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**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**

**Texas A & M University  
College Station, Texas**

**July 21-22, 1987**

**Submitted by  
T.E. Morelock, Secretary  
S-9 Technical Committee 1986-1987**

## AGENDA

S-9 Technical Committee  
Texas A&M University  
College Station, Texas  
July 21-22, 1987

1. Call to Order, 8:00, July 21, 1987.
2. Introductionn of Attendees.
3. Official Welcome - Dr. E. C. A. Runge, Head, Department of Soil and Crop Sciences, Texas A&M University.
4. Approval of Minutes, 1986 Meeting.
5. Additions to and Approval of Agenda, 1987 Meeting.
6. Appointment of Committees:
  - A. Nominations
  - B. Time and Place of Next Meeting
  - C. Resolutions
7. Introduction and Remarks from the S-9 Administrative Advisor.
8. State Progress Reports and Research Plans.
9. Discussion on the Revision of the S-9 Project.
10. Discussion of Proposed Joint Meeting with NE-9, W-6 & NC-7 in 1988.
11. Other Agency Reports and Research Plans.
12. National Program Staff 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, Noon, July 22, 1987.
17. Tour, July 21, 1987

1. CALL TO ORDER

The meeting of the S-9 Technical Committee was called to order by Chairman Clarence Watson at 8:00 a.m., July 21.

2. INTRODUCTION OF ATTENDEES

| Name                    | Address  | Phone                   |
|-------------------------|--|-------------------------|
| Gerald Arkin            | GAES<br>Griffin, GA 30212  | 404/228-7263            |
| Marvin O. Bagby         | USDA-ARS-NRRC<br>Oil Chemical Research<br>1815 N. University<br>Peoria, IL 61604   | 309/685-4011<br>ex. 531 |
| * David W. Bradshaw     | Dept. of Horticulture<br>Clemson University<br>Clemson, SC 29634-0375  | 803/656-4949            |
| * David I. Bransby      | Dept. of Agronomy & Soils<br>Auburn University<br>Auburn, AL 36849   | 205/826-4100            |
| * David L. Coffey       | Dept.-Plant & Soil Sci.<br>University of Tennessee<br>355 Ellington Plant Sci Bldg.<br>Knoxville, TN 37996                       | 615/974-8829            |
| Steve Eberhardt         | NSSL<br>Colorado State University<br>Ft. Collins, CO 80523   | 303/484-0402            |
| * Bill Fike             | Crop Science Dept.<br>North Carolina State Univ<br>Raleigh, NC 27695-7620  | 919/737-3267            |
| * Guillermo J. Fornaris | Dept. of Horticulture<br>Agricultural Exp. Sta.<br>University of Puerto Rico<br>P.O. Box 21360<br>Rio Piedras, Puerto Rico 00928 | 809/767-9705            |
| Richard B. Heizer       | USDA - Soil Cons. Service<br>101 South Main<br>Temple, TX 76501  | 817/774/1294            |
| P. J. Ito               | 461 W. Lanikaula St.<br>Hilo, HI 96720   | 808/935-2885            |
| * James S. Kirby        | Dept. of Agronomy<br>Oklahoma State University<br>Stillwater, OK 74078   | 405/624-6417            |

|                     |   |              |
|---------------------|---|--------------|
| Robert J. Knight    | USDA - ARS<br>13601 Old Cutler Rd.<br>Miami, FL 33158-1399                                | 305/238-9321 |
| Gil Lovell          | S. Reg. Plant Intro. Sta.<br>USDA-ARS<br>Georgia Experiment Sta.<br>Experiment, GA 30212  | 404/228-7255 |
| * George G. McBee   | Soil & Crop Sciences Dept.<br>Texas A & M Univ.<br>College Station, TX 77843              | 409/845-8796 |
| * Teddy E. Morelock | Dept. of Horticulture<br>Univ. of Arkansas<br>316 Plant Science<br>Fayetteville, AR 72701 | 501/575-2603 |
| * Gordon M. Prine   | Agronomy Dept.<br>Univ. of Florida<br>304 Newell Hall<br>Gainesville, FL 32611            | 904/392-1811 |
| Henry L. Shands     | Bldg. 005, Rm. 140<br>BARC-W<br>Beltsville, MD 20705                                      | 301/344-3311 |
| Ray Smith           | TAES<br>P.O. Drawer E<br>Overton, TX 75684  | 214/834-6191 |
| * Norman L. Taylor  | Dept. of Agronomy<br>Univ. of Kentucky<br>Agri Sci Bldg North<br>Lesington, KY 40540-0091 | 606/257-5785 |
| * Ann Marie Thro    | Agronomy Dept.<br>Louisiana State Univ.<br>Baton Rouge, LA 70803-2110                     | 504/388-1301 |
| Francisco Vasquez   | USDA-ARS-TARS<br>P.O. Box 70<br>Mayaguez, Puerto Rico 00709                               | 809/834-2435 |
| * Clarence Watson   | Agronomy Dept.<br>Mississippi State Univ<br>Box 5248<br>Mississippi State, MS 39762       | 601/325-2311 |
| S. C. Wiggins       | USDA-CSRS<br>217 J.S. Morrill Hall<br>Washington, DC 20251                                | 202/447-4202 |

\* Members of the S-9 Technical Committee

3. WELCOME

Dr. E. C. A. Runge, Head, Department of Soil and Crop Science, Texas A & M University, welcomed the group to Texas and discussed the research program of the department.

4. APPROVAL OF MINUTES

Bill Fike moved that 1986 minutes be approved as circulated. The motion was seconded by Jim Kirby, and approved.

5. APPROVAL OF AGENDA

The 1987 agenda was approved as circulated.

6. APPOINTMENT OF COMMITTEES

Chairman Watson appointed the following committees:

- |                 |   |
|-----------------|---|
| A. Nominations  | Jim Kirby, Chairman<br>Guillermo Fornaris<br>Ann Marie Thro |
| B. Time & Place | David Coffey, Chairman<br>Francisco Vasquez<br>George McBee |
| C. Resolutions  | David Bradshaw, Chairman<br>Bill Fike<br>Gordon Prine       |

7. REMARKS FROM ADMINISTRATIVE ADVISORS

Dr. Gerald F. Arkin stated that he was happy to have recently been appointed as administrative advisor to S-9, and that he would make every effort to learn all he possibly could about the functions of S-9 and would work closely with the committee to accomplish its mission.

Dr. S. G. Wiggins reported for Dr. D. A. Sleper (CSRS Representative). Dr. Wiggins stated that CSRS was requesting a substantial budget increase and at this point prospects for an increase appeared favorable.

8. 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        |
| T. E. Morelock        | Arkansas       |
| G. M. Prine           | Florida        |
| Carl S. Hoveland      | Georgia        |
| P. J. Ito             | Hawaii         |
| Norman L. Taylor      | Kentucky       |
| A. M. Thro            | Louisiana      |
| C. E. Watson, Jr.     | Mississippi    |
| W. T. Fike            | North Carolina |
| James S. Kirby        | Oklahoma       |
| Guillermo J. Fornaris | Puerto Rico    |
| D. W. Bradshaw        | South Carolina |
| David L. Coffey       | Tennessee      |
| George G. McBee       | Texas          |
| Richard E. Veilleux   | Virginia       |

9. DISCUSSION ON THE REVISION OF THE S-9 PROJECT

Gil Lovell reviewed status of S-9 revisions and stated that the individual states needed to provide examples (2 - 4) of the more significant accomplishments where plant introductions were used. These examples need to be sent to Gil Lovell by early August.

10. PROPOSED JOINT MEETING WITH NE-9, W-6, AND NC-7 IN 1988

A lengthy discussion about a joint meeting with other regional projects occurred. The major problem with the meeting appeared to be the date of June 1988. Several committee members felt that they would have problems with travel authorizations because they would be traveling twice in the same fiscal year. The discussion ended with the approval of the June 22-24 joint meeting in Fort Collins, Colorado. Friday, June 24, 1988 was approved as the date for the S-9 meetings.

11. OTHER AGENCY REPORTS AND RESEARCH PLANS

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

Representative

Agency

|                 |                           |
|-----------------|---------------------------|
| G. Lovell       | S. Reg. Plant Intro Sta.  |
| F. Vasquez      | Tropical Agri. Res. Sta.  |
| R. J. Knight    | Subtropical Hort Res. Sta |
| S. A. Eberhardt | National Seed Storage Lab |
| H. W. Everett   | SCS                       |

12. NATIONAL PROGRAM STAFF REPORTS

Henry Shands presented the National Program staff report. Dr. Shands also pointed out that the IR-1 and IR-2 programs faced

future cancellation if proper steps were not taken by state experiment stations.

### 13. PLANT EXPLORATION PROPOSALS

Two plant exploration proposals were submitted to S-9 in 1987. These proposals are listed in Appendix II of the report of the Southern Regional Plant Introduction Station. The following priorities were recommended for the proposals:

| <u>Priority</u> | <u>Proposal</u>                            |
|-----------------|--|
| 1               | <u>Trifolium</u> spp. (clovers) Yugoslavia |
| 2               | <u>Gossypium</u> spp. (cotton) Brazil      |

Bill Fike moved that these recommendations be accepted and Henry Shands seconded the motion. Approved.

### 14. COMMITTEE REPORTS AND ACCEPTANCE

- a. Nominations - The Nominating Committee presented the following candidates for consideration: Teddy Morelock (Arkansas), as Chairman, and Phil Ito (Hawaii) as secretary. The candidates were elected by acclamation.
- b. Time and Place of Next Meeting - The Location Committee proposed that the 1988 S-9 Technical Committee meeting be held at Fort Collins, Colorado as a joint meeting with the other three regional technical committees on June 22-24. The S-9 meeting will be June 24th. The motion was passed by acclamation.
- c. Resolutions - The following report was presented by the Resolutions Committee and was accepted by acclamation:

#### Resolution 1

Be it resolved that the S-9 Technical Committee expresses its appreciation to Dr. George McBee for his many efforts in making our stay in Texas a happy and comfortable occasion. His selection of motel accommodations was excellent.

#### Resolution 2

Be it resolved that the S-9 Technical Committee expresses its appreciation to Dr. E. C. Bashaw, Dr. S. Bhaskaran, Dr. C. Miller, Dr. E. C. Runge, Mr. Phil Sheets, and Dr. W. Smith for their interest in sharing with us their research work and insight into the future of agriculture.

Resolution 3

Be it resolved that the S-9 Technical Committee expresses its condolences to the family of long time Texas representative Eli Whitely, who passed away in October of 1986.

15. UNFINISHED OR NEW BUSINESS

There was no unfinished or new business

16. ADJOURNMENT

The meeting was adjourned by Clarence Watson at 11:50 a.m., July 22, 1987

17. TOUR

A tour of ongoing research at the Texas A & M Experiment Station was conducted on the afternoon of July 21, 1987. The following projects were reviewed by the researchers:

Speaker

Subject

Dr. Shyamala Bhaskaran  
Dr. E. C. Bashaw  
Dr. Ed Percival  
Dr. C. Miller  
Dr. W. Smith  
Mr. Phil Sheets  
Dr. G. McBee

Tissue Culture  
Hybrid Grasses  
Cotton Germplasm  
Cowpea Breeding  
Cotton Breeding  
Sorghum Germplasm  
Minor Crops

APPENDIX I

STATE AND FEDERAL REPORTS

Written progress reports are attached in the following order:

Arkansas

Florida

Georgia

Hawaii

Kentucky

Louisiana

Mississippi

North Carolina

Oklahoma

Puerto Rico

South Carolina

Tennessee

Texas

Virginia

Germplasm Resources Laboratory

National Program Staff

National Seed Storage Laboratory

Soil Conservation Service

Southern Regional Plant Introduction Station

Subtropical Horticultural Research Station

Tropical Horticultural Research Station

1987  
S-9 REPORT

Accession User: James McD. Stewart  
Address: Agronomy Department, University of Arkansas,  
Fayetteville, AR 72701

Nature of Research: Acquisition, evaluation and enhancement of  
Gossypium germplasm.

Progress to Date: Taxonomic treatment of 1985 Gossypium collections from the Kimberely region of Western Australia is near completion and descriptions and illustrations of the 5 new species are in progress. We have concluded that a supposedly well-known taxon (G. populifolium) is misidentified. This problem is being studied and may result in an additional new species. Seed of each of the accessions of the Kimberely Gossypium have been germinated and seedlings are now growing of all but one accession. That accession is lost because of immature seed.

Seed of all the accessions of asiatic cottons in the US germplasm collection were obtained and plants are being grown in the field of all accessions that had viable seed. The objective is to verify accession labels (many errors as to species ID are involved), obtain description information and voucher specimens, and increase seed numbers for a multiple screening project. The screening project is designed to locate in the asiatic cottons resistance to seedling diseases, root-knot nematodes, thrips, plant bugs, Heliothis, and boll weevil. The lines are also being tested for certain physiological features such as degree of osmotic adjustment. Useful traits will be transferred to upland cotton.

Cytoplasms of wild Gossypium are being introgressed into the tetraploid nuclear background. Cytoplasmic male sterility has been identified in one of the introgressed cytoplasms lines in which a sister line has a male fertility. Crosses in anticipation of male fertility restoration are in progress. Other nuclear traits are being introgressed from wild Gossypium to upland cotton.

A range of upland cotton genotypes are being examined for their response to Agrobacterium tumefaciens infection.

Publications: None

Cultivar Releases: None

1987

S-9 Technical Committee Report

Agency: Arkansas Agricultural Experiment Station  
Submitted by: T.E. Morelock  
Address: Department of Horticulture and Forestry, 316 Plant  
Science Building, University of Arkansas, Fayetteville,  
AR 72701

\* \* \* \*

Accession User: D.E. Longer  
Address: Department of Agronomy, 115 Plant Science Building,  
University of Arkansas, Fayetteville, AR 72701  
Nature of Research: Evaluation of grain amaranth (*amaranthus*  
spp.) as a potential row crop in Arkansas.  
Progress to Date: Project terminated  
Publication: C.S. Enders and D.E. Longer. 1987. Herbicide  
selectivity among grain and weedy amaranthus species.  
Agronomy Journal. In Press.

Accession User: J.L. Bowers  
Address: Department of Horticulture and Forestry, 316 Plant  
Science Building, University of Arkansas, Fayetteville,  
AR 72701  
Nature of Research: Evaluation of new crop potential of Apios  
americana  
Progress to Date: Increasing selections for yield trial  
Publications: None  
Cultivar Releases: None

Accession User: S.J. Scott  
Address: Department of Horticulture and Forestry, 316 Plant  
Science Building, University of Arkansas, Fayetteville,  
AR 72701  
Nature of Research: Breeding for resistant to spotted wilt virus  
Progress to Date: A number of individual plants in eight  
Lycopersicon peruvianum accessions showed resistance;  
screening of L. pimpinellifolium accessions is  
continuing.  
Publications: Paterson, R.G., S.J. Scott and R. Gergerich.  
1987. Epidemiology and genetic resistance in tomato  
to tomato spotted wilt virus in Arkansas. HortScience  
(in press) (Abstr.)  
Cultivars Releases: None

## 1987 S-9 TECHNICAL REPORT

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

- Submitted by: G. M. Prine, University of Florida
- Address: Department of Agronomy  
304 Newell Hall, University of Florida  
Gainesville, Florida 32611
- Accession User: L. E. Sollenberger  
Agronomy Department  
Bldg. 477  
University of Florida  
Gainesville, Florida 32611
- Nature of Research: Forage grass and legume management and utilization
- Progress to Date: Grazing trials have been completed or are in progress comparing 'Floralta' limpograss fertilized with N or grown in association with aeschynomene, N-75 dwarf elephantgrass with 'Pensacola' bahiagrass. Animals grazing aeschynomene-limpograss outgained those on limpograss-N by more than 50% during each of three years. Steers grazing elephantgrass (3 years of data) and rhizoma peanut (2 years of data) gained an average of 2.1 lb/day, while those on bahia gained 0.9 lb/day. Handplucked elephantgrass herbage had 12% protein and 70% digestibility throughout the season, but bahiagrass herbage decreased in digestibility during the late summer.
- Publications: Rusland, G. A., L. E. Sollenberger, K. A. Albrecht, and L. V. Crowder. 1986. Animal performance on two summer pasture systems in Florida: Limpograss-N vs. limpograss-aeschynomene. Agron. Abst. p. 144.
- Sollenberger, L. E., and C. S. Jones, Jr. 1986. Animal performance on dwarf elephantgrass and bahiagrass pastures. Agron. Abst. p. 144.
- Sollenberger, L. E., M. J. Williams, and C. S. Jones, Jr. 1987. Dwarf elephantgrass: A high quality forage with potential in Florida. Fla. Beef Cattle Short Course Proceedings. Univ. of Florida, Gainesville, pp. 76-81.

Cultivar Release: N-75 dwarf elephantgrass in being considered for release in late summer 1987.

Accession User: Dr. O. C. Ruelke  
2195 McCarty Hall  
University of Florida  
Gainesville, Florida 32611  
(904) 392-1823

Nature of Research: Forage improvement from new germplasm under varied management

Progress to date: 'Florigraze' rhizoma peanut, a seedling from P.I. 118475 peanut, is slow-establishing but long-lived, while 'Florida 77' alfalfa establishes rapidly but is a relatively short lived perennial in Florida. Florigraze rhizoma peanuts were interplanted in Florida 77 alfalfa to evaluate the short and long term production, quality and persistence of the association to determine if better production could be obtained from the associations than from each crop in pure stands. Alfalfa accounted for 100% of the forage harvested the first year and 95% in the second year after planting. As the alfalfa declined in the fourth year after planting, it was replaced by the peanuts. By the fourth year after planting, Florigraze peanuts outyielded alfalfa both in pure stands and in mixtures.

Publications: Valentim, J. F., O. C. Ruelke, and G. M. Prine. 1987. Interplanting of Alfalfa and Rhizoma Peanut. Soil and Crop Sci. Soc. Fla. Proc 46: In Press.

Accession User: F. P. Gardner  
Department of Agronomy  
304 Newell Hall, University of Florida  
Gainesville, Florida 32611

Nature of Research: Perennial Arachis for turf.

Progress to Date: For ground cover and turf, P.I. 262840 was planted as rhizomes in 12"- rows in a well prepared seedbed on 5-9-83. Prior to planting sawdust was incorporated ca. 100t/A to improve soil physical conditions and to discourage weed competition. by nitrogen immobilization.

Survival and establishment was good to excellent despite several weeks of moisture deficiency

immediately following planting. Grassy weeds were greatly suppressed by the sawdust. About 12 months was required to achieve a complete ground cover and high quality turf. A major problem in establishment and maintenance of turf quality was control of legume weeds including viny crotalaria, sickle pod, Florida beggarweed, and other legumes. Also, nut sedge was a problem.

Since ground cover, no irrigation or fertilizer has been applied. Recycling of nutrients from mower clippings seems more than adequate for fertility maintenance. Irrigation appears counter productive in the long run, since quality turf persist despite drought. Mowing at about 5 cm at about 2-week intervals appears desirable, but not necessary. It is necessary for a well-groomed, smooth appearance.

In summary, this legume can serve as a low-maintenance, quality ground cover for sunny, dry areas, which does not receive excessive traffic.

Accession User: D. W. Gorbet  
Agricultural Research and Education Center  
Route 3, Box 376  
Marianna, Florida 32446  
(904) 594-3241

Nature of Research: Plant breeding and genetics program on peanuts - variety (cultivar) development, genetics studies, and breeding studies.

Progress to Date: This is a long-term program and part of the peanut breeding project of the University of Florida (since 1920's). A number of successful cultivar releases are credited to the program. The most recent is 'Southern Runner', which is a commercial runner market-type peanut with moderate leafspot resistance (from PI 203396).

The following peanut PIs are actively being evaluated at the present time, with emphasis on leafspot resistance:

|           |           |           |           |
|-----------|-----------|-----------|-----------|
| PI 415880 | 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 |

Accession user: David D. Baltensperger  
304 Newell Hall  
Agronomy Department  
University of Florida  
Gainesville, FL 32611  
(904) 392-1811

Nature of Research: Breeding research has been conducted on cool and warm-season forage legumes. Adaptability to Florida with emphasis on specific viruses and nematodes have been the primary objectives.

Progress to Date: Sources of root-knot nematode resistance have been identified in Alysicarpus vaginalis, Indigofera hirsuta, and Arachis glabrata. Variation in root-knot nematode resistance in cool-season legumes has been less distinct and so far includes only moderately tolerant types in Trifolium repens, T. incarnatum and T. subterraneum. Virus resistance is currently being evaluated in Alysicarpus and Indigofera accessions. Releases of Alysicarpus and Indigofera are currently being planned.

Publications: Baltensperger, D. D., G. M. Prine and R. A. Dunn. 1986. Root-knot nematode resistance in Arachis Glabrata. Peanut Sci. 13:78-80.

Taylor, S. G., and D. D. Baltensperger. 1987. Seedling vigor of selected Alysicarpus accessions. Agron. J. 79:101-103.

Cultivar releases: 'Flame' crimson clover. D. D. Baltensperger, G. M. Prine, K. A. Albrecht, L. S. Dunavin and R. L. Stanley. 1987. Univ. of Fla. Agric. Exp. Stn. Circular. S-339.

Accession User: G. M. Prine  
Agronomy Department  
304 Newell Hall  
University of Florida  
Gainesville, Florida 32611

Nature of Research: New Crops and Plant Introductions

Progress to Date:

1. Arbrook rhizoma peanut (PI 262817) Arachis glabrata Benth.) has been released as a named cultivar by IFAS and USDA, SCS. Rhimomes will be furnished to

commercial rhizome growers during January and February 1988. The commercial acreage of Florigraze rhizoma peanut climbed to about 2000 acres. New plantings of both Arbrook and Florigraze suffered severe plant loss during the dry springs of 1985, 1986, and 1987.

2. PI 300086 elephantgrass (Pennisetum purpureum) which had been leading the elephantgrass trials in biomass yields suffered considerable winter damage at Gainesville from the December 1983 and January 1985 freezes, which gave record low temperatures. Other elephantgrass accessions such as N51, Meakeron, and N43 had high yields and did not winterkill as much as PI 300086.
3. Pigeonpea cultivar development continues and one or more of lines 99W and 76W will be released as a cultivar within the next year or so.
4. The fifth cycle of recurrent selection of a Marshall-maturity annual ryegrass population for rust resistance was conducted at Gainesville during the 1986-87 winter season. Testing of plants from the fourth cycle of selection indicated a high level of crown rust resistance has been obtained. This new ryegrass will probably be released as a cultivar in July, 1988.
5. A recurrent selection nursery of fababeans (Vicia faba) was conducted during the winter 1986-87. Seed were obtained from the best plants for next year's nursery.
6. The average over dried biomass yield of stems of 12 Leucaena sp. introductions planted in duplicate 5 hill plots in 1979 was 40.2 Mg ha<sup>-1</sup>. The average dry matter stem yields of the same 12 accessions was 29.3 and 24.7 Mg ha<sup>-1</sup> in 1982 and 1983, respectively. The growing season in 1986 was especially long, from early March until mid-January to mild winter of 1986-87. The energy contained in the Leucaena stems would have been equivalent to that in 18 Mg oil per hectare. Annual harvesting of frosted Leucaena in sub tropics offers much potential in this tropical shrub legume becoming one of our first energy crops.

#### Publications:

- Orthman, A. B. and G. M. Prine. 1986. Biomass production and nutrient removal by leucaena in colder subtropics. In Biomass Energy Development, Plenum Press, New York, N.Y. p. 95-102.
- Reddy, K. C., A. R. Soffes, and G. M. Prine. 1986. Tropical legumes for green manure. I Nitrogen production and effects on succeeding crop yields. Agron. J. 78:1-4.

Reddy, K. C., A. R. Soffes, G. M. Prine, and R. A. Dunn. 1986. Tropical legumes for green manure. II Nematode populations and their effects on succeeding crop yields. Agron. J. 78:5-10.

Prine, G. M., L. S. Dunavin, Paul Mislevy, K. J. McVeigh and R. L. Stanley. 1986. Registration of 'Florida 80' annual ryegrass. Crop Sci. 26:1083-1084.

Prine, G. M., L. S. Dunavin, J. E. Moore and R. D. Roush. 1986. Registration of 'Florigraze' rhizoma peanut. Crop Sci. 26:1084-1085.

Prine, G. M., C. S. Gardner, D. S. Calhoun, K. R. Woodard and T. R. Burton. 1986. Progress report on developing elephantgrass as biomass (energy) crop in colder subtropics. Agronomy Abstracts, 1986 annual meeting at New Orleans, La. p. 121

Cultivar Release: Prine, G. M., L. S. Dunavin, R. J. Glennon and R. D. Roush. 1986. Arbrook rhizoma peanut, a perennial forage legume. Univ. of Fla., IFAS, Agric. Exp. Sta. Circ. S-332. 16 p.

Accession User: S. C. Schank  
Department of Agronomy  
2183 McCarty Hall, University of Florida  
Gainesville, FL 32611

Nature of Research: Grass breeding for forage and energy

Progress to Date: A replicated test of 12 tall elephantgrasses and 8 semi-tall hybrids which was planted in December 1986 is growing well. These test include PI 300086, N-51, and various triploid and hexaploid selected plants from earlier nurseries. These selected plants will be used in plant quality determinations, and in joint studies on bioconvertability to methane gas.

During 1987, seedlings of interspecific hybrids of pearl millet and napiergrass were germinated and transplanted to the field. Over 100 crosses were made, and approximately half of these crosses were subjected to nitrous oxide treatment 24 hours after pollination. Only 22 plants were obtained from the nitrous oxide treatment, and these plants are in the GH and will be checked for chromosome number using the root tip method. Approximately 2000 seedlings from the hexaploid crosses (thirty crosses of the hexaploid x hexaploid were germinated in 1986-87, and most of these were transplanted to the field during March, April and May, of 1987.

Accession User: P. Mislevy  
AREC, Box 62  
Ona, Florida 33865

Nature of Research: A. Compare new genotypes of *Hemarthria* and bahia to standard cultivars for yield, quality and persistence using the grazing animal.

B. Study the effect of fertilizer and nematicide treatments on crops grown for biomass (energy).

Progress to Date: A mob grazing experiment is being conducted to study the yield, quality, persistence and stubble carbohydrate level of Argentine bahiagrass PI 306279, and two *Hemarthria* grasses PI 364869 and PI 364871 when harvested at 2, 4, 6, and 8 weekly intervals. These introductions are being compared with known released cultivars. Following one year of grazing PI 364871 disappeared due to lack of persistence. Preliminary data indicate PI 364869 is low growing cultivar but is not as persistent as *Floralta* therefore will probably not be recommended for release.

Publication: Mislevy, P., R. S. Kalmbacher, A. J. Overman and F. G. Martin. 1986. Effect of Fertilizer and Nematicide Treatments on Crops Grown for Biomass (11(4):243-253.

Cultivar Release: None

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

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

Progress to Date: The introduction, P.I.300086, *Pennisetum purpureum*, is being evaluated for biomass. In 1986, it produced 40.7 Mg ha<sup>-1</sup> of dry biomass. The following introductions of Giant Reed, *Arundo donax*, produced the indicated dry biomass yields (Mg ha<sup>-1</sup>) in 1986: P.I.432427 (16.5), P.I.432425 (13.9), and P.I.432432(10.1).

The following introductions of rose clover were observed: P.I.120124, 120125, 120131, 120135, 120137, 120146, 120162, 120179, 120188, 120192, 120198, 120230, 120231, 120247, 120248, 121232, 206761, 227256, 234050, 249846, 287972, 287973, 287974, 287975, 287996, 302969, 304274, 311482, 311483, 311484, 311485, 311486, 311487, 319134, 348886, 419341.

Publications: Prine, G. M., L. S. Dunavin, B. J. Brecke, R. I. Stanley,

P. Mislevy, R. S. Kalmbacher, and D. R. Hensel. 1987. Model Crop Systems - Sorghum - Napiergrass. In press. In W. H. Smith and J. R. Frank (ed.) Methane from Biomass--a systems approach. Elsevier Applied Science Publishers., Ltd., Barking, England.

Cultivar Releases: None

Accession User: M. J. Williams  
USDA, ARS, STARS  
P.O. Box 46  
Brooksville, Florida 34605  
Phone Number: (904) 796-3385

Nature of Research: Evaluating the adaptation, in particular drought and cold tolerance, and forage potential of tropical and subtropical legumes.

Progress to Date: Five browse species (Leucaena leucocephala K-8, L. diversifolia K-156, L. leucocephala X L. diversifolia K-743, Gliricidia sepium, and Desmanthus virgatus) were evaluated at this location for establishment, growth potential, reseeding ability and winter survival. The Leucaenas, as a group evidenced greater potential for dry matter production, measured by plant height and branching, than the other genera. Gliricidia emerged significantly faster than the Leucaenas, but inoculation problems evidenced by slow growth, chlorosis and leaf loss were noted. Although Desmanthus flowered rapidly and set seed, no seedlings have been observed. Only one Leucaena plant (k743) was observed to flower, while the Gliricidia has not flowered at this location. Winter survival was essentially equal for all browse species.

Publications: Williams, M. J. 1987. Establishment and Winter Survival of Leucaena spp. and Gliricidia sepium in the Cold Subtropics. Leucaena Res. Rep. (in press).

Accession User: J. W. Scott  
Gulf Coast Research and Education Center  
5007 60th Street East  
Bradenton, Florida 34203  
Phone Number: (813) 755-1568

Nature of Research: Tomato breeding and Genetics: Breeding for multiple disease resistance, improved fruit setting including heat tolerance and improved fruit quality.

Progress to Date: In the last year the following Lycopersicon PI's have been processed for the given project: 414773 - Fusarium wilt race 3 resistance, 112215 and 120265 - Target Spot resistance, 126443 - heat stable nematode resistance, and

263722, 196298, and 251323 - bacterial wilt resistance. All projects are in preliminary stages. Crosses will be made with PI's which appear promising in fall trials.

Publications: Scott, J. W. and J. P. Jones 1986. Monogenic resistance in tomato to Fusarium oxysporum F. sp. lycopersici race 3. Euphytium (in press).

Accession User: J. M. Crall  
CFREC, Leesburg, Institute for  
Agricultural Sciences  
University of Florida  
Leesburg, Florida 32748

Nature of Research: Development of Disease Resistance in Watermelon (Citrullus lanatus L. [Thunb.] Matson and Nakai)

Progress to Date: P.I. 198225, with purported resistance to gummy stem blight (Plant Disease Repr. 46:883-885. 1962), was used in crosses with various breeding lines in 1981. Progenies in the BC<sub>5</sub> in 1987 are segregating for resistance (not immunity) to gummy stem blight.

Publications: None

Cultivar Releases: None

Accession Users: J. B. Brolmann  
A. E. Kretschmer  
Agricultural Research and Education Center  
P.O. Box 248  
Ft. Pierce, Florida

W. D. Pitman  
Agricultural and Education Center  
Rt. 1, Box 62  
Ona, Florida 33865

Nature of Research: Brolmann is a legume breeder specializing in Stylosanthes sp. Kretschmer and Pitman work with developing forage crops from tropical grass and legume introductions.

Progress to date: No report received but release of a perennial Alyce clover and perennial wild Vigna have been requested.

1987 GEORGIA S-9 TECHNICAL COMMITTEE REPORT

Agency: Georgia Agricultural Experiment Station, University of Georgia, and USDA

Submitted by: Carl S. Hoveland

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

- 
1. Accession User: John Cardina  
USDA-ARS  
Coastal Plain Exp. Station  
Tifton, GA 31793-0748
  2. Nature of Research: Screening Desmodium and other legume species for susceptibility to a fungal pathogen to determine the host range of the organism.
  3. Progress to Date: Eleven species of Desmodium were susceptible to Colletotrichum truncatum isolated from D. tortuosum. Five Desmodiums and more than 80 other species did not exhibit disease symptoms.
  4. Publications: One publication is in initial review process.
  5. Cultivar Releases: Not applicable.
  6. Need for Explorations: Not applicable.

- 
1. Accession User: Richard B. Chalfant  
Entomology Dept.,  
Coastal Plain Experiment Station  
Tifton, GA 31793-0748
  2. Nature of Research: Resistance of cowpeas to curculio.
  3. Progress to Date: A large number of cowpea lines were screened for resistance to the cowpea curculio during 1985 and 1986. About 40 lines with thin hulls and showing resistance to the curculio have been identified for reevaluation. Lines and landrows from Central and South America may be of interest as sources of resistance to the curculio.
  4. Publications: None.
  5. Cultivar Releases: None.

- 
1. Accession User: Mr. James H. Chalkley  
Georgia Station  
Department of Plant Pathology  
Virus Lab  
Experiment, GA 30212

2. Nature of Research: Screening of P.I. peanut (Arachis hypogaea L.) collection for resistance to peanut stripe virus (PStV). All P.I. lines will be planted, inoculated with peanut stripe, evaluated for resistance and grown to maturity to check for seed transmission of peanut stripe virus (PStV) using ELISA techniques.
3. Progress: Of the total peanut collection (7,526 PI's) at the S-9 P.I. Station, 299 have been tested. We have observed already what seems to be some resistance or at least some partial resistance to peanut stripe virus (PStV). This research will continue as time and greenhouse space permits in order to test the entire collection.
4. Publications: None.
5. Cultivar Releases: None.

- 
1. Accession User: Wayne W. Hanna  
Coastal Plain Experiment Station  
Tifton, GA 31793-0748
  2. Nature of Research: Gene transfer from wild to cultivated species with emphasis on apomixis.
  3. Progress to Date: Progress is being made in the backcrossing process to pearl millet. Pennisetum squamulatum (PI 248534 and PI 319196) has been the most useful. Some good forage types have been produced.
  4. Publications:
 

Dujardin, Michael and Wayne W. Hanna. 1983. Apomictic and sexual pearl millet x Pennisetum squamulatum hybrids. Jour. of Heredity 74:277-279.

Dujardin, M. and W. Hanna. 1984. Microsporogenesis, reproductive behavior, and fertility in five Pennisetum species. Theor. Appl. Genet. 67:197-201.

Dujardin, M. and W. Hanna. 1984. Cytogenetics of double cross hybrids between Pennisetum americanum - P. purpureum amphiploids and P. americanum x Pennisetum squamulatum interspecific hybrids. Theor. Appl. Genet. 69:97-100.

Dujardin, Michael and Wayne Hanna. 1985. Cytology and reproduction of reciprocal backcrosses between pearl millet and sexual and apomictic hybrids of pearl millet x Pennisetum squamulatum. Crop Sci. 25:59-62.

Dujardin, M. and W. W. Hanna. 1985. Cytology and reproductive behavior of pearl millet - napiergrass hexaploids x Pennisetum squamulatum trispecific hybrids. Journ. of Heredity 76:382-384.

Dujardin, M. and W. Hanna. 1986. An apomictic polyhaploid obtained from a pearl millet x Pennisetum squamulatum apomictic interspecific hybrid. Theor. Appl. Genet. 72:33-36.

5. Cultivar Releases: None.
  6. Need for Explorations: Need complete collection of tertiary gene pool species of Pennisetum. Located in Africa and South America.
- 
1. Accession User: Carl S. Hoveland and J. H. Bouton  
Agronomy Dept.  
University of Georgia  
Athens, GA 30602
  2. Nature of Research: Screening of perennial legumes for persistence and production in south Georgia pastures.
  3. Progress to Date: Screening of a large number of kura clover (Trifolium ambiguum) in a field nursery over two years identified seven accessions from the USSR that were superior in persistence, forage growth, persistence, and spread by rhizomes. Rhizome cuttings of these accessions and Monaro from New Zealand and ladino clover were rooted in the greenhouse in August-September and transplanted to small plots in October for forage yield evaluation. Thus far, ladino clover has been superior as the kura clover entries have been slow to spread. Transplants of a superior accession have been set out in tall fescue pastures at 3 locations to determine persistence under grazing.  
  
Open pollinated seed from 16 superior accessions and 5 Australian and New Zealand cultivars started in the greenhouse and transplanted to replicated rows in a nursery in October. Plants are being screened for forage and seed yield, plant spread, and rhizome number. Heritability estimates for these characteristics are being determined.
  4. Publications: None.
  5. Cultivar Release: None.
- 
1. Accession User: R. P. Lane  
Department of Horticulture  
Georgia Station  
Experiment, GA 30212
  2. Nature of Research: PI lines are being used as a source of Bacterial Spot and Tobacco Etch Virus resistance in a breeding program to improve disease resistance in bell pepper.
  3. Progress to Date: PI 163192 was used as a source of Bacterial Spot resistance in a cross with 'Jupiter' and PI 264281 was used for TEV resistance. We are now in the BC<sub>2</sub> generation and resistance, non-pungent selections have been made. Further backcrossing is needed to recover the desired horticultural characteristics.
  4. Publications: None.
  5. Cultivar Releases: None.
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1. Accession User: John D. Miller  
USDA-ARS  
Forage and Turf Unit  
P. O. Box 748  
Tifton, GA 31793-0748
2. Nature of Research: Plant Breeding
3. Progress: Six cowpea lines have produced high yields of forage. These lines are PI number 163142, 186386, 292911, 293581, 339709, and 353050. White lupins were evaluated for winterhardiness in 1984-85, 1985-86 and 1986-87 with no differential killing noted. These lupins included entries numbered from 457921 to 457956. Fifteen lines of Trifolium alexandrinum and eight lines of T. echinatum were evaluated in 1985-86 but survival was poor compared to newly released 'Bigbee' or 'Miscavi' cultivars.
4. Publications: None.
5. Cultivar Releases: None.
6. Needs: More hardy lupins both Lupinus albus and L. angustifolius.

- 
1. Accession User: Doyle A. Smittle  
Horticulture Department  
Coastal Plain Experiment Station  
Tifton, GA 31793-0748
  2. Nature of Research: Melon evaluation and breeding
  3. Progress: Characteristics of PI lines 183047, 223638, 266930 and 273441 are being incorporated into genetic base. PI lines 226444, 228343, 289874 and 370441 are under further evaluation.
  4. Publications: None.
  5. Cultivar Releases: None.
  6. Other Species Desired: Cucurbita foetidissima, Allium cepa

- 
1. Accession User: Dr. B. R. Wiseman  
Insect Biology and Population Management  
Research Lab., USDA  
P. O. Box 748  
Tifton, GA 31793-0748
  2. Nature of Research: Breeding for sorghum midge resistance and screening for fall armyworm seedling resistance.
  3. Progress: PI383856 is useful for sorghum midge resistance. None of the PI's screened for FAW seedling resistance are useful.
  4. Publications: None.
  5. Cultivar Releases: SGIRL-MR-3, SGIRL-MR-4
  6. Needs: Resistance to insects and/or diseases.

S-9 TECHNICAL COMMITTEE REPORT

JULY 1987

Agency: Hawaii Institute of Tropical Agriculture & Human Resources

Submitted by: P. J. Ito

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

Page 1 of 5

\* \* \* \* \*

Accession User: R. W. Hartmann, Patrick J. O'Malley, Candace M. Yoshii

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

Nature of Research: Breeding lettuce for resistance to spotted wilt virus.

Progress to Date: Tomato spotted wilt virus is a virus with a very wide host range, most often causing damage on tomatoes, but also on peppers, chrysanthemums, peanuts, pineapple, and many other plants including lettuce. This disease has become especially severe on lettuce in Hawaii in recent years and thus an extensive search for useful genetic resistance was made.

As a result of the preliminary testing in 1979-80, it seemed that some materials which had originated in Holland had some resistance, so these materials have been looked at more closely. 123 P. I. lines from Holland were received from the Western Regional Plant Introduction Station in 1986. Of these, 50 seem to have some resistance, based on the first test. They are being retested and their progeny are also being tested. Another collection undergoing testing is about 160 lines of L. sativa and L. serriola collected by R. provvidenti in Turkey and Greece. 30 of these appear to have some resistance and are also being retested along with their progeny. Nothing, however, has been found in L. sativa or L. serriola which has a higher level of resistance than the 10% survival mentioned. L. perennis, PI 273594, and a line of L. capensis received from R. Provvidenti have shown 100% survival, however.

Two lines from Holland thought to have some resistance based on the 1979-80 trials have undergone further extensive study. By repeated trials with sufficient numbers of plants, PI 342517 (Ancora) and Tinto (received from E. J. Ryder, but also in the PI collection as PI 342444 incorrectly designated Trinto), had a statistically significant difference in resistance from the susceptible check, Green Mignonette. Inheritance studies through the F<sub>2</sub> population have suggested that the resistance is controlled by several genes, but does show some dominance.

Publications: Hartmann, R. W. and P. J. O'Malley. 1986. Tomato spotted wilt virus resistance in lettuce, (Lactuca sativa L.). HortScience 21:790. (Abstr.)

O'Malley, P. J. 1987. Inheritance of resistance to tomato spotted wilt virus in lettuce (Lactuca sativa L.). MS Thesis, University of Hawaii, Manoa, 78 pp.

Cultivar Release: None.

Accession User: Francis Zee, Curator  
Address: c/o Beaumont Agriculture Research Station  
 461 W. Lanikaula St., Hilo, Hawaii 96720  
 Tel: (808) 959-5833

Nature of Research: Germplasm collection and preservation of Macadamia, Carica, Artocarpus, Ananas, Passiflora, Psidium, Malpighia.

Progress to Date: Carica: 8 accessions of Carica species and 150 accessions of C. papaya were collected. About 100 accessions from Africa, PI #491584 to 491673 will be planted and evaluated during this summer. All 5 seeds of a dwarf C. papaya PI #50383, from the French Polynesia did not germinate. Twenty five lines of named C. papaya were field planted for evaluation since April 1987.

The papaya industry in Hawaii had encountered a serious problem with the cultivar Kapoho since spring of 1987. Live fruit fly larvae were repeatedly observed in hot water double dip treated papaya fruits. A single treated papaya intercepted at Oakland, California was found to be infested with 50 live third instar larvae of the oriental fruit fly, Dacus dorsalis Hendl. As a result of the infestation, shipment of Hawaiian papaya to the continental United States was suspended for over 2 weeks. The infestation of quarantine treated papaya was due to the present of 2 types of blossom end defect in Cv. Kapoho fruits. This genetic defect was included into the 'Kapoho' germplasm through the lack of a properly conducted seed selection and preservation practice by the industry. In recent years, most seeds of the Cv. Kapoho used by the industry were selected based on external fruit morphology and were harvested directly from the packing lines.

During this crisis, the repository staff, in cooperation with the industry; USDA-ARS and UH. Extension service, had contributed significantly in the determination of the fruit defects, and in the survey for incidence of defective trees in the commercial orchards. A project has been initiated to preserve and locate the original 'Kapoho' germplasm.

Ananas: Four accessions of pineapple, 2 with resistance to pink disease and one to Phytophthora cinnamomi and P. parviflora are being multiplied. Two accessions introduced from Taiwan are under quarantine observation in the State Department of Agriculture quarantine facility; 87 accessions of pineapple from the Maui pineapple Co. collection were transferred to the repository on July 10th.

Malpighia: Eight accessions of acerola cultivars are being propagated.

Artocarpus: The repository is currently maintaining 10 accessions of seedless breadfruit. We had successfully rooted 8 out of the 18 accessions of stem cuttings provided by Ms. Dianne Ragone via Dr. Richard Manshardt in April. The ability for the stem cuttings to root appeared to vary between clones, success in rooting had ranged from 0 to 80%. The transition time was 3 weeks between harvested and arrived at the repository, about half of the cuttings received had decayed. The transition time for the next shipment, if possible, should be reduced as much as possible. Waxing of the whole stem cutting will be tested to determine if it can reduce losses during transportation.

**Psidium:** Four Psidium species and 4 P. guajava cultivars were collected. Mature trees of 11 P. guajava at 2 UH. experimental farms were pruned to stimulate vegetative growth for cutting propagules.

**Macadamia:** Rootstocks are being grown for 22 cultivars and selections that are being maintained by the University.

**Passiflora:** Nineteen accessions of passion fruit, 13 collected in Hawaii, 1 from Tanzania, Africa and 6 from Florida are being maintained as seeds or cuttings.

**Publications:** None.

**Accession User:** P. J. Ito and C. L. Chia

**Address:** Department of Horticulture, 3190 Maile Way, University of Hawaii, Honolulu, HI 96822

**Nature of Research:** Introduction, selection and testing of tropical fruits and nuts.

**Progress to Date:** Several new introductions of wax apple, rambutan, guava, mango and jujube from Taiwan and Thailand were made.

**Publications:** Hamilton, R. A. 1986. Present status of tropical fruit germplasm collection in Hawaii. International Germplasm meeting (IBPGR), Malaysia, 3 pages.

Hamilton, R. A., C. L. Chia & P. J. Ito. 1986. Recommended fruits and nuts for the home and gardens. HITAHR Brief No. 052, 2 pages.

Hamilton, R. A. 1985. Old and new banana varieties for Hawaii. Proc. 17th Ann. Hawaii Banana Industry Assoc, 4 pages.

Hamilton, R. A., C. L. Chia & P. J. Ito. 1985. Better rootstocks for citrus grown in Hawaii. HITAHR, Research Extension Series 053, 7 pages.

**Cultivar Release:** See table 1.

Table 1. Promising New Fruit Cultivars Developed at Horticulture Department but not yet Officially Named and Released

| Genus             | Species                 | Prospective CV         | Proposed Name |
|-------------------|-------------------------|------------------------|---------------|
| 1. Averrhoa       | Carambola               | D-R11T1                | Kary          |
| 2. Averrhoa       | Carambola               | D-R6T1                 | Kyra          |
| 3. Mangifera      | Indica                  | ER1T1                  | Exel          |
| 4. Mangifera      | Indica                  | FR6T6                  | Rapoza        |
| 5. Mangifera      | Indica                  | Malama Ki Paris Variet | Paris #1      |
| 6. Persea         | Americana               | R27T8                  | Greengold     |
| 7. Persea         | Americana               | R11T14                 | ?             |
| 8. Litchi         | Chinensis               | C-R10-T2               | Kaimana       |
| 9. Carica         | Papaya                  | 72-12                  | Sunset        |
| 10. Citrus Hybrid | Grandis Paradise        | B-R4T5                 | Puma          |
| 11. Canarium      | Ovatum                  | Pili Nut Sel 3         | ?             |
| 12. Artocarpus    | Heterophyllus           | Hessaraghata Jak       | Hess          |
| 13. Annona Hybrid | Cherimola<br>x Squamosa | Field D Selection      | ?             |
| 14. Psidium       | Guajava                 | WK-11-26               | Waiakea       |

Accession User: Richard M. Manshardt and C. Diane Ragone  
Address: Department of Horticulture, University of Hawaii, Honolulu, HI 96822

Nature of Research: Collection of breadfruit (Artocarpus altilis (Park.) Foeb.) from the Pacific region for horticultural evaluation and biosystematic studies.

Progress to Date: Our objective is to document the genetic and horticultural variation in breadfruits of the Pacific. To facilitate this end, we have begun to establish a permanent study collection in Hawaii, so that the crop can be evaluated in a uniform environment outside the cyclonic storm belts of the Pacific. In the first half of 1987, Diane Ragone, PhD candidate in the Dept. of Horticulture, travelled extensively in the Pacific region collecting breadfruit seeds, stem cuttings, root cuttings and suckers. Root cuttings and suckers continue to be the most reliable clonal propagating materials, while stem cuttings, in spite of improved propagating techniques, are less satisfactory. A total of about 120 accessions have been collected, and propagating materials, including 229 root cuttings from 66 accessions, approximately 200 stem cuttings representing 44 accessions, 97 suckers from 40 accessions, and 17 seeds from 2 accessions have been shipped to Hawaii. So far this year, about 30 accessions have been successfully established from root cuttings or suckers. Dr. Francis Zee of the National Clonal Germplasm Repository in Hilo, Hawaii, has established 8 clones from stem cuttings. Much of the material is still in the process of establishment. Collection areas visited this year include Fiji, Solomon Islands, the Marquesas Islands, the Society Islands, Palau and Yap. Diane is currently collecting in the Mariana Islands, Truk, Pohnpei, Kosrae, Kiribati and the Marshalls. We intend to revisit Western Samoa and perhaps Fiji this fall to complete the collection. This work was funded partly by a USDA Plant Exploration grant and partly by a grant from the International Board for Plant Genetic Resources.

Publications: Ragone, Diane. 1987. Collecting breadfruit in the Central Pacific. Bull. Pacific Tropical Botanical Garden, Vol. 17 (2): 37-41. (see attached)

Cultivar Releases: None.

Accession User: Richard M. Manshardt  
Address: Department of Horticulture, University of Hawaii, Honolulu, HI 96822

Nature of Research: Evaluation of wild Carica species for resistance to papaya ringspot virus (PRSV), and use of resistant germplasm in a papaya improvement program.

Progress to Date: Previously, interspecific hybrids have been produced between Carica papaya and 4 virus-resistant wild species using embryo rescue techniques. Preliminary field tests have demonstrated that two different interspecific hybrids have useful levels of resistance to PRSV and that the resistances are apparently under different genetic control. One hybrid (C. papaya x C. quercifolia) is vigorous and has never developed PRSV symptoms after repeated inoculations. Another hybrid (C. papaya x C. pubescens) is also vigorous, and remains symptomless in the field under natural disease pressure that causes 100% infection of papaya, although it develops an acute reaction if inoculated with PRSV. Preliminary results from reciprocal crosses between PRSV-resistant C. pubescens and susceptible C. monoica suggest that full expression of the

virus resistance conditioned by C. pubescens nuclear genes is achieved only in C. pubescens cytoplasm. The other two hybrids (C. papaya x C. stipulata and C. cauliflora x C. papaya) are weak and appear to be susceptible if inoculated with PRSV. All interspecific hybrids involving papaya and wild Carica species are reproductively sterile. However, it has been possible to backcross the two vigorous hybrids to papaya through use of ovule and embryo rescue techniques. They are currently being cloned in vitro and have not yet been evaluated for PRSV resistance. Results of isozyme analyses (PGM, IDH, MDH) of 9 backcrossed plantlets derived from a C. papaya x C. pubescens F<sub>1</sub> are consistent with a sesquidiploid constitution, suggesting functional unreduced eggs or allotetraploidy in the F<sub>1</sub> parent. Chromosome number determinations are in progress for F<sub>1</sub> and backcross plants. The successful production of backcross individuals from the PRSV-resistant interspecific hybrids is a milestone that indicates that sterility in the F<sub>1</sub> plants is not an insurmountable barrier, and that gene transfer from wild Carica species into papaya is possible.

Publications: None.

Cultivar Releases: None.

S-9 Technical Committee Report  
July 1987

**Agency:** Kentucky Agricultural Experiment Station  
**Submitted By:** N. L. Taylor  
**Address:** Department of Agronomy  
University of Kentucky  
Lexington, KY 40546-00914

Page 1 of 2

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**Accession User:** J. C. Snyder  
**Address:** Department of Horticulture  
University of Kentucky  
Lexington, KY 40546-00919

**Nature of Research:** Selection in Lycopersicon for arthropod resistance and ability to flower under long days.

**Progress to Date:** Nine accessions of Lycopersicon hirsutum were evaluated and all met the criteria. Crosses among these accessions have been initiated and the resulting populations are forming the basis for determining the genetic control of certain morphological features associated with pest resistance including trichome morphology, density, and their interactions with the environment as well as quality and quantity of trichome exudate. As specific desirable traits are identified, introgression into L. esculentum will be attempted.

**Publications:** Carter, C. D. and Snyder, J. C. 1986. Mite responses and trichome characters in a full-sib F family of Lycopersicon esculentum X L. hirsutum. J. Amer. Soc. Hort. Sci. 111: 130-133.

**Cultivar Releases:** None

**Accession User:** N. L. Taylor  
**Address:** Department of Agronomy  
University of Kentucky  
Lexington, KY 40546-00914

**Nature of Research:** Evaluation of Trifolium species collected in Romania.

**Progress to Date:** Seeds of 42 accessions of Trifolium species were added to the USDA-ARS Kentucky clover germplasm bank from plant exploration in Romania. Chromosome numbers and species identities were determined and PI numbers assigned. Trifolium seed holdings in the United States were surveyed to determine the need for future exploration. Significant holdings were located in KY, CA, GA, MS, UT, WI, NY, TX. It was determined that the next exploration should be in Yugoslavia. An exploration proposal was submitted to project S-9. The Kentucky-USDA Trifolium collection now numbers 233 species. The most recent additions to the collection include T. blacheanum, (Israel), T. stoloniferum (an endangered species) from West Virginia, and a new discovery from Tennessee and Virginia, as yet unnamed. We are maintaining seeds of the endangered species in cooperation with the Missouri Botanic Garden. An investigation into crossing and morphological relationships among Trifolium species closely related to strawberry and persian clover is complete, and is in the process of publication. We expect to conduct similar investigations of phylogenetic

relationships among the Eastern United States Trifolium species. Other research underway includes phenotypic selection for day length response among introductions of zigzag clover (T. medium) and kura clover (T. ambiguum). The latter program is in the evaluation stage.

**Publications:** Taylor, N. L. 1986. Collecting clovers in Romania.

Trifolium conf. Proc. 9:47-51. Guelph, Ontario, Canada.

**Cultivar Releases:** None.

1987 S-9 TECHNICAL COMMITTEE REPORT FOR LOUISIANA

Agency: Louisiana Agricultural Experiment Station,  
Louisiana State University Agricultural  
Center

Submitted by: A. M. Thro

Address: Agronomy Department  
Louisiana State University  
Baton Rouge, LA 70803-2110

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Accession

User: E. Nowick

Address: Rice Research Station, P. O. Box 1429  
Crowley, LA 70520

Nature of  
Research:

Rice germplasm collection

Progress  
to Date:

Thirty-three samples of four species of Oryza were collected between Belim and Manaus in the lower Amazon Basin. Samples were collected from both black-water (low-nutrient) and white-water rivers. All collections are deep-water flowering types and will be screened for possible use as sources of resistance to rice water weevil, an insect that is endemic in the collection region.

Publications: None

Cultivar

Releases: None

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Accession

User: Mike Smith

Address: Entomology Dept., LAES, Baton Rouge, LA

Nature of  
Research:

Rice Germplasm Characterization

Progress  
to Date:

Several hundred PI's (520) were evaluated for rice water weevil, Lissorhoptrus oryzophilus, and fall armyworm, Spodoptera grugiperda, resistance.

Publications: Pantoja, A., C. M. Smith, and J. F. Roginson. 1986. Evaluation of rice germplasm for resistance to the fall armyworm (Lepidoptera: Noctuidae). Environ. Entomol. 79:1319-1323.

Cultivar

Releases: None

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Accession

User: W. J. Blackmon

Address: Dept. of Plant Pathology & Crop Physiology  
LAES, Baton Rouge, LA 70803

Nature of research: Development of crop potential of Apios americana, a native tuber-forming legume.  
Progress to Date: Apios selections are being tested by home gardeners throughout the USA and Canada, Summer, 1987. Gardeners will evaluate adaptation, bean yield, and tuber yield.  
Publications: Wilson, P. W., F. Pichardo, J. A. Luizzo, Wl J. Blackmon, and B. D. Reynolds. 1987. Amino acids in the American groundnut (Apios americana). J. of Food Sci. 32:224-225.  
Cultivar Releases: None

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Accession User: A. M. Thro  
Address: Agronomy Dept., LAES, Baton Rouge, LA  
Nature of Research: Collection, characterization, preservation, utilization of Louisiana germplasm of the forage legume Aeschynomene americana.  
Progress to Date: Accessions collected in 1985 were characterized at two locations. Louisiana germplasm had forage yields similar to 'Florida common' (PI 421680), smaller seedlings, and finer stems.  
Publications: None  
Cultivar Releases: None

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Accession User: A. M. Thro  
Address: Agronomy Dept., LAES, Baton Rouge, LA  
Nature of Research: Evaluation of Arachis glabrata forage potential in Louisiana  
Progress to Date: A nursery was planted at Clinton, Louisiana, of 20 plant introductions of A. glabrata obtained from Drs. Banks and Pitman, Oklahoma State U. First data will be taken in 1988.  
Publications: None  
Cultivar Releases: None

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Accession User: A. M. Thro, R. Joost, G. Mooso, R. Mitchell, R. Gates  
Address: Agronomy Dept. (Thro & Joost), Rosepine Research Station (Mooso), Northeast Research Station (Mitchell), Iberia Research Station (Gates), Louisiana Agricultural Experiment Station, LSU Agricultural Center.  
Nature of Research: Summer forage legume species adaptation trial.  
Progress to Date: Introduced germplasm of Aeschynomene americana, Alysicarpus vaginalis, Arachis glabrata, Desmodium intortum and D.

uncinatum, Indigofera hirsuta, Lotononis bainesii, Macroptillium lathyroides, Stylosanthes hamata and Stylosanthes guianensis is being evaluated for yield and adaptation at five locations. The first year has been completed and the second year is in progress. Three years of data will be obtained. Distinct differences in relative performance of species have been observed across the state.

Publications: 1986 Annual Livestock Research Report, LAES, and Annual Reports of each research station.  
Cultivars Released: None (all are already released cultivars, developed in other parts of the world).

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Accession User: R. Joost, G. Mooso, R. Mitchell,  
R. Gates  
Address: Agronomy Dept. (Joost), Rosepine Research Station (Mooso), Northeast Research Station (Mitchell), Iberia Research Station (Gates), Louisiana Agricultural Experiment Station, LSU Agricultural Center.  
Nature of Research: Cool season forage legume uniform variety trial, in cooperation with the S.E. Regional P.I. Station and other southeast regional experiment stations.  
Progress to Date: Tests are conducted each year with standard and new varieties of clovers and other cool season legumes. Producer recommendations are made on the basis of three years' data.  
Publications: Annual Reports of each research station and the Agronomy Department  
Cultivar Releases: None

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Accession User: R. Joost  
Address: Agronomy Department, LAES, Baton Rouge, LA  
Nature of Research: Management and utilization of Aeschynomene ameriana  
Progress to Date: Studies are being conducted to define optimum seeding data, seeding rate, and harvest management of A. americana in Louisiana. Growth and reproduction of goats grazing A. americana is also being studied.  
Publications: None  
Cultivar Releases: (Not applicable)

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Accession User: R. Joost, S. Harrison, A. M. Thro  
Address: Agronomy Dept., LAES, Baton Rouge, LA  
Nature of Research: Forage potential of the perennial legume Vigna luteola

Progress to Date: Four PI's, additional accessions received from the international collection in Belgium, and several native Louisiana collections of V. luteola are being tested at Clinton, Louisiana, this season.

Publications: None

Cultivar

Releases: None

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Accession

User: M. K. Johnson

Address: Sch. of Forestry, Wildlife, & Fisheries, LAES, Baton Rouge, LA

Nature of Research: Use of Aeschynomene americana in planted summer food plots for deer

Progress to Date: Deer grazing A. americana were larger and bucks had better antler development than deer on a simulated native diet.

Publications: Johnson, J. K, T. W. Keegan, S. R. Schultz, and D. Franke. 1987. American jointvetch for summer-fall grazing. Louisiana Cattleman (Jan):9,11.

Cultivar

Releases: (Not applicable)

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Accession

User: H. V. Hanna

Address: Citrus Res. Station, LAES, Port Sulfur, LA

Nature of Research: Breeding tomatoes for heat tolerance.

Progress to Date: Two tomato breeding lines from the Asian Vegetable Research and Development Center, CL9-0-0-1-3-0 and CL5915-153, are being used in the Louisiana breeding program.

Publications: None

Cultivar

Releases: None

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Accession

User: L. Zimmer and E. Jupe

Address: Biochemistry Dept., LAES, Baton Rouge, LA

Nature of Research: Search for DNA restriction polymorphisms  
Progress to Date: PI's 21704, 21705, 21708, 21709, 21710, 21711, 21712, 21713 were screen for restriction enzyme polymorphisms in genes coding for the large ribosomal RNA; none were detected.

Publications: None

Cultivar

Releases: None

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Accession

User: J. F. Fontenot

Address: Horticulture Dept., LEAS, Baton Rouge, LA

Nature of Research: Breeding potatoes  
Progress to Date: PI's observed for possible use in the breeding program were: S. acaule 473513, 498066, 498078, 498079, 500008, 500016, 500018; S. boliviense 310974; S. chacoense 500042, 498322, 498323, 498324, 498325; S. clarum WRF1568; S. demissum, 205625, 230578, 230579, 498014, 498015; S. canasense 210035, 283080, 473346. Publications: Fonteno, J. F., D. W. Newsom, H. M. Brewer, and P. W. Wilson. 1986. National Potato Germplasm Evaluation and Enhancement Report 56:52-60.

Cultivar Releases: None

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Accession  
User: J. F. Fontenot  
Address: Horticulture Dept., LEAS, Baton Rouge, LA  
Nature of Research: Breeding sweet and hot peppers for home garden and commercial production  
Progress to Date: Ease of pod abscission character was studied using PI's 260504, 281439, 260558, 260557, and 'Serrano Chili'. Continued investigation of transfer of multiple flower gene from other species to Capsicum annum.  
Publications: None  
Cultivar Releases: None

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Accession  
User: J. F. Fontenot  
Address: Horticulture Dept., LEAS, Baton Rouge, LA  
Nature of Research: Okra breeding for yield, quality, and mechanical harvestability.  
Progress to Date: The best of thirty PI's evaluated were 174003 (Turkey), 249620 (India), 269494 (Pakistan), 390580 (Peru) Publications: Fontenot, J. F., P. W. Wilson, K. Butts, D. M. Shuh, and H. M. Brewer. 1987. Extending the shelf-life of okra pods. Louisiana Agriculture, Summer Issue.

Cultivar Releases: None

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Accession  
User: C. A. Clark  
Address: Dept. Plant Pathology and Crop Physiology, LAES, Baton Rouge, LA  
Nature of Research: Evaluation of sweet potato (Ipomoea batatas L.) germplasm for disease resistance and other characters.

Progress to Date: Heirloom cultivars and breeding lines from US programs are being evaluated. A special agreement has just been reached with the sweet potato germplasm repository at Experiment, GA, to screen for resistance to soil and storage rots next year.

Publications: None

Cultivar Releases: None

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Accession

User: P. M. St. Amand

Address: Dept. Horticulture, LAES, Baton Rouge, LA

Nature of Research: Sweet potato breeding

Progress to Date: Breeding lines are obtained from breeders located throughout the world for use in a polycross breeding system. Useful lines are maintained and are evaluated through participation in the National Sweet Potato Collaborators Group.

Publications: None

Cultivar Releases: None

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Additional requests for Plant Introduction Station materials in Louisiana in 1986-1987 were as follows:

G. Whittington, Jennings, LA (7 accessions of Elocharis dulcis, water chestnut, for development of commercial production)

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Additional plant introduction activity in Louisiana in 1986-87:

N. Murai and M. C. Rush, Dept. Plant Pathology and Crop Physiology, College of Agriculture, Louisiana State University, Baton Rouge, LA  
(introduced a Japanese rice cultivar, 'Nippon-bare', for use in protoplast regeneration research)

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1987

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: 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 will be evaluated in 1987 and be subjected to an additional cycle(s) of selection.

Publications: None  
Cultivar Releases: None

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 (1000 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.

Publications: None  
Cultivar Releases: None

Accession User: P.G. Thompson  
Address: Department of Horticulture, P.O. Drawer T, Mississippi State, MS 39762

Nature of Research: Breeding watermelons for improved quality, yield and disease resistance

Progress to Date: PI accessions 189225, 270550, 271775, 271778, 271779 and 299379 with reported resistance to the diseases gummy stem blight and anthracnose were crossed to 6 commercial watermelon varieties with high levels of resistance to Fusarium wilt. F<sub>4</sub> progenies were screened for resistance to the 3 diseases and resistant progenies were selected for high yield and quality. Breeding lines were identified with high levels of disease resistance, high yield and quality. Intermating and selection will continue to maximize these traits in homozygous lines.

Publications: None  
Cultivar Releases: None

S-9 TECHNICAL COMMITTEE REPORT

Texas A & M University - July 21 - 22, 1987

Agency: NORTH CAROLINA STATE UNIVERSITY

Submitted By: W. T. Fike

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

Five cooperators from a pool of 30 cooperators received 1,049 PIs from 9 species of 5 genera. Many PIs are in the pipeline of breeding new varieties as can be attested by the release in May of the forage cultivar "CAROSTAN" flaccidgrass. "Carostan" was developed by the selection of vigorous seedlings and plants from material tracing to an Afghanistani introduction PI 220606, obtained from the U.S. Plant Introduction Station, Experiment, Georgia in 1962.

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

1. Accession User - Dr. Wanda W. Collins, Horticulture Department, NCSU, Raleigh, North Carolina 27695-7609.

Nature of Research: Breeding sweet potatoes for high dry matter and disease resistance.

Progress During 1987: 'Sweet Red', sweet potato was released in 1986 with PI 153655 in its genetic background. PI 153655 was released to breeder's in 1948. In addition to PI 153655, in our program we maintain (but do not use in crosses):

|           |           |
|-----------|-----------|
| PI 324885 | PI 344124 |
| PI 296116 | PI 134413 |
| PI 153908 | PI 399162 |
| PI 324885 | PI 344140 |

In 1987 thirty-four PIs were released by USDA. We have established these PIs and will be evaluating them in 1987.

Publication: Collins, W.W. and J.W. Moyer. 'Sweet Red' Sweet Potato. Hort. Science. 22(3):514-515. 1987.

2. Accession User - Dr. Dave Timothy, Crop Science Department, NCSU, Raleigh, North Carolina 27695-7620.

Nature of Research: The development of biosystemic information in Panicum, Pennisetum and Tripsacum. The development of populations for germplasm or varieties with short term emphasis to grazing and production trials of Panicum and Pennisetum.

Progress During 1987: In May, the North Carolina Agricultural Research Service announced the release of a new, perennial forage cultivar, 'CAROSTAN' flaccidgrass. Carostan was developed by selecting vigorous seedlings and plants from material tracing to an Afganistani introduction, PI 220606 received from the U.S. Plant Introduction Station at Experiment in 1962. This cultivar is widely adapted across the southeastern U.S. Its hay yields are superior to those of tall fescue or orchardgrass, and it grows actively during the summer when the cool-season grasses are inactive. The in vitro dry matter disappearance (IVDMD) is exceptionally high for warm-season grasses comparing favorably with alfalfa. Steer average daily gains (ADG) and productivity estimates compare favorably against standard systems.

Publication: Timothy, D.H. and R.J. Kuhr. Notice of Release of the Forage Cultivar 'Carostan' Flaccidgrass.

3. Accession User - Dr. Todd C. Wehner, Horticulture Department, NCSU, Raleigh, North Carolina 27695-7609.

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

Progress During 1987:

- a) PI Lines Maintained -
  - 1) Nematode resistance — Cucumis metuliferus lines are being used in a program to transfer nematode resistance to cucumber (Cucumis sativus). These include the following: PI 482452, PI 482454, PI 482448, PI 482461, and PI 482450.
  - 2) Rhizoctonia resistance — The following lines are being used for their resistance to fruit rot: PI 197087, PI 197088, and PI 163216.
- b) Future Explorations -
  - 1) Exchange with the Indian government to obtain cucumber lines they have already collected.
  - 2) Exchange with the Chinese government to obtain cucumbers with disease resistance.

4. Accession User - Dr. Dennis J. Werner, Horticulture Department, NCSU, Raleigh, North Carolina 27695-7609.

Nature of Research: Developing peach cultivars through breeding and selection.

Progress During 1987: I am currently maintaining approximately 55 peach PIs. These are being used in electrophoretic studies to document isozyme variability in exotic peach germplasm. We have uncovered isozyme variability in these clones that is not present in commercial germplasm. Secondly, cer-

4. (Cont'd.)

tain PIs are being used in my breeding program for the development of late-blooming peach varieties. These PIs bloom considerably later than the latest blooming commercial types, and hence are valuable in providing variability to meet this breeding objective. PIs used for this objective are:

|           |                       |           |
|-----------|-----------------------|-----------|
| PI 101668 | Ta Tao #6             | China     |
| PI 134401 | Select China Seedling | China     |
| PI 133551 | Peregrine             | Australia |
| PI 55836  | Armerellio Tardio     | Spain     |
| PI 119844 | Krasvynos             | Russia    |
| PI 131209 | Pineapple             | England   |

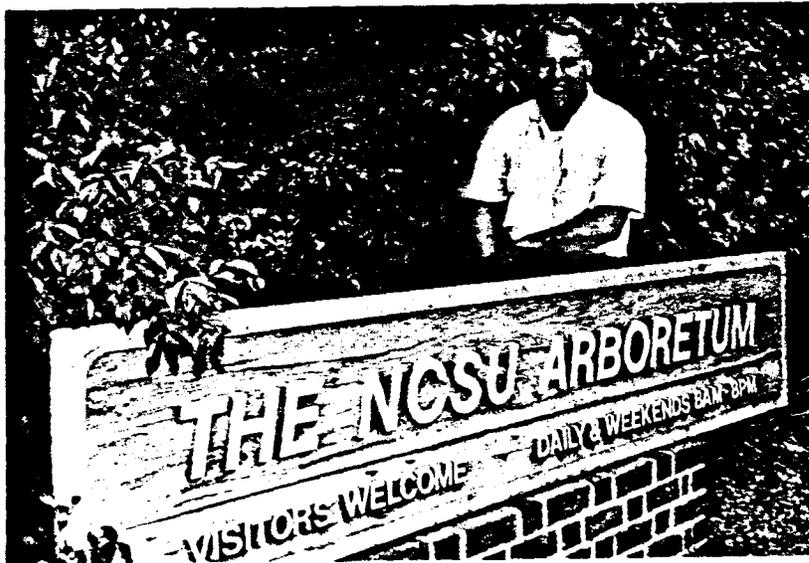
Publication: Werner, J. and D.F. Ritchie, N.C. State University; D.W. Cain and E.I. Zehr, Clemson University. Susceptibility of Peaches and Nectarines, Plant Introductions, and Other Prunus Species to Bacterial Spot. Hort. Science. 1986. 21(1);127-130.

5. Information Note: Dr. J. C. Raulston, Department of Horticulture, NCSU, Raleigh, North Carolina 27695-7609.

The article on the NCSU Arboretum appeared in the May edition of the NCSU Official Bulletin.

# NCSU ARBORETUM HAS 5,000 SPECIES

Vol. LVIII No. 79  
Friday, May 15, 1987



Despite the fact that it's spring, the best time to visit the University Arboretum is anytime.

Even in winter, the arboretum has its appeal--for both professionals and amateurs. There were 65 species in bloom there on New Year's Day, according to Dr. J. C. Raulston, arboretum founder and director.

The NCSU Arboretum now has the most diverse collection of plants in the Southeast, including a number of species that are the rarest and most unusual in the U.S. Among these is a new redbud from China. It bloomed here for the first time the species has been reported blooming outside China.

Born on a wheat farm in Oklahoma, Raulston has become a world traveler and plant collector, with a widening circle of professional friends around the world with a similar passion.

He receives an average of 10 plants a week from people with who he works with plant exchange.

He has now traveled in 43 countries for collection purposes and will be on a sabbatic in 1988 in New Zealand, Australia, England and Scotland. In 1985 he was in South Korea for two months.

The arboretum was started in 1976. Design was completed and planting begun in 1977. It was dedicated in 1980. It's eight acres now has some 5,000 species.

Among the most valuable specimens is a Japanese maple that would cost \$15,000 at commercial prices.

The most recently developed west half of the site now has 1,500 trees and shrubs. There are 500 different trees in the "collection."

There is always something in bloom, and many plants to be seen there are not seen anywhere else in North Carolina. Some are not grown anywhere else in the nation or the world.

Unlike many gardens, the NCSU arboretum focuses on variety. There are unusual plants such as corkscrew willows, a Japanese crape myrtle that sheds its bark, a rare black pussy willow, and more than 100 varieties of magnolia, which bloom over a four-month period.

There is a tall-grasses collection which grows 14 feet high in the summer, as well as a whole collection of northern and southern turf grasses.

Rhododendrons from the mountains and heathers from Scotland are among the non-native plants grown in the arboretum's shade house, which holds 1,500 species.

Landscape and construction ideas abound at the arboretum, including model gardens, each with its own theme, which show a variety of fences, pools and paving ideas.

It is believed the arboretum has the largest collection of plants between the National Arboretum in Washington, D.C., and Calloway Gardens in Georgia. Dr. Raulston estimates it would cost a minimum of \$2 million to duplicate the arboretum at its present stage of development and perhaps as much as \$4 million.

The arboretum is a valuable research and teaching facility and is an important extension demonstration service for the landscape horticultural industry and the public.

It's clearly a million-dollar opportunity for visitors. Admission is free. It's open from dawn til dusk everyday of the year.

The NCSU Arboretum is located on the Method Horticultural Research Station west of the main campus, on Beryl Road.

1987 S-9 TECHNICAL COMMITTEE REPORT

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

Page 1 of 6

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ACCESSION USERS: R. M. Hunger and J. L. Sherwood  
ADDRESS: Plant Pathology Department, Oklahoma State University, Stillwater,  
OK 74078-0285

NATURE OF RESEARCH: Identify entries from the International Winter Wheat Rust Nursery (IWWRN) resistant to races of wheat leaf rust that occur in Oklahoma, and to combine this leaf rust resistance with resistance to wheat soilborne mosaic virus (WSBMV) into wheat lines adapted to Oklahoma.

PROGRESS TO DATE: Three entries from the 1986 IWWRN exhibited excellent field resistance to wheat leaf rust (Puccinia recondita f. sp. tritici) in Oklahoma. Two of the entries were from Bulgaria (86 IWWRN #s 189, 271), and one was from Hungary (86 IWWRN #82). Inoculation of these entries with races of leaf rust isolated from urediniospore collections made in 1986 resulted in the hypersensitive response. These three lines were increased during 1986-87, and their response to WSBMV will be determined during 1987-88 by using visual assessment in conjunction with the enzyme-linked immunosorbence assay (ELISA). The IWWRN entries were crossed during 1987 with cultivars adapted to Oklahoma including Chisholm and Century, and with F3 lines containing resistance to WSBMV to initiate the process of combining leaf rust and WSBMV resistance into wheat lines adapted to Oklahoma.

SELECTED PUBLICATIONS: Bahrani, Z., J. L. Sherwood and M. R. Sanborn. 1986. Production of monoclonal antibodies to wheat soilborne mosaic virus (WSBMV). *Phytopathology* 76:1133 (Abstr).

Hunger, R. M., and J. L. Sherwood. 1986. Effect of wheat soilborne mosaic virus on yield of winter wheat cultivars. *Phytopathology* 76:1127 (Abstr).

Brown, D. A. and R. M. Hunger. 1987. Isolation and partial characterization of a phytotoxin produced by the fungal wheat pathogen Pyrenophora tritici-repentis. *Current Topics in Plant Biochemistry and Physiology*, Vol. 6 In press (Abstr).

Armitage, C. R., R. M. Hunger, and J. L. Sherwood. 1987. A comparison of ELISA reactions from dry, frozen, and fresh wheat leaf tissue infected with wheat soilborne mosaic virus. *Phytopathology* 77:In press (Abstr).

CULTIVAR RELEASES: 'Century' wheat (Oklahoma AES and USDA-ARS)

ACCESSION USERS: Brett F. Carver, Richard C. Johnson, and A. Lane Rayburn  
ADDRESS: Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK 74078-0507

NATURE OF RESEARCH: Utilization of alien germplasm for improving photosynthesis of winter wheat.

PROGRESS TO DATE: Research has continued to characterize the genetic control of high photosynthetic rate in Triticum dicoccoides, a wild tetraploid wheat species. Based on intraspecific crosses of T. dicoccoides, the high photosynthesis trait is not controlled by cytoplasmic genes, but rather nuclear genes with additive effects. Interspecific crosses with

T. aestivum (cv. TAM W-101) have been successful, although the F plants were male-sterile. Efforts to transfer the high photosynthesis trait to T. aestivum have been initiated through a backcross selection program.

PUBLICATIONS: Johnson, R. C., B. F. Carver, D. W. Mornhinweg, H. Kebede, and A. L. Rayburn. Photosynthetic variation in Triticum dicoccoides accessions: photosynthesis and crop yield. Cambridge, UK. 20-24 July, 1987.

CULTIVAR RELEASES: None

ACCESSION USERS: A. C. Guenzi, O. G. Merkle, J. A. Webster, and R. L. Burton  
ADDRESS: Dept. of Agronomy, Oklahoma State Univ., and USDA-ARS, Plant Science Laboratory, Stillwater, OK 74078

NATURE OF RESEARCH: Use of cell culture in the recovery and deployment of greenbug and Russian wheat aphid resistance from Triticum species into wheat.

PROGRESS TO DATE: Three cell culture techniques are being utilized to aid in the introgression and deployment of greenbug and aphid resistance into wheat. They are: 1) embryo rescue, 2) callus initiation and plant regeneration and 3) anther culture. Embryo rescue and callus induction are being used to overcome postfertilization interspecific crossing barriers. Anther culture will then be used for the rapid deployment of the resistance into wheat cultivars. These techniques are currently being utilized on crosses with Triticum monococcum, Triticum tauschii, Triticum kotschyi, and Triticum speltoides. These species contain resistance to greenbugs (biotypes B,C,E,F) and the Russian wheat aphid.

SELECTED PUBLICATIONS: Guenzi, A. C. and R. G. Sears. 1986. Cell culture and wheat improvement. Presentation in the symposium 'Use of regenerated plants in crop improvement'. American Society of Agronomy, Agron. Abstr. 78:148.

CULTIVAR RELEASES: None

ACCESSION USER: D. E. Weibel

ADDRESS: Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK 74078-0507

NATURE OF RESEARCH: Sorghum breeding and genetics.

PROGRESS TO DATE: Thirty-two lines of sorghum were introduced from ICRISAT (India). They originated in Sudan and Ethiopia, and they are classified as Zera-Zera grain types. They were converted to photo-insensitive types at ICRISAT. The lines were grown in quarantine in the greenhouse during the winter and observed frequently for possible disease by a plant pathologist and a mycologist. The lines are reported to exhibit exceptional grain quality.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USERS: J. A. Webster, R. L. Burton, O. G. Merkle, and S. D. Kindler  
ADDRESS: USDA-ARS, Plant Science Laboratory, P. O. Box 1029, Stillwater, OK 74076

NATURE OF RESEARCH: 1. Evaluation of sorghum [Sorghum bicolor (L.) Moench], and sorghum relatives for resistance to greenbugs, yellow sugarcane aphid, chinchbugs, sorghum midge and fall armyworms. 2. Evaluation of New Introduction small grain lines and wheat relatives for insect resistance, especially greenbugs, Russian wheat aphids and the yellow sugarcane aphid.

PROGRESS TO DATE: The Ethiopian sorghum collection has been evaluated for resistance to the yellow sugarcane aphid. A few entries appear to have

antibiosis to this pest. Two rye lines from the National Small Grain Collection, CI 187 and PI 240675 were found to be resistant to biotypes B, C, E, and F of the greenbug. Wheat relatives are being tested for resistance to the Russian wheat aphid which has now been detected in 9 states, from South Dakota on the North to Arizona on the West.

SELECTED PUBLICATIONS: Merkle, O. G., J. A. Webster, and G. H. Morgan. 1987. Inheritance of a second source of greenbug resistance in barley. *Crop Sci.* 27:241-243.

Rafie, A. R., D. E. Weibel, and J. A. Webster. 1987. Using an electronic monitor as a new approach to study the feeding behavior of greenbug biotype E on 3 isogenic lines of sorghum. *Proceedings, 15th Biennial Grain Sorghum Research and Utilization Conference* p. 195.

Tyler, J. M., J. A. Webster, and O. G. Merkle. 1987. Use of greenbug biotype mixtures in evaluating wheat seedlings for resistance. *Crop Sci.* 27:350-351.

Tyler, J. M., J. A. Webster, and O. G. Merkle. 1987. Designations for genes in wheat germplasm conferring greenbug resistance. *Crop Sci.* 27:526-527.

Tyler, J. M., J. A. Webster, E. E. Sebesta, and E. L. Smith. 1986. Inheritance of biotype E greenbug resistance in bread wheat CI 17882 and its relationship with wheat streak mosaic virus resistance. *Euphytica* 35:615-620.

Webster, J. A. 1987. Evaluating sorghum lines for resistance to the yellow sugarcane aphid. *Proceedings, 15th Biennial Grain Sorghum Research and Utilization Conference.* pp. 196-197.

CULTIVAR RELEASES: None

ACCESSION USERS: H. A. Melouk and C. N. Akem

ADDRESS: USDA-ARS, Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74076

NATURE OF RESEARCH: A detached shoot technique was developed for evaluating reaction of peanut genotypes to *Sclerotinia minor*. Basal end of fifteen cm long shoot-tips from ten peanut genotypes were immersed individually in Hoagland's solution in 1 x 14 cm test tubes, and supported by foam plugs. All leaves were removed leaving about 1 cm of each petiole on the shoot. A 4 mm mycelial plug of *Sclerotinia minor*, taken from the periphery of a 2-day old culture grown on potato dextrose agar (PDA), was placed between the stem and a petiole in the middle of the shoot. Tubes with shoots were then placed in a fabricated polyethylene enclosure in a growth chamber at  $31 \pm 1^\circ\text{C}$  and  $25 \pm 1^\circ\text{C}$  during the day and night, respectively. Relative humidity (RH) was maintained at 95 to 100% by lining the bottom of the enclosure with wet burlap. Lesions appeared on shoots 3 days after inoculation, and their length was measured at various times. This method was effective in differentiating reaction of peanut genotypes to *S. minor*.

PUBLICATIONS: Melouk, H. A., and C. N. Akem. A detached shoot technique for evaluating reaction of peanut genotypes to *Sclerotinia minor*. *Proc. Amer. Peanut Res. and Educ. Society* 18:57, 1986.

CULTIVAR RELEASES: None

ACCESSION USERS: J. L. Sherwood, H. A. Melouk, and J. N. Culver

ADDRESS: Plant Pathology Department, Oklahoma State University, Stillwater, OK 74078

NATURE OF RESEARCH: Identification of resistance to peanut stripe virus in Arachis germplasm.

PROGRESS TO DATE: Peanut accessions of the Arachis section; A. dioqoi (PI 468141 and PI 468142), A. helodes (PI 468144), Arachis sp. (PI 468345), and of the Rhizomatosae section (PI 468174, PI 468363, and PI 468366), were identified as resistant to peanut stripe virus (PStV). To test for resistance each PI was inoculated three separate times. Between each inoculation, plants were tested for PStV by symptomatology, local lesion assay on Chenopodium amaranticolor, and enzyme-linked immunosorbent assay. Electron microscopy was also used after the last of the three inoculations.

PUBLICATIONS: Culver, J. N., J. L. Sherwood, and H. A. Melouk. 1987. Resistance to peanut stripe virus in Arachis germplasm. Phytopathology 77:640.

CULTIVAR RELEASES: None

ACCESSION USER: H. H. Fagbenle

ADDRESS: Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

NATURE OF RESEARCH: Screening for resistance to the northern root-knot nematode.

PROGRESS TO DATE: Peanut germplasm is being evaluated for resistance to the northern root-knot nematode, Meloidogyne hapla. Some preliminary greenhouse studies have been completed. Some lines have been selected for determination of cytokinin content, which may be correlated to resistance.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USER: James S. Kirby

ADDRESS: Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK 74078-0507

NATURE OF RESEARCH: Peanut Breeding

PROGRESS TO DATE: There seems to be considerable interest in the Okrun peanut variety released in 1986 but we are renewing our efforts to select an earlier maturing runner variety which is needed in Oklahoma. We are continuing to use Chico and other Spanish lines as sources of earlier maturity. We are also still evaluating breeding material for leafspot resistance utilizing PI 109839 crosses. We are beginning to evaluate some of the runner breeding material for size uniformity. Preliminary data indicates considerable differences in uniformity but it is not yet known how stable the size distribution is over different seasons and locations with variable growing conditions.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USERS: D. J. Banks and R. N. Pittman

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

NATURE OF RESEARCH: Peanut Introduction, Increase, Maintenance and Evaluation

PROGRESS TO DATE: Additional field and greenhouse increases were made of earlier PI accessions from South America. A new nursery for selected wild species of Arachis representing a wide diversity of species and genotypes was established at the USDA, ARS, Subtropical Agricultural Research Station

at Brooksville, Florida. Purpose of the nursery is two-fold: 1) to determine the feasibility of that location for providing a suitable habitat to insure long-term winter survival of selected species and 2) to allow for observation and evaluation of potential forage species that may be useful in subtropical areas. Approximately 100 accessions were established with few losses. Dr. Mimi Williams, Research Physiologist, USDA, ARS, is the cooperater at Brooksville. The winter Arachis nursery at the USDA, ARS, Subtropical Agricultural Research Station at Weslaco, Texas, continued to flourish with no additional plant losses during the winter of 1986. Individual plant selections based on large seed size, early maturity, compact plant form and improved seed production potential resulting from crosses between large seeded Virginia genotypes and Spanish breeding lines are being evaluated in the field at Ft. Cobb, OK. Plant selections were made from crosses involving the hirsuta botanical variety in support of future heat and drought tolerant breeding programs. Significant losses of wild peanut accessions and hybrids occurred during the winter of 1986 at Stillwater, OK. The collections are being reorganized for better management to prevent additional losses. In August, Dr. Pittman left the Wild Arachis Germplasm Maintenance Project at Stillwater for a new assignment as Curator of the cultivated peanut (Arachis hypogaea) collection at the Southern Regional Plant Introduction Station, Experiment, Georgia. Vegetative material of potentially useful forage types of Arachis species were dispersed to Florida and Louisiana scientists in support of research. Vegetative material of selected species of Arachis were distributed to the National Seed Storage Laboratory to support germplasm preservation technology research. Seeds of wild and cultivated peanut accessions were distributed to various domestic and foreign investigators in support of their research.

- SELECTED PUBLICATIONS: Banks, D. J. 1985. An audible scarecrow for protecting harvested peanut plots. Proc. Am. Peanut Res. Educ. Soc. 17:19-21.
- Banks, D. J. 1986. Variation and evolution of Peanut (Arachis hypogaea L.). Abstracts, 2nd Int. Legume Conf.
- Banks, D. J. and R. N. Pittman. 1986. Origin, inheritance, and characteristics of a yellow-flowered peanut from Bolivia. Proc. Am. Peanut Res. Educ. Soc. 18:31. (Abstract).
- Moffett, J. O., D. J. Banks, and R. N. Pittman. 1986. Floral visits by honey bees to three caged peanut cultivars. Am. Bee J. 12:833. (Abstract).
- Banks, D. J. 1987. Collection of peanut, Arachis hypogaea L. (Leguminosae), in Peru. Am. J. Bot. 74:664. (Abstract).

CULTIVAR RELEASES: None

ACCESSION USERS: C. L. Dewald and W. A. Berg

ADDRESS: USDA-ARS, Southern Plains Range Research Station, Woodward, OK 73801

NATURE OF RESEARCH: Evaluation of Old World bluestem grasses (Bothriochloa spp.) for revegetation of marginal cropland. Twelve introductions were evaluated on an iron deficient, calcareous soil (Quinlan loam, Typic Ustochreps) to determine their relative iron efficiency. The introduction P.I. 301535 was the highest dry matter producer and had slight to no chlorosis. In contrast, the cultivars 'WW-Spar' and 'Caucasian' bluestem were low to moderate in dry matter production and exhibited moderate to severe chlorosis. Iron chlorosis is a serious problem for many introduced grasses grown in eroded calcareous soils and around 10 million acres with moderate to severe iron deficiency problems exist in the Southern Plains.

PUBLICATIONS: Berg, W. A., C. L. Dewald and P. I. Coyne. 1986. Selection for Iron Efficient Old World Bluestems. *Journal of Plant Nutrition*, 9(3-7), 453-458.

CULTIVAR RELEASES: 'WW-Iron Master' bluestem (USDA-ARS and USDA-SCS) released June 16, 1987.

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

ADDRESS: Department of Agronomy, Oklahoma State University, Stillwater, OK 78078

NATURE OF RESEARCH: Evaluation of Alfalfa (*Medicago* spp.) introductions as sources of resistance to blue alfalfa aphid (*Acyrtosiphon kondoi* Shinji) and spotted alfalfa aphid (*Therioaphis maculata* Buckton). Much of this research is conducted in cooperation with the USDA-ARS Plant Introduction Laboratory, Ames, Iowa.

PROGRESS TO DATE: A total of 550 world collection accessions have been evaluated for resistance to the blue alfalfa aphid. Several of these accessions from southern USSR, Iran, Afghanistan, and Pakistan have 5-20% resistant plants for this aphid.

PUBLICATIONS: A. A. Zarrabi, J. L. Caddel, and R. C. Berberet. 1986. Host resistance to blue alfalfa aphid in alfalfa germplasm from different geographic origins. North American Alfalfa Improvement Conference. 1986. In press.

CULTIVAR RELEASES: None

1987

S-9 TECHNICAL COMMITTEE REPORT

AGENCY: : University of Puerto Rico  
College of Agricultural Sciences  
Agricultural Experiment Station

SUBMITTED BY: Guillermo J. Fornaris

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

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ACCESSION USER: Reinaldo del Valle, Jr. and Miguel Santiago-Córdova

ADDRESS: College of Agriculture, University of Puerto Rico,  
Agricultural Experiment Station, Department of  
Agronomy and Soils, Box 21360, Río Piedras, PR 00928

NATURE OF RESEARCH: Evaluation of twelve arracacha (Arracacia xanthorrhiza  
Bancrof) introduced from Colombia S.A. and their per-  
formance and adaptation to our conditions.

PROGRESS TO DATE: From 12 cultivars of arracacha introduced from Colombia  
(S.A.) in 1980, only three have shown good potential in  
Puerto Rico. A brief and general description of the  
cvs. is as follows: a) Cultivar I - Purple foliage and  
yellow roots; b) Cultivar A - light green foliage with  
red stripes extending from the base of the petioles to  
the middle portion of the same section and with yellow  
roots; c) Cultivar E - light green foliage with the  
base of the petioles of a pink color and the rest green  
with white creamy roots.

In a replicated experiment in Barranquitas, Puerto  
Rico, where cultivars I, A, E, and the local "Criolla"  
cv. were included, the highest root yield of 20.80  
Metric tons/ha was obtained with cv. A, which out-  
yielded significantly the cvs. I (12.5 Mt/ha) and E  
(5.62 Mt/ha). Yields of over 11 Mt/ha are considered  
good in the island. The cultivars were affected how-  
ever by root rot caused by a disease complex of  
Rhizoctonia, Pythium and Fusarium species. In addition,

some damage to the roots have been observed caused by rats and snails which probably contributed to the low yields of cvs. I and E. The local cultivar "Criolla" appears to be more tolerant to these pests and diseases.

In addition, cultivars I, A, and Criolla were included in a planting date trial (August 1986, December 1986, April and June 1987). Data collected from the August 1986 planting revealed that cv. A produced the highest commercial root yield of 37.74 Mt/ha while 23.04 and 15.21 Mt/ha were obtained with cvs. I and Criolla, respectively. The incidence of pests and diseases have been less probably due to preventive applications of insecticide and fungicide sprays made at 15 to 21 days intervals throughout the growth of the crop. The experiment is at present in progress.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USER: Miguel A. Santiago-Córdova and Agenol González-Vélez

ADDRESS: Corozal Agricultural Research and Development Center, HC-02 Box 10322, Corozal, Puerto Rico 00643

NATURE OF RESEARCH: Plantains and Bananas-their introduction, multiplication, evaluation and preservation.

PROGRESS TO DATE: Four banana local selections (1A, 2A, 3A, and 4A) are being compared with the Grand Naine cv. The characteristics under evaluation are: response to yellow sigatoka (Mycosphaerella musicola), pseudostem height and width at flowering, days to harvest, average number of hands, marketable weight, bunch weight and organoleptic properties. Others 44 cvs. of banana are still under evaluation and preservation.

Twelve plantains cvs. are still under evaluation. The Maricongo cv. is still the one recommended for commercial use, especially because its excellent quality and its high number of fruits per bunch.

PUBLICATIONS: None

CULTIVAR RELEASE: Grand Naine cv. release is in progress.

ACCESSION USER: Miguel A. Santiago-Córdova

ADDRESS: Corozal Agricultural Research and Development Center, HC-02 Box 10322, Corozal, Puerto Rico 00643

NATURE OF RESEARCH: Root Crops-their introduction, multiplication, evaluation and preservation.

PROGRESS TO DATE: Results of the evaluation of 29 cvs. of yam (Dioscorea sp.) are showing different levels of susceptibility to the "Candelilla" (anthracnose) disease, with the exception of Gunnung and Binugus cvs. which showed more tolerance. The mean yield of these two cvs. is about 381 kg/ha.

Results of 18 cvs. of taniens (Xanthosoma sp.) are showing susceptibility to the "Mañ seco" (dry rot) disease, with the exception of the Alela cv. which is showing moderate tolerance to this disease.

The following cassava cultivars were submitted to the release control committee of the Agricultural Experiment Station: Forastero, Tremesiana, Llanera and Serrallés.

Twenty-nine sweet potato cvs. are still under evaluation. From these the best will be selected for planting.

PUBLICATIONS: None

CULTIVAR RELEASE: The release of the cassava cvs. Forastero, Tremesiana, Llanera and Serrallés is in progress.

ACCESSION USER: Sonia L. Martínez-Garrastazú

ADDRESS: Horticulture Department, College of Agricultural Sciences, University of Puerto Rico, Mayaguez, P.R. 00708

NATURE OF RESEARCH: To obtain throught plant introduction, evaluation and selection, better fruit crops (avocado - Persea americana Mill., mango - Mangifera indica (L.), sapodilla - Manilkara sapota (L.), soursop - Annona muricata (L.), guava - Psidium guajava (L.) with high yielding ability, resistant to prevalent maladies and adapted to our conditions.

PROGRESS TO DATE: Production data was taken in the avocado 17 varieties experiment, the soursop 7 selection and the sapodilla 17 selection experiments. Evaluation for weight, internal and external fruit color, fruit form, taste and pulp thickness was made in some selections of the guava collection. Evaluation of sapodilla fruit quality was conducted by the Food Technology Laboratory personnel. Drip irrigation system was installed in the mango collection, also identification with labels and

reconversion of trees with commercial varieties as Palmer, Parvin and Keitt are being carried. Preliminary identification of insect pests was made in the avocado, sapodilla and soursop orchards. These evaluations indicate that Selenothrips rubrocinctus and Diaprepes abbreviatus are the main insect pests in the avocado experiments; Bephratelloides cubensis, Corythucha gossypii, Aphis spiraeicola and Saissetia coffeae are the most common pests in soursop and Conotrachelus sp., Anastrepha suspensa and Diaprepes abbreviatus are insect pests in sapodilla. Also two entomological records for the biological control of insect pests in soursop were made; Leucopis sp. as predator of aphids and scales, and Scutellista sp. as parasite of Saissetia coffeae.

PUBLICATIONS:

Cruz, J. G., 1987. Efecto de algunos tratamientos de defoliación en el crecimiento, floración y producción de la guanábana (Annona muricata (L.)). M. S. Degree Thesis, Univ. P.R., Recinto de Mayaguez, 62 pp.

Medina-Gaud, S., F. Gallardo, E. Abreu and R. Inglés, 1987. The insects of níspero (Manilkara zapote (L.) P. Van Roger) in Puerto Rico. J. Agric. Univ. P.R. 71(1): 129-132.

CULTIVAR RELEASES:

None

ACCESSION USER:

Rubén Vélez-Colón

ADDRESS:

HC-02 - Box 7115, Juana Díaz, Puerto Rico 00665

NATURE OF RESEARCH:

Selection and evaluation of table grape varieties suitable for the southern, semi-arid, coastal plains of Puerto Rico.

PROGRESS TO DATE:

At the Fortuna Substation, Juana Díaz, P.R., studies have been performed with grapes under local project H-94 (S-9). There is an orchard which contains, among other, the cultivars Exotic, Ribier, Lake Emerald, Tamiami, Muscat of Alexandria, Cardinal and California 48.

They are evaluated in relation to their agronomic behavior, as well as to the quantity and quality of their production. Up to this day, the cultivars Cardinal (red), Ribier (lilac) and Muscat of Alexandria (white) are the most promising, not only in relation to their good adaptation to our environmental conditions, but to their good quality as fresh fruit as well.

PUBLICATIONS: Vélez-Colón, R. "Experiencias con el cultivo de la uva en la Subestación de Fortuna". Paper delivered at the Coloquium on: The Wine Industry in Puerto Rico. Rum Pilot Plant, Agricultural Experiment Station. May 15, 1987.

ACCESSION USER: Gerardo Ruiz-Sifre, Wigmar González and Agenol González

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

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

PROGRESS TO DATE: Production data was obtained from the oranges collection in terms of numbers and size of fruit per tree for 1986-87. Data apparently shows that Pietri 333 and 334 selections have higher number and size of fruits than the rest. Those oranges selections grafted on Cleopatra mandarine apparently show better yields than those grafted on sour orange.

Evaluation of pomelo selections at Adjuntas Substation was accomplished during the last three years. Data will be evaluated and a publication will be prepare by the end of this year.

As part of a new experiment, pruning treatments were applied on ten Chironja clones at Corozal Substation and on four Valencia orange clones at Adjuntas Substation on April 1987.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USER: Elvin Boneta, Wigmar González and Fernando Gallardo

ADDRESS: Adjuntas Substation, HC-01 Box 4508, Adjuntas, P.R. 00601-9717

NATURE OF RESEARCH: Coffee germplasm - Its introduction, maintenance and evaluation.

PROGRESS TO DATE: Twenty-six resistant cultivars to various races of coffee rust (Hemileia vastatrix) are under evaluation as well as

49 susceptible cultivars. Susceptible cv. H-1 is so far the highest yielder with an average production of 11.8 kilograms per tree for the past 5 years. Catimor C-2543-4, with an average production of 10.4 kilograms of cherries per tree per year is the highest yielder among the rust resistant cultivars. Catimor 1661-1, with 7.1 kilograms per year per tree is the most promising variety among the latest introduced selections.

A new experiment was established where 8 selections of Catuai will be evaluated, using two planting distances, and including Bourbón and Pacas cvs. as standards.

PUBLICATIONS: None

CULTIVAR RELEASES: None

ACCESSION USER: Gerardo Ruiz-Sifre and Octavio Colberg

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

NATURE OF RESEARCH: To obtain through plant introduction and selection, better vegetable crops with high yielding ability, resistant to the prevalent maladies and adapted to our conditions.

PROGRESS TO DATE: From December 1986 to March 1987, two experiments were accomplished on melons: a preliminary (observational) trial on cantaloupe (12 cultivars) and a replicated trial on honey dew (5 cultivars). On the cantaloupe trial, the cultivars Early Dawn, Tam Uvalde, Dixie Jumbo, Planters Jumbo and Summet were apparently better yielders and more resistant to downy mildew than the other 7 cultivars. On the honey dew trial, the cultivar Honey Dew Greenfleshed of Ferry Morse apparently shows better resistant to downy mildew and higher yield than the other 4 cultivars.

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, P.R. 00928

NATURE OF RESEARCH: To introduce and evaluate cultivars of tomatoes (Lycopersicon esculentum), peppers (Capsicum annuum), watermelon

(Citrullus lanatus) and onion (Allium cepa), in order to find germplasm with outstanding characteristics such as higher yield, superior product quality and "resistance" to insects and diseases.

PROGRESS TO DATE:

During our past vegetable crops main growing season (November to April), a preliminary (observational) trial on cooking pepper took place at Juana Díaz Substation. The best performing cultivars and lines were: Cubanelle (Harris-Moran), Cubanelle (Petoseed), Key Largo, PSR-19684 and PSR-23986.

On that same growing season, replicated trials (4 plots/cv.) took place on fresh market tomato, processing tomato, watermelon and onion. The best performing cultivars were: Fresh Market Tomato - Duke, Sunny and Flora-Dade; Onion - Granex 429, Houston (Texas Grano 1025) and Texas Grano 502; Watermelon - Charleston Gray, Charleston 76 and Royal Jubilee; Processing Tomato - Niagara, Zenith, Napoli, Nema-Mech and Nema 1200.

PUBLICATIONS:

I. Beauchamp de Caloni, G. Fornaris-Rullán, and L. Avilés-Rodríguez. 1987. Cultivation and acceptability of carrot cultivars. J. Agric. Univ. P.R., 71(3): 287-92.

J. Escudero, G. Fornaris-Rullán, and E. Caraballo. 1987. Yield and tolerance of bell pepper (Capsicum annuum L.) cultivars to potato virus Y isolate from Puerto Rico. J. Agric. Univ. P.R., 71(3): 337-40.

CULTIVAR RELEASES:

None

ACCESSION USER:

Pedro Márquez

ADDRESS:

Isabela Substation, P. O. Box 506, Isabela, Puerto Rico 00662

NATURE OF RESEARCH:

Pineapple germplasm - Its evaluation and preservation

PROGRESS TO DATE:

During this year, the pineapple collection passed from the H-299, former pineapple breeding project, to the H-94-P (S-9) Project. As a result, the collection was moved from the Finca Fundador at Manatí (Land Authority Pineapple Program) to the Finca de la Montaña at Aguadilla (University of Puerto Rico, Mayaguez Campus), which is close to our Isabela Substation. A thorough plant and fruit evaluation will take place in order to have a uniform description of all the selections in this germplasm collection.

PUBLICATIONS:

None

CULTIVAR RELEASES:

None

1987

S-9 Technical Committee Report

Agency: Clemson University  
Submitted by: D.W. Bradshaw  
Address: Department of Horticulture, Clemson University, Clemson, SC  
29634-0375

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Accession User: George Fassuliotis  
Address: U.S. Vegetable Laboratory, 2875 Savannah Highway, Charleston,  
SC 29407

Nature of Research: Interspecific Hybridization of Cucumis sp. for  
Root-knot Nematode Resistance.

Progress to Date: Twenty-five plant introductions of Cumis metuliferus  
were evaluated for resistance to the southern root-knot nematode,  
Meloidogyne incognita and compared to VBL line 701A and 2  
accessions from NYSAES, Geneva, NY. PI 482449 showed a higher  
level of resistance than 701A, our standard resistant check. Other  
entries with resistance equal to 701A were: PI 482456 and NYS  
3396.

Several variations in fruit characteristics were noted. PI 482453  
and 482461 were spineless and 482455 was pale green turning yellow  
at maturity rather than orange. Variations were also noted in the  
patterns created on the fruit by the ivory and green colorations  
(Table 1).

Isoelectric focussing of protein bands of leaf extracts from these  
C. metuliferus lines resolved 16 esterase bands and indicated no  
correlation for nematode resistance.

A study on inheritance of root-knot nematode resistance is in an  
advanced stage of analysis. PI 482461, the most susceptible line  
of C. metuliferus was crossed with the resistant 701A.

Interspecific hybrids from crosses between C. metuliferus (PI  
292190, 202681, NY 3503, and 701A) x C. anguria (PI 233646) were  
obtained through direct embryo culture and embryonic somatic  
embryonic somatic embryogenesis. A total of 48 hybrid plants were  
produced. Evidence of hybridization included leaf shape  
intermediate between the two parents, peduncle shape prior to  
fertilization which resembles the male parent, low pollen viability  
and isoelectric focussing of protein bands for acid phosphatase of  
leaf extracts.

Publications: None this period.

Cultivar Releases: None this period.

Table 1. Evaluation of Cucumis metuliferus accessions for fruit traits and resistance to the southern root-knot nematode, Meloidogyne incognita.

| Entry     | Origin     | Fruit traits |                 |                    | Reproduction index <sup>b</sup> | Eggs/gm root  |
|-----------|------------|--------------|-----------------|--------------------|---------------------------------|---------------|
|           |            | Shape        | Spines (+ or -) | Color <sup>a</sup> |                                 |               |
| 482449    | Zimbabwe   | round        | +               | 1                  | 1.5                             | 7.3 a         |
| 701A      | USVL       | oblong       | +               | 1                  | 1.0                             | 11.9 ab       |
| 3396      | NYSAES     | oblong       | +               | 1                  | 1.5                             | 12.9 ab       |
| 482456    | Zimbabwe   | oblong       | +               | 1                  | 2.0                             | 13.8 ab       |
| 482439    | Zimbabwe   | oblong       | +               | 1                  | 2.3                             | 14.0 abc      |
| 3263      | NYSAES     | oblong       | +               | 1                  | 2.5                             | 16.3          |
| 482440    | Zimbabwe   | oblong       | +               | 1                  | 3.3                             | 16.7          |
| 202681    | So. Africa | oblong       | +               | 1                  | 2.5                             | 17.2          |
| 482458    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 17.8          |
| 482454    | Zimbabwe   | oblong       | +               | 1                  | 2.0                             | 18.1          |
| 482455    | Zimbabwe   | oblong       | +               | 2                  | 2.0                             | 19.9 abcd     |
| 482443    | Zimbabwe   | oblong       | +               | 1                  | 2.0                             | 19.9          |
| 441995    | Zimbabwe   | oblong       | +               | 1                  | 2.7                             | 21.6 abcde    |
| 482453    | Zimbabwe   | oblong       | -               | 3                  | 2.0                             | 22.4          |
| 482462    | Zimbabwe   | oblong       | +               | 1                  | 2.0                             | 22.8          |
| 482456    | Zimbabwe   | oblong       | +               | 1                  | 2.75                            | 23.6          |
| 482459    | Zimbabwe   | oblong       | +               | 1                  | 2.3                             | 24.3 abcdef   |
| 482451    | Zimbabwe   | oblong       | +               | 1                  | 2.3                             | 24.4          |
| 482444    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 27.5 abcdefg  |
| 3503      | NYSAES     | oblong       | +               | 1                  | 2.0                             | 30.3          |
| 482442    | Zimbabwe   | oblong       | +               | 1                  | 2.8                             | 32.6          |
| 292190    | Transvaal  | oblong       | +               | 1                  | 2.8                             | 33.1 abcdefgh |
| 482446    | Zimbabwe   | oblong       | +               | 1                  | 2.8                             | 35.7          |
| 482441    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 44.2          |
| 482452    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 44.1          |
| 482450    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 50.6          |
| 482435    | Zimbabwe   | oblong       | +               | 1                  | 2.8                             | 55.4          |
| 482448    | Zimbabwe   | oblong       | +               | 1                  | 3.0                             | 56.6          |
| 482461    | Zimbabwe   | oblong       | -               | 3                  | 3.3                             | 63.0          |
| Gulstream |            |              |                 |                    | 5.0                             | 52.8          |

<sup>a</sup>1 = Green with longitudinal ivory pattern; orange at maturity.

2 = Pale green with longitudinal ivory pattern; yellow at maturity.

3 = Green with mottled ivory pattern; orange at maturity.

<sup>b</sup>Reproduction index (RI) = 1-5 scale.

Accession User: B.B. Rhodes

Address: Edisto Research and Education Center, P.O. Box 247,  
Blackville, SC 29817

Nature of Research: Cucurbit breeding

Progress to Date: Citrullus lanatus. Watermelon breeding lines from crosses with PI 189225 and 29937 (resistance to anthracnose) are still undergoing intensive selection and in breeding. (See previous report).

Pumpkin breeding lines from crosses with Cucurbita PI 432443, 43244, 43245, 169424, and 432442 are undergoing inbreeding and selection for a Halloween- type pumpkin resistant to downy and powdery mildew, pickle worm and squash bug.

Publications: None this period.

Cultivar Releases: None this period.

Accession User: C.E. Thomas

Address: USDA, ARS, U.S. Vegetable Laboratory, 2875 Savannah Highway,  
Charleston, SC 29407

Nature of Research: Develop and study disease resistant vegetable germ plasm.

Progress to Date: Agency release of Cucumis melo breeding line with non-specific resistance to downy and powdery mildews (see publication below).

Publications: HortScience 21:329.

Cultivar Releases: Breeding line MR-1 of muskmelon

# Downy and Powdery Mildew Resistant Muskmelon Breeding Line MR-1

Claude E. Thomas<sup>1</sup>

U.S. Vegetable Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Charleston, SC 29407

*Additional index words.* *Cucumis melo*, disease resistance, *Pseudoperonospora cubensis*, *Sphaerotheca fuliginea*, vegetable breeding

MR-1 is a monoecious muskmelon (*Cucumis melo* L.) breeding line that was developed by the USDA to provide breeders and seedsmen with a source of high levels of resistance to both downy mildew, incited by *Pseudoperonospora cubensis* (Berk. and Curt.) Rostow., and powdery mildew, incited by *Sphaerotheca fuliginea* (Schlecht. ex Fr.) Poll. It is resistant to 2 undesignated races of downy mildew and to races 1, 2, and 3 of powdery mildew.

## History and Origin

MR-1 was derived from 90319, an inbred line of *C. melo* PI 124111 that had been selected for powdery mildew resistance at the U.S. Horticultural Field Station in La Jolla, Calif. from 1938 to 1948. I.C. Jagger of that station had noted evidence of downy mildew resistance in PI 124111 when it was introduced from India in 1937. He selected for this resistance for 3 generations in the field, but this work was discontinued in 1939 due to his death. In 1977 and 1978, a high level of resistance against 2 physiologic races of *P. cubensis* again was recognized in 90319, the inbred line of PI 124111 (5). A program was begun to stabilize this resistance while maintaining the high level of powdery mildew resistance in this line.

Populations were first evaluated for powdery mildew resistance from the cotyledon through the first leaf stages. During this period, plants were inoculated by blowing powdery mildew conidia from infected donor leaves of 'Early Prolific Straightneck' (*Cucurbita pepo* L.) into the air over the greenhouse bench and allowing these conidia to settle on the plants in still air. Beginning at the unfolding of the cotyledons, plants were inoculated 3 times in this manner at 3–4 day intervals. When plants reached the 2-leaf stage, usually 7–8 days after the 3rd powdery mildew inoculation, those that showed

no macroscopic evidence of powdery mildew infection were subsequently evaluated for downy mildew resistance using the previously described inoculation procedure for 2-leaf stage plants (1). Plants were inoculated and treated as prescribed by this protocol, except that only the reaction of leaf 1 was evaluated. The objective of this work was to select plants that exhibited the highly resistant reaction type (RT) 4 (1, 6). Since RT 4 against downy mildew on leaf 1 of 2-leaf stage plants of *C. melo* is always associated with RT 4 on leaf 2 and subsequent leaves, it was, therefore, only necessary to evaluate leaf 1 to accomplish the objective.

Powdery mildew isolates representing races 1, 2, and 3 (2, 4) were alternated at each generation of testing to avoid selection of race-specific resistance. Likewise, U.S. isolates representing 2 physiologic races of downy mildew, as distinguished by host range within the Cucurbitaceae (3), were also alternated for the same reason at each generation of testing.

Plants that survived both the powdery and downy mildew selection procedures were sib-pollinated in the greenhouse to produce the F<sub>1</sub>, which was also evaluated and selected as described, first for powdery mildew resistance and then for downy mildew resistance. The survivors were self-pollinated to produce the F<sub>2</sub>. This cycle was repeated twice so that the F<sub>3</sub> and F<sub>5</sub> generations were produced by sib-crossing survivors of the selection procedures, and the F<sub>4</sub> and F<sub>6</sub> generations were produced by selfing survivors. MR-1 represents a bulked lot of seed produced by resistant F<sub>6</sub> plants that were grown in an isolation plot in the field at Charleston, S.C. in 1984.

## Description

Vines of MR-1 are long and spreading, so that the dense foliar cover produced is similar to that of muskmelon 'Edisto 47'. The fruit (Fig. 1) are essentially the same as first described in 1937. They are oblate with an average width of 11.7 cm and an average length of 9.2 cm. Average fruit weight is 0.75 kg. The fruit exterior is smooth and slightly ribbed with a hard, dark-green rind that turns yellow at maturity. The vein tracts are prominent and remain dark green at maturity. Most fruit slip from the stem when mature and crack open to reveal a fairly firm, spherical mass composed of seed and placental material. Flesh is off-white to creamy



Fig. 1. Fruit of muskmelon line MR-1. (Ruler = 30.48 cm).

white in color with a mealy texture and insipid taste. Soluble solids as percent sucrose average 6.1.

## Disease resistance

Resistance to powdery mildew in line MR-1 is characterized by the absence of macroscopic lesions on leaves, stems, or petioles. A few lesions occasionally may be found on cotyledons, but these do not indicate susceptibility of other plant parts. Resistance to downy mildew is characterized by the production of RT 4 type lesions in response to infection by *P. cubensis*. These roughly circular, 1–2 mm, water-soaked, yellow lesions, with no or extremely limited sporulation, do not expand and coalesce so that leaf collapse does not occur even when large numbers of infection sites are present (6).

## Availability

Limited quantities of seed are available to plant breeders and seed producers upon a request to the author at the U.S. Vegetable Laboratory ARS/USDA, 2875 Savannah Hwy., Charleston, SC 29407.

## Literature Cited

1. Cohen, Y., H. Eyal, A. Cohen, and C.E. Thomas. 1984. Evaluating downy mildew resistance in *Cucumis melo* L. *Cucurbit Genet. Coop. Rptr.* 7:38–40.
2. Jagger, I.C., T.W. Whitaker, and C.R. Porter. 1938. A new biologic form of powdery mildew on muskmelons in the Imperial Valley of California. *Plant Dis. Rptr.* 22:275–276.
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4. Thomas, C.E. 1978. A new biological race of powdery mildew of cantaloups. *Plant Dis. Rptr.* 62:223.
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<sup>1</sup>Research Plant Pathologist.

1987

S-9 TECHNICAL COMMITTEE REPORT

AGENCY: Tennessee Agricultural Experiment Station

SUBMITTED BY: D. L. Coffey

ADDRESS: Department of Plant and Soil Science, University of Tennessee,  
P.O. Box 1071, Knoxville, Tennessee 37901-1071.

Page 1 of 1.

\* \* \* \* \*

Accession User: B. N. Duck

Address: School of Agriculture, University of Tennessee at Martin, Martin,  
Tennessee 38238-5008.

Nature of Research: Evaluation of Vicia spp. for agronomic adaptation.

Progress to Date: Seed of 63 selections of Vicia from 1985-86 field nurseries were planted in October, 1986, on 1.8 m centers. Species represented included villosa, sativa, and ervilia, and 10 plants of each selection were established. Hairy vetch (V. villosa) and common vetch (V. sativa cv. 'Cahaba White') were grown as standards for comparison, and observations were made on winter hardiness, vigor, maturity, and seed dehiscence. Considerable genetic variation was observed, both among and within families. Seed of 107 individual plant selections were harvested and will be used to establish a field nursery in fall, 1987.

Publications: None

Cultivar Releases: None

## S-9 Technical Committee Report

Agency: The Texas Agricultural Experiment Station  
 Submitted By: George G. McBee  
 Address: Soil and Crop Science Department  
 Texas A&M University  
 College Station, Texas 77843  
 Phone: 409-845-8796

Page 1 of 2

\* \* \* \* \*

Accession User: Ramsey L. Sealy  
 Address: Department of Horticultural Sciences  
 Texas A&M University  
 College Station, Texas 77843-2133; phone:(409) 845-5341

Nature of Research: Vegetable amaranths

Progress to Date: Cultivars Amaranthus hybridus 'Quilete' from Mexico, A. hybridus 'Veta' from Greece, A. tricolor 'Red' from China, and A. dubius 'Ibondwe' from west Africa; are being compared to tricolor 'Tampala', which is one of the few vegetable amaranths that are commercially available in this country. They are suited to our summer climate, because they grow well at hot temperatures and they seem to be both desiccation and salt tolerant.

Publications: None

Cultivar Releases: None

Accession User: W.R. Ocumpaugh  
 Address: Texas Agricultural Experiment Station  
 Texas A&M University  
 Beeville, Texas 78102-9410; phone:(512) 358-6390

Nature of Research: Medicago PI's

Progress to Date: 280 Medicago PI's were evaluated against the cultivar 'Jemalong' (Medicago truncatula). The evaluation was based on a subjective rating for "Forage Production Potential". A number of subterranean PI's were also evaluated, but no material with a PI number was selected.

Publications: Annual Medic Evaluation for South Texas Pastures.

Cultivar Releases: None

Accession User: E.C. Bashaw and Mark Hussey  
 Address: USDA, Agriculture Research Service  
 Soil and Crop Sciences Department  
 Texas A&M University  
 College Station, Texas 77843-2133; phone:(409) 845-5341

Nature of Research: Plant introductions of Buffelgrass, Cenchrus ciliaris

Progress to Date: We are currently screening the U.S. collection of Buffelgrass introductions which constitute some 600-700 accessions. Primary emphasis is placed on adaptation, stress tolerance, vigor, seed production, mode of reproduction, and relationships of diverse ecotypes. Accessions selected for potential use as germplasm (male parents in crosses with sexual buffelgrass plants) and other promising accessions are listed below. These are obligate apomictic strains and any superior selection could be released as a new cultivar.

**Accession User:** James C. Read  
**Address:** Texas A&M Research and Extension Center  
17360 Coit Road  
Dallas, Texas. 75252;  
phone:(214) 231-5362

**Nature of Research:** Festuca Arundinaceae

**Progress to Date:** Festuca Arundinaceae

231 557, 231 558, 231 560, 283 291, and 310 308 were evaluated. The result was that 231 557 was found to be tolerant to droughty summers and excluding the seedling stage also to the cold. 231 558, is similar, except not as cold tolerant. 231 560 is very similar to 231 558. 283 291 is tolerant to droughty summers, has a good cold tolerance and an excellent resistance to leaf and stem rust. 310 308 show good seed production, vigorously rhizomatous, and a source of genes that may be transferred to other Sorghastrum sp.

**Publications:** Cool season perennial grass test  
- Dallas.

**Cultivars:** None

**Accession User:** C.E. Simpson  
**Address:** Texas A&M University at Stephenville  
Box 292, Stephenville, Texas 76401  
phone:(817) 968-4144

**Nature of Research:** Development of Peanut Germplasm

**Progress to Date:** Continuing to use plant introductions in development of peanut germplasm.

**Publications:** Langley Peanut  
Registration of Langley Peanut

**Cultivars:** Langley peanut.

**Accession User:** G.R. Smith  
**Address:** Texas Agric. Exp. Sta.  
P.O. Drawer E  
Overton, TX 75684

**Nature of Research:** Evaluation and Genetic  
Improvement of Forage  
Legumes

**Progress to Date:** Five elite experimental rose clover (Trifolium hirtum All.) have been identified for seed increase. Currently evaluating Subterranean clover (Trifolium subterraneum) for reseeding potential and isoflavone content. Kura clover (Trifolium ambiguum Bieb.) has been evaluated for summer survival and rhizome spread.

**Publications:** Smith, G.R., R.D. Randel, and C.D. Bradshaw. 1986. Influence of harvest date, cultivar, and sample storage method on concentration of isoflavones in subterranean clover. Crop Science 26:1013-1016.

Bradshaw, C.D., R.D. Randel, and G.R. Smith. 1985. High performance liquid chromatography analysis of subterranean clover isoflavone levels. Southern Branch ASA Abstracts. p.5.

Smith, G.R., and R.D. Randal. 1986. Screening subterranean clover for isoflavone concentration using high performance liquid chromatography. American Forage and Grassland Conference.

Smith, G.R. 1986. Development of subterranean clover germplasm with high levels of persistent hard seed. Ninth Trifolium Conference.

Smith G.R. 1986. A new look at rose clover. Proceedings 1986 Southern Pasture and Forage Crop Improvement Conference. Athens, Georgia.

Smith, G.R. 1985. Rose clover evaluation and selection. TAES CPR 4347:49-50.

Smith, G.R., G.W. Evers, T.J. Gerik, E.C. Holt, M. Hussey, W.R. Ocumpaugh, J.C. Read, and A.M. Schubert. 1986. Evaluation of experimental rose clover at eight Texas locations. TAES CPR 4499:45-47.

Smith, G.R. 1986. Breeding subterranean clover for improved reseedling. TAES CPR 4499:48-49.

1987  
S-9 TECHNICAL COMMITTEE REPORT

**Agency:** Virginia Agricultural Experiment Station  
**Submitted by:** Richard E. Veilleux  
**Address:** Department of Horticulture, VPI & SU, Blacksburg, VA 24061

\*\*\*\*\*

**Accession User:** M. Rangappa  
**Address:** Virginia State University  
Petersburg, VA 23803

**Nature of Research:** Evaluation of bean germplasm for biotic and abiotic stress factors.

**Progress to Date:** Eighty four entries were evaluated for pod and seed yields, agronomic characteristics, and responses to ambient ozone. Twelve cultivars were used in open-top field chambers to study genetic variation and six were studied by electron microscopy to examine mechanisms of resistance to biological and environmental stress.

**Publications:**

Baker, D. M. and M. Rangappa. 1987. Examination of beans resistant to air-pollutant ozone: A comparative anatomical approach using scanning electron microscopy. Seventh Biennial Research Symposium. October 4-7, 1987, Washington, DC.

Mebrahtu, T. M., M. Rangappa, and P. S. Benepal. 1987. Effect of polycultural system on Mexican bean beetle leaf hopper and corn earworm populations. Bean Improvement Cooperative 30:10-12.

Chappelka, A. H., M. Rangappa, P. Gross, and P. S. Benepal. 1987. Differential response of fourteen plant introductions of *Phaseolus vulgaris* L. to ozone in the field. Bean Improvement Cooperative 30:72-73.

Chappelka, A. H., M. Rangappa, E. Robbins, and P. S. Benepal. 1987. Comparison of ozone symptom expression among plant introductions of *Phaseolus vulgaris* L. between laboratory and field studies. Bean Improvement Cooperative 30:74-75.

**Cultivar Releases** none

\*\*\*\*\*

**Accession User:** D. Morris Porter

**Address:** Tidewater Research Center  
P.O. Box 7099  
Suffolk, VA 23437

**Nature of Research:** Lines of peanuts, *Arachis hypogaea*, obtained from China will be used in field screening research to determine levels of resistance to major peanut pathogens. Resistance to *Sclerotinia* blight (*Sclerotinia minor*) and early leafspot (*Cercospora arachidicola*) will be determined by growing peanuts in farmer fields having a history of this pathogen. Some of the Chinese lines are of particular importance since they are known to be early maturing as well as drought tolerant. Also, the oil content of Chinese peanuts is usually higher than that of domestic peanuts.

**Publications:** none

**Cultivar Releases:** none

\*\*\*\*\*

**Accession User:** Robert J. Soreng

**Address:** Biology Department  
Virginia Polytechnic Institute and State University  
Blacksburg, VA 24061

**Nature of Research:** Systematic botany; study of the phylogeny and classification of the genus *Poa*, and the sequence of origin of dioecy.

**Progress to Date:** All of the species sent are being grown to maturity for identification and vouchering. Seedling morphology and anatomy of mature leaves are being examined. Some of the accessions are being harvested for extraction of chloroplast DNA which will then be cut with restriction enzymes and analyzed for fragment length polymorphisms.

**Publications:** none

**Cultivar Releases:** none

\*\*\*\*\*

**Accession User:** Michael P. Timko

**Address:** Department of Biology  
University of Biology  
Charlottesville, VA 22901

**Nature of Research:** We are exploring the potential of *Vigna subterranea* as a source of novel genetic information which may be accessed by current recombinant DNA technology for use in other plant species of more immediate commercial interest.

**Progress to Date:** Our research involves two distinct approaches. We are isolating and characterizing the major soluble seed storage proteins present in "Bambara" and examining the accumulation of the proteins during seed development. Second, we are working out the conditions for cell culture and regeneration of plants and evaluating the ability of "Bambara" to be transformed by *Agrobacterium*.

**Publications:** none

**Cultivar Releases:** none

\*\*\*\*\*

**Accession User:** Michael Pillay

**Address:** Department of Biology  
Virginia Polytechnic Institute and State University  
Blacksburg, VA 24061

**Nature of Research:** The objective of the research is to determine evolutionary relationships in the genus *Bromus* using molecular techniques. The seed accessions were sown in the field primarily to increase seed quantity.

**Progress to Date:** A number of plants did not produce seeds, although flowering was good.

**Publications:** none

**Cultivar Releases:** none

\*\*\*\*\*

**Accession User:** Wayne Randolph

**Address:** Colonial Williamsburg Foundation  
P.O. Box C  
Williamsburg, VA 23185

**Nature of Research:** Williamsburg is a historic site at which historic crop cultivars are grown for public display and qualitative evaluations.

**Progress to Date:** Accessions no. 213175, 217405, and A-1903 were all grown near Williamsburg in display gardens.

**Publications:** none

**Cultivar Releases:** none

REPORT OF THE  
GERMPLASM INTRODUCTION AND EVALUATION LABORATORY  
TO THE  
REGIONAL TECHNICAL COMMITTEES ON PLANT GERMPLASM

June 1987

"Ask most agricultural scientists to list our natural resources and they will probably answer 'soil, water, and air'. Yet there is a fourth resource that for many years has received scant attention. It is germplasm, the natural resource which makes Earth unique, insofar as we know, in our solar system." 1983 Plant Breeding Forum.

PLANT INTRODUCTION OFFICE (PIO)

George A. White

Personnel - Sharon Stern, Botanist, resigned on February 14, 1987. She is now the proud mother of a lovely daughter, Teddi. Vicki Binstock replaced Sharon on March 2, 1987. David Manning joined PIO on February 15, 1987 as Shipment Clerk at the Plant Germplasm Quarantine Center. Kathy Selby is our new Program Clerk and Toni Fiumos-McDonald, a short term student assistant.

PIO activities

There has been a continuous decline in the number of accessions sent abroad. For example, 111,122, 95,854, and 71,494 items were sent overseas in 1984, 1985 and 1986 respectively. These totals include significant numbers of entries in cereal disease nurseries (accounted for 46% of 1986 total items). In 1986, 1488 shipments to 115 countries constituted the involvement of our regular exchange program. Additionally, 1416 items went to AID missions and their cooperators in 37 countries via 105 shipments.

PI numbers were assigned to 6,070 items and 12,054 items passed through our flow channels. Many of the latter group will later be assigned PI numbers and included in NPGS.

A significant event during the past year was the changeover from a Datapoint computer system to the GRIN database. USDA Plant Inventory 194 which covers January 1 through May 31, 1986 marked the end of the Datapoint era (January 1, 1979 through May 1986). Finalization and publication of Inventory 195 for June 1 through December 31, 1986 has been delayed because of necessary software changes and printing problems. Computer printing of the manuscript should be completed in June 1987. Issuance is expected by August or September.

PIO computer operators entered 42,000 PI ranges from the years 1898-1978. About 1000 changes were made in priority assignments of plant species. A major advancement in documentation is underway to electronically link the National Plant Germplasm Quarantine Center (Glenn Dale, the new quarantine facility at BARC-East, and the sugarcane quarantine at BARC-West) with PIO and

the Plant Germplasm Quarantine Center (Bldg. 320, BARC-East). This will be done via the GRIN database. PIO will enter Q numbers and skeletal information for all items going to NPGQC under quarantine, except for sugarcane, at the time of arrival from abroad. Additional passport data as available will be added as soon as possible, hence documentation will be nearly complete and the information available on GRIN well before PI numbers are assigned. The Q number will serve as the identifier until quarantine release and PI number assignment. This process will be in full operation as soon as all hardware and communication hookups are in place.

Dr. White gave seminars in Korea and Taiwan in 1986 and established an exchange agreement with the Rural Development Administration of Korea. Contributions were made during the reporting period through meetings, lectures to University classes and to IBPGR trainees, and presentations at scientific society meetings. Many foreign and domestic visitors are received each year. PIO contributed significantly to the cooperative agreement between the U.S. and USSR for germplasm and team exchanges.

Beginning in January 1987, PIO has been documenting passport data and assigning PI numbers to all plant materials that are registered by the Crop Science Society. PIs are linked to the Society's registrations through the input of appropriate Crop Science Registration (CSR) groups such as CSR-Alfalfa. The registration numbers are depicted with the prefixes CV (cultivars), GP (germplasms), and PL (parental lines). Each month, Dr. Phil Miller, NPS and member of the Crop Registration Committee of the Society, gives PIO the registration manuscripts. We then glean appropriate information for passport data documentation. Upon publication of registration articles, PIO plans to enter the literature reference information to the PI records.

PIO provides much assistance to scientists relative to quarantine questions and problems. Scientists are encouraged to use the well-established flow channel through the Plant Germplasm Quarantine Center for imports and exports of plant germplasm. All incoming materials should be inspected by quarantine officials and all outgoing materials should be accompanied by a phytosanitary certificate (our jargon shortens this to simply "phyto"). The address is USDA Plant Germplasm Quarantine Center, Bldg. 320, BARC-East, Beltsville, Maryland 20705. ATTN: David Manning.

Examples of PI assignments and pending assignments for 1986 and 1987 are given below.

| Crops                                    | Origin/Collector/Other Information       | PI numbers    |
|--|--|---------------|
| 1986                                     |  |               |
| Okra, cucurbits, sorghum<br>corn, others | Zambia. Mehra (India)<br>IBPGR sponsored | 500149-501266 |
| <u>Gossypium</u>                         | Several countries. Percival              | 501301-501480 |
| <u>Arachis</u>                           | Peru. Banks. IBPGR                       | 501267-501300 |
| Forage grasses/legumes                   | USSR. Asay, Rumbaugh<br>1982 collection  | 502262-502641 |

|  |   |   |
|--|---|---|
| <u>Heliarthus</u>                      | U.S. Seiler, Roath, Skoric                            | 503202-503291                             |
| Sugarcane                              | India. 1981 India<br>collection, North Bihar          | 504747-504808                             |
| Sugarbeet                              | Italy, France. Doney<br>1985 exploration              | 504170-504285                             |
| <u>Lupinus, misc.</u>                  | U.S. Davis 1971<br>collection                         | 504313-504440                             |
| <u>Cicer</u>                           | United States and other<br>countries. Isom            | 502989-503031                             |
| Rice                                   | China, other countries.<br>Introductions by Groth     | 503033-503139                             |
| Corn                                   | Guinea. Received through<br>ORSTOM (France) and IBPGR | 503346-503485                             |
| Forage species<br>& <u>Beta</u>        | USSR. VIR   | 505822-505934                             |
| Peas                                   | Various countries.<br>Received through ICARDA, Syria  | 505059-505150                             |
| <u>Glycine species</u><br>(wild)       | Various countries.<br>Hymowitz                        | 505151-505304                             |
|  | 1987  |   |
| <u>Paspalum &amp; other</u><br>forages | South America. Burson<br>1979 collection              | 508559-509043                             |
| <u>Cicer, Lens</u>                     | Turkey. Muehlbauer/Kaiser<br>1985 collection          | 509117-509432                             |
| <u>Citrus medica</u>                   | Israel JFK airport<br>interception                    | 508265                                    |
| Korean vegetables                      | Korea. Korean Seed<br>Association                     | 508401-508504                             |
| <u>Glycine soja</u>                    | Japan   | 507581-507669                             |
| Ornamental cherries                    | Japan, Korea, Taiwan<br>Jefferson collection          | Pending. 126<br>accessions,<br>14 species |
| Misc. species                          | High elevation crops, Peru<br>Bergman collection      | Pending (109 items)                       |
| Rice                                   | Rejuvenation Project,<br>T. H. Johnston               | Pending (800-1000<br>items)               |
| <u>Prunus</u>                          | Various countries<br>Released from quarantine         | 506389-506401                             |

Ted Dudley of the National Arboretum is in China until sometime in August. PIO coordinated requests for germplasm. He was also asked to obtain information about any collections that he becomes aware of and to provide contacts. He will spend time in Jiangsu, Anhui, and Zhejiang Provinces. Dr. C. M. Taliaferro of Oklahoma State and two other scientists will also be in China (July 24-August 21). They hope that permission will be given to collect germplasm of warm season grasses.

Skip March also of the National Arboretum will collect cultivated ornamentals in Great Britain from mid-September to mid-October.

NATIONAL SMALL GRAIN COLLECTION  
D. H. Smith, Jr.

The National Small Grain Collection responded to approximately 500 requests for seed of wheat, barley, oats, rice, rye, triticale, and Aegilops. Over 50% of the requests originated in foreign countries. Morpho-agronomic descriptor observations were made on 2500 lines of wheat and barley and 400 lines of oats at the Aberdeen Branch Station in Southeastern Idaho. Head and panicle samples were collected on each three row plot for subsequent analysis for seed and spike/panicle characteristics. Approximately 200 lines of rice were grown in quarantine in the greenhouse at BARC; an additional group of 600 lines of rice were grown in large plastic pots in a field nursery for increase.

The following table shows the distribution of cereal germplasm samples by crop and type of recipient from the National Small Grain Collection located at BARC for 1986. The numbers of requests and the number of samples requested for 1986 was the lowest in my tenure as Curator.

1986

|           | Domestic<br>Private | Domestic<br>Public | ARS    | Foreign<br>Private | Foreign<br>Public |
|-----------|---------------------|--------------------|--------|--------------------|-------------------|
| Aegilops  | 0                   | 29                 | 10     | 0                  | 23                |
| Barley    | 7                   | 16,351             | 2004   | 13                 | 143               |
| Oats      | 1                   | 24                 | 807    | 0                  | 32                |
| Rice      | 7                   | 101                | 56     | 53                 | 84                |
| Rye       | 2                   | 3                  | 14     | 0                  | 29                |
| Triticale | 8                   | 0                  | 0      | 0                  | 0                 |
| Wheat     | 95                  | 207                | 43,544 | 46                 | 286               |

EVALUATION OF SMALL GRAIN GERMLASM  
 PROGRESS REPORT  
 L. W. Briggie  
 1986

Systematic evaluation of accessions in the USDA-ARS National Small Grain Collection (NSGC) was initiated in 1983. Funding was obtained specifically for this purpose.

A set of descriptors appropriate for each of the principal small grain crop species - wheat, barley, oats, and rice - has been determined in collaboration with the appropriate Crop Advisory Committees (CAC's).

Data on field descriptors have been obtained on 23,900 wheat accessions, 8,500 oat accessions, and 7,000 barley accessions during the 1983-86 period. All barley and oat data were collected at the Aberdeen, Idaho grow-out location. A total of 13,400 wheat accessions were evaluated at Aberdeen; field descriptor data were obtained at Mesa or Maricopa, Arizona on 10,500 wheat accessions. Field data were recorded on such descriptors as number of days from planting to anthesis, plant height, spike (or panicle) type, spike (or panicle) density, straw lodging, straw breakage, awn and glume characteristics. Spikes or panicles were collected from each accession at maturity. Seed and more precise spike data on about 2/3 of the 1984 wheat accessions grown at Aberdeen were obtained during the winter of 1984-85 and will be finished during the winter of 1986-87. Similar data will be collected on as many oat accessions (panicles) and other wheat accessions as possible during the same winter. The remaining oat panicle and barley and wheat spike data will be recorded as it can be scheduled. Grain from each plot each year was harvested and the weight recorded. Grain was (or will be) returned to Beltsville for storage and for use in further evaluation (for disease and insect resistance, quality factors, etc.).

During the 1987 season approximately 3,000 wheat accessions will be grown at Maricopa, Arizona to meet quarantine and propagation requirements. Field descriptor data will be obtained at the same time. Approximately 2,500 wheats may be field evaluated at Aberdeen, Idaho in 1987. Duplicate oats and wheat accessions (named varieties that appear two or more times in the NSGC) will be grown and studied for identification. True duplicates will be bulked. Purification nurseries for wheat, barley, and oats may also be grown in 1987. Numbers have not yet been determined.

Evaluation for disease and insect resistance was initiated in 1983 and expanded in 1984, 1985, and 1986. Accessions evaluated so far are as follows:

|                         |         |               |               |
|-------------------------|---------|---------------|---------------|
| Barley Yellow Dwarf:    | 1983-86 | Davis, CA     | Urbana, IL    |
|                         |         | 10,000 wheats | 10,000 wheats |
|                         |         | 7,000 barleys | 10,000 oats   |
|                         |         | 4,500 oats    |               |
| Soilborne Mosaic Virus: | 1985-86 |               | Urbana, IL    |
|                         |         |               | 10,000 wheats |

|                                |         |                                       |
|--------------------------------|---------|---------------------------------------|
| Hessian Fly:                   | 1983-86 | <u>Lafayette, IN</u><br>20,000 wheats |
| Crown Rust:                    | 1983-85 | <u>Ames, IA</u><br>9,250 oats         |
|                                | 1986    | 2,000 <u>Avena sterilis</u>           |
| Leaf Rust:                     | 1983-86 | <u>Manhattan, KS</u><br>25,000 wheats |
| Spot Blotch:                   | 1985-86 | <u>Fargo, ND</u><br>5,000 barleys     |
| Barley Stripe<br>Mosaic Virus: | 1986    | <u>Aberdeen, ID</u><br>2,500 barleys  |
| Common and Dwarf Bunt:         | 1985-86 | <u>Pendleton, OR</u><br>5,000 wheats  |
| Stripe Rust:                   | 1984-86 | <u>Pullman, WA</u><br>15,000 wheats   |

Growth habit (winter, facultative, or spring type) determinations have been done primarily at Bozeman, Montana from a late spring planting made in June. Data were also recorded on plots at Aberdeen, Idaho and Maricopa, Arizona when growth habit was apparent. During 1985-86, 15,000 wheat accessions, 2,000 oats, 400 non-shattering Avena species, and 4,000 barleys were tested at Bozeman.

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.

Mixtures occur in some accessions in all three 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 in which mixed accessions are thinly planted and plots separated by rows of strong straw borders of a different crop species.

An extremely valuable part of the National Small Grain Collection is that of the related species. About 250 accessions of Aegilops species were grown and classified in the greenhouse at Columbia, Missouri in 1983-84 and more in 1984-85. About 600 accessions of the Triticum species were grown and classified in the greenhouse at Beltsville in 1983-84 and another 1,200 in 1984-85. More were grown in 1985-86. When proper classification is difficult, chromosome counts are made at Columbia, Missouri. This procedure has proved to be very helpful. Approximately 700 ploidy analyses have been conducted.

A new metal storage and work space building (30' x 80') to be used for germplasm was erected at Aberdeen, Idaho in 1985. A full-time technician position for germplasm evaluation is funded at Aberdeen by ARS. A similar metal building (50' x 75') was built at Maricopa, Arizona, also in 1985, and it too will be used for evaluation and propagation of the NSGC. An ARS technician position will be established at Maricopa on January 4, 1987.

Approximately 600 new Avena collections from an expedition made by R. A. Forsberg and M. D. Simons in northeastern Turkey during the summer of 1986 were checked for species classification. Some collections were subdivided into varying morphological types. Additional subdividing may be done by the collectors. This procedure, prior to assignment of PI numbers, will help assure correct species classification and can provide more complete records on accessions after they become a part of the NSGC.

About 200 Triticum, Aegilops, Secale, and Hordeum (mostly Triticum) samples that were collected by Calvin Sperling in 1985 in southeastern Turkey were checked for species classification. Approximately 100 samples collected by Sperling and Alan Atchley in 1986 from the same area were also checked, primarily for species classification. Some subdividing was done, based on readily apparent morphological variation. Growing the individual collections under quarantine and for propagation before PI number assignment has definite advantages.

PLANT EXPLORATION/LAB. LEADER OFFICE  
R. E. Perdue, Jr.

Dr. J. A. Duke, Botanist, transferred to the Narcotics Laboratory, Agricultural Environmental Quality Institute. GIEL activities were formally reviewed by the Area office and NPS in March, 1987. Considerable emphasis by reviewers was placed on more complete automation through the GRIN Database. Discussions are taking place concerning staffing and some possible redirection of efforts.

The contacts computer file was expanded to include 560 organizations or individuals who can provide information of value in planning plant explorations or meeting other germplasm needs. Compilation of a bibliography or atlases useful in planning plant explorations was initiated. A review of literature pertinent to compilation of a "Plant Exploration Manual" is underway. Literature (310 items) related to plant exploration has been assembled and a computerized bibliography compiled to identify literature by keywords. Plans call for preparation of list of "Travel Tips", and do's and don'ts for germplasm collectors abroad. The Plant Exploration Office continues to respond to needs of scientists planning plant explorations.

A listing of 1987 Plant Explorations follows.

## 1987 PLANT EXPLORATIONS

| Participant | Affiliation           | Germplasm                         | Area             |
|-------------|-----------------------|-----------------------------------|------------------|
| Manshardt   | Univ. of Hawaii       | <u>Artocarpus</u><br>(Breadfruit) | Western Pacific  |
| Hoopes      | Cornell Univ.         | <u>Solanum</u>                    | Bolivia          |
| Okada       | Argentina             | (potatoes)                        |                  |
| Aviles      | Bolivia               |                                   |                  |
| Nowick      | Louisiana State Univ. | Rice                              | Brazil           |
| Groth       | Louisiana State Univ. |                                   |                  |
| Pike        | Texas A&M             | <u>Allium</u>                     | USSR (postponed  |
| Swenson     | Private (Chicago)     |                                   | until 1988)      |
| Asay        | ARS, Logan, Utah      | Grasses                           | USSR             |
| Johnson     | ARS, Logan, Utah      |                                   |                  |
| Grauke      | LSU (Shreveport, LA)  | <u>Carya/Juglans</u>              | Mexico           |
| Payne       | ARS (Byron, GA)       |                                   |                  |
| Wood        | ARS (Byron, GA)       |                                   |                  |
| Parfitt     | Univ. of Calif.       |                                   |                  |
| Seiler      | ARS (Bushland, TX)    | <u>Helianthus</u>                 | NW United States |
| Pomeroy     | Iowa State Univ.      |                                   |                  |
| Doney       | ARS (Fargo, ND)       | Sugarbeet ( <u>Beta</u> )         | U.K.             |
| Roath       | ARS (Ames, IA)        | <u>Cuphea</u>                     | United States    |
| Widrechner  | ARS (Ames, IA)        |                                   |                  |
| Buhrow      | Univ. of Arizona      | <u>Phaseolus</u>                  | Mexico           |
| Wilkes      | Univ. of Mass.        | Teosinte ( <u>Zea</u> )           | Mexico           |

## ECOGEOGRAPHIC STUDIES

A. A. Atchley

Climatic sources have been investigated sufficiently now to conclude that no further meteorological stations will be found in the area of greatest interest in Turkey. More recent meteorological data, known to exist, was sought without success both in Turkey and in the United States. It was decided to collect actual minifloras at those stations which are located within an expanded area (east of 39° E, south of 38° 30' N) of southeastern Turkey. The level of detail of maps available has been low, and the distribution of larger scale maps found to be restricted. Atchley traveled to Turkey this year and

checked LANDSAT imagery against ground conditions. This led to progress in identifying areas for further exploration. Restrictions on movement and collecting reduced the opportunity for additional observations on ecological factors, such as the correlation between habitat and distribution of species of Triticeae. Nevertheless, progress was made in setting up computer systems for analyzing the distribution of genetic diversity in the samples collected this year (and last), mapping, and incorporating the strategy of germplasm collection into an expert system.

In the 1986 field season our contractor (C. R. Sperling) performed field work (germplasm collection of wheat and its wild relatives) in Turkey. He reported that his time was spent coping with procedural/bureaucratic matters (including obtaining permission to collect) on the one hand, and collecting on the other, in a ratio of about 2:1 during his approximately 9 weeks in-country. Some of the areas of greatest interest to the project were off limits for politico-military reasons. Activity in one was limited to a single day's collecting. There were no clear prospects of improved access to remote areas, particularly with the existing collaborative arrangement. The contractor's collections this field season numbered 150, of which 54 were wheat.

#### PUBLICATIONS

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\_\_\_\_\_ 1987. Climates of sixty-six countries with potential for biomass production. In: Duke, J. A., ed., *CRC Handbook of Energy Potential in Developing Countries*. CRC Press, Boca Raton, FL 33431.

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White, G. A. 1986. The National Plant Germplasm System of the United States. Proc. of the Symposium on Plant Genetic Resources of Southeast Asia, Jakarta, Indonesia, August 1985. Pages 61-66.

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## 1986 GLENN DALE REPORT TO REGIONAL PROJECTS

On October 1, 1986, the U.S. Plant Introduction and Quarantine Station at Glenn Dale (USPI/QS); the sugarcane quarantine facility, Building 009, Beltsville; and the new quarantine facility, Building 580 (BARC-E-580) were combined under one management unit, which is to become known as the National Plant Germplasm Quarantine Center (NPGQC). All quarantine pathogen-testing procedures for imported plant germplasm were assigned to Agricultural Research Service (ARS) personnel at NPGQC. Major crops within the ARS quarantine responsibility now include Malus, Pyrus, Cydonia, Prunus, Rubus, Ribes, Solanum, Ipomoea, Citrus, grasses, ornamentals, and sugarcane. Previously, both ARS and Animal and Plant Health Inspection Service (APHIS) personnel shared these duties. APHIS staff now are responsible only for regulatory and postentry activities.

Significant changes in staffing have occurred. Suzanne Hurtt, plant pathologist, was hired and has been assigned the responsibility of supervising the quarantine pathogen-testing program at NPGQC. Her responsibilities will include upgrading and streamlining the testing program by developing, adapting, and implementing state-of-the-art technologies. One research scientist position and two research technician positions were converted to full-time service activities. Positions for two additional (new) pathogen-testing technicians are being filled currently. Two additional positions are scheduled to be advertised in fiscal year 1988.

Dr. Ahmed Hadidi was hired to conduct research on pathogens of quarantine significance, especially the detection of Malus and Prunus viruses and viroids by nucleic acid hybridization to cloned DNA probes. Program objectives are planned to include the development of recombinant probes for the rapid detection of nepoviruses and viroids infecting deciduous fruit trees, the evaluation of the ability of nepoviral coat protein genes to confer resistance to virus infection in transgenic plants, and the determination of the etiology and the characterization of causal agents of one or more diseases currently having unknown etiologies.

The BARC-E-580 quarantine facility is now operational even though construction activities have not been completed. Most of the Prunus accessions now are housed in the screenhouses. In greenhouses, herbaceous and woody tests are being conducted and certain Solanum and Ipomoea accessions are being maintained. All greenhouse/screenhouse operations are scheduled to move from Glenn Dale to BARC-E-580 in the fall of 1987. Before orchard plots can be established, drainage problems must be corrected and a drip irrigation system must be installed. These problems are being resolved but it is expected to take another 18 months before the first orchard plots are planted. A new laboratory building, designed to house quarantine pathogen testing and APHIS regulatory operations, is under construction at this time. A second building designed for APHIS plant inspection operations is being designed. Plans for additional screenhouses, a growth chamber room, and the upgrading of the current system have been made.

## GRIN

Jimmie Mowder

The Germplasm Resources Information Network has been converted to a more responsive menu driven system for the collection sites. A four day training session was conducted in June, 1986, to train collection site personnel on the new system. Data continues to be loaded in the database at a rapid rate. The Cotton and Potato collection data were stored in the database in addition to 120,000 National Small Grain Collection observation records. The GRIN Prime 750 minicomputer was upgraded to a Prime 9955 minicomputer in October 1986 which increased processing capabilities six times. The Plant Introduction Office has been converted from a small stand-alone minicomputer to the GRIN. The inspection station is currently being tied directly into the GRIN. This provides immediate information to the Plant Quarantine stations which eliminates the need for the data to be entered again and permits users of the GRIN to query the database for quarantine entry and release dates. The PUBLIC procedures that are available to anyone having a need to access the database are continually being updated to increase their usefulness. A new public access will be written which will provide a more flexible, responsive, and easy to use set of procedures. This will be completed in late 1988.

## SUMMARY OF CAC ACTIVITIES FOR REGIONAL TECHNICAL COMMITTEE REPORTS

Mark Bohning

Thirty-seven Crop Advisory Committees (CACs) exist within the NPGS. These cover most of the economically important oil, fiber and food crops along with many of the ornamental species. Additional CACs may be developed to handle crops not already covered and possible new crops, or these may be grouped under an existing CAC. The committees are involved with advising the NPS, crop curators, and other members of the NPGS on all matters pertaining to plant germplasm. All of the committees have completed or are currently developing a report requested by Paul Fitzgerald (Chairman, National Plant Germplasm Committee) which will review the current situation and future needs for their respective crops. These reports will be used to help develop a long range plan to manage the NPGS.

National Program Staff Report  
to Regional Technical Committees  
July 1987  
Henry L. Shands

This report briefly addresses some of the activities of the National Plant Germplasm System (NPGS) happenings during the past year.

Budgets. Proposed base funding levels for ARS presented in the 1986 report pretty much materialized. Those and the budget proposed by the President to Congress for FY88 are presented:

| <u>Research</u> | <u>FY 1987</u>       | <u>FY 1988</u>       |
|-----------------|----------------------|----------------------|
| Acquisition     | \$ 2,212,800         | \$ 2,635,600         |
| Maintenance     | 6,641,800            | 9,606,200            |
| Evaluation      | 5,627,800            | 8,800,500            |
| Enhancement     | <u>4,303,600</u>     | <u>5,708,600</u>     |
| Totals:         | 18,786,000 <u>1/</u> | 26,750,900 <u>1/</u> |

1/Includes pay cost and FERS increases.

The proposed increase for base support amounts to a 45 percent increase. It is obvious from the above distribution of figures that the bulk of it is scheduled to support the activities at the core stations of the NPGS, i.e. the P.I. centers and the National Seed Storage Laboratory.

National Seed Storage Laboratory. Included in the President's budget was \$1M for planning and design of expanded storage facilities at Fort Collins. As of this time, we are uncertain of the outcome of this proposal. We anticipate that the storage space will be full during 1989.

User Fees. Much discussion has been made about the user fee initiative inserted into the President's budget message to congress. The USDA agreed to conduct a study on the user fee issue and report to the Office of Management and Budget. Participants in the study by ARS included persons from professional societies, industry and state universities. The report covered the three year period, 1983-1985, and demonstrated that the private sector, upon which the fee was to be levied, received only 6.1% of the germplasm distributions. That number, coupled with extrapolated direct and indirect costs, demonstrated that there would be virtually no budget benefit to the department. Additionally, there were many philosophical issues raised in the report involving U.S. free and open exchange policy on germplasm, international issues and misconstrued signals, and equal partnership in the NPGS. A number of state persons felt that there should be no one-sided charges to the private sector and that all recipients should be treated equally in keeping with the partnership concept. There will be no user fee implemented at this time even though the USDA has to absorb the targeted revenue as a loss.

New NPGS Personnel. New assignments to NPGS positions during the year include Steve Eberhart, Director, NSSL; Kim Hummer, Curator, NCGR-Corvallis; Suzanne Hurtt, Indexing Supervisor, Plant Quarantine, Glenn Dale; Steve Kresovich, Research Leader, RPIS-Geneva; Ray Schnell, Curator, NCGR-Miami. We welcome each of these key people to ARS and the germplasm system. Recruiting is underway for Research Leader, NCGR-Corvallis and Curator, NCGR-Riverside.

Beltsville Symposium XIII, May 9-11, 1988. This important symposium on Biotic Diversity and Germplasm Preservation: Global Imperatives will feature an outstanding array of international and national expert speakers dealing with plant, animal and microbial germplasm issues. Allan Stoner (PGGI) and Lloyd Knutsen (BBII) are organizers at Beltsville. Information can be obtained from Dr. Allan Stoner, Director, PGGI, Bldg 001, BARC-W, Beltsville, MD 20705.

Crop Advisory Committee reports. Approximately 25 of the 37 CACs have submitted reports to the NPGC detailing their considered needs in acquisition, maintenance, evaluation and enhancement of germplasm as well as their assessment of the status of genetic vulnerability of their crop. These reports are being summarized and by the fall should be available for distribution in one of several formats.

DIVERSITY magazine. DIVERSITY magazine was unsuccessful in obtaining individual subscriptions or corporate support necessary for financial solvency. The rate of support by germplasm people at state universities and experiment stations is 23%, while USDA workers (10%), other governmental (9%), foundations (8%), private industry (25%) and other (9%) make up the remaining U. S. balance. Overseas subscriptions are mainly supported by bulk subscriptions (16%). Agricultural Research Service, Cooperative State Research Service and Extension Service have agreed to provide partial assistance during a two year period, July 1987-June 1989. The National Council of Commercial Plant Breeders has provided a two year support grant along with contributions from several corporations.

Germplasm Resources Information Network (GRIN). The database unit has initiated a rewrite effort on the PUBLIC version which should be ready in 1988. GRIN will present a major demonstration at the 1987 American Society of Agronomy meetings at Atlanta. The new Prime 9955 has speeded up response time and GRIN also gained a new operating system in the shift. GRIN is becoming more valuable to the user community as more collections are added and new evaluation data are researched and entered. GRIN studied the need for developing the DNA database discussed in last year's report and concluded that public DNA databases adequately fulfill that need. It is studying databasing genetic map data in collaboration with IBPGR.

Plant Quarantine. The ARS-APHIS agreement for operation of the plant quarantine activities at the new BARC-E facility constructed by APHIS went into effect in October 1986. Orchard land is being prepared for installation of the irrigation system in 1988 after delivery of a new water system to the facility in the fall of 1987. The new Virology lab for the indexing activities will be completed in the spring of 1988. Work is being gradually phased out of the Glenn Dale facility as it can be accomplished at the new site.

National Academy of Sciences study. Coordinated by Dr. John Pino, the Board on Agriculture study will assess plant and animal germplasm issues on a global scale. In the U.S. a sub-committee of the plant committee will examine the NPGS operations. Various reports such as the GAO report of 1981, the USDA's environmental assessment of 1986, and the Office of Technology Assessment (OTA) report of 1987 have raised questions about the NPGS which the academy study expects to address.

TITLE; REPORT FOR THE NSSL SEED VIABILITY AND STORAGE UNIT

DATE: June 22, 1987

TO: REGIONAL TECHNICAL COMMITTEES ON PLANT GERMPLASM

PREPARED BY: Steve A. Eberhart, Director, National Seed Storage Laboratory, Fort Collins, CO 80523

During 1986 the 19,420 accessions added to the base germplasm collection brought the total cataloged accessions in storage to 218,274. The distribution of these samples is as follows:

|              |         |      |
|--------------|---------|------|
| cereal crops | 128,500 | 58%  |
| corn         | 16,260  | 7%   |
| wheat        | 48,718  | 22%  |
| sorghum      | 22,500  | 10%  |
| barley       | 11,500  | 5%   |
| oats         | 19,300  | 9%   |
| rice         | 7,838   | 4%   |
| vegetable    | 33,700  | 15%  |
| oil crops    | 26,000  | 12%  |
| forage crops | 23,300  | 10%  |
| fiber crops  | 4,300   | 2%   |
| ornamentals  | 1,400   | 1/2% |
| sugar crops  | 1,000   | 1/2% |
| misc.        |         | 2%   |

45,135 Are not in the in working collections.

Two thousand, four hundred and forty-three (2,443) accessions of CIMMYT wheat and 5,000 IRRI rice accessions were received for back-up storage. A total of 680 seed-increase samples were received. Approximately 17,200 accessions stored at the NSSL were tested for viability. Over 3,500 accessions from various germplasm curators were tested for germination as part of the program to monitor the viability of the entire U.S. germplasm collection. Seeds of 406 accessions were sent to 76 scientists in 18 countries. Seed inventories on computer printout were sent to scientists upon request. NSSL data was reloaded into GRIN-2. Barley genetic stocks maintenance, distribution, and associated studies carried out under an extramural CRIS consisted of growing 170 genetic, 37 trisomic and 23 multiple genetic stocks to study characteristics and to increase fresh seeds.

A moisture meter (non destructive) requiring only 100 grams of seed was obtained to permit closer monitoring of seed moisture of accessions going into storage and as they are re-tested periodically for germination. A near-infrared moisture meter that can test 5, 100 or 250 gram samples (non-destructive) will be ordered.

A new PC with 40 megabytes of fixed disk storage (to replace the Telex) and two PC's with 20 megabytes of fixed disk storage have

been ordered for the data accession section. INFO is now used to enter, assemble, check and transfer data by "batch" to GRIN rather than directly with the on-line terminals. Plans are being developed to add PC's to the germination laboratory FY88 to permit direct entry of germination and moisture records.

Storage space will remain critical until new storage facilities are provided. Meanwhile, an inventory search has revealed numerous cases of multiple samples which will be consolidated. The cryogenic pilot project indicates cereals can be stored satisfactorily under liquid nitrogen. Hence, a proposal to place the wheat, barley and rice in cryogenic storage is being prepared. One million dollars for architectural plans have been included in the FY88 budget request with plans to include ten million dollars for construction of a new facility in the FY89 budget request.

1987 S-9 Technical Committee Report

Agency: Soil Conservation Service  
Submitted by: H. Wayne Everett  
Address: Fort Worth Federal Center  
P.O. Box 6567  
Fort Worth, Texas 76115

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Accession user: Brooksville Plant Materials Center  
Address: 14119 Broad Street, Brooksville, Florida 33512  
Nature of research: Development of new conservation plants for MLRA 138, 151-155, and 270-273 (emphasis on cropland erosion control).  
Progress to date: In 1985 and 1986, selected species were collected or assembled that had potential as cover crops in citrus groves during the summer rainy season. Sufficient material of Indigofera hirsuta, Cassia fasciculata, and Crotalaria lanceolata were collected to begin evaluation in 1987. A naturalized collection of Arundo donax (Mediterranean in origin) has been narrowed to six from fifty accessions collected in 1983 for gully erosion control in north Florida, southern Georgia, and southern Alabama. Field evaluation of PI-299648, Digitaria macroglossa, for coastal dune stabilization, is continuing to evaluate its potential as a weed. Several released plants introduced through the PI system, released or studied extensively outside of Florida, but never evaluated in Florida, are showing promise: Paspalum nicorae PI 202044, 310131, 490363, 490364; Eragrostis lehmanniana PI-106088 'Puhuima'; Eragrostis lehmanniana x trichodes PI-276033 'Cochise'; Eragrostis chloromelas PI-469222 'A-84'; Eragrostis superba PI-469254, PI-276055 'Palar'; and Panicum coloratum PI-166400 'Selection 75' all for critically eroding areas throughout Florida.  
Publications: 1  
Cultivar releases: None

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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 conservation plants for MLRA's 128-130, 133, 136, and 137.

Progress to date: PI-490363, PI-490364, PI-310131, and PI-202044, Paspalum nicorae, continue to be evaluated for forage and critical area planting purposes, particularly peach orchard cover and grassed waterways. While it establishes more quickly from seed when planted in grassed waterways than 'Pensacola' bahiagrass, seed production problems and potentials need to be worked out before a release can be planned. The following are being increased for use in advanced evaluation: PI-222177, PI-383803 Vicia villosa; PI-199258, PI-289311 Medicago orbicularis. These legumes will be used in a conservation tillage study. PI-166400, 'Selection 75', Panicum coloratum, and PI-301477, 'WW-477', Bothriochloa ischaemum, field plantings are adapted and continue to perform well in the Black Belt area (MLRA 135) of Alabama for marginal cropland conversion, forage, and critical areas.

PI-286452, Lespedeza cuneata, 'Appalow' sericea lespedeza. The full range of adaptation and performance have not been determined for Alabama and Georgia. Field plantings of Appalow appear to be adapted and have potential as a warm-season pasture legume in addition to being a good plant for critical area stabilization.

PI-434285, Salix X cottetii, 'Bankers' dwarf willow. Field plantings have been established in Alabama and Georgia to determine the adaptation and performance for streambank stabilization.

PI-218004, Lespedeza virgata, 'Ambro' virgata lespedeza. Ambro has never been fully evaluated as a warm-season legume for pastures. It grows well in a bahiagrass mixture at Americus, and with tall fescue, lovegrass, and common bermuda at other locations. Wildlife biologists are now interested in the plant as a source of food and cover for quail, turkey, and geese. Field plantings are under way to evaluate the adaptation and performance of Ambro for wildlife.

PI-267817, Arachis glabrata, 'Arbrook' perennial peanut. Field plantings are being established in Alabama and Georgia to determine its range of adaptation and performance as a warm-season forage.

Publications: 1

Cultivar releases: 1

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Accession user: Quicksand Plant Materials Center

Address: Quicksand, Kentucky 41363

Nature of research: Development of conservation plants for the Appalachian Region

Progress to date: The initial evaluation of 46 narrowleaf trefoil, Lotus tenuis, introductions were completed in the fall of 1985. Five accessions were selected in 1986 for further testing, to begin in 1987. PI-246734 originated from Spain. PI-316269, which came from Hungary via Australia, was noted for its excellent spread and early spring growth. It stayed greener and free of disease longer into the summer than most other accessions, and put on good fall growth. 'Los Banos' (PI-G2252B), a strain selected by the California Plant Materials Center, did not perform well. It had been placed into the commercial trade several years ago, but was dropped due to difficulty in seed production.

The evaluation of 120 introductions of tall oatgrass, Arrhenatherum elatius, and 38 Dactylis glomerata introductions was completed in 1986, with selections being made in 1987 for further testing and small scale seed increase. These two grasses are being evaluated as potential forage plants in the region, for use on shallow, droughty, low-fertility hillside pastures.

PI-168939, Quercus acutissima, was released in March 1986 as 'Gobbler' sawtooth oak for wildlife food purposes and mitigation plantings on surface-mined lands. It is a small-fruited strain of sawtooth oak (150 acorns per pound), that has wildlife potential in the eastern United States. A number of wildlife agencies are interested in it because of its early acorn production, beginning at 6-8 years of age. PI-325489 kura clover, Trifolium ambiguum, will be released in 1988 as a pasture legume. Its strongly rhizomatous character helps to keep it in pastures with grasses. The plant appears to have a wide tolerance to soil drainage conditions and to be adapted to diverse climatic conditions across the United States. It originated from the Caucasus Region of the Soviet Union. About five acres have been established at Quicksand over the past couple years for breeder and foundation seed production.

Commercial production for 'Appalow' *sericea lespedeza*, Lespedeza cuneata, (PI-286452), which was released in 1978, is starting to accelerate. In 1986, 20,000 pounds of certified seed were produced. 'Appalow' *sericea lespedeza* is a dense, low-growing, low-maintenance ground cover used to prevent erosion and stabilize soil on roadbanks, surface-mined land, logging roads, and other disturbed sites. In recent studies, it has also shown promise as a pasture legume, and can be successfully established by no-till methods on shallow low-fertility hillside pastures. In 1986, 70,000 plants (cuttings, rooted cuttings, whips and potted plants) of 'Bankers' dwarf willow, Salix X cottetii (PI-434285), were produced by about a dozen commercial nurseries. Most of these plants were sold out early in the spring of 1987. 'Bankers' dwarf willow is used for streambank stabilization and reduction of upstream flood damage. The bulk of the plants produced in 1986 were planted in upper reaches of the Potomac River Watershed in Virginia and West Virginia, to vegetate restabilized streambank areas which had sustained much flooding damage in the fall of 1985. 'Bankers' willow had been released in 1983.

Publications: 1

Cultivar releases: 1

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Accession user: Coffeetown Plant Materials Center

Address: Route 3, Box 215-A, Coffeetown, Mississippi 38922

Nature of research: Development of conservation plants for MLRA's 118, 131, and 133-135.

Progress to date: PI-163453, Glycine soja, 'Quail Haven', is in foundation quality seed production status at the Coffeetown Plant Materials Center. Commercial production of seed was in short supply and demand was good.

PI-220584, Calamagrostis pseudophragmites, is in an increase and field testing status. It showed good potential for use on an overland flow sewage treatment situation near Alma, Arkansas. Fertilizer requirement trials continued at the Coffeetown PMC.

Publications: 1

Cultivar releases: 1

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Accession user: East Texas Plant Materials Center

Address: Agriculture Building, SFASU  
P.O. Box 13000, SFA Station  
Nacogdoches, Texas 75962

Nature of research: Development of conservation plants for east Texas.

Progress to date: The Center was moved this past year so several plantings have been abandoned at the old location. The only materials that are plant introductions are in our miscellaneous block for adaptability and observation purposes. These include Pennisetum orientale 'Cowboy' and P. flaccidum (PI-220606 and 9042664); Paspalum nicorae, (PI-404860 and PI-310131); Paspalum notatum, 'Argentine' and 'Paraguay'; Bothriochloa ischaemum - 'King Ranch', 'Ganada'; Dichanthium spp. 'T-587'; Panicum coloratum, 'Selection-75' and 'Verde'; Lespedeza serpens, (PI-297385); L. stipulacea, (9002016); L. capitata, (9004336); L. bicolor, 'Natob' (9017522) Clitoria ternata, (PI-283234, PI-283233 and PI-213498); Alysicarpus vaginalis, 9038315.

Publications: None

Cultivar releases: None

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Accession user: Knox City Plant Materials Center

Address: Route 1, Box 155, Knox City, Texas 79529-9752

Nature of research: Development of conservation plants for MLRA's 42, 77, 78, 80-87, 112, 118, 119, 133B, 150A, and 150B of Texas and Oklahoma.

Progress to date: Several accessions of Pinus eldarica, Pinus sylvestris, and Pinus nigra are being evaluated at Knox City and four off-Center sites for use in windbreaks. Evaluations will continue for 4-5 more years before any selections are made.

PI-469254, Eragrostis superba, is still being evaluated and may be released for range, pasture, and critical area plantings. There are several field plantings of PI-469254 in Texas as well as an initial evaluation at Knox City comparing PI-469254 with 'Palar' and a variety commercially available in Texas.

Two accessions of Pennisetum flaccidum, 9042664 from North Carolina and PI-315868 from Los Lunas, are being evaluated for adaptation at Knox City.

Twenty-four accessions of Thuja orientalis are being evaluated at Knox City in cooperation with the Manhattan PMC.

Publications 1

Cultivar release: 1

\*\*\*\*\*

Accession user: South Texas Plant Materials Center

Address: Caesar Kleberg Wildlife Research Institute  
Texas A&I University  
P.O. Box 218  
Kingsville, Texas 78363-8202

Nature of research: Development of wildlife, pasture and rangeland plants for southern Texas.

Progress to date: Major grasses and legumes of foreign origin are being evaluated for adaptation purposes. No selections have been made. In addition, common buffelgrass (Cenchrus ciliaris), Wilman lovegrass (Eragrostis superba), and 'Selection-75' kleingrass (Panicum coloratum) have been planted to act as base grass for interseeding different cool and warm season forbs and legumes this fall.

In the spring of 1987, a major assembly of Panicum maximum was planted that included 13 accessions of local origin and 41 of foreign origin. They are to be evaluated for pasture improvement.

Approximately 40 accessions of buffelgrass (Cenchrus ciliaris) were planted in 1983 as a cooperative study with ARS (Dr. E. C. Bashaw). These are still being evaluated.

'Corto,' australian saltbush Atriplex semibaccata and Atriplex glauca are still being evaluated for adaptation.

Other materials of foreign origin being evaluated include: Three Sesbania species (S. acculaeata, S. aegyptica, S. grandiflora); one accession each of Digitaria decumbens Natalgrass - Rhynchelytrum repens, 'Catalina' boer lovegrass, and 'Palar' wilman lovegrass; and three accessions of Paspalum nicorae PI-490363, PI-496364, and PI-310131.

Publications: 1

Cultivar releases: 0

\*\*\*\*\*

Accession user: Hawaii Plant Materials Center

Address: P.O. Box 236, Hoolehua, Hawaii 96729

Nature of research: No report received.

\*\*\*\*\*

Assession user: Texas Plant Materials Program - Field Evaluations

Address: 101 South Main  
Temple, Texas 76501-7682

Nature of research: Development of conservation plants for the 24 MLRAs represented in Texas

Progress to date: Several introduced species are in the final stages of field evaluations: Eragrostis superba, (PI-469254); Wilman lovegrass along with the only released variety 'Palar' are being compared in 14 field plantings representing 10 MLRAs. We have extended the E. superba area of adaptation into the sandy textured soils of north central portions of Texas.

Eragrostis lehmanniana x E. trichophora, (PI-276033), 'Cochise' lovegrass is being field evaluated in 8 field planting locations representing 4 MLRAs in Texas. It appears that it will be approved for use in Texas.

Pennisetum orientale (9042665) 'Cowboy' (commonly called laurisagrass in Texas) has shown potential adaptation. Several centers throughout Southern U.S. are looking at this cultivar and a release from North Carolina, Pennisetum flaccidum (PI-220606).

Field planting of Bothriochloa ischaemum var ischaemum 'Spar' is a major evaluation thrust in the state. 'Plains', 'Ganada' and 'King Ranch' have already been accepted for certain ranges of adaptability but the newer Spar is being tested to ascertain its range.

Several lespedezas and one indigo are being field tested on a limited basis, L. cuneata, 'Appalow' L. virgata 'Ambro' and Indigofera pseudotinctoria (PI-198015) have been planted at approximately 5 locations in eastern Texas but none have shown a great deal of promise. We did gain an excellent stand of false anil indigo at the East Texas Plant Materials Center.

Publication: 1

Cultivar releases: 0

\*\*\*\*\*

SOUTHERN REGIONAL PLANT INTRODUCTION STATION  
Report to S-9 Technical Committee  
July 21-22, 1987

This report covers the primary activities of this plant introduction station for the period of July 1, 1986 through June 30, 1987.

### Plant Introduction

Germplasm of 2,143 new Plant Introductions (PI's) were added to the S-9 Project plant germplasm collections. This total included 33 genera and 102 species from 58 countries. The crop groups received were sorghum, peanuts, eggplant, sesame, and forage grasses. The total collection is 55,521 PI's and is composed of 259 genera and 1,127 species from 170 countries.

### Seed Distribution

A total of 35,612 seed samples were shipped in all categories of distribution. In direct response to 409 requests 19,860 seed packets were shipped within the S-9 Region, 3,266 to the other three regions (NC-7, NE-9, and W-6) and 3,907 to 36 foreign countries. Shipments in other categories of distribution were: 688 PI's sent to the National Seed Storage Laboratory (NSSL) for long-term storage; 3,227 to the other three regions for consolidation of genus collections; 1,221 cultivar samples for the Forage Legume Variety Field Trials.

### Seed Increase

A total of 4,628 PI's are included in the 1987 increase plantings. The major crop groups involved are sorghum, cowpeas, peanuts, sesame, peppers, squash, and melons. The P.I. Station is increasing 1,198 new and old PI's which include 30 genera and 78 species from 82 countries. Cooperators in several states (Alabama, Florida, Oklahoma, and Texas) are increasing 1,730 PI's of melons, peanuts, and tropical forage legumes. The Tropical Agriculture Research Station (TARS) at Mayaguez, P.R. increased and evaluated 1,500 PI's of Ethiopian Sorghums in two plantings during the Fall of 1986 and the Winter-Spring period of 1987. TARS also increased at the St. Croix station 200 sorghum and pearl millet introductions.

### PI Station Staffing 1/

Major staff changes have occurred in 1986-87:

Dr. Robert Jarret, Research Horticulturist, was hired July, 1986 to fill the new position of Sweet Potato Curator. He in turn hired a lab technician.

Dr. Graves Gillaspie, Research Virologist, transferred from Beltsville Agricultural Research Center to assume positions of the ARS Location Coordinator and Department Head of the Plant Introduction Department at the Georgia Experiment Station at Experiment. Dr. Gillaspie will be Research Leader and also carry out a pathology research program. He has hired two

1/ Appendix III Staffing Chart

technicians. The field technician was hired in May 1987 and a lab technician was selected and will begin work August 2, 1987.

Two headhouse/laboratory structures have been extensively modified and equipped to accommodate the Virology/Pathology research and the Sweet Potato Repository. The last electrical and plumbing modifications are being completed now. By early August, 1987 these labs will be declared as "operational".

Dr. Roy Pittman, category IV, Peanut Curator, is being transferred from the ARS peanut improvement project, Stillwater, Oklahoma. He will assume duties as Curator of the peanut germplasm on August 2, 1987. It is planned that the collection of "wild peanuts" (species other than Arachis hypogaea), which is maintained as clonal material in in pots in greenhouses, will in time be transferred for maintenance at Experiment. On a practical basis this transfer will not take place until 1990. Greenhouse construction will be required to maintain the vegetative peanut collection.

An Administrative Technician (ARS) position is in the final selection process and this new position will also be in place August 2, 1987.

The Georgia Experiment Station position that manages the seed storage facilities (receiving, inventorying, and distributing germplasm) was vacated through resignation. To ease budget limitations in the S-9 Project this position will be filled through an ARS hire. Person filling this vacancy should be hired by October-November, 1987.

APPENDIX I

Southern Regional Plant Introduction Station Budget

| <u>Source of Funds</u>              | <u>FY-87</u>     | <u>FY-88</u>     |
|-------------------------------------|------------------|------------------|
| Regional Research Funds (Pooled)    | \$136,774        | \$140,458        |
| RRF (Committee of Nine Allocations) | ?                | ?                |
| TOTAL                               | <u>\$136,774</u> | <u>\$140,458</u> |

Expenditures

|                       |                  |                  |
|-----------------------|------------------|------------------|
| Personal Services     | 117,796          | 103,993          |
| Travel                | 500              | 500              |
| Supplies & Operations | 16,478           | 33,965           |
| Equipment             | 2,000            | 2,000            |
| TOTAL                 | <u>\$136,774</u> | <u>\$140,458</u> |

Source of Funds

|                                     |                  |                  |
|-------------------------------------|------------------|------------------|
| ARS Base (recurring Funds)          | \$776,006        | \$782,706        |
| Special Allocations (Non-Recurring) | -0-              | ?                |
| TOTAL                               | <u>\$776,006</u> | <u>\$782,706</u> |

Expenditures

|                                       |                  |                         |
|---------------------------------------|------------------|-------------------------|
| Personal Services                     | \$274,200        | \$376,636 <sup>1/</sup> |
| Travel                                | 27,000           | 30,000                  |
| Construction & Repairs                | 80,000           | 30,000                  |
| Supplies & Materials                  | 97,849           | 148,755                 |
| Support Equipment                     | 68,500           | 53,500                  |
| Vehicle Operations                    | 4,000            | 4,000                   |
| Extramural Services (Curators, RSA's) | 211,815          | 139,815                 |
| Plant Explorations                    | 12,642           | -0-                     |
| TOTAL                                 | <u>\$776,006</u> | <u>\$782,706</u>        |

<sup>1/</sup>

This FY87 projection includes salaries for two Technician vacancies.

## Appendix II Plant Explorations

### A. Proposals Received for FY 88 Funding

1. Trifolium spp. (clovers); collection sites primarily in the Dinaric Alps of Yugoslavia; August of 1988; two of the following three scientists, Dr. R.R. Smith, ARS, Dr. N.L. Taylor, University of Kentucky; Dr. R.M. Rumbaugh, ARS.

Cost: \$9,618.00

Objective: Biotypes of perennial Trifolium species potentially adapted to the U.S. or species useful for interspecific hybridization with T. pratense and T. repens. The final goal is to extend the range of adaptation of the clovers in the U.S..

2. Gossypium spp. (cotton); collection sites in Brazil; August 17-September 15, 1988; Edward Percival, ARS and Dr. James MacD. Stewart University of Arkansas.

Cost: \$10,758.00

Objectives: Whereas Mexico or Central America is considered to be the center of diversity for G. hirsutum, Brazil is probably the center of diversity for tetraploid Gossypiums. The proposed area for collection is further justified in that the boll weevil is moving into Brazil and the dooryard cottons may be destroyed as a control measure.

## S - 9 TECHNICAL COMMITTEE REPORT

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

Submitted by: R. J. Knight

Address: 13601 Old Cutler Road, Miami, Florida 33158-1399

Page 1 of 5

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 33158-1399.

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

Progress to Date:

E. J. Garvey left his position as Germplasm Curator at this station in November, 1986. He is being replaced by Dr. R. J. Schnell, employed until recently by the Hawaiian Sugar Planters as a geneticist, who began his duties at Miami on July 20, 1987.

This station maintains as live plants 5,665 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 (3,298 accessions) is held at Miami.

Between June 1, 1986 and May 31, 1987, 282 new introductions were received at Miami (table I). Ornamental and fruit crops together represented over 64% of all accessions, and cacao (Theobroma cacao) was next in importance, comprising well over 20% (table I). The 66 new accessions will be indexed and found to be free of Cacao Swollen Shoot Virus before sending them on to plant at Mayaguez. During this reporting period, 1,695 distributions left the station (table II). A little under half (46.3%) went to people involved in research, education and public service or private industry in the United States (table III), with only 31.8% going to users in Florida, less than in previous years. Foreign public institutions and private individuals received 22.5 and 18.6%, respectively, of all material distributed, while other stations of the Agricultural Research Service of USDA received 5.7%, USAID received 5.3%, and international crops research centers received 3.7% of the total (table IV).

Cooperative work with Puerto Rico has continued, directed toward establishing a cacao seed garden there from which elite lines are expected to be made available in order to promote the industry's development in the Caribbean Basin. Seedlings of EET 400 rootstocks germinated at Miami were sent to Mayaguez, there to be grafted with the desired parental clones. During this period the total of 290 distributions of cacao that went from Miami were distributed to users in Papua New Guinea, Malaysia, the Caribbean, and South America. Distribution of limited numbers of cacao pods, for educational purposes, continued within the United States.

A shipment of 230 clones of sugar cane and related grasses went from here to Brazil in early 1987. Chemurgic and spice crops continued to attract interest: all seed of neem (Azadirachta indica) produced in 1986 was distributed, but demand was not satisfied because of a short crop. The new crop promises to be more abundant.

Genuine progress in facilities improvement continues. In 1986 the new greenhouse (3200 square feet) was completed and put into use. It has enhanced the rate of success in propagating trees for the Clonal Repository under sanitary, relatively disease-free conditions. At the close of the reporting period plans were well advanced to clear 40 acres of weed trees (Casuarina sp.) from the station, making it possible to consolidate clonal repository and germplasm evaluation plots. A head house for the new greenhouse that will incorporate tissue culture and plant shipping facilities is in the final stage of planning at this writing. It is much needed. Fruit germplasm repositories here have good representation of cultivated forms of the major crops for which we are responsible, but related cultivated and wild species are sadly lacking, particularly mango (Mangifera indica) relatives. Explorations to collect and establish this material, which is known still to exist at present, are needed.

Among fruit clones added this year is a carambola from Hawaii, DR11T1, that is to be named Kary. This was given to us for testing by Dr. R. A. Hamilton, and is kept here under station accession number M-31717. Fruit of Kary is low in oxalic acid, high in sugar content, and is considered by people familiar with the fruit to be superior in eating quality to any grown commercially. Its seed parent, Sri Kembangan (M-25962) came to Miami from Dr. Hamilton 8 years ago. Recent carambola introductions from elsewhere that may be of commercial potential are Hew 1 (M-25129) from Singapore and B-10 (M-26763) from Malaysia. Carambola has taken off as a successful new crop in the last 5 years. The most successful Florida cultivar currently is Arkin (M-25157), grown from a seed collected in Malaysia in 1973.

Hybrid annonas (Annona cherimola x A. squamosa), called atemoyas, are also increasing in commercial importance. The most successful of these to date is Gefner (M-21324), introduced from Israel in 1970.

Tetraploid temperate zone passion fruit seedlings continue to show marked differences in productivity directly related to the pollen parent. Most are strongly self-incompatible. We plan to work with cooperators in North Carolina and northern Florida to evaluate winter hardiness in this group.

To avoid the relative inflexibilities tied to tetraploid inheritance, we started back-crossing improved forms of purple and yellow passion fruit on a diploid pollen-sterile hybrid between cold tolerant Passiflora incarnata from Maryland and P.I. 424814, a wild purple passion fruit (P. edulis) from Brazil. The seedlings started from this work will be evaluated for cold tolerance, degree of pollen and seed fertility, and fruit quality.

M-26396, an avocado seedling of Brooksville (M-18686) open-pollinated, continues to bear fruit of outstanding quality, much superior to that of the seed parent. This selection is one of a group currently undergoing cooperative testing for cold tolerance in southern Texas.

#### Publications:

Knight, R. J., Jr. 1983. Tropical fruits of Asia with potential for expanded production. Trop. Region Amer. Soc. Hort. Sci. 27A: 71-93.

Knight, R. J., Jr. 1986. Allopolyploid passion fruit hybrids for the temperate zone. HortScience 21(3): 695. [Abstract]

King, J. R. and R. J. Knight. 1987. Occurrence and assay of estragole in the leaves of various avocado cultivars. J. Agr. and Food Chem. 35(5). [In press.]

Kushad, M. M., G. Yelenoski and R. J. Knight. 1986. Changes in avocado polyamines and polyamine synthesizing enzymes in relation to the ethylene biosynthetic pathway. Supplement to Plant Phys. 80: 95. [Abstract]

Kushad, M. M., G. Yelenoski and R. J. Knight. 1987. Changes in avocado polyamines and their biosynthetic enzymes in relation to the ethylene biosynthetic pathway. Plant Phys. 81. [In press.]

Table I. Germplasm Receipts at USDA/ARS, Miami, Florida from  
June 1, 1986 through May 31, 1987

| <u>Material</u>  | <u>Introductions received</u> |             |
|--|-------------------------------|-------------|
|  | <u>No.</u>                    | <u>%</u>    |
| Miscellaneous Ornamentals and Shade Trees (includes orchids and Ferns) | 91                            | 32.3        |
| Tropical and Subtropical Fruits  | 90                            | 31.9        |
| Cacao  | 66                            | 23.4        |
| Coffee   | 2                             | 0.7         |
| Medicinal, Chemurgic, Tropical Vegetables <sup>z/</sup>                | <u>33</u>                     | <u>11.7</u> |
|  | Total: 282                    | 100.0       |

z/ Includes edible palms, spices, industrial crops.

Table II. Germplasm Distributions from USDA/ARS, Miami, Florida from June 1, 1986 through May 31, 1987

| <u>Material</u>  | <u>Distributions</u> |             |
|--|----------------------|-------------|
|  | <u>No.</u>           | <u>%</u>    |
| Miscellaneous Ornamentals and Shade Trees (includes Orchids and Ferns) | 447                  | 26.4        |
| Tropical and Subtropical Fruits  | 613                  | 36.2        |
| Cacao  | 290                  | 17.1        |
| Coffee   | 11                   | 0.6         |
| Medicinal, Chemurgic, Spices and others <sup>y/</sup>                  | <u>334</u>           | <u>19.7</u> |
|  | Total: 1695          | 100.0       |

y/ Includes edible palms, nuts, rubber, sugarcane, tropical vegetables, industrial crops.

Table III. Distributions of Plant Introductions from USDA/ARS, Miami, Florida from June 1, 1986 through May 31, 1987

| <u>Destination</u>                          | <u>Plants sent to each destination</u> |               |
|---|--|---------------|
|   | <u>No.</u>                             | <u>%</u>      |
| Florida                                     | 540                                    | 31.8          |
| California                                  | 34                                     | 2.0           |
| Rest of Continental U.S., Hawaii and Canada | 211                                    | 12.5          |
| Caribbean Region <sup>z/</sup>              | 135                                    | 8.0           |
| Mexico, Central America and Panama          | 120                                    | 7.1           |
| South America                               | 307                                    | 18.1          |
| Europe                                      | 43                                     | 2.5           |
| Asia  | 149                                    | 8.8           |
| Africa                                      | 36                                     | 2.1           |
| Pacific Basin <sup>y/</sup>                 | 120                                    | 7.1           |
| <b>Total:</b>                               | <b>1695</b>                            | <b>100.00</b> |

z/ Includes Puerto Rico and The Virgin Islands

y/ Includes Australia, Malaysia, Guam, New Zealand, Papua New Guinea, Philippines, other Pacific Islands.

Table IV. Distributions of Plant Introductions by Type of User from USDA/ARS, Miami, Florida, June 1, 1986 through May 31, 1987.

|         | <u>Total</u> | <u>USP</u> | <u>UXT</u> | <u>ARS</u> | <u>AID</u> | <u>FPR</u> | <u>FPU</u> | <u>ICT</u> <sup>x/</sup> |
|---------|--------------|------------|------------|------------|------------|------------|------------|--------------------------|
| Number  | 1695         | 359        | 390        | 97         | 90         | 316        | 381        | 62                       |
| Percent | 100.0        | 21.2       | 23.0       | 5.7        | 5.3        | 18.6       | 22.5       | 3.7                      |

x/ 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 research or education. ICT—International Centers such as CIMMYT (Mexico), CATIE (Costa Rica), et al.

1987

S-9 TECHNICAL COMMITTEE REPORT

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

\*\*\*\*\*

Accession Users: F. Vázquez and P. Hepperly  
Address: Tropical Agriculture Research Station, P.O. Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Evaluation of tropical plant germplasm.  
Progress to Date: Yam Collection (Dioscorea alata, D.  
esculenta, D. bulbifera, D. trifida and D. rotundata

The yam collection (5 species, 18 varieties) was evaluated at two different locations for horticultural characteristics and disease reaction. Anthracnose and scorch were the major foliar diseases of D. alata locally. Virus was the major foliar disease of the other species. "Gunung" was the highest yielding and the more anthracnose resistant cultivar in D. alata. The "Doli" variety had the highest yield in D. esculenta. Variable anthracnose reactions over varieties and locations suggest races are present locally. Anthracnose is caused by Colletotrichum gloeosporioides and the etiology of scorch is still unknown.

Publications: None.

Accession Users: F. Vázquez and P. Hepperly  
Address: Tropical Agriculture Research Station, P.O. Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Evaluation of tropical plant germplasm.  
Progress to Date: Five promising passion fruit hybrids from Miami and some exotic inbreds from Australia were evaluated for local adaptation, disease reaction, and yields. The major foliar diseases appeared to be Septoria, Anthracnose, virus, and scab. The exotic inbreds all died in the first season due to Phome canker. The hybrids introduced from Miami died after a second year pruning. Short duration of local passion fruit suggests a need for greater disease control and improved management.

Publications: None

Germplasm Collections:

Fruit trees, vines, and shrubs - Over 518 accessions of 407 species of tropical and subtropical fruits and nuts, ornamental shrubs, and trees are maintained at the TARS grounds. Only 142 of these accessions have their PI numbers.

Dioscorea spp. - Eleven selections of Dioscorea alata, 5 selections of D. esculenta, and 1 of D. bulbifera have been grown in replicated plots in two different locations (Mayaguez and Isabela) for evaluation. Requests for plant material were processed during the months of February and March, 1987.

Musa spp. - Forty four (44) banana and 24 plantain selections are maintained at TARS for evaluation and distribution.

Legume seed - Seeds of various species of legumes are available in small amounts for distribution.

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

Theobroma cacao - In cooperation with the American Cocoa Research Institute (ACRI), TARS maintains a disease-free collection of selected cacao clones which serve as a permanent source of budwood for worldwide distribution. The collection consists of 372 clones with three mature plants representing each clone. The cacao collection provides plant material for continued breeding research, serving also as a source of moderate or large-scale distributions to scientists, cacao breeders, and institutions in U.S. and throughout the world. New clones are added to the collection once these are grafted and achieve the proper size for transplanting.

TARS, in cooperation with the American Cocoa Research Institute (ACRI) is providing technical support to the Agricultural Experiment Station of the University of Puerto Rico in a newly created program of cacao hybrid seed production. Grafted trees of 8 selected clones have been provided to the Agricultural Experiment Station.

Cuphea spp. - Seeds of 3 cultivars were received from the Plant Introduction Station, Ames, Iowa. Seed harvested was returned to Ames for evaluation on seed quality and dormancy.

Plant Introductions:

Xanthosoma spp. - A breeding program on taniens (Xanthosoma spp.) was begun in TARS during the present year. A collection of 69 varieties was introduced from the Tropical Research and Education Center, Homestead, Florida.

Glycine max (L.) Merr. - Fifteen (15) lines of soybeans were introduced from the University of Florida to be evaluated in Puerto Rico. These were planted in replicated plots in three different locations, and will be evaluated for disease reaction, yielding and other agronomic characteristics.

Vitis vinifera L. - Two varieties of table grapes (Ribier and Cardinal) have been planted at the Isabela Experiment Farm for evaluation for fruit quality, disease resistance, and other agronomic characteristics.

Germplasm Distribution:

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

| <u>Germplasm</u>                              | <u>Packets</u> | <u>No.<br/>of Persons</u> | <u>Countries</u> |
|---|----------------|---------------------------|------------------|
| Vegetable seeds                               | 86             | 34                        | 20               |
| Tubers, yams, leaves<br>stems, cuttings, etc. | 329            | 41                        | 15               |
| Seedlings, fruits and<br>nuts                 | 23             | 4                         | 1                |
| Dried leaves and stems                        | 1              | 1                         | 1                |
| Cacao budwood                                 | 37             | 4                         | 2                |
| Cacao pods                                    | 193            | 3                         | 1                |
| Cacao seeds                                   | 17             | 5                         | 3                |
| Other seeds                                   | 512            | 10                        | 6                |

Accession User: K. D. Ritchey and R. Goenaga  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Screening sorghum for acid soil tolerance.  
Progress to Date: Sorghum lines, populations and varieties are  
being evaluated for tolerance to aluminum toxicity in  
soil and solution culture in the laboratory.  
Complementary studies are being conducted in the  
field in a high Al Ultisol.  
Publications: None.

Accession User: G. F. Freytag  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Tropical bean germplasm and genetic stocks.  
Progress to Date: We have obtained 47 new accessions of bean  
species germplasm through the collaborative efforts  
of two field collectors. These collectors are Dr.  
Daniel G. Debouck working out of CIAT, Cali,  
Colombia; and Russ Buhrow who is at the University of  
Arizona, Tucson. These collections have been planted  
at Mayaguez for study and for seed increase, and  
represent some 27 taxa not present in our collections  
before.

Accession User: G. F. Freytag  
Address: Tropical Agriculture Research Station, P.O. Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Release of bean germplasm lines.  
Progress to Date: We now have several breeding lines from our  
long-term breeding program for high protein which  
have been selected for release. These lines show  
transgressive segregation for both yield and high  
protein which demonstrate that the separate gene sets  
controlling these factors can be successfully  
selected concurrently. The 6 parental lines tested  
at 2 locations in Puerto Rico and at both summer and  
winter seasons produced an average of 734 kg/ha with  
an average of 25% total seed protein content while in  
the same field trials the selected best lines  
produced an average of 1232 kg/ha with an average of  
27.8% total protein. The best selected line produced  
1265 kg/ha with an average of 29.2% total protein.  
This means that if these selected lines were used  
under the average production conditions of the  
tropics nearly twice as much food protein could be  
produced per hectare. Analyses and calculations are  
being double checked and release statements are being  
prepared.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Evaluation of grain sorghum lines and  
hybrids for midge resistance.  
Progress to Date: A large group of grain sorghum lines (70)  
and hybrids (60) are being evaluated and studied at  
Isabela, Puerto Rico. Special attention is being  
given to determining midge resistant genotypes.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Agronomic evaluation of forage sorghum and  
Pennisetum americanum x P. purpureum for yield and in  
vitro dry matter digestibility.  
Progress to Date: These genotypes are being evaluated and  
studied at two locations and three cutting intervals.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709  
Nature of Research: Evaluation and improvement of corn (Zea  
mays).  
Progress to Date: Two temperate and two local corn populations  
in comparison with Pioneer Brand Hybrid X304C were  
planted on four planting dates at two locations in  
Puerto Rico. The overall response of the five  
genotypes was higher at Mayaguez as compared to the  
Isabela location. Most traits including grain yield  
showed a quadratic response for planting dates at  
both locations. Pioneer Brand Hybrid X304C produced  
the highest grain yields, 6,059 and 5,302 kg/ha at  
Mayaguez and Isabela, respectively. However, the  
strongest effects of planting dates were the local  
population 'Diente de Caballo' at both locations.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709.  
Nature of Research: Increase and evaluation of the sorghum  
collections.  
Progress to Date: Part of the Ethiopian Collection (1,500  
accessions) was planted, selfed, and classified.  
Most of the selfed seed was returned to the  
Coordinator of the Regional Plant Introduction  
Station.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709.  
Nature of Research: Increase and evaluation for daylength  
sensitivity of the sorghum collection.  
Progress to Date: Part of the Ethiopian Collection (500 items)  
was planted, selfed and classified for daylength  
sensitivity. Most of the selfed seed was returned to  
the Coordinator of the Regional Plant Introduction  
Station.

Accession User: A. Sotomayor-Ríos  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709.  
Nature of Research: Evaluation of sorghum germplasm for yield  
and in vitro dry matter digestibility.  
Progress to Date: A large group of sudangrass and forage  
sorghums have been evaluated for yield, many  
agronomic characteristics and in vitro dry matter  
digestibility (IVDMD). Outstanding hybrids producing  
over 40 tons of green forage per hectare showing  
IVDMD of more than 55% have been obtained.  
Publications: "Potential for and development of forage  
sorghums in Puerto Rico". Proc. 15th Biennial Grain  
Sorghum Research and Utilization Conference, Lubbock,  
Texas. 1987.

Accession User: A. Sotomayor-Rios  
Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709.  
Nature of Research: Response of forage sorghum to cutting  
intervals.  
Progress to Date: The effect of cutting intervals on the  
agronomic performance of a sorghum-sudan and  
sorghum-sorghum hybrid which are presently being  
utilized in many tropical and subtropical areas was  
determined. In general the dry forage and crude  
protein yield increased with increased cutting  
intervals. The mean dry matter content of both  
genotypes increased as cutting interval increased,  
while crude protein content diminished as cutting  
interval increased. The in vitro dry matter  
digestibility diminished as cutting interval  
increased. Both hybrids performed up to  
expectations, verifying their potential for forage  
production in the tropics.  
Publications: "Response of forage sorghum to cutting intervals  
in Puerto Rico". Abstract. Ann. Meeting, Carib.  
Food Crops Soc., St. Lucia. 1986.

Accession User: A. Sotomayor-Ríos

Address: Tropical Agriculture Research Station, Box 70,  
Mayaguez, Puerto Rico 00709.

Nature of Research: Evaluation on the effect of photoperiod on  
yield and agronomic characteristics of tropical  
forage sorghums.

Progress to Date: The agronomic performance of a photoperiod  
insensitive sudangrass, a photoperiod sensitive local  
forage sorghum and their F<sub>1</sub> hybrids with  
male-sterile line ATx623 was determined. The F<sub>1</sub>  
hybrids and their male parents were planted monthly  
during two years. During the two years, the  
photoperiod insensitive genotypes had nearly constant  
dry forage yield (3-4 t/ha). At both years and  
during long days, photoperiod sensitive genotypes  
produced highest yields (over 7 t/ha). The excellent  
yields of photoperiod sensitive genotypes during long  
days, make them valuable materials for intensively  
managed tropical sorghum.

Publication: "Response of forage sorghum to tropical photo-  
period during two years in Puerto Rico". Abstract.  
Amer. Soc. of Agron., Ann. Meeting, New Orleans,  
Louisiana. December, 1986.