Observations were made for regenerants of 2 potato cultivars in a field planting and studies are continuing.

Methods developed were applied to shoot tips derived from several other species. Plant regenerants were observed in most species; however as before, shoot regeneration in most cases followed a brief callus or disorganized growth phase. Various treatments have been examined to improve survival. Major effects were observed by applying osmotic stress during preculture (0.75-1.0M sucrose or mannitol) and room temperature dilution after treatment. Dilution at room temperature is distinctly better than at ice temperatures, although rate of dilution did not influence the response.

Studies were begun in Nov. 1987 with apple to determine the extent of desiccation and proper acclimation stage necessary for survival after LN exposure. Conductivity of leachates and browning response from the buds were used as viability estimates. Leakage requires further analysis to assess usefulness. Preliminary experiments suggest LN treatment of dormant, somewhat dried, vegetative buds gave survival for diverse apple genotypes. A plan was devised in cooperation with the Clonal Repository at Geneva, NY to initiate long term storage of apple lines within the repository.

Christina W. Vertucci (Plant Physiologist):

In all of the studies, we have looked for relationships between bound water and physiological activity. By correlating the energy associated with the water transition with water content, we have identified two types of bound water in seeds: water that is unfreezable (A) and water that melts but is not observed to freeze (B). In apple buds, only one type of bound water has been identified. The amount of bound water corresponds to the level of hardiness in the buds.

In freezing injury studies, we have found that under most circumstances, there is intracellular ice formation at water contents lower than where freezing injury is expressed. That is, the formation of ice from type B water does not induce damage. Only when seeds with high oil contents are exposed to temperatures lower than the freezing temperature of the lipid is there an agreement between the moisture content of freezing injury and the moisture content at which type B water exists. Injury to seeds exposed to low temperatures can also occur when there is no freezable water present. We have related this observation to the formation of glasses in the lipid component of seed tissues.

Studies of oxygen uptake in seeds treated with various inhibitors as a function of water content have repeated earlier findings and clearly show that oxidative reactions occur at low moisture levels but these are not due to mitochondrial electron transport. Rate of seed deterioration and levels of heat evolution correlate with the rate of oxygen consumption.

Studies relating lipid properties with seed longevity have demonstrated no correlations between lipid content, transition temperature or energy of transition of extracted lipid with aging rates of 75 seed species. However, a significant correlation exists between the energy of the lipid transition in vivo and aging rates. Seeds with greater transition energies (or fluidities) have lower longevities. In soybean, water content influences the fluidity in a similar manner to its influence on seed aging rates. Heating thermograms show qualitative differences between fresh and deteriorated seeds. In addition the fluidity of lipids are reduced in seeds which are deteriorated.

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Plant Germplasm Preservation Research Unit
USDA-ARS National Seed Storage Laboratory
Colorado State University Campus
Fort Collins, Colorado 80523

4/26/89

SUCCESSFUL LIQUID NITROGEN STORAGE OF POLLEN FROM SEVERAL SPECIES

Prepared by: Kristina F. Connor, Research Associate, National Seed Storage Laboratory, Fort Collins, CO 80523

CLONAL SPECIES

Species	Location of Research	Ref.
Carica	Indian Inst. Hort. Res.	1,2
Carya	USDA-ARS, Georgia	3
Citrus spp.	Indian Inst. Hort. Res.	4
Corylus	USDA-ARS, NCGR, Corvallis	5
Diospyros kaki	Japan	6
Fragaria	USDA-ARS, NCGR, Corvallis	5
Humulus	USDA-ARS, NSSL, Ft. Collins	7
Juglans nigra	Unknown*; T.V.A.	8,9
Juglans regia	Univ. of Calif., Davis	10,11
Malus spp.	Hungarian Acad. Sci.	12
Malus pumila	N and S Centr. For. Exp. Sta.	13
Olea europaea	Univ. of Calif., Davis	14
Persea americana	CSIRO, Adelaide, Australia	15
Phoenix dactylifera	USDA-SEA-ARS, Pasadina, Albany, CA	16
Phoenix reclinata	See above	16
Phoenix sylvestris	See above	16
Prunus spp.	Univ. of Calif., Davis	17
Prunus cerasus	Hungarian Acad. Sci.	12
Prunus persica	Fruit Tree Res. Stn., Japan	18
Pyrus spp.	USDA-ARS, NCGR, Corvallis	5
Pyrus communis	N and S Centr. For. Exp. Stns; The Netherlands	13,19
Pyrus malus	The Netherlands	19
Pyrus serotina	Fruit Tree Res. Stn., Japan	18
Rubus	USDA-ARS, NCGR, Corvallis	5
Saccharum spontaneum	USDA-ARS, Honolulu, HA	20
Vaccinium	USDA-ARS, NCGR, Corvallis	5
Vitis	Indian Inst. Hort. Res.; USSR	4,21
Vitis vinifera	Indian Inst. Hort. Res.; and U. of Calif., Davis	22,23

*The site where this research was performed is unknown.

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NONCLONAL SPECIES

Species	Location of Research	Ref.
Allium cepa	Indian Inst. Hort. Res.	1
Antirrhinum majus	Cornell Univ. Ag. Exp. Stn.	2
Avena sativa	Univ. of Arkansas	3
Beta	Beet Sugar Dev. Found. and and USDA-ARS, NSSL	4
Brassica	Nat. Veg. Res. Sta.; UK	5
Cryptomeria japonica	Asahigaoka Jr. High, Japan	6
Glycine max	Univ. of Arkansas	3
Gossypium hirsutum	See above	3
Helianthus	Hungarian Acad. Sci. and Cereal Res. Inst., Hungary	7,8
Jojoba	Colorado St. Univ.	9
Larix leptolepis	Asahigaoka Jr. High, Japan	10
Lilium longiflorum	W. Virginia Univ.	11,12
Lupinus polyphyllus	Unknown	13
Lycopersicon esculentum	The Netherlands	14
Medicago sativis	Univ. of Arkansas	3
Paprika	Hungarian Acad. Sci.	7
Populus tremuloides	N and S Centr. For. Exp. Stns.	15
Primula obconica	Punjab Ag. Univ., India	16
Pseudotsuga menziesii	NW For.-Range Exp. Stn. and For. Sci. Lab., Corvallis	17,18
Rhododendron catawbiense	N and S Centr. For. Exp. Stns.	15
Secale cereale	Univ. of Arkansas	3
Solanum spp.	USDA-ARS, NSSL*; Univ. of Birmingham, England	19,20,21,22
Sorghum bicolor	Univ. of Arkansas	3
Trifolium aestivum	See above	3
Trifolium pratense	Unknown	23
Zea mays	W. Virginia Univ.** and Hungarian Acad. Sci.	7,11,12,24,25

*USDA-ARS, NSSL refers to refs. 19,20,21.
**W. Virginia Univ. refers to refs. 11,12; Hungarian Acad. Sci. to 24,25.

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Report for 1989 Meetings of the W-6, S-9,
and NC-7 Technical Committees

Organization

October, 1988 saw the organization of NRRC modified from twelve research groups to fourteen. One of these new groups was New Crops Research, headed by Robert Kleiman. The direction of the research is to commercialize new industrial crops, specifically meadowfoam (Limnanthes), Lesquerella, Cuphea, jojoba, and guayule. Each one of these crops requires a different type of activity. Product development is necessary for Lesquerella and meadowfoam; processing research is important in Lesquerella and Cuphea; meal detoxification is important to jojoba's development; germplasm evaluation is to be carried out for Cuphea; and quality and analysis is necessary for guayule. Of course, there still is expertise in other areas which gets this group involved in other industrial crops such as Vernonia, crambe, high-erucic rape, and the umbellifers.

Limnanthes (Meadowfoam)

Two scientists are working full time to develop new application from meadowfoam oil. They are producing vulcanized products, amides, and polymers to be used in lubricants and other uses.

Hydroxy-acid oils and Lesquerella

A task force has been formed to promote development of Lesquerella oil as a supplement and replacement for imported castor oil. At a meeting in Phoenix in March 1989, the task force reviewed the status of Lesquerella, viewed experimental plots, laid the groundwork for pilot plant oil extraction studies (July 1989), and explored mutual interests and possible future cooperation with a Phoenix-area cotton seed extraction mill. Available germplasm and agronomic experience suggests that a small commercial production effort could be made within 5 years assuming laboratory product development efforts warrant such activities. For example, experimental lubricating greases have been made from Lesquerella oil derivatives. Pilot quantities need to be made so that fully-formulated lubricants can be tested under standard conditions and their in-use performance evaluated. Five-hundred pounds of seed will be processed by two standard oil extraction procedures in a July 1989 pilot plant study at a major manufacturer of oil extraction equipment. The study should identify potential processing problems, and provide an excellent basis for scale-up to a commercial facility. A second pilot plant study is planned to demonstrate and evaluate state-of-the-art extrusion processing with a like quantity of Lesquerella seed. Oil will be used in product development research, and meal will be used in small animal feeding studies to evaluate the feed potential of defatted Lesquerella meal.

High Erucic Acid Oils

A high erucic acid oils project was established through the USDA's Office of Critical Materials, CSRS, in 1986. The project is directed by a Management Committee derived from Directors of Experiment Stations/Cooperative Extension Programs at eight universities (IL, IA, MO, KS, NE, ND, NM, ID) and ARS, CSRS,

and state and university personnel with special expertise with crambe and rapeseed. Projects of the Committee are planned, directed and carried out through Production, Processing and Marketing Subcommittees consisting of multidisciplinary teams of scientists. Committee sponsored and promoted projects include research on: agronomy; seed production and maintenance; breeding, seed selection and improvement; pilot plant oil extraction; laboratory seed processing; product synthesis and evaluation; animal feeding; marketing and product development; and development of public-private partnerships to enhance market development activities with industry. The Committee interacts with companies currently contracting for commercial acreage of rapeseed. Efforts are being made to crush excess crambe seed, while maintaining a level of readiness to be able to quickly initiate crambe production and increased rapeseed production as warranted by market development activities.

Epoxy oils and Vernonia galamensis

Original Ethiopian germplasm of V. galamensis collected by Dr. R. E. Perdue, Jr., has proved to be an excellent source of epoxy acid (vernolic acid), and an excellent seed producer in Kenya and Zimbabwe. Early plantings in the U.S. provided evidence of flowering and seed set. The oil was shown to form excellent baked coatings on steel panels, and interesting interpenetrating polymer networks with other polymers. Use of vernonia oil as a reactive diluent in commercial-type paints and coatings is now being aggressively pursued, because EPA regulations will soon mandate a drastic reduction in emissions of volatile hydrocarbons from high-solvent content paints and coatings. Another exciting development is that Dr. Anson Thompson (Water Conservation Laboratory, Phoenix, AZ) is finding that a number of vernonia selections, provided by Dr. Perdue from his later germplasm collections, are flowering heavily and setting seed in Arizona. These developments suggest that Vernonia galamensis may have crop potential in the U.S.

Plant Bioactive Compounds

A male-produced aggregation pheromone was demonstrated in the nitidulid beetle, Carpophilus hemipterus. Both sexes fly to the pheromone in a wind tunnel. The pheromone is strongly synergistic with various food-derived volatiles. Two novel hydrocarbons were identified as pheromone components and were synthesized. Two new liminoids having insect antifeedant activity have been isolated from seed of Sandoricum koetjape. A study of the antifeedant activity of the dogwood tree (Cornus florida) has revealed that the activity is associated with a complex glycoside aglycone of undetermined structure. A series of loline alkaloid derivatives has been prepared and is being tested for activity in the fall armyworm and European corn borer assays. Several additional plant extracts that have demonstrated insecticidal activity have been selected for fractionation studies. Information obtained will be useful in the design of new ecologically acceptable methods for the control of insects.

Sixty-three strains of the pathogenic fungus Giberella pulcaris isolated from diseased plants and from soil were tested for tolerance of 16 furanocoumarins or furanocoumarin precursors. All plant-derived strains were highly tolerant

of the compounds; strains from soil were tolerant of the precursors but were generally susceptible to furanocoumarins. Tolerance was usually correlated with metabolism; and a putative, nontoxic metabolite of xanthotoxin was isolated and characterized. A new phytotoxicity bioassay procedure suitable for poorly water-soluble compounds was developed and tested. The method requires about one-tenth of the material necessary for the velvetleaf germination test previously used and is applicable to many test species. Medicarpin, an alfalfa phytoalexin, was shown to be a factor in alfalfa autotoxicity. When applied to seedlings, it delayed their growth and reduced seedling length. Alfalfa seedlings concentration is reduced to a nontoxic threshold level; then growth resumes. Soil from an allelopathic alfalfa field contained medicarpin; that soil and its extract inhibited alfalfa germination and growth. (-)-5'-Methoxysativan, a new isoflavan, was isolated from alfalfa and its structure elucidated. Neither sativan nor the new compound appear to be as toxic to alfalfa as medicarpin. Information obtained will assist in improving alfalfa yields and in the design of new herbicides and fungicides.

Several new trichothecenes were isolated and characterized. Two 13-C labeled putative intermediates of T-2 biosynthesis were prepared by feeding mutants 13-C labeled glucose as a carbon source. The metabolism and detoxification of furanocoumarins by the phytopathogenic fungus Gibberella pulicaris (Fusarium sambucinum) has been studied. The influence of endophyte status and water regime on alkaloid levels and toxicity in tall fescue paddocks has been studied. A novel class of mycotoxin, fumonisins, which have been reported to cause Equine Leukoencephalomalacia have been identified in corn samples associated with field cases of the disease. Fumonisin levels correlate well with hepato- and renal toxicity in rats. Isolation of enough pure material for rat toxicity studies is in progress. Analysis of the pterocarpan glycinol, which was elicited in the presence of labeled oxygen (in O-2 or water), by tandem mass spectrometry has established that the 6-alpha oxygen is derived from molecular oxygen. A procedure using mass spectrometry for the assignment of ring substitution pattern for substituted furanocoumarins has been reported. The identification of platelet-activating factor in a biological sample by tandem mass spectrometry has also been reported. These studies of plant fungal interactions should lead to reduction in losses currently suffered by grain and livestock producers.

Efficient procedures have been developed for: (a) the isolation of loline, a saturated pyrrolizidine-type alkaloid (as the dihydrochloride), from tall fescue seed; (b) conversion of loline dihydrochloride, in high yield, to any of the other naturally occurring loline derivatives; and (c) accurate analysis of loline alkaloids in fescue seed and forage samples by capillary gas chromatography or gas chromatography-mass spectrometry. Detailed proton and carbon NMR data was also recorded for all of the loline derivatives. The presence of N-methyl loline in endophyte-infected tall fescue was noted for the first time. The loline alkaloids are of interest as they are suspected contributors to several disease syndromes in cattle that consume tall fescue infected with endophytic fungus Acremonium coenophialum. These procedures will now be used to prepare quantities of the pure lolines required for studies of their physiological effects in animals and to monitor the amounts of these materials consumed by cattle under normal field conditions.

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Submitted by R. Kleiman
Northern Regional Research Center
1815 North University Street
Peoria, IL 61604

1989 S-9 TECHNICAL COMMITTEE REPORT

Agency: Soil Conservation Service

Submitted by: H W Everett

Address: 501 West Felix, Fort Worth, Texas 76115

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Accession user: Brooksville Plant Materials Center

Address: 14119 Broad Street, Brooksville, Florida 34601

Nature of research: Development of new conservation plants for MLRA 138, 151-155, and 270-273 (emphasis on cropland erosion control and water quality maintenance)

Progress to date: The two introduced perennial peanuts (Arachis glabrata) PI-421707, 'Florigraze' and PI-262817, 'Arbrook', continue to find increased use by commercial growers.Grower organizations have been formed and predictive studies using current trends indicate a potential need of over 100,000 acres to supply future race horse hay demands of Florida tracks. Peanut hay is equal to or superior to the alfalfa hay presently imported from northern areas at high cost. Spartina patens accessions PI-421238 and PI-415141 continue outstanding in southern coastal areas. PI-421238 will be released in 1989, the other in 1990. St. Lucie Longfingergrass, Digitaria macroglossa, PI-299648 continues to do well where planted on coastal locations. Paspalum hieronymii 'Tropic Lalo' (PI-310108) is doing well in tests as a citrus grove cover crop. The minimal maintenance required is the most outstanding feature. 'Alamo' switchgrass (PI-422006) has done very well in phosphate mine reclamation plantings especially in combination with 'Comanche' partridge pea (PI-421727). Information requests on this combination are increasing. A native Florida switchgrass PI-422000, Panicum virgatum, has done moderately well in fertilization-seed production studies and may rate releasing. There is a strong preference to using native or regional materials over those introduced from outside areas but many of our native plant species are poor seed producers.

Publications: 0

Cultivar releases: 0

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Accession user: Americus Plant Materials Center

Address: Route 6 Box 417
Morris Drive
Americus, Georgia 31709

Nature of research: Development of new conservation plants for Georgia, Alabama, South Carolina with emphasis on cropland erosion control.

Progress to date: The Americus PMC is increasing 3 accessions of Vetiveria zizanoides, PI-196257, PI-271633, and PI-302300. This grass has received much interest for use in erosion control on cropland. Adaptation plantings will be established at Alabama A&M University in Huntsville; at Tuskegee University in Tuskegee; and at Fort Valley State College in Fort Valley, Georgia.

PI-383803, Vicia villosa, hairy vetch was established in a field planting in the fall of 1988 in Georgia to compare this accession with two commercial vetch varieties for abundance of winter cover and for earliness of spring bloom and maturity. Selected for early bloom and early maturity, this accession may be released if results remain promising.

PI-490363, PI-490364, PI-310131, and PI-202044, Paspalum nicorae, brunswickgrass, continue to be evaluated for grassed waterway stabelization and for forage purposes. They establish more quickly than bahiagrass from seed but seed production techniques are yet to be fully worked out.

PI-199258 and PI-289311, Medicago orbicularis, are being evaluated in field plantings for winter cover where notill seedings of rowcrops will be used in the spring.

In 1987, 'Amquail' thunberg lespedeza was released for use in establishing quail food patches in heavily populated deer country. Amquail displays a resistance to deer browse, the deer may actually avoid it, whereas the deer heavily browse bicolor lespedeza. Amquail provides excellent food and cover for bobwhite quail.

The following accessions are being evaluated for use in improving water quality on:

Constructed wetlands:
Phragmites australis, common reed, PI-434204 & 434213
Spartina pectinata, prairie cordgrass, PI-421603
Panicum hemitomon, maidencane, PI-434171
Eleocharis dulcis, PI-276260, 276261, 276263, 276264, 276273, 276274.

Animal waste disposal:
Tripsacum dactyloides, eastern gamagrass, PI-421612, 434493
Panicum virgatum, switchgrass, PI-422006.

Paspalum nicorae, brunswickgrass, PI-310131.

Arundo donax, PI-421727, 'Alamo' Panicum virgatum, PI-422006, and 'Quail Haven' Glycine soja, PI-163453 are being established in Alabama and Georgia to determine their range of adaptation and performance for wildlife.

Publications: 1

Cultivar releases: 0

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Accession user: Hawaii Plant Materials Center

Address: P O Box 236
Hoolehua, Hawaii 96729

Nature of research: Development of new conservation plants for Hawaii and the Pacific Basin which includes Guam, the Northern Mariana Islands, the Federated States of Micronesia, the Republic of Palau, the Republic of the Marshall Islands and American Samoa.

Progress to date: PI-224980, Glycine wightii, has been the best legume for erosion control and forage in low rainfall (15"-20") areas. It is currently being compared to the Australian cultivars 'Tinaroo', 'Cooper', and 'Clarence' in replicated trials, with and without irrigation.

Publications: 1

Cultivar releases: 1 'Tropic Shore' Paspalum vaginatum was released in 1988 for stabelizing aquaculture pond banks. Accession number is 9037868.

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Accession user: James E "Bud" Smith Plant Materials Center

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

Nature of research: Development of new conservation plants for MLRA's 42, 77a, 77b, 77c, 77d, 78a, 78b, 78c, 80a, 80b, 81a, 81b, 82, 83a, 83b, 83c, 84a, 84b, 84c, 85, 86, 87, 112, 113, 118, 119, 133b, 150a, 150b, and 152b in Texas and Oklahoma.

Progress to date: No accessions of foreign origin were selected for advanced evaluation in 1988.

Publications: 1

Cultivar Release: 1 'Van Horn' green sprangletop was released for forage and critical area plantings in Texas, Oklahoma and New Mexico. The accession number is PI-441106.

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Reports were not received from Mississippi, Arkansas, Louisiana, South Texas and East Texas Plant Materials Centers.

SOUTHERN REGIONAL PLANT INTRODUCTION STATION
Report to S-9 Technical Committee
July 18, 1989

This report covers the primary activities of this plant introduction station for the period of June 1, 1988 through June 15, 1989.

Plant Introduction

Germplasm of 880 new Plant Introductions (PI's) were added to the S-9 Project plant germplasm collections. The crop groups received were sorghums, clovers, peanuts, squash, and pumpkins. The total collection is 59,145 PI's and is composed of 259 genera and 1,127 species from 170 countries.

Seed Distribution

A total of 46,610 seed samples were shipped in all categories of distribution. In direct response to 407 requests 21,822 seed samples were shipped within the S-9 Region, 4,508 to the other three regions, 4,889 to 42 foreign countries, and 1,106 legume cultivars for field trials in the southern states.

Shipments in other categories of distribution were: 2,521 PI's sent to the National Seed Storage Laboratory (NSSL) for long-term storage and 6,495 samples for germination testing; 3,774 PI's distributed for seed increase and evaluation.

Seed Increase

A total of 3,774 PI's are included in the 1989 increase plantings. The major crop groups involved are sorghum, cowpeas, peanuts, sesame, peppers, squash, grasses and melons. The P.I. Station is increasing 1,321 new and old PI's which include 198 genera and 842 species from 84 countries. Cooperators in several states (Alabama, Arizona, California, Florida, Oklahoma, and Texas) are increasing 1,553 PI's of melons, peanuts, and tropical forage legumes. The Tropical Agriculture Research Station (TARS) at Mayaquez, P.R. increased and evaluated 900 PI's of Ethiopian Sorghums in two plantings during the Fall of 1988 and the Winter-Spring period of 1989.

Peanut Curator

Nine hundred accessions were distributed for seed increase in FY 89. Prior to distribution five hundred accessions received from Asian countries were screened for Peanut Stripe Virus (PSTV). Sites for seed increases include Georgia, Oklahoma, Texas, and Virginia. Most of the forty-two new introductions from China will be available for distribution in the spring of 1990.

Pathology Research

Current research efforts involve development of methods and screening watermelon germplasm for watermelon mosaic virus to resistance. Also, field trials are in progress to study the spread of peanut stripe virus from peanuts to soybeans and to determine yield effects and possible seed transmission in soybean, lima bean and cowpea. Germplasm accessions are being indexed and surveyed to determine presence of pathogens especially in forage grasses and the germplasm increases plants.

Sweet Potato Repository

All sweet potato (Ipomoea batatas) cultivars, breeding lines and plant introductions (PIs) have been placed in tissue culture and are being maintained in vitro. Seed samples of 9 of the 10 Ipomoea species most closely related to sweet potato have been acquired and scheduled for increase. Seed samples of Ipomoea gracilis, Ipomoea littoralis and 8 additional Ipomoea species which form storage roots were collected in Australia. These seed will be increased in 1889-90. The quarantine screenhouse has been completed. The greenhouse has been fitted with new coolers, screening and a quarantine entryway for virus indexing. A total of 200 clones have been evaluated for their morphological characteristics and the data is being prepared for publication as a handbook. In vitro times for sweet potato cultures has been extended to 1 year (up from 3 months). Research on the development of in vitro storage techniques is continuing. In reply to requests, sweet potato germplasm, recently released from quarantine, was propagated and distributed to scientists and North Carolina, Georgia, Lousiana, Mississippi, South Carolina, and Utah. Cultures and seed of various species were provided to the International Potato Center.

Facilities

Funding for the construction of both greenhouses for peanut germplasm maintenance was found in FY 88. Construction should be finished by August 1989. The construction of a headhouse should begin in the fall of 89.

APPENDIX I

Southern Regional Plant Introduction Station Budget

Source of Funds		FY-89	FY-90
Regional Research Funds (Pooled)		$179,560	$233,747
RRF (Committee of Nine Allocations)		0	0
	TOTAL	$179,560	$233,747
Expenditures			
Personal Services - Salaries		$109,233	$125,607
Personal Services - Benefits		33,862	35,675
Travel		500	500
Supplies & Operations		33,965	33,965
Equipment		2,000	38,000 1/
	TOTAL	$179,560	$233,747
Source of Funds			
ARS Base (recurring Funds)		$1,354,741	$1,424,554 2/
Special Allocations (Non-Recurring)		139,000	-0-
	TOTAL	$1,493,741	$1,340,334
Expenditures			
Personal Services		$355,408	$530,910
Travel		25,000	26,500
Construction & Repairs		603,250	114,613
Supplies & Materials		165,553	193,869
Support Equipment		42,000	40,780
Operations		18,000	40,800
Cooperative Agreements		284,530	352,082
Temp. Transfer to NSSL		-0-	125,000
	TOTAL	$1,493,741	$1,424,554

1/ Includes a one-time allocation of $36,000 from the Southern Directors for purchase and installation of dehumidifiers for the seed storage rooms.

2/ The FY 90 figures (ARS) are close planning estimates only.

1989

S-9 TECHNICAL COMMITTEE REPORT

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

Progress to Date:

This station maintains as live plants 7900 accessions of tropical perennial economic plants. It and the Tropical Agricultural Research Station at Mayaguez, PR, together constitute the National Plant Germplasm Repository for avocado, mango, coffee, banana, and plantain, and tropical species of Ziziphus. Other fruit crops well represented are annonas, carambola and lychee, and also numerous guava relatives (Psidium and Eugenia spp.). The Miami station serves as an intermediate quarantine facility for Theobroma cacao, which after clearing this facility is established permanently at Mayaguez. The U.S. replicate of the World Collection of sugarcane and related grasses (3,512 accessions) is held at Miami.

Between June 1, 1988 and May 31, 1989, 536 new introductions were received at Miami (Table I). During this reporting period, 631 distributions left the station (Table II). Most of the distributions were to people involved in research, education, public service, or private industry in the United States (Tables III & IV).

In November, 1988, the Plant Science Staff occupied a new lab/ headhouse facility. This was the first new facility added to the station in many years and has greatly increased the research effort in isozyme analysis, tissue culture, and fruit evaluation. In addition to the 25 acres cleared last year, another 16 were cleared for germplasm consolidation and evaluation this year. A new irrigation system was installed for eight acres and improvements made to existing irrigation substantially increased our ability to provide cold protection during winter months. A new pesticide storage building was completed ensuring our compliance with environmental laws. Two new sugarcane trellis systems and a Passiflora breeding nursery trellis system were completed.

Germplasm Evaluation and Enhancement:

Isozyme Analysis: Isozyme systems were resolved for cacao, carambola, passion fruit, and mango during the past year (Table V). Analysis of genetic diversity within the collections is continuing.

Mangifera. Analysis of genotypes from India, Southeast Asia, and Florida have revealed interesting results. Three enzyme systems have proven useful for this analysis, Phosphoglucoisomerase (PGI), Malate Dehydrogenase (MDH), and Shikimic Acid Dehydrogenase (SDH). Greater variation exists among the Florida mangos than in either the Indian or Southeast Asian mangos. The Southeast Asian mangos are proving to be remarkably uniform, being fixed for most alleles in these enzyme systems. Cluster analysis confirms groupings from the three areas with an approximate expected overall R-Squared = 0.71461. More systems are currently being analyzed and phenotypic data will be included with the isozyme data for further analysis.

Passiflora. Selfed and cross-pollinated progenies from the most popular Florida commercial cultivar 'Possum Purple' and a promising breeding line, 'M25025', have been analyzed for 11 enzyme systems. Results from four enzyme systems have proven useful. SDH, PGI, Leucine Aminopepidase (LAP), and Isocitrate Dehydrogenase (ICDH) have been analyzed for their segregation ratios. In some cases alleles segregate in proper Mendelian ratios; however, SDH and ICDH deviate significantly from expected ratios. These results substantiate previous observations of differential pollen tube growth through the style in passiflora crosses. Self and cross incompatibility are substantial problems in commercial production and these studies may lead to a better understanding of the mechanisms involved with these incompatibility systems.

Tissue Culture:

A tissue culture project with banana (Musa spp.) was initiated this year with the objective of maintaining an 'in vitro' collection as a backup to the field collections. Several media, temperature, and genotype combinations are being tested to determine if this is a realistic alternative. Work is continuing on regeneration systems for cacao and passiflora.

Field Evaluations:

Sugarcane. Characterization of the sugarcane collection was completed this year. Dr. E. Terrell, Plant Taxonomist, completed a taxonomic characterization, Dr. N. Balasundaram, Indian Sugarcane Geneticist, completed a descriptor list and Dr. Betty Wood, Molecular Biologist, completed an isozyme analysis on the collection. These

data are currently being analyzed to determine evolutionary groupings within the collection. Dr. Balasundaram's descriptors are currently being entered on the GRIN system.

Mango. The mango rootstock experiment reported last year is still in progress with the expectation of adding an additional location in California next year.

A Maternal Half-Sib Family test has been planted to estimate genetic variances and heritabilities for horticultural traits.

A dozen cultivars from Thailand have fruited this year and are considerably different from the Indian, Philippine and Florida hybrid types already well known, although they are phenotypically fairly uniform as a group, just as their enzyme systems indicate. These cultivars bear fruit more cylindrical in shape, duller in color, and milder but sweeter in taste than most other mangos. They uniformly lack objectionable fiber, and all examined are polyembryonic, indicating they can be propagated clonally from seed. Some of them may become important in commerce because of the large population of recent U.S. immigrants from southeast Asia, and they certainly can broaden the genetic base of this fruit crop. The best performers include 'Hong Sa' (P.I. 479221), 'Mon Tong' (P.I. 479228) and 'Okrung Tong' (P.I. 479235).

Passionfruit. A seedling selected and named by a cooperator from germplasm placed with him for evaluation (M-31106, 'Possum Purple') is proving to be important to this new south Florida industry because it is dependably productive, early, and has a sweet flavor that makes it preferred on the fresh fruit market. It combines phenotypic traits of yellow and purple forms of Passiflora edulis.

Tetraploid seedlings were started for cooperative planting on ARS land at Byron, Georgia to evaluate the response of this hybrid group to the climate of the area.

Avocado. Two accessions from the north coast of Colombia (M-32146, 'Sevillano' and M-32147, 'Calera') were collected in cooperation with Dr. Ben Ya'acov in November, 1988. These are of interest in that they are land race material believed to be long grown in the mountains by native American tribes of the region.

Lychee. Potentially valuable germplasm was acquired in the 'Kwai May Pink' cultivar (M-32099), brought from Australia in August, 1988. This clone has proven to be more consistently productive in Australia than any others of the many tried there, and dependable productivity is critical to development of a stable lychee industry in the United States.

Publications:

Knight, Robert J., Jr. 1988. Annona production in Florida. Proceedings, Fourth Australasian Conference on Tree and Nut Crops (ACOTANC). In press.

Knight, Robert J., Jr. 1988. Florida lychee and longan production. 1988. Proceedings, Fourth Australasian Conference on Tree and Nut Crops (ACOTANC). In press.

Knight, Robert J., Jr. 1988. Mango culture in Florida. 1988. Proceedings, Fourth Australasian Conference on Tree and Nut Crops (ACOTANC). In press.

Knight, Robert J. Jr. 1988. Miscellaneous tropical fruits grown and marketed in Florida. Proceedings of the Interamerican Society for Tropical Horticulture. Vol. 32.

Knight, Robert J., Jr. 1988. The general world subtropical horticulture scene. Proceedings, Fourth Australasian Conference on Tree and Nut Crops (ACOTANC). In press.

Reveal, J. L., Jarvis, C. E. and Terrell E. E. 1989. Typification of sugarcane, Saccharum officinarum L. (Poaceae). Taxon. 38:95-97.

Schnell, R. J. 1989. The National Germplasm System. Invited Seminar at Clemson University to outline the National System and explain how faculty could use it.

Schnell, R. J. and Knight, R. J. 1989. Variation in isozyme alleles in Averrhoa carambola. Proceedings, Interamerican Society for Tropical Horticulture. In press.

Schnell, R. J. and Nagai, C. 1989. Variation of agronomic characters among maternal half-sib families of Saccharum officinarum and elite Hawaiian commercial clones. Euphytica. In press.

Wood, B. and Strand, A. 1989. Characterization of the world collection of sugarcanes and related grasses by isozyme analysis. Final report.

Table 1. Germplasm Receipts at USDA/ARS Miami, Florida from June 1, 1988 through May 31, 1989.

Material	Introductions	
	No.	%
Medicinal, Chemurgic, Tropical Vegetables, Sugarcane, and Palms	256	47.76
Tropical and Subtropical Fruits	223	41.61
Cacao	57	10.63
TOTAL	536	100.00

Table II. Germplasm Distributions from USDA/ARS, Miami Florida from June 1, 1988 through May 31, 1989.

Material	Distributions	
	No.	%
Cacao	223	35.34
Tropical and Subtropical Fruits	204	32.33
Medicinal, Chemurgic, Spices, Sugarcane and Others	169	26.78
Miscellaneous Ornamental and Shade Trees (includes Orchids and Ferns)	20	3.17
Coffee	15	2.38
TOTAL	631	100.00

Table III. Destination of Distributions from USDA/ARS, Miami, Florida from June 1, 1988 through May 31, 1989.

Destination	No. Sent	%
Florida	47	43.52
California	4	3.70
Rest of Continental U.S., Hawaii and Canada	32	29.63
Caribbean Region[z]	3	2.78
Mexico, Central America and Panama	5	4.63
South America	1	.93
Europe	7	6.48
Asia[y]	7	6.48
Africa	2	1.85
TOTAL	108	100.00

[z] Includes Puerto Rico and the Virgin Islands
[y] Includes Malaysia and Guam

Table IV. Distributions by Type of User from USDA/ARS, Miami, Florida from June 1, 1988 through May 31, 1989.

	Total	USP	UXT	ARS	AID	FPU	ICT
Number	108	27	39	13	2	23	1

Definitions of user codes: USP=United States Private Persons or Industry. UXT=U.S. Education, Research, Parks. ARS=Agricultural Research Service. AID=U.S. Agency for International Development. FPR=Foreign Private People or Industry. FPU=Foreign Public or Education. ICT=International Centers such as CIMMYT (Mexico), CATIE (Costa Rica), et al.

Table V. Isozyme Systems Resolved for Tropical Fruit Systems at Miami

	Plant Species			
ENZYME SYSTEM	Cacao	Carambola	Passion Fruit	Mango
AAT	+		+	+
ACN		+		
ALD	+			
APH	+		+	+
CAT			+	
EST			+	+
Fl,6,DP	+			+
FUM		+		
GDH	+	+	+	+
HK		+		
ICDH	+	+	+	+
LAP	+	+		+
MDH	+	+	+	+
ME	+	+		+
PER			+	
6PGD		+		
PGI	+	+	+	+
PGM	+	+		+
SDH	+	+	+	+
SoDH		+		
TPI	+	+	+	+
21	13	14	11	13

1989

S-9 TECHNICAL COMMITTEE REPORT

Agency: USDA, ARS
Tropical Agriculture Research Station
Submitted by: Francisco Vázquez, Agronomist
P.O. Box 70
Mayaguez, Puerto Rico 00709

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Accession Users: F. Vázquez and P. Hepperly
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Evaluation of Tropical Plant Germplasm
Progress to Date: Germplasm work in yams and papaya has focused on evaluating varietal potential, disease and pest resistance, and germplasm enhancement.

Winged yam (Dioscorea alata). At Isabela and Mayaguez during two growing seasons ten varieties of winged yams were characterized for anthracnose susceptibility and response to foliar control of the disease by fungicide spray with benomyl and mancozeb. Plots were subdivided and fungicide applied to half of the plots only in months when a 5% increase in foliar necrosis was determined by scouting. In the second growing season, 1988-89, when two applications (mid-August and mid-September) were made at both sites, five varieties showed significant yield response at each location and seven varieties showed increased tuber size at Mayaguez. Gunung, which was the most disease-resistant entry, had reduced yield and size with fungicide application, indicating possible fungicide toxicity reaction. The scouting and control spraying system during two seasons at the two locations required less application than preventive fungicide treatment as currently recommended.

Papaya (Carica papaya). PR 6-65, Sunrise Solo, Cariflora, Criollo, and hybrid papaya have been under evaluation. Cariflora, a very heterogeneous dioecious papaya developed in Florida for virus tolerance, produced soft, round fruit very susceptible to anthracnose. From 100 trees, a vigorous, semi-dwarf selection with a firmer, more egg-shaped fruit was chosen. This selection gave much improved performance and reduced horticultural variability. S2 selections were made for superior fruit form, size, taste, brix, and tree longevity and yield. Cariflora was used as a source of virus tolerance, earliness, and semi-

dwarfness in the hybrids. Variability in hybrid flavor and color demonstrated that more inbreeding and selection are needed before commercialization of Cariflora hybrids is feasible.

Plantings of Cariflora selections from Puerto Rico have been made in St. Croix, where they are flowering and showing a good virus tolerance under severe epidemic conditions.

Criollo, a large, red-fruited variety collected locally, has excellent yield, drought tolerance and disease resistance. Its drawback is the soft-fleshed fruit, which has variable taste and sugar content and is very susceptible to anthracnose, sunscald, and mechanical and pathological damage.

PR 6-65 is the dominant commercial variety in Puerto Rico. In local commercial plantings, virus tolerant individual plants were identified and selected. Field selections and other varieties were inoculated with ringspot virus. From 200 inoculations of three varieties, twenty superior reactions were found in the greenhouse in three varieties. In the field, ten of these are continuing to show excellent tolerance to virus.

Sunrise Solo is a popular commercial Solo type. In Mayaguez, where bunchy top is very limiting, this variety has reduced potential because it is very susceptible to the disease. In crosses with PR 6-65 some superior horticultural types have been found, and F3 selections have been superior to PR 6-65.

Maradol, a large, red, Cuban variety favored by the Cuban export market, is under evaluation. This variety is currently flowering and fruit characteristics will be evaluated before the end of 1989.

Publications: Hepperly, P. R. and Vázquez, F. Resistance and Scouting in the Control of Yam Anthracnose of the Winged Yam (Dioscorea alata). Ann. Meeting, Caribbean Food Crops Society, Guadeloupe, 1989.

Irizarry, H. and Rivera, E. Management of the Binugas yam (Dioscorea alata) in Puerto Rico. Ann. Meeting, Caribbean Food Crops Society, Guadeloupe, 1989.

Accession Users: F. Vázquez, H. Irizarry, and E. Rivera
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Evaluation of tropical plant germplasm

Progress to Date: Xanthosoma species. A breeding program of taniers (Xanthosoma species) was begun in TARS during the year 1987. A collection of 69 varieties was introduced from the Tropical Research and Education Center, Homestead, Florida, and five more accessions were added. In 1988, it was planted in replicated plots at two locations, Corozal and Isabela, for evaluation of yield and dry root-rot syndrome (mal seco).
Results from Corozal showed no marketable yields in any of the cultivars. However, four cultivars (selections from Venezuela, cultivar Palma and two other introductions) showed promise as potential sources for resistance to dry root-rot syndrome.
The field used in this location was previously planted to taniers and will be maintained for disease- resistance screening. The planting at the second location, which had not been previously planted to taniers, showed varying degrees of susceptibility to this condition. Yields at this location ranged from 0 to 19,366 kg/ha. The collection will be evaluated at the same locations for an additional year.

Publication: Sotomayor-Ríos, A., Schertz, K. F. and Rivera, E. Chromosome Number and Cytological Observations of Selected Xanthosomas and Their Possible Importance in Breeding for Dry Root-Rot Resistance. Ann. Meeting, Caribbean Food Crops Society, Guadeloupe, 1989.

Accession User: F. Vázquez
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Evaluation of tropical plant germplasm
Progress to Date: Fifteen soybean (Glycine max) cultivars provided by Dr. K. H. Hinson of USDA, ARS, Gainesville, Florida, were grown for the third season at three sites in Puerto Rico. Santa Isabel and Lajas are in semi-arid southcoast regions with a fertile montmorillonitic clay, and Isabela is in the subhumid northwest area with a poor-quality kaolinitic clay. There was no significant difference in yields between two locations; but, at the Santa Isabel site, yields were lower than expected, probably due to insufficient precipitation during the growing period. The highest yield at Isabela (3,238.0 kg/ha) came from variety 14 (F85-4085), while variety 3 (Cristilina) produced the highest yield (3,219.7 kg/ha) at Lajas. The lowest yield for the two sites was 1,616.0 kg/ha at the Lajas farm. In Isabela, two of the lines being tested, varieties 8 (F84-5114) and 14, yielded the most. However, at the Lajas site, known variety Cristilina, along with varieties 8 and 12 (F83-1415) had the highest yields.

Publications: None
Cultivar releases: None

Germplasm Collections:

Fruit trees, vines, and shrubs. Over 518 accessions of 407 species of tropical and subtropical fruits and nuts, ornamental and medicinal trees and shrubs, and legumes and grasses are maintained at the TARS grounds.

Dioscorea species. Eleven selections of Dioscorea alata, five selections of D. esculenta, two selections of D. trifida and one of D. bulbifera were grown for evaluation in replicated plots in two different locations (Mayaguez and Isabela). Requests for yam plant material were processed during the months of February and March, 1989.

Theobroma cacao. In cooperation with the American Cocoa Research Institute (ACRI), TARS maintains a disease-free field collection of selected cacao clones, which serves as a permanent source of budwood for worldwide distribution. The collection consists of more than 380 clones with three mature plants representing each clone. The cacao collection provides plant material for continuous breeding research, serving also as a source of moderate or large-scale distribution to scientists, cacao breeders, and institutions in the U.S. and throughout the world. New clones are added to the collection once they are grafted and achieve the proper size for transplanting.

Manihot esculenta. A collection of forty-five cultivars of cassava is under field evaluation at the Isabela farm. Vegetative material is available for distribution.

Plant Introductions:

Cacao clones: Plant material in the form of budwood of seventy-two different clones was introduced during 1988-89 from the Miami Subtropical Horticultural Station.

Bamboo species: Twenty-four new bamboo accessions were received from Byron, Georgia, during January and February, 1989.

Musa species: Fourteen plantain selections from the Agricultural Experiment Station, University of Puerto Rico, were planted in the field collection at Mayaguez.

Cortaderia species: Two Cortaderia species in the form of plants and seeds were received from Experiment, Georgia. The seedlings are being maintained in the greenhouse.

Germplasm Distribution:

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

USA (including PR and VI)	Entries
Institutions	40
USDA	31
Individuals	70
Foreign countries:	
Institutions	1
Government	18
Individuals	74

Publications: None.
Cultivar Releases: None.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Agronomic evaluation of a triploid Pearl Millet x Napiergrass Interspecific Hybrid for yield and in vitro dry matter digestibility.
Progress to Date: Yield increased with N fertilization and cutting interval. Crude protein content was higher at 45 days and diminished as the cutting interval was increased. Maximum dry forage yield resulted from the application of less than 80 kg/ha^{-1}.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase and evaluation of sorghum collections.
Progress to Date: Part of the Ethiopian Collection (900 accessions) was planted; individual plants were selfed and classified. The selfed seed was returned to the Coordinator of the Southern Regional Plant Introduction Station.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase and evaluation of sorghum collections.
Progress to Date: Part of the World Collection (1,116 accessions) was planted, selfed and classified in terms of head type. The selfed seed was returned to the National Seed Storage Laboratory.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase and evaluation of sunflower populations
Progress to Date: Seven populations were planted, increased and classified. The seed was returned to the Curator of the NC-7 Regional Project.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase of Lycopersicon species
Progress to Date: Fifty accessions of Lycopersicon species (forty L. esculentum, five L. esculentum var. cerasiforme, one L. cheesmanii, and four L. parviflorum) were planted and increased. The seed was returned to the Curator of the Northeast Regional Plant Introduction Station.

Accession User: A. Sotomayor-Ríos
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase and evaluation of corn collections.
Progress to Date: Six hundred accessions were planted, increased and classified. The seed was returned to the Coordinator of the Northeast Regional Plant Introduction Station.

Accession Users: A. Sotomayor-Ríos and A. Arias-Pedraza
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Increase and evaluation of tropical forage legumes.
Progress to Date: Forty-seven accessions of 19 species of Centrosema from CIAT's Germplasm Bank were planted at the Mayaguez and Isabela farms for seed increase and flowering evaluation. Accessions 5913 and 5803 (Centrosema randiflorum and C. brachipodum, respectively) were the last to flower. Accessions 5038 and 5175 (C. virginianum and C. pascuorum, respectively) were the earliest in flowering. C. brasilianum 5234 was the highest seed producer. A local cultivar of C. pubescens was evaluated at the same locations. It had an intermediate flowering period and very low seed production.

Publications: None.
Cultivar Releases: None.

Accession User: George Freytag
Address: Tropical Agriculture Research Station, P.O. Box 70, Mayaguez, Puerto Rico

Nature of Research: Determination of the nature of inherited resistance to six strains of common bacterial blight (Xanthosomas campestris pvs.) in the tepary bean (Phaseolus acutifolius var. latifolius).

Progress to Date: Crosses were made between susceptible and resistant tepary cultivars obtained from preliminary trials in the field and greenhouse. Parentals, F_1's and reciprocals, and F_2 progeny were planted in the greenhouse under controlled temperature and humidity conditions, and inoculated at near flowering with six strains of bean blight bacteria (mostly from the Am. Type Culture Collection) with one strain per leaflet. Notes for symptom expression were taken at 14 and 21 days from inoculation, tabulated, converted into resistant and susceptible equivalents and analyzed for goodness of fit by X2. The results indicated that the resistance for three strains was inconclusive (probably due mostly to loss of virulence by the bacteria) while resistance for the three virulent strains was due to one dominant gene for each strain. Tests for linkage indicated that these three genes were closely linked with about 5.5 crossover units between genes.

Publication: Inheritance of resistance to three strains of common bacterial blight (Xanthosoma campestris) in the cultivated tepary bean (Phaseolus acutifolius var. latifolius). Ann. Rept., Bean Imp. Coop. 32:101-102. 1989.

Cultivar Releases: None.

Accession User: George F. Freytag
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico 00709

Nature of Research: Agronomic evaluation of tepary bean (Phaseolus acutifolius var. latifolius) cultivars for commercial production in Puerto Rico.

Progress to Date: Cultivated tepary beans obtained from USDA-PI, CIAT, IBPGR, and other sources were planted at two locations during the summer and winter seasons in 1987 and 1988. Evaluation emphasized disease resistance, plant and grain type, daylength response and yield. Results indicated susceptibility (and resistance in some lines) to rust, powdery mildew, virus, root rots, and generally high resistance to common bacterial blight (some line immunity). The better lines showed yield potential of up to 3,000 kg/ha under difficult climatic conditions (hot, humid summers) when the best common dry bean lines would barely return the seed planted.

We believe there is an enormous unrealized potential for commercial production of this relatively unknown U.S. bean species, not only for the excessively hot, humid tropics but also for the very dry drought or heat stricken areas of the United States.

Publications: None.
Cultivar Releases: None.

Accession Users: D. Ritchey and R. Lemus
Address: Tropical Agriculture Research Station, P. O. Box 70, Mayaguez, Puerto Rico
Nature of Research: Response of cacao clones, (Theobroma cacao) to soil acidity factors
Progress to Date: Response to soil acidity factors of seedlings of four clones of cacao grown in 7-liter pots was evaluated 3 and 6 months after planting in soil mixtures receiving various rates of lime.
In a high-Mn Torres Clay Ultisol (Plinthic palehumults), manganese toxicity symptoms and severe depressed growth occurred when ammonium-acetate-exchangeable soil Mn levels were 94 mg/kg or higher, corresponding to foliar Mn levels of 4000 mg/kg and higher.
In a high-Al Maricao Clay Ultisol (Distropeptic Tropudults), growth increased linearly as Al saturation was reduced from 74% to 19% by liming. Symptoms and growth depression in both soils were more severe at 6 than at 3 months.
Plants from seeds obtained from an ICS-40 tree (paternity unknown) performed best in the acid soils and in a nonacid potting mixture, followed by UF-668. Growth of plants from UF-613 and ICS-75 trees was poorer. No significant differences in tolerance to soil acidity factors among the clones were detected in this experiment.

Publications: None.
Cultivar Releases: None.