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

Clemson University
Clemson, South Carolina

August 8-9, 1980

Respectfully submitted,

James S. Kirby
Secretary, S-9 Technical Committee

Agenda
S-9 Regional Technical Committee
Clemson University
Clemson, SC
August 8-9, 1980

1. Call to order, 8:00 AM August 8, 1980

2. Introduction of attendees

3. Official Welcome: Dr. L. P. Anderson, Dean, College of Agricultural Sciences

4. Approval of minutes, 1979 meeting

5. Approval of agenda, 1980 meeting

6. Appointment of committees:

   A. Nominations
   B. Time and Place of Next Meeting
   C. Resolutions

7. State Progress Reports and Research Plans

8. Remarks from Administrative Advisors: Dr. C. R. Jackson, Dr. D. E. Zimmer

9. Report from National Program Staff: Dr. Q. Jones, Dr. R. J. Miravalle

10. Report from Southern Regional Plant Introduction Station: Gilbert Lovell

10.A. Exploration Proposals

11. Germplasm collections and programs:

   A. Subtropical Horticultural Research Station: Dr. R. J. Knight, Jr.
   B. Soil Conservation Service: Arnold G. Davis, Wayne Everett
   C. Germplasm Resources Laboratory: Dr. A. J. Oakes
   D. Mayaguez Institute of Tropical Agriculture: Dr. George F. Freytag

12. Committee Reports:

   A. Nominations
   B. Time and Place of Next Meeting
   C. Resolutions

13. Unfinished or new business

14. Adjournment

15. Tours, August 9, 1980

   Clemson Horticultural Gardens and P.I. Arboretum
   Wives are invited.

1. CALL TO ORDER

The meeting of the S-9 Technical Committee was called to order by Chairman David W. Bradshaw (South Carolina) at 8:00 AM August 8, 1980, at Clemson University, Clemson, South Carolina.

2. INTRODUCTION OF ATTENDEES

Name	Address	Phone
*David W. Bradshaw	Dept. of Horticulture Clemson University Clemson, SC 29631	(803) 656-3404
Wayne Everett	SCS-PO Box 280 Washington, D. C.	FTS-4475667
*Bill Fike	Crop Science Dept. NCSU Raleigh, N. C. 27650	(919) 737-3267
George F. Freytag	Mayaguez Institute of Tropical Agriculture P. O. Box 70 Mayaguez, Puerto Rico 00708	(809) 832-2435
*Richard A. Hamilton	Horticulture Department University of Hawaii 3190 Maile Way Honolulu, HI 96822	(808) 948-7934
*Carl S. Hoveland	Agronomy & Soils Dept. Auburn University Auburn, Ala. 36849	(205) 826-4100
*Curtis R. Jackson	Georgia Experiment Station Experiment, GA 30212	(404) 228-7263
Quentin Jones	National Program Staff SEA/AR Bldg. 005, Rm. 308 BARC-WEST Beltsville, Md. 20705	(301) 344-3311
*James S. Kirby	Department of Agronomy Oklahoma State University Stillwater, OK 74078	(405) 624-6417

Name	Address	Phone
*Robert J. Knight, Jr.	Subtropical Horticulture Research Station USDA/SEA/Agricultural Research 13601 Old Cutler Road Miami, FL 33158	(305) 238-9321
*A. J. Lewis	Horticulture Department VPI & SU Blacksburg, VA 24601	(703) 961-5019
*Gilbert Lovell	USDA-SEA-AR, P. I. Station Experiment, Ga. 30212	(404) 228-7255
Robert J. Miravalle	USDA-SEA-AR So. Region PPR Staff P. O. Box 53326 New Orleans, La 70153	(504) 589-6339
A. J. Oakes	Germplasm Resources Laboratory USDA BARC-WEST Beltsville, MD 20705	(301) 344-3328
*Gordon M. Prine	University of Florida Agronomy Department 314 Newell Hall Gainesville, FL 32611	(904) 392-1811
*Oscar D. Ramirez	Horticulture Department Agri. Exp. Sta. College of Agriculture University of Puerto Rico Rio Piedras, Puerto Rico	(809) 767-9705
*L. N. Skold	Department of Plant and Soil Science University of Tennessee P. O. Box 1071 Knoxville, TN 37916	(605) 974-7391
*Oliver E. Smith	Soil & Crop Sciences Dept. Texas A&M University College Station, TX 77843	(713) 845-5322
*Richard J. Stadtherr	Horticulture Department 235 Agron-Hort Bldg. Louisiana State University Baton Rouge, LA 70808	(504) 388-2729

*Members of the S-9 Technical Committee.

3. OFFICIAL WELCOME FROM CLEMSON UNIVERSITY

The S-9 Technical Committee members and visitors were welcomed to Clemson University by the Dean of Agriculture, Dr. L. P. Anderson; the Director of the Agricultural Experiment Station, Dr. W. Cecil Godley; and the Head of the Horticulture Department, Dr. T. L. Senn.

4. APPROVAL OF MINUTES

Dr. Larry Skold moved approval of the 1979 meeting minutes as published. The motion was seconded by Gordon Prine and approved.

5. APPROVAL OF AGENDA

The tentative agenda prepared by Chairman Bradshaw was modified by the addition of items 10A, 11C, and 11D and was approved as presented in these minutes.

6. APPOINTMENT OF COMMITTEES

Chairman Bradshaw appointed the following committees:

A. Nominations	Richard Stadtherr, Chairman Carl Hoveland Bob Knight
B. Time and Place of Next Meeting	Dick Hamilton, Chairman Jeff Lewis Gordon Prine
C. Resolutions	Bill Fike, Chairman Jim Kirby George Freytag

7. STATE PROGRESS REPORTS AND RESEARCH PLANS

The following state representatives presented their annual reports (John Bowers could not be present, but had provided the Arkansas report). Copies of the state reports are included in Appendix A.

Representative	State
C. S. Hoveland	Alabama
J. L. Bowers (in absentia)	Arkansas
G. M. Prine	Florida
G. Lovell	Georgia
R. A. Hamilton	Hawaii
R. J. Stadtherr	Louisiana
W. T. Fike	North Carolina
J. S. Kirby	Oklahoma
O. D. Ramirez	Rio Piedras, Puerto Rico
D. W. Bradshaw	South Carolina
L. N. Skold	Tennessee
O. E. Smith	Texas
A. J. Lewis	Virginia

8. REMARKS FROM ADMINISTRATIVE ADVISOR

Dr. Curtis Jackson gave an update on the activities and interests of the Southern Agricultural Experiment Station Directors as related to S-9 interests.

9. REPORT FROM NATIONAL PROGRAM STAFF

Dr. Quentin Jones reported on activities of the National Program Staff with regard to Germplasm. He stated that the "climate" is right in government for support of germplasm. He also gave an update on the exchange of germplasm teams with The People's Republic of China.

Dr. Robert Miravalle visited with the group outlining his interest, activities, and support of the objectives and work of the S-9 project.

10. REPORT FROM SOUTHERN REGION PLANT INTRODUCTION STATION

Gilbert Lovell, Regional Coordinator appointed to replace Dr. W. R. (Bob) Langford who retired in 1979, presented the report from the P. I. Station including the proposed budget for 1981. (included in Appendix A).

10. A. EXPLORATION PROPOSALS

Gilbert Lovell reviewed two proposals for germplasm exploration and collection. These were a domestic exploration for blueberries and a cotton exploration to Australia. Both proposals are included in Appendix B. Larry Skold moved and Bill Fike seconded that both proposals be supported. Motion passed.

Quentin Jones suggested that a priority for support be placed on the two proposals in case both could not be funded. After considerable discussion the cotton proposal received first priority by a majority vote. It was noted that procedures for submitting exploration proposals should be available in State and Federal administrative offices and concern was expressed that these procedures had not been followed by the cotton proposal with particular reference to the time-table to be followed in submitting proposals.

Gilbert Lovell raised a question concerning proper procedures for review of plant exploration proposals. Discussion revealed that a Plant Exploration Committee within the S-9 Technical Committee had reviewed proposals in past years but apparently has been inactive for a few years. Curtis Jackson moved the Plant Exploration Committee be reactivated. Seconded and passed.

11. REPORTS ON GERMPLASM COLLECTIONS AND PROGRAMS AT:

A. Subtropical Horticultural Research Station

Bob Knight presented the report from the Subtropical Horticultural Research Station. The complete report is included in Appendix A.

B. Soil Conservation Service

Wayne Everett presented the SCS report in the absence of Arnold Davis who could not be present. This report is included in Appendix A.

C. Germplasm Resources Laboratory

Dr. A. J. Oakes extended greetings from personnel in the Germplasm Resource Laboratory and reviewed the activities of the lab and personnel. Jack also presented the written report from the Germplasm Resources Laboratory which is included in Appendix A.

D. Mayaguez Institute of Tropical Agriculture

Dr. George Freytag discussed his work at MITA and presented the report included in Appendix A.

12. COMMITTEE REPORTS

A. Nominations - Richard Stadtherr, Chairman of the Nominating committee, reported that his committee wished to nominate Jim Kirby (Oklahoma) as Chairman of the S-9 Technical Committee and A. J. (Jeff) Lewis (Virginia) as Secretary for the 1980-81 term. Larry Skold moved acceptance of these nominations, that nominations be closed, and that Kirby and Lewis be elected by acclamation. Seconded and passed.

B. Time and Place of Next Meeting - Dick Hamilton, Chairman of the committee, moved that the 1981 annual meeting of the S-9 Technical Committee be held at the Northern Regional Research Center at Peoria, Illinois. His committee suggested that the meeting be held near the first week in August but that the executive committee be requested to negotiate the specific dates with NRRC personnel. His report was accepted and approved.

C. Resolutions - Bill Fike, Chairman of the committee, moved acceptance of the following resolutions:

Resolution 1

Be it resolved that the S-9 Technical Committee expresses its

appreciation to Dr. David W. Bradshaw and his associates for making the arrangements for the meeting at Clemson University, providing refreshments, and for giving us a very enlightening tour of the beautiful and extensive Horticultural Gardens.

Resolution 2

Be it resolved that the S-9 Technical Committee expresses its appreciation for the warm welcome to Clemson University and South Carolina Agriculture by Agriculture Dean L. P. Anderson, Agricultural Experiment Station Director W. Cecil Godley, and Horticulture Department Head T. L. Senn. Their interest in regional research as well as in our comfort and needs is greatly appreciated.

Resolution 3

Be it resolved that the S-9 Technical Committee expresses its appreciation to Dr. John Creech, retired Director of the National Arboretum, for his leadership and guidance to early S-9 programs as Head of the New Crops Research Branch and as a leader in ornamental exploration and maintenance.

Resolution 4

Be it resolved that the S-9 Technical Committee welcomes Gilbert Lovell as Regional Coordinator and federal representatives George Freytag and Wayne Everett. May these future associations be beneficial and worthwhile to all of us.

Resolution 5

Be it resolved that the S-9 Technical Committee expresses its appreciation to Mr. Harold Winters, retired Chief of the Germplasm Resources

Laboratory, for his faithful and fruitful service to the Southern Region in the field of vegetable procurement.

Bob Knight moved approval of these resolutions. Seconded and passed.

13. UNFINISHED OR NEW BUSINESS

There was no unfinished business. Chairman Bradshaw asked for comments on the agenda so that future meetings might be improved.

14. ADJOURNMENT

There being no further business, Oliver Smith moved adjournment at 6:45 PM August 8.

15. TOURS, AUGUST 9, 1980

The S-9 group reassembled at 9 AM Saturday, August 9, and was transported to the Clemson Horticultural Gardens and P. I. Arboretum for a very interesting tour which concluded shortly before lunch.

APPENDIX A

STATE AND FEDERAL AGENCY REPORTS

Written progress reports are attached in the following order:

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

National Program Staff
Subtropical Horticulture Research Station
Soil Conservation Service
Germplasm Resources Laboratory
Mayaguez Institute of Tropical Agriculture
National Seed Storage Laboratory
Northern Regional Research Center
Southern Regional Plant Introduction Station

ALA-1

ALABAMA S-9 PLANT INTRODUCTION ACTIVITIES

June 1979 - July 1980

Carl S. Hoveland, Department of Agronomy and Soils
Auburn University, Alabama 36849

Plant introductions ordered in 1979-80 included 145 forage grasses and legumes and one Cucumis.

HORTICULTURAL CROPS

Tomatoes and Peppers (W. H. Greenleaf)

In tomato breeding, F_2BC_1 (backcross 1) and F_2BC_2 populations segregated plants highly resistant to the leaf miner and also to tobacco mosaic virus in greenhouse plants. Soluble solids ranged up to 13% and some plants had very firm fruits. The wild species L. hirsutum f. glabratum P.I. 134417 was used as a source of leaf miner resistance.

In pepper breeding, Capsicum chinense P.I. 1555 is serving as the highly ripe not resistant parent in crosses to transfer this resistance to pimento.

Cantaloupes and Watermelons (J. D. Norton)

Cantaloupe: P.I. 140471 (C. melo) is being used in the development of breeding lines that are resistant to Gummy Stem Blight (Didymella bryoniae) (= Mycosphaerella citrullina), pickle worm (Diaphania nitidalis), and Fusarium wilt Races 1 & 2. P.I.'s of C. metuliferus and C. anguria are being utilized in efforts to make interspecific crosses with C. melo to incorporate resistance to the root knot nematode (Meloidogyne incognita acrita) into breeding lines.

Watermelon: P.I. 271778 and P.I. 189225 (C. lanatus) are being used in the development of breeding lines that are resistant to Gummy Stem Blight in watermelon.

These two P.I.'s and P.I.'s 271775, 299379, 326515 and 203551 are being used in the development of breeding lines that are resistant to Anthracnose (Colletotrichum laginarium) Races 1 & 2.

Plant introductions used in new cultivar development: Cantaloupe -- P.I. 140471 - resistance to Gummy Stem Blight (Mycosphaerella citrullina). New multiple disease resistant cantaloupe varieties, 'Gulfcoast' and 'Chilton', permit the development of a commercial melon industry in the southeastern U.S. and other humid areas. Home gardners may enjoy excellent melons comparable to western grown fruit.

Cowpeas (C. Bruce Williams)

Plant introduction in the genus Vigna are being used to locate desirable root characteristics which affect plant shoot growth (drought tolerance, nematode resistance, root strength, etc.). The objectives of this research are to incorporate desirabile root and shoot characteristics into a more productive cowpea selection. Initial observations of some cowpea lines indicate the ability of the root system to penetrate traffic (plow) pans and tolerate severe drought conditions of the Southeast.

AGRONOMIC CROPS

Tall Fescue (R. L. Haaland)

Tall fescue germplasm of Mediterranean origin has been syntehsized into a new cultivar ('AF-5') that is much more winter productive than 'KY-31' when grown in the Southeast. In central Alabama, winter forage yields of AF-5 have been 2 to 3 times greater than that of KY-31. The winter forage production advantage of AF-5 decreases in north Alabama. AF-5 has more upright leaves than KY-31. Results from small plot tests at 3 locations over a 3 year period in Alabama have shown that AF-5 is more compatible with Red Clover and Ladino Clover than KY-31. AF-5 forms fewer tillers than KY-31 thus allowing ground space for the legumes and the upright leaves of AF-5 provide less shading than KY-31. This new cultivar should provide excellent winter grazing and improved legume stands in tall fescue in the Southeast.

Phalaris (R. L. Haaland and C. S. Hoveland)

A new phalaris cultivar selected from Mediterranean P.I. germplasm is being considered for release as a high quality pasture grass on clay soil.

Trefoil (C. S. Hoveland and R. L. Haaland)

Seed of AT-P birdsfoot trefoil, developed at Auburn from P.I.'s of Mediterranean origin and increased in California, was planted in replicated grazing paddocks with orchardgrass, KY 31 tall fescue, and AF-5 tall fescue at our Tennessee Valley Substation. Steer gains were outstanding the first grazing season, with over 400 lb/acre steer gain and daily gains per steer of 2 lb or more for the season. Trefoil growth was better in the less competitive AF-5 than KY 31 tall fescue. This new semi-prostrate, soloniferous trefoil is expected to be released as a new cultivar if the grazing trial performs well next year.

Annual Legumes (C. S. Hoveland and R. L. Haaland)

A clover selection *Trifolium mutabile* P.I. 269053 from Turkey has performed well for several years in small plot trials in association with rye and ryegrass. It tolerates grazing well and natural reseeding is excellent. *Trifolium pallidum* 247868 also has performed well in small plot trials.

PUBLICATIONS CONCERNING PLANT INTRODUCTIONS

1. Granberry, Darbie M. 1979. Response of progeny from Interspecific cross of Cucumis melo L. x C. metuliferus E. Mey. to Meloidogyne incognita acrita. J. Amer. Soc. Hort. Sci. 105:180-183.

2. Hoveland, C. S., R. L. Haaland, C. C. King, Jr., W. B. Anthony, J. A. McGuire, L. A. Smith, H. W. Grimes, and J. L. Holliman. 1980. Steer performance on AP-2 phalaris and Kentucky 31 tall fescue pasture. Agron. J. 72:375-377.

3. Hoveland, C. S., R. L. Haaland, and R. Rodriguez-Kabana. 1979. Forage production of Phalaris species as affected by nematode populations. Nematropica 9:22-27.

4. Suvanprakorn, Kamolvan. 1980. Inheritance of Resistance to Race 2 Anthracnose (Colletotrichum laginarium) in Watermelon. J. Amer. Soc. Hort. Sci. (Accepted for publication).

S-9 Technical Committee Report
Arkansas Agricultural Experiment Station
Fayetteville, AR 72701
Period of July 1, 1979 to July 1, 1980

The Arkansas Agricultural Experiment Station received from the Regional Plant Introduction Station in the 1979-80 period; four accessions of Capsicum annuum, 46 accessions of Astragalus; nine accessions of Zea Mays and one pound sample of the Tainung I Cultivar of Kenaf for a Delta farmer. The request for the pepper seed came from our pickle processor to determine if we can locate a fruiting type similar to the one the company has been obtaining from Greece and using for a specific type of pack.

Chick Peas - the chick pea accession trial was carried out in the Summer and Fall of 1979 and involved these three planting dates: June 25, July 9 and July 23. We had a complete failure of production from our July 23rd planting. Performance of the entries in the June 25 and July 9 plantings is presented in Table 1.

Table 1. Yields of Shelled Chick Peas Per Acre

Plant Accession	June 25	July 9	Average
P.I. 257583	1036	68	552.0
P.I. 297275	68	329	198.5
P.I. 315784	668	252	460.0
P.I. 315799	891	494	692.5
P.I. 315801	1442	271	356.5
P.I. 315803	532	378	455.0
P.I. 315811	803	407	605.0
P.I. 315813	436	10	223.0
P.I. 315815	1268	39	653.5
P.I. 315818	290	445	367.5
P.I. 315830	-	203	101.5

Nine of the twelve accessions produce higher yields in the June 25th planting than was produced in the July 9th planting. There were only three accessions producing slightly more in the June 25th planting than in the July 9th planting.

The 1980 studies on chick peas is being expanded to included these plant spacings within the row: 1 -; 2 -; 4 and 6 plants per foot as well as planting dates. At the time this report was being prepared we have just completed the seeding of our third planting date.

Spinach - two new disease resistant spinach cultivars: Greenvalley and Ozarka were released in the Spring of 1980 by the Arkansas Agricultural Experiment Stations. These derived their white rust resistance from a U.S.D.A. breeding line and it's sources of resistance goes back to the P.I. 165560 accession. In addition to possessing white rust resistance these new cultivars possess a fair level of resistance to fusarium decline.

Sweet Corn (Dr. J.L. Dale, Department of Plant Pathology: Nine plant introductions of sweet corn inbreds are being tested for their reaction to maize dwarf mosaic and maize chlorotic dwarf virus diseases in a test of numerous inbreds and hybrids at the University of Arkansas Vegetable Substation at Alma.

August, 1980

1980 Florida Report to S-9 Regional Technical Committee

Prepared by G. M. Prine

Scientists from many disciplines in Florida continue to receive and evaluate plant introductions obtained from or through the Southern Regional Plant Introduction Station. Test plantings of various introductions are widely scattered throughout the state. In this report, the investigator and where he is located in the state, will be given along with information about promising introductions.

Dr. Steven G. Pueppke, Plant Pathology Department, Gainesville, reports his work with plant introductions deals entirely with the genus Arachis, primarily A. hypogaea. He states we are systematically examining the germplasm for lines which lack or contain altered peanut lectin, a seed protein with well known carbohydrate-binding properties, but no known natural function. Two methods are being used. In the first, the lectin is purified to homogeneity and analyzed by isoelectric fucusing. We have screened 100 PI's using this method and have identified 3 classes of variants, the biological significance of which is still unclear.

1. PI 197399, 268721, 259611, 259817, 314048.
2. PI 274202, 261904, 234376.
3. PI 223683, 268649, 288152, 288172.

The second procedure relies on rapid screening utilizing an immunological test. About 1000 lines have been examined to date, but no variants have been found.

Dr. Emil Wolfe, Horticulturist, Belle Glade, AREC, states that they still have some early blight and bacterial blight resistant celery lines in their breeding program which have PI Apium graveolens lines in their parentage. One of the lines, PI 196831, which Dr. Pieczarka tested this spring had excellent vigor and good resistance to bacterial and early leaf blight. We made a cross of this line with one of our most resistant commercial type lines to see if we can come up with higher resistance through possibility of cumulation of multiple genes if from different sources.

The one used in previous crosses was PI 171499.

Dr. W. B. Sherman, Fruit Crop Breeder, Gainesville, supplied information that the 'Anna' (P.I. 280400) and 'Dorsett Golden' apple have proven to be reliable under central and north Florida conditions as evidenced by about 1/2 million trees sold in Florida by local nurseryman during the past 8 years. Currently about 100,000 are being propagated annually in Florida.

Seed of a persimmon Disporyous glandulosa from Thialand was obtained and grown in the nursery as a potential rootstock for Japanese persimmons (D. kaki) but the winter killed with 28°F during early winter.

Dr. David A. Knauft, Peanut Breeder, Gainesville, reports that the seven PI's of Arachis hypogaea reported to be resistant to peanut rust, (Puccinia arachidis) have been crossed with susceptible Florida lines. These are currently being increased and advanced to the F_2. They will be tested with help from the team of researchers from Florida in Malawi, Africa, where rust is endemic. Resistant lines with good agronomic characters will be selected.

Overall 275 PI's of Arachis hypogaea were supplied in large (100 seed) quantities for nematode resistance screening. Corely Holbrook is doing his Master's thesis on both field and greenhouse screening of these lines to determine if any nematode resistance exists within this group.

Dr. A. J. Norden, Peanut Breeder, Gainesville, reports no major changes from the progress report made last year concerning the P.I.'s utilizated in breeding for Cercospora disease resistance. His work during the past year with other PI's of Arachis hypogaea L. has been primarily to continue evaluating the projeny of crosses in which they serve as parents. Twenty-nine new introductions of Arachis hypogaea were received in 1980 that will be studied for potential usefulness in the breeding program. Also, a PI received from West Africa in 1973 (PI 383426) with supposedly good tolerance to drought is being evaluated by Dr. L. C. Hammond in comparison with 9 other lines this year.

Dr. D. W. Gorbet, Peanut and Sorghum Breeder, Marianna ARC, reported that fifty-one peanut plant introductions were grown in 1979 to make preliminary evaluations and to increase the seed supply for possible future testing and utilization.

PI 261893, 261906, 262090, 196658, 162539, and segregates from prior crosses with PI 306230, 121067, 203396, and 145681, were utilized in greenhouse crossing for Cercospora and Cercosporidium resistance studies. Selection was continued in segregating populations from crosses with various P.I.'s previously reported. No new material in sorghum was utilized in 1979 or 1980.

Dr. Ron Barnett, Small Grains Breeder, Quincy, AREC reported he is growing and using in crossing a number of P.I. wheat lines. These were included in my breeding program for the following reasons: leaf rust resistance, purple seed character, high protein content, etc.

Dr. L. S. Dunavin, Associate Agronomist, Jay ARC, reports the following:

1. Hemarthria altissima P.I. 349752 is currently the best looking unreleased Hemarthria in trials at ARC, Jay.
2. Arachis benthamii P.I. 338282 yielded 5000 kg/ha of dry matter on 30 June 80 as compared to 3620 for Florigraze (A. glabrata) and 3290 for Arbrook (A. glabrata) in the first harvest following establishment.
3. Pennisetum flaccidum P.I. 220606 and P. orientale P.I. 219610 are in a replicated trial with 'Llano' buffelgrass.

Plant introductions are evaluated at ARC-Fort Lauderdale as part of a turfgrass breeding program. Phil Busey, Assistant Professor of Ornamental Horticulture reports that several Cynodon accessions are very competitive to sedges and bullgrass under low maintenance conditions. PI 291586, a turf type from Rhodesia, has achieved the best coverage in two successive field trials. Stenotaphrum (St. Augustinegrass) introductions have been invaluable as sources of diversity for chinch bug resistance and other characteristics. PI 365032 (Republic of South Africa) has been the best combining introduction in terms of vigor. An exceedingly well adapted Paspalum notatum for irrigation areas is PI 306279; this is a forage type. In a forage trial set up by county agent W. R. Llewellyn, UF-4 Stargrass and 'Callie' bermudagrass performed best. Zoysia japonica PI 42839 was introducted in 1916 from Java. Dr. Busey feels this will be ready for release after a little more evaluation.

Dr. Busey underlines a need for continued and expanded turf collections. Up until now only a few individuals --- W. W. Huffine and W. R. Langford, for example, can be credited for this important work. Of even more importance, the availabe resources in warm season turfgrasses must be maintained vegetatively. Although they maintain about a thousand accessions in pots. He is afraid the collection is vulnerable. Last year, during Hurricane David, he was able to get half the collection moved to a protected area. Ideally, we should have a duplicated collection somewhere else in the South, and with free access to and exchange of materials. Furthermore, the care of living plant materials is not just a question of watering and feeding them, but is a curatorial duty as well. Therefore, he hopes the S-9 committee would consider the problems of genetic resources in some of our minor commodities, such as forages and turf. The underlying problem seems to be communications --- not knowing who's doing what.

Dr. V. E. Green, Jr. Agronomist, Gainesville, reported that although P.I. No. 432510, 432521, and 432523 sunflower, (Helianthus annuus L.) were no more tolerant to Alternaria leaf and stem spot (Alternaria helianthi) or to the sunflower head moth (Homoeosoma electellum Hulst), their abilities to progress well when planted in north Florida in late April after the usual planting season gave the impetus to repeat them in the 1980 screening nursery.

In 1979, the three entries were among the latest in maturity and were among the tallest in the nursery. Since they evolved under droughtly conditions among the Hopi of AR, the Acoma and Pueblo of NM, they might fit under the droughty sandy conditions of north Florida. Their tallness would seemto fit them to silage production under our conditions. Their stalks were among the thickest or all sorts tested. Phytomass production was very high per unit area.

Dr. O. C. Ruelke, Agronomist, Gainesville, reports as follows:

1. An evaluation study of 14 promising Cynodon spp is in progress using 'McCaleb Stargrass' (developed from P. I. 224152) as a standard and including P.I. 255957, & P.I. 224966 from Africa, a selection from Honduras, and other selections and hybrids from plant introductions. From this work P.I. 224566 has just been released as 'Ona' stargrass (Cynodon nlemfuensis Vanderyst var nlemfuensis) and another P.I. 225957, is being considered for release as a new cultivar.

2. Following three years of grazing of 30 genotypes of Hemarthria species, 8 plant introduction lines were selected for further research to determine which could withstand more frequent defoliation than 5 week intervals and, of the highest quality introductions which did not persist, what length of rest period was needed. Diploid Hemarthria introductions persisted better but were of lower quality. Tetraploid introductions were generally higher in quality but could not withstand frequent close grazing.
3. From above Hemarthria spp introductions (selected from 53 introductions), four introductions (P.I. 299993, P.I. 299995, P.I. 34975 and P.I. 364888), were selected to investigate the effect of various defoliation and fertilization treatments on the morphology and physiology as it effects production and persistence.
4. Three Hemathria spp introductions (P.I. 299993, P.I. 299995, and P.I. 299888) are being topseeded with winter clovers to study the possibility of developing a grass legume association. Initial investigations suggest the possibility of allelopathy.

This is probably the last report from Elver M. Hodges, Agronomist, Ona ARC, who is retiring from Ona and taking an assignment with the Florida team in Malawi, Africa. Elver will be missed as he has had a role in developing many of the forage crops grown in Florida. Elver reports: I have approximately 80 accessions of Cynodon many with PI numbers but some with only source names; some are hybrids from Tifton and other sources. We have a nursery of Hemarthria including all that could be obtained in the U.S. We had a severe episode in 1979 with Roundup residue in the block later planted to Hemarthria. We have blocks of a semi prostrate Hemarthria under PI 364869 which came from Gainesville in 1971 and another, more upright type PI 364871. These selected have higher stand density and shorter habit of growth than N. 299995.

Paul Mislevy, Agronomist, Ona ARC, conducted a mob-grazing study over a 3-year period to compare the productivity, quality and persistence of 16 tropical grasses. Results indicate that Puerto Rico stargrass (PR 2341), Cynodon nlemfuensis Vanderyst Var nlemfuensis was superior in yield, forage quality, and persistence when compared with presently released entries.

In vitro organic matter digestion of this numbered introduction was high even after allowing plants 5 weeks for regrowth.

Puerto Rico stargrass (PR 2341) will be expanded in 1980 to study various grazing pressures and grazing cycles.

In another study he is monitoring the HCN-p content of 9 Cynodon species. Preliminary research indicates that UF-5 stargrass (PI 225957) Cynodon aethiopicus Clayton et Harlan contains an average of 20% of the HCN-p content found in Puerto Rico (PR 2341) Cynodon nlemfuensis Vanderyst var nlemfuensis. HCN-p content was monitored on a weekly basis in all grasses by sampling plant tips (tips severed between first and second expanded leaf blade). Both high and low concentrations of HCN in plant tips tended to decrease with time after nitrogen application during the summer, however, HCN-p concentrations decreased much slower during the cool fall season.

HCN-p from all grasses decreased to a low level when grass tips were severed and allowed to dry for hay.

Dr. K. H. Quesenberry, Forage Breeder, Gainesville reports that during 1979-80 an experiment on the effect of four rest intervals between grazing on plant introductions of Hemarthria altissima was initiated. These eight introductions 299993, 299995, 349753, 364884, 364887, 364888, 365509, 367874, were selected from previous experiments as having at least one desirable attribute, i.e. yield, high digestibility, good spring growth etc. Three hectares of P.I. 364888, which had high yield and good persistence under grazing, were established in 1980 for an animal performance experiment. Over 200 accessions of Aeschynomene and over 100 accessions of Desmodium were evaluated in 1979-80. Most of this material was received from CIAT, but those that flowered and produced seed will be submitted to the Southern Region Plant Introduction Station for inclusion in the USDA collection.

Drs. G. O. Mott and W. R. Ocumpaugh Agronomist, Gainesville, have a graduate student working on evaluating over 300 accessions of Leucaena. Most accessions survived the winter of 1979-80.

Dr. G. M. Prine, New Crops and Plant Introductions Specialist, Gainesville, has made available enough planting material of 'Florigraze' rhizoma peanut (Arachis glabrata Benth.), which is probably a chance seedling out of PI 118457, to commercial rhizome growers to plant 60 to 75 acres. Another 40 to 50 acres is expected to be planted the winter of 1980-81.

The F_6 generation of lines from two pigeon pea (Cajanus cajan) crosses obtained from ICRISAT in F_3 are presently in the field. Some 8 or 10 of the best lines are being tested at several areas of the state. These lines are adapted to lower South where they can be planted from mid-June to early-June and growing season terminated in November by a freeze. The seed can then be combined directly from field.

Some eighty PI-numbered accessions of subterranean clover are being evaluated under pasture conditions for reseeding capabilities. 'Woogenellup' subclover has reseeded best of three recommended cultivars, Woogenellup, 'Mt. Barker' and 'Tallarook'.

Arachis benthamii PI 338282 and 'Arbrook' Arachis spp. PI 262817 looks promising among available perennial peanut accessions to follow Florigraze as recommended commercial cultivars.

Collections of late big showy crotalaria (Crotalaria spectabilis) were made over the state of Florida in November of 1978 and 1979. Mass selection in being used to develop a late flowering, high-producing cultivar. Showy crotalaria, Norman pigeon pea and hairy indigo may he useful for nematode suppression as well as nitrogen fixation.

Ten accessions of pigeon pea are being evaluated as forage by harvesting at 25 and 50 cm height. Regrowth is much better at 50 cm cutting height.

Dr. Al Kretschmer, Agronomist, Ft. Pierce ARC, is growing out some 1000 accession of tropical legumes as a seed increase for the Southern Regional Plant Introduction Station. Dr. Kretschmer collected a perennial peanut (Arachis spp.) in Brazil growing in a swamp. This peanut is doing well on flatwoods soils. This peanut produces a excellent seed crop and is a reseeding annual on upland soils in Northern portion of state. Dr. D. E. McCloud and his replacement Dr. Frank P. Gardner are similarly making a seed increase on some 190 accessions of common peanut (Arachis hypogaea).

Dr. John B. Brolmann, Forage Legume Breeder, Ft. Pierce ARC, reports that he has several Stylosanthes selections which were derived from the original Oxley types (PI 401504 & 401505). They are crosses between Oxley-Stylo and S. guyanensis selections. The plants are more vigorous than Oxley, nodulate better and have about the same frost tolerance as Oxley-Stylo.

A very persistant Stylo is S. scabra (PI 358391) which has been grown for 7 years now in the same pangola stand. It will regenerate from seed each year, but also will perenniate if winter is not too severe. It seems that this introduction is able to cross with the native S. hamata. Those interspecific crosses are extremely vigorous. F_4 - generations are being studied now.

Most of his work relates to the native species which carry no PI numbers. This year, he is testing about 100 S. hamata ecotypes in the field. Some have good cold tolerance.

PUBLICATIONS

1. Green, V. E., Jr., J. A. Robertson, B. A. Bailey, G. W. Simone, F. A. Johnson, and W. G. Genung. Oilseed Sunflower Research in Florida--1979. Agronomy Research Report AG-80-4 (Rev), 103 pp. Offset. IFAS, Univ. Fla. Gainesville, 32611. March 1980.

2. Hodges, E. M., P. Mislevy, L. S. Dunavin, O. C. Ruelke and R. L. Stanley, Jr. 1979. 'Ona' A new stargrass variety. Univ. of Fla., IFAS, Agr. Exp. Sta. Circ. S-268. 11p.

3. Sherman, W. B., R. J. Knight and T. M. Lyrene. 1978. Probable apomoxis in 'Anna' a diploid apple cultivar. Hort. Science 13:162.

Georgia Report to S-9 Technical Committee

August 8-9, 1989

The following are reports received from scientists who are utilizing plant introductions in their research and breeding.

I. Turner S. Davis, Georgia Experiment Station, Experiment, GA

Some of the introductions located in field studies near Experiment, Georgia and their condition are as follows:

1) Japanese black pine, Pinus thunbergii (PI 317258) is 20 ft. tall with a 16 ft. spread, has shaggy appearance and an abundance of cones at 11 years.

2) Chinese pistachia, Pistachia chinensis has reached 25 ft. with a 21 ft. spread at 11 years. It has beautiful fall color and a supply of seed which has not germinated well thus far. It appears relatively free of pests.

3) Quercus myrsinaefolia has reached 19 ft. in 11 years with a 20 ft. spread. This is an average evergreen, shrubby in appearance and should make a good tree for screening.

4) China fir, Cunninghamia lanceolata (PI 324969) is up to 26 ft. with a 15 ft. spread after 11 years. Some trees have died back during the winter and sprouted back. When grown in the open, winters in middle Georgia are damaging.

5) China oak, Quercus chenii (PI 102653) has an extremely shaggy appearance and spreading form, with a crown spread as great as its height, 21 ft. after 11 years.

6) Trident red maple, Acer rubrum var. tridens is 20 ft. tall with a crown spread of 12 ft. after 11 years. Growth is fair with foliage not thick enough for excellent shade.

7) Sweet bay magnolia, Magnolia virginiana var. australis (NA 31021) has not had vigorous growth and foliage is somewhat sparse. It has only reached 10 ft. in height with a 5 ft. spread in 11 years.

8) Dawn redwood, Metasequoia glyptostroboides is 24 ft. tall with a 14 ft. spread in 11 years. This tree should make a good specimen for yards and parks.

9) Quercus robur salicifolia (NA-15313-1-s) has reached 23 ft. with a 13 ft. spread in 10 years. This species has an abundance of mildew on the leaves.

10) Japanese birch, Betula platyphylla var. japonica (PI 235128) has reached 22 ft. with a spread of 12 ft. in 8 years. Early growth and appearance was good but its shallow root system has resulted in several falling over during heavy rains and wind, especially in red clay soils. It has an attractive white trunk.

II. Dr. Aubrey C. Mixon, Research Agronomist, USDA-SEA-AR, Tifton, GA

In the peanut project, 7702-20080-001, "Breeding Peanuts for Aflatoxin Resistance", we have utilized peanut introductions as part of the breeding program.

In our 1980 peanut nursery we are increasing 18 peanut introductions with various infection levels to aflatoxin-producing strains of A. flavus in repeated laboratory evaluations. Also, we are currently growing 112 peanut lines that have a peanut introduction as part of their ancestory. These lines are a result of selecting within successive generations from crosses with agronomic adapted genotypes using modification of the pure line procedure. These lines are in various generations of selection. Twenty-seven of these lines are included in a performance test for evaluation of their yield and quality performance.

III. Dr. Ray O. Hammons and W. D. Branch, Crops Research, Tifton, GA (Supervisory Research Geneticist and Research Leader, respectively)

Peanut Plant Introduction: Evaluation and Use in the USDA-Georgia Cooperative Breeding Research Programs at Tifton, GA 1979-80.

Contributing Projects: 7702-20080-004 "Genetic Improvement of Peanuts, Arachis hypogaea L. and GEO-00-0313 "Peanut Genetics, Breeding and Production."

1. Agronomic

Five peanut plant introductions - PI's 274191, 371965, 409036, 414332 and 422241 - were evaluated with adapted cultivars for yield and quality in replicated trials.

Some 1,150 selections from crosses between U.S. adapted cultivar lines and either PI 274191 ('486 GKP') or PI 371965 ('Makulu Red') were evaluted in F_3 progeny performance tests and numerous selections made for further evaluation of yield and other attributes.

Progenies representing the highest yielding F_1 plant in each of the 16 primary crosses for the above population were yield-tested (F_2 in 1978, F_3 in 1979) and their F_2 performances reported at the peanut breeding symposium, Richmond, VA., July 1980.

Four non-nodulating lines were isolated in the F_4 generation from progenies of crosses where PI 341879 ('Tarapoto') or 371965 ('Makulu Red') was one parent. Non-nodulating peanuts are a relatively recent discovery. Our isolates can be used for genetic and physiological-agronomic studies.

2. Evaluation and Preservation

Thirty-three recent peanut PI's from 8 countries were evaluated in 1-replicate nurseries and increased seed returned to SRPIS for short-term storage: PI's 415003; 415687-697; 415835-837; 415870-875; 415876-881; 418225-226; 420196 and 420333-336. Seed of 15 cultivars, 4 breeding lines and 10 elite germplasms were also provided to SRPIS

for preservation. Seed of 13 cultivars, 4 special breeding lines, 9 elite germplams, and 4 Arachis species accessions were sent to the National Seed Storage Laboratory for long-term storage. As part of an international linkage, vegetative material for 34 Arachis species accessions was provided to the International Crops Research Institute for the Semi-Arid Tropics, ICRISAT Center, Patancheru, P.O., Andhra Pradesh, INDIA. Seed samples for 15 cultivars, 4 advanced breeding lines and 10 elite germplasm lines were multiplied at Tifton and sent to the Germplasm Resources Laboratory, Beltsville, MD for use in the foreign germplasm exchange program. Certain of these - PI's 109839, 288160, 337394 and 337409 - are direct selections from plant introductions, while others have PI (e.g., 121070) in their pedigrees.

3. Breeding Peanuts for Disease Resistance

a. Leafspot

'PI 109839' was released in October 1979 as a Cercospora-arachidicola resistant germplasm line and registered in Crop Science with the P.I. number formalized as its name.

In a No Fungicide field nursery 186 F_4 progenies, involving PI's 109839 or 341879 as one parent, were evaluated for naturally-occurring leaf-spotting fungi, and 40 selections made for evaluation in an F_5 field trial.

b. Rust

The 22 USDA PI's most resistant to peanut rust (agent: Puccinia arachidis Speg.) were sent to the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India in 1978 for cooperative evaluation. They were scored for rust reaction in the Post-entry Plant Quarantine and Post-rainy Season field trials where extensive damage occurred to inferior rows and to susceptible cultivars in the tests.

Disease assessments at ICRISAT in 1979 and 1980 (on a 9-point ascending scale) are shown in Table 1[1/], in comparison with our ratings (score 0-4) at Tifton, GA in 1976 and at the Mayaguez Institute of Tropical Agriculture (Isabella) Puerto Rico, in 1977, 1978, and 1979.

Twelve new peanut accessions with resistance to peanut rust were identified in this research: PI's 215696, 390593, 390595, 393516, 393517, 393526, 393527, 393531, 393541, 393643, 393646, and 407454. These are documented in Table 1.

Two other peanuts, PI's 414331-332, bred in Honduras and selected for resistance to both rust and leafspot, were also evaluated and have low scores in our study (Table 1).

The rust resistant accessions described in this report are being distributed to the world peanut breeders through the USDA germplasm office in Beltsville.

[1/] On hand at SRPIS for distribution as requested.

c. Cylindrocladium black rot (CBR).

Two screening methods - one sterile and the other nonsterile - were developed and used for large-scale, relatively rapid evaluation of peanut genotypes for CBR reaction. Using these methods, more than 929 peanut genotypes from the world germplasm pool were evaluated. Some 133 lines showed sufficient resistance to warrant further evaluation. After second and third cycle screening, 12 lines, derived by selection from peanut plant introductions, had resistance greater than the most resistant standard previously identified. The 929 entries including more than 646 different PI accessions are documented in Table 2[2/].

The resistant lines are under seed multiplication at Tifton in 1980 for breeding use. These have already been distributed to the USDA-SEA-AR breeding program at Suffolk, VA for field testing and further research.

4. Inheritance Studies

The inheritance of testa color variegation was investigated in reciprocal crosses between the variegated (red and white) PI 274191 X solid red PI 371965 peanut genotypes. Variegation was controlled by an incompletely dominant locus, designated V.

Thirty peanut PI's, with various white-testa phenotypes, were used as female parents in a natural crossing program to obtain F_1 hybrids for studies of testa color inheritance.

5. Industrial Uses

PI 288160, a white testa genotype, was multiplied for cooperative research at the Oilseed and Food Laboratory, Southern Regional Research Center, AR-SEA-USDA, New Orleans. The good chemical and functional properties of high protien flour made from this peanut led to investigations on wider uses of peanut in the vegetable protien market.

Defatted flour from 288160 has been sent to 6 or 7 industrial food processors and to 2 universities for product research in which peanut protiens were incorporated with sausages, cheeses, and processed meats, milk-like drinks, breads, muffins, breakfast rolls, cookies, and dry soup mixes.

The baked goods seem to be ideal for peanut protien fortification.

A preliminary seed increase is being made in 1980 to afford opportunity for handling the PI 288160 peanut as additional uses are determined.

2/ On hand at SRPIS for distribution as requested.

References

1. Branch, W. D., and Ray O. Hammons. Inheritance of a variegated testa color in peanut. (Abstract). Am. Soc. Agronomy, Agronomy Abstracts, p. 56. June 1979.

2. Branch, W. D., and Ray O. Hammons. Inheritance of testa color variegation in Arachis hypogaea L. (Abstract). Proc. Am. Peanut Res. Educ. Soc. 11(1):54. Nov. 1979.

3. Branch, W. D., and Ray O. Hammons. Inheritance of testa color variegation in peanut. Crop Sci. 19(6): 786-789. Nov.-Dec. 1979.

4. Hammons, Ray O., Grover Sowell, Jr., and D. H. Smith. Registration of Cercospora arachidicola-resistant peanut germplasm. Crop Sci. 29(2): 292. Mar.-Apr. 1980.

IV. Dr. J. H. Bouton, Agronomy Department, University of Georgia, Athens, GA

One hundred, eighty one (181) plant introductions of tall fescue, Festuca arundinacea, obtained from the Regional Plant Introduction Station, Pullman, WA, were evaluated for persistence and adaptability to Georgia's conditions. After two years at two locations, the following PI's were found adaptive enough to warrant further selection for yield and forage characteristics.

PI Number			
150156	207769	229500	231558
172423	208679	229692	231559
174209	208680	231552	255875
184041	208681	231553	260245
203728	221927	231554	264766
204446	225572	231555	265367
204447	227505	231557	269850

PI Number			
269376	283289	287819	314251
283276	283290	287820	314685
283277	283291	292602	315430
283278	283292	292604	315431
283279	283293	295669	315432
283280	283294	297900	315433
283281	283295	297902	316244
283282	283296	297905	316246
283285	283297	297906	321676
283286	283298	297907	325322
283287	283299	297908	325323
283288	283301	302996	325324

HAWAII 1980 ANNUAL PROGRESS REPORT

TO

TECHNICAL COMMITTEE S-9

R. A. Hamilton

Approximately 840 P.I. number accessions and additional unnumbered direct importations have been acquired and utilized in plant breeding, germ plasm collections, nitrogen fixation studies, adaptation trials, windbreak tests and related activities by 5 agencies in Hawaii during the past year. The Soil Conservation Service, NIFTAL, the Waimea Arboretum and Botanical Garden, and the University of Hawaii Horticulture and Agronomy and Soil Science Departments have been the principal agencies involved in this work. Additional accessions have also been acquired and utilized by private investigators and cooperators.

Forestry, agronomy, pasture management, biomass, nitrogen fixation, ornamentals, tropical fruits and vegetable crops are involved and concerned in acquiring, testing and utilizing plant material acquired through P.I. number accessions.

The following plant introductions have been grown or are presently being grown and tested in Hawaii during the past year:

Soil Conservation Service Plant Materials Center

Reported by Bob Joy

1. Glycine max (100)
2. Calapogonium (3)
3. Pueraria (3)
4. Cenchrus ciliaris
5. Desmodium triflorum
6. Digitaria valida
7. Erythrina fusca
8. Glycine wightii
9. Hemarthria altissima
10. Leucaena leucocephala
11. Panicum maximum
12. Panicum " var. trichoglume
13. Paspalum hieronymii
14. Pinus eldaria

NIFTAL

Reported by Bill Kerry

1. Canavalia brasiliensis
2. Canavalia ensiformis
3. Cassia angulata
4. Cassia leptandenia
5. Crotalaria balansae
6. Crotalaria lanceolata
7. Desmodium canum
8. Desmodium distortum
9. Desmodium intortum
10. Desmodium perplexum
11. Dolichos biflorus
12. Glycine wightii
13. Indigofera hirsuta
14. Lespedeza striata
15. Lotononis bainesii
16. Sesbania sesban
17. Stylosanthes hamata
18. Bornia diphylla
19. Calopogonium mucunoides*
20. Centrosema pubescens*
21. Centrosema sp.*
22. Desmodium ovalifolium*
23. Stylosanthes guianensis*

*Seed increase for S-9.

Agronomy & Soil Science Department, University of Hawaii

Reported by Ukio Urata

1. Hemarthria altissima (4)
2. Digitaria decumbens (2)
3. Pennisetrum clandestinum (3)

Horticulture Department, University of Hawaii
(Fruit Crops)

Reported by R. A. Hamilton

1. Mangifera indica (4)
2. Persea americana (7)
3. Litchi chinensis (2)
4. Averrhoa carambola (3)
5. Nephelium lappaceum (4)
6. Carica papaya (3)
7. Psidium guajava (2)

542 P.I. introductions of Capsicum annum, C. frutescens, Lycopersicon sp., and Latuca sativa were used by the Vegetable Crops section of the Horticulture Department during the past year. These have been reported at the 1980 W-6 Technical Committee meeting. 124 P.I. accessions of ornamental and botanical interest being grown and tested by the Waimea Arboretum and Botanical Garden, were also reported to the W-6 Technical Committee.

The following recent publications related to S-9 plant material or activities connected with the New Crops project have not been reported on previously:

1. Hamilton, R. A. 1974. Mango varieties in Hawaii. Horticulture Digest: Fruit and Nut Information No. 29:3-4.

2. Hamilton, R. A. 1975. Importance and potential of germplasm from Southeast Asia in Hawaii. Proc. of the SE Asian Plant Genetic Resources Conf., Bogor, Indonesia: 77-82.

3. Tang, C. S. and R. A. Hamilton. 1976. Benzyl-Isothiocyanate in Cyclocimorpha solmsii (Caricaceae). Phytochemistry 15(11): 1767.

4. Mitchell, W. C., Hamilton, R. A. et al. 1977. The Mediterranean Fruit Fly and its economic impact on Central American Countries and Panama. UC/AID Pest Management and Related Environ. Protection Project. U.C./Berekeley, CA. 189 p.

Louisiana S.9 Report

August 1980

Richard J. Stadtherr
Horticulture Department
Louisiana State University

In 1979, 18 accessions were obtained from the National Arboretum for trial purposes. Seed of Prunus campanulata was obtained from Taiwan but there was no germination in two lots one of which was planted immediately and kept outside, and the other which was stratified for 2 months at 40°F before planting.

Following are the reports of Plant Introductions for this year.

Vegetables

James F. Fontenot

Okra Breeding Objectives in Louisiana:

Project objectives are high yield, improved pod type as to culinary quality, spinelessness, color, shape, length, shipping and storage quality. Improved plant types for mechanical harvest such as uprightness, increased internode length, increased pod stem length, and large pod base. Fusarium wilt, nematode and drought resistant individuals are desired. High oil and protein content are desired in the seed.

Pepper Breeding Objectives in Louisiana:

The objectives of this research program are: 1) Screening commercial varieties and plant introductions for potential use by the hot pepper industry in the state and for characteristics of value to the breeding program. 2) Development of a disease-resistant mechanically harvestable Cayenne pepper. 3) Development of a disease-resistant mechanically harvestable small fruited pepper similar to Tabasco. 4) Incorporation of other fruit types, such as Floral Gem, Cherry, Sport, and Pepperoncini, into the appropriate disease-resistant mechanically harvestable small and large fruited pepper lines. 5) Study heterozygosity in hot pepper to determine the effects of inbreeding on vigor while attempting to develop more plant-to-plant uniformity in fruiting. 6) Study and characterize plant habits to determine on a long-range basis, which will be the most efficient for mechanical harvesting. 7) Bell and hot types that are resistant to pepper weevil and possess the character of easy abscission are desired.

Potato Breeding Objectives in Louisiana:

The principal objectives of the Louisiana potato breeding project are wide adaptability, high yield, frost, heat and drought resistance, insect and disease resistance (particularly late blight and scab), improved culinary quality (including chipping quality, French frying quality, and baking quality), resistance to after-cooking darkening, improved storage ability, better shape and skin color, and resistance to tuber greening. Development of an oblong russet baking type adapted to Louisiana conditions is highly desirable.

Other objectives are to gain a further insight into the physiological changes, during rest and to ascertain the effect of growth regulators, applied as preplant, preharvest and postharvest treatments on the production, storage ability, and quality of potatoes.

Use of Plant Introductions in Breeding Objectives:

In order to attain these objectives on all three crops, genetic diversity is required; thus, we are making good use of plant introductions.

At this writing we have 27 potato clones that have plant introductions in their pedigree and 38 okra lines. Last year we evaluated 27 Capsicum annuum, 20 Capsicum chinense, and 11 Capsicum frutescens plant introductions.

Ornamentals

R. J. Stadtherr

Received 2/17/75, USDA, Glenn Dale

Burbridgia schizochilea PI 242616 Propagated - have - Grh.
Impatiens marianae NA 35697 Carried 2 yrs. - Dropped
Thyrostachys siamensis PI 392276 - Died - 1975

Received 3/2/75, USDA, Beltsville

Carpinus betulus NA 35091 - moved - 12/1979
Carpinus betulus NA 35093 - moved - 12/1979
Carpinus orientalis NA 35100 - moved - Dead - 1980
Clematis vitcella NA 35103 - Dead - 1976
Clematis vitcella NA 35104 - Dead - 1976
Clematis var. "Betty Corning"NA 33992-c - Dead - 1976
Hedera rhombea NA 30236-c - Stolen - 1976
Indigophera incarnata NA 27542-c - Lost
Lithocarpus henryi NA 830-s - Dead - 1976
Ostrya carpinifolia NA 35146 - Moved - 12/1979 - Burden
Ostrya carpinifolia NA 35147 - Moved - 12/1979 - Campus
Picea jezoensis NA 33527 - Dead - 1976
Vaccinium cyclopense NA 36766 - Dead - 1976
Weigela florida "Pink Princess" NA 35364-c - Prop. -Have

Received 3/3/75, SCS, Beltsville

Akebia quinata rosea BN 11051-60 - Prop. -Have
Euonymus fortunei "Longwood" BN 17493-66 - Prop. -Have
Gypsophila repens rosea BN 10781-55 - Dead - 1975
Helianthemum apenninum BN 12899-62 - Dead - 1975
Helianthemum nummularium BN 12896-62 - Dead - 1975
Hemerocallis dumortieri BN 18181-66 - Dropped
Hypericum calycinum BN 12900-62 - Dead - 1976
Iberis sempervirens BN 10782-59 - Dead - 1975
Juniperus conferta "Emerald Seas" BN 18528-67 - Prop. -Have
Liriope graminifolia BN 10762-60 - Prop. - Have
Liriope graminifolia BN 10763-60 - Prop. - Have
Liriope graminifolia BN 10764-60 - Prop. - Have
Liriope Muscari exiflora BN 11064-60 - Prop. - Have
Liriope Muscari "Munroi #1" BN 11065-60 - Prop. - Have
Liriope Muscari "Big Blue" BN 11063-60 - Prop. - Have
Liriope sp. "Wonder Evergreen" BN 11069-60 - Prop. Have
Marrubium sp. BN 11030-60 - Lost
Nepeta Mussinii BN 10999-60 - Dropped - 1977
Ophiopogon sp. BN 10792-60 - Prop. Have

Potentilla anserina BN 13784-62 - Carried to 1978
Potentilla reptans BN 13785-63 - Carried to 1978
Potentilla tridentata BN 11030-60 - Prop. - Have
Rudbeckia solvante BN 22748-74 - (Seed) - Have
Sasa pygmaea BN 1475-41 - Prop. - Have
Teucrium chamaedrys BN 11057-60 - Prop. - Have
Wedelia trilobata BN 23216-74 - Prop. - Have
Xanthorhiza simplicissima BN 8610-56 - Dead - 1976

Received 6/3/75, USDA, Beltsville

Agapanthus sp. PI 387881 - Lost
Begonia sp. PI 349558 - Froze in Plastic House
Begonia sp. PI 390601 - Froze in Plastic House
Datura chlorantha PI 390618 - Prop. - Dropped
Heliotropium sp PI 390626 - Dead - 1975
Onoseris albicans PI 390758 - Dead - 1975
Onoseris hyssopifolia PI 390523 - Dead - 1975
Portulaca sp PI 390809 - Dropped - 1977
Undetermined PI 390850 - Dead - 1975
Undetermined PI 390853 - Dead - 1975

Received 9/27/75, Subtropical Hort. Res. Sta., Miami

Agave sp M 23211 - Stolen
Agave sp M 23212 - Stolen
Alocasia cucullata PI 354160 - Prop. - Have - Grh.
Amaryllis evansiae M 23052 - Seeds - Distributed
Begonia sp M 22592 - Froze Plastic House - 1979
Begonia sp M 22596 - Prop. - Have - Grh.
Blakea pulverulenta M 20836 - Dead - 1975
Bouganvillea "Miss Manila" M 21612 - Prop. - Have - Grh.
Crinum asiaticum M 354193 - Prop. - Have - Grh.
Eulophia guineensis M 19353 - Lost
Ficus natalensis PI 78261 - Prop. - Have - Grh.
Freycinata multiflora PI 134996 - Dead - 1975
Haemanthus multiflorus PI 279832 - Dead - 1977
Impatiens sp M 22598 - Dead - 1975
Impatiens sp M 22600 - Dead - 1975
Jaquinia arborea M 14063 - Lost
Justicia sp M 21855 - Prop. - Have - Grh.
Justicia sp M 21857 - Carried to 1979
Justicia sp M 21858 - Carried to 1979
Lantana "Tahi White" M 22482 - Prop. - Have
Medinilla speciosum M 22497 - Dead - 1975
Mitrocitrus sp M 21232 - Dead - 1975
Pilea sp M 22289 - Dead - 1979
Plumbago sp PI 390536 - Carried to 1978 - Dropped
Podocarpus falcatus M 21018 - Lost - 1977
Rhododendron sp PI 199300 - Dead - 1975
Rhododendron sp PI 199303 - Dead - 1975
Ruellia affine M 21473 - Carried to 1978 - Dropped
Schismatoglottis calyptrata PI 354159 - Carried to 1977- Lost

Schismatoglottis sp PI 354231 - Carried to 1977 - Lost
Scilla violacea M 22104 - Carried to 1978 - Dropped
Undetermined Ginger PI 354415 - Carried to 1979 - Dropped
Xylosma congesta PI 98385 - Lost in seedling stage
Xylosma senticosa PI 63629 - Lost in seedling stage

Those plants which showed the most promise for certain plantings are listed below. The Burbridgia makes a small plant for greenhouse use. Begonia sp M 22596 has colorful foliage and is a good house plant. Miss Manila bouganvillea bloomed profusely in containers in the greenhouse each winter. The bracts are orange and turn to a coral pink as they age. The Alocasia, Crinum, Natal fig, and Justicia sp M 21855 made excellent foliage plants.

All of the liriopes and ophiopogon are good groundcovers. Monroe #1 and Big Blue liriopes are excellent flowered varieties. Although "Tahi White" lantana and Wedelia kill to the ground after the first frost they come back in spring and are very pretty in flower. Five-leaved Akebia and dwarf bamboo show much potential as groundcovers here.

Emerald Seas shore juniper is a more compact, excellent shore juniper. "Pink Princess" weigela has flowered well although this genus does not appear to be well-adapted here. These two varieties of woody ornamentals were best among those which were under trial.

Mississippi S-9 Progress Report
1979-80

C. E. Watson, Jr.
Agronomy Department
Mississippi State University

During the 1979-80 year Mississippi Cooperators received the following plant introductions:

Genus	Accessions
Cucumis	593
Festuca	190
Lycopersicon	270
Total	1053

The following reports from cooperators were received:

Forage Grasses (C. E. Watson and L. E. Trevathan)

190 plant introductions of tall fescue are currently being screened for resistance to Helminthosporium sp. These introductions are being evaluated using an artificial inoculation technique in the greenhouse as well as under natural infection in the field. Generally, the greenhouse technique has resulted in higher levels of infection. No plants have been found which show immunity to the disease. These materials will also be screened for resistance to crown rust caused by Puccinia coronata.

Field plantings of the collections of Lolium multiflorum, L. perenne, and L. rigidum have been established. These introductions will be rated in the spring for resistance to rust, net blotch, and other diseases.

Cotton (J. N. Jenkins)

89 germplasm lines of cotton involving crosses from the Gossypium hirsutum L. race collection were released (Crop Science Regs. GP52-140). These lines represent a diverse germplasm pool available to breeders.

Subterranean Clover (W. E. Knight)

Plant accessions of subterranean clover, Trifolium subterraneum L. were evaluated in the field and greenhouse in 1978. Eighty-six accessions were grown in replicated rows and rated for vigor, incidence of disease and spread. Accessions with promise will be increased for evaluation in plots. In addition, 106 accessions were grown in the greenhouse for seed increase and evaluated for vigor, disease and plant type. These accessions were evaluated in the field in seeded rows in 1978-79. Seven accessions evaluated earlier were increased and evaluated with named cultivars in field plots. PIs 184962, 291917 and 311499

performed as well as cvs Mt. Barker and Tallarook. PIs 311498, 319415, 168638 and 319145 were superior to 8 of the named cultivars. These introductions appear to be well adapted in the Southeast and have outstanding agronomic traits.

Recently, I visited Badajoz, Spain and Elvas, Portugal. This visit was part of project review under the U.S. - Spanish Cooperative program. We need to pursue two possible areas of cooperation at increasing our subterranean clover selections. This would provide adequate seed for animal evaluation and testing for regional adaptation. This would entail 5-6 kg of each selection shipped to them and they indicate an increase to 200-300 kg of seed would be no problem. These selections are late maturing and may have no value to the Spanish.

The second area that needs development is obtaining seed of the 1200 subterranean clover accessions in the Spanish collection. Many of these have been evaluated and classified as "early" or "late". There are several hundred late accessions that have not been threshed since the late accessions do not fit the Spanish environment. The late accessions would be of greatest value for the Southeast. Some of the other accessions might be adapted to more arid areas of the U.S. The late accessions are supposed to be threshed and made available to us. This was the main justification for transfer of funds from the U.S. budget to the Spanish budget.

The mechanics of sending seed to Spain and receiving the increased seed back into the U.S. have been explored with George White. There is apparently no problem in sending 5-6 kg of accessions to Spain. However, the mechanics of returning the larger quantities of seed to the U.S. will have to be investigated.

At Elvas, Portugal, Dr. David Crespo has a large collection of subterranean clovers (650 accessions) and a large collection of strawberry clovers (Trifolium fragiferum). Dr. Crespo is very cooperative. Hopefully, we can obtain these accessions for evaluation in the U.S.

North Carolina S-9 Progress Report 1979-1980

W. T. Fike
Crop Science Department
North Carolina State University

Thirty campus research personnel receive PI catalogues and information through my office, while others receive information direct from the National Arboretum, etc. Eight cooperators received 518 PI's of 45 species of 24 genera. The great majority of these were of Cucumus spp. being screened by Dr. Todd Wehner for his cucumber breeding program. Dr. Wehner is the second breeder in the last three to five years which has screened PI's available in the program, thus the need for a working stock of seed at the Regional Stations.

General Comments

1. With the many plant explorations being made to foreign countries it is heartening to see that domestic explorations are also being made.

   a. Dr. Bill Gilbert has just released a variety of St. Augustine grass named Raleigh which was collected from a private lawn here in the NCSU area. This variety is winter hardy, tolerates shade, remains green longer, spreads quickly and is tolerant to a virus causing St. Augustine decline. Vegetative material is being propagated at this time and will be available by 1982.

   b. Dr. Jim Ballington has collected numerous lines of Vaccinum species from North and South Carolina, from 14 locations in 1978 and from 76 locations in 1979. A summary of these collections appear as Horticultural Crops Research Series 51. A summary of the crosses made and the breeding lines of the Galletta trips is summarized on the next page.

   c. Dr. Dave Timothy is presently cataloguing his collection of Maritime relatives of switchgrass - Panicum virgata section, collected from Long Island to the Mexican border, for incorporation into the PI system. Many of these lines are extremely palatable and show promise in his warm season breeding program.

2. Dr. J. C. Raulston is establishing a new arboretum at the NCSU Method Research Farm. The arboretum will provide horticulture students and visitors with the largest growing collection of exotic plants between Calloway Gardens in Georgia and the National Arboretum in Washington. The arboretum will contain a collection of trees, shrubs, and other ornamental plants that are used by the public in landscaping. Very few PI's as such will be present but appropriate releases from the National Arboretum will be located in the gardens.

3. Dr. Wanda Collins will be looking through various sweet potato PI's for a totally new sweet potato - one that could be used exclusively in the production of ethanol.

4. Dr. Frank Haynes has collected diploid potato lines from the Columbian, Peruvian and Bolivian Andes and through five two-year cycles of crossing has adapted them to the temperate zone. By crossing these diploids with commercial tetraploid lines he has obtained clones with 50% more dry matter than the Russet Burbank standard (21-22%), as well as lines that are resistant to Late Blight, Root Knot Nematode, Bacterial Wilt, Wart, the PVX and PBY viruses and lines having heat tolerances. Some very exciting news will be coming from this program in a few years.

6. We are continuing our cultural research programs on kenaf, sunflowers, catnip, sumac, and alcohol producing crops, such as sugar and sirup sorghums, sugarbeets, sugarcane and fodder beets, etc.

1980 Report to S-9

from the

Oklahoma Agricultural Experiment Station

Sorghum Insect Research - K. J. Starks and D. E. Weibel

During the summer of 1980 about 2500 sorghum accessions will be screened in the field for fall armyworm, Spodoptera frugiperdia, resistance. Entries are planted in single row plots. When plants are 21-days old they are each infested with 10-12 1st instar larvae which are lab reared, mixed with corn cob grits, and placed in the whorl with a 'gun' applicator. Visual damage ratings are taken 10 days after infestation.

Also, during 1980-81, the sorghum collection (about 3600 entries) from Experiment, GA will be screened for greenbug resistance in the greenhouse. A new greenbug biotype, biotype D, has overcome the resistance presently used in commercial sorghum. Thus, it will be necessary to locate and transfer resistance to breeding lines.

Sorghum Breeding - Dale Weibel

In the Oklahoma sorghum breeding program for 1980, there are more than 400 of 1000 pedigree lines that come from crosses involving 27 plant introductions, or derivatives of introductions. Some of these lines are being evaluated in test crosses. Additionally, several sorghum and two millet (Penisetum) random mating populations involving plant introductions are being observed.

Brachiaria Research - Rahmona Thompson

In 1979, I obtained 43 samples of various species of the genus Brachiaria from the Southern Regional Plant Introduction Station at Experiment, Georgia. Selected specimens are being grown in a greenhouse to provide fresh material for an anatomical and taxonomic study of the genus.

Adaptation of Moroccan Alfalfas to Oklahoma

John L. Caddel

Nineteen introductions (P.I. Nos. 418613 through 418631) along with three sources of 'African' and one source each of 'Moapa' and 'Sonora' (all collected in Morocco in 1977) were sown in the fall 1979 at Stillwater, OK for observations related to general adaptation and pest resistance. P.I. Nos. 418630 and 418631 are composites of annual Medicago. Poor stands of these accessions were established and no plants survived the winter. The round seeded portions of P.I. Nos. 418618 and 418621 are not Medicago (probably Trifolium alexandrinum L.). The plants from these introductions grew rapidly in the fall and died during the winter.

All the other introductions and cultivars appeared to be Medicago sativa. No plants from P.I. Nos. 418613, 418614, and 418619 survived the winter of 1979-80. These introductions are very nondormant and were collected from the Sous River Valley in southern Morocco.

All the other accessions survived the winter and late spring freezes very well but were very susceptible to the alfalfa weevil (Hypera postica) and pea aphid (Acyrthosiphon pisum). In general, they are less dormant than 'Arc' and more dormant than 'Moapa' according to spring growth habit and regrowth in July during a hot dry period.

These surviving accessions will be further evaluated during the upcoming year.

Peanut Physiology - Darold Ketring

Peanut cultivars, breeding lines, and plant introductions were tested for emergence at early planting dates in Oklahoma. Emergence at the earliest planting date, 15 April, at Fort Cobb, OK was reduced compared to planting at 22 April or 9 May at Perkins, OK. Emergence was evaluated at 22-24 day after planting. Emergence was nearly equal (it differed by 5% or less) for the two later planting dates for eleven genotypes. Emergence decreased for seven genotypes and increased for eight genotypes at the latest planting date. Thirteen genotypes emerged at the 90% level for the 22 April planting date.

Peanut Germplasm Resources - D. J. Banks

During early 1980 an IBPGR sponsored team consisting of Antonio Krapovickas (Argentina), Charles Simpson (Texas), Co-leaders, and Don Banks (Oklahoma), Aurelio Schinini (Argentina), Lidio Coradin (Brazil), and Hebert Zurita (Bolivia) were involved in a peanut collecting expedition in Argentina and Bolivia. Later José Pietrarelli

Peanut Germplasm Resources - D. J. Banks (continued)

(Argentina) joined Charles Simpson for a short trip into Peru. Seeds of wild and cultivated races were collected as well as nodules of Rhizobium from living plants. The collections, consisting of 121 cultivated and 37 wild accessions, are being increased in Oklahoma and Texas and will be available through the U.S. Plant Introduction system as soon as stocks are adequate. These important germplasm sources, collected in the areas where cultivated peanuts evolved, will be new sources of genetic material for pest resistance and agronomic breeding. In addition 48 seed collections of other plant materials, including forage grasses and legumes, peppers, and others were made.

In May 1980 'PRONTO', a new early maturing Spanish peanut was released jointly by the Oklahoma and Georgia Agricultural Experiment Stations and USDA-SEA-AR. This new large-seeded cultivar has shown superiority to present commercial Spanish cultivars for yield, grade, and shelling properties when grown under short seasons and limited soil moisture. It was derived from a cross between Chico (a selection from P.I. 268611) and Comet.

Peanut Breeding - J. S. Kirby

Several peanut plant introductions continue to be evaluated in our program. A specific area of interest this year is the initiation of a graduate student's research into the inheritance of leafspot resistance. Several crosses have been made utilizing P.I. 109839 which has been identified as having field resistance to early leafspot caused by Cercospora arachidicola. The F_1 plants are now in the field for evaluation and for maximum increase of F_2 seed.

NEW CROPS RESEARCH IN PUERTO RICO

July 1979 - June 1980

Oscar D. Ramírez

Horticulture Department
Agricultural Experiment Station
College of Agriculture
University of Puerto Rico
Río Piedras, Puerto Rico
00928

The introductions received by our Experiment Station last year were grouped as follows: fruits 1, legumes 11, forages 3, vegetables 5, ornamentals 25 and miscellaneous, 4; making a total of 49.

Fruits: (H. Ortiz, O. D. Ramírez)

Three avocado varieties received from Israel (Hoshim, Tova, Ein Vered), continued under observation. Trees of these varieties were grafted so as to have material for further testing.

Legumes and forages: (J. Vélez Santiago)

Results of previous introductions such as alfalfa, Stylosanthes and Digitaria are presented in attached tables (1, 2, 3, 4).

In the variety trial of alfalfa the highest yield (dry forage) was obtained with Hayden Px-1 followed by a new c.v., U.C. - 164. Vegetative material of seven accessions of Cynodon plectostachyus (409742, 43, 45, 46, 47, 48, 50) were sent to Dr. E. M. Hodges, of the Agricultural Research Center, Ona, Florida, to be tested. Also seed of Desmodium ovalifolium (237955) was sent to Dr. G. Lovell, at Experiment, Georgia.

Coffee: (C. J. Torres)

Evaluation of a semi-dwarf coffee variety "Pacas" continues. Planted in September 1975, in its second crop it produced an average of 10.47 kg (23.07 pounds) of ripe berries per tree, which is equivalent to 2155 kg (4747 lb) of market coffee per acre. Being a high yielder, well adapted to our conditions, vigorous and with a power of recovery after a heavy crop, it is considered as very promising for Puerto Rico, as a variety to be planted in full sunlight.

Ornamentals: (O. D. Ramírez)

Many of the ornamentals received seems not to be adapted to our conditions. Among the best adapted are: Callisia repens (406942), Zebrina sp. (424907), and Murdania nudiflora (354427). Unrooted cuttings of 23 bougainvillea cultivars were received from the Subtropical Research Station at Miami, Florida, of which only 10 survive and are under observation. Two peperomias, P. clusiaefolia and procteri, are being increased for further observation. They seem to be promising as potted plants.

Publications prepared and submitted to be published in the Journal of Agriculture of the University of Puerto Rico

1. Effect of Nitrogen Fertilization and Frequency of Cutting on the Yield and Composition of Five Tropical Grasses, J. Vélez-Santiago and J. A. Arroyo.
2. Effect of Three Harvest Intervals on the Yield and Nutritive Value of Seven Napier Grass Cultivars, J. Vélez-Santiago and J. A. Arroyo.
3. Influence of Two Fertilizer Rates on the Herbage and Crude Protein Yield of Seven Tropical Grasses, J. Vélez-Santiago and J. A. Arroyo.
4. Yield and Chemical Composition of Five Napier Cultivars at the Northwest Coastal Plain of Puerto Rico, J. Vélez-Santiago and J. A. Arroyo.

5. Preliminary Evaluation of Ramie (Boehmeria nivea (L.) Gaudich as a Forage Source for Livestock Feeding, O. D. Ramírez, J. A. Arroyo and N. Semidey.

Table 1. - Dry forage yields (kg/ha) of 8 alfalfa entries at the south of Puerto Rico for a period of 5 months, 1980

Identification	Harvest No. and Date of Harvest 1st March 20	2nd April 21	3rd May 19	4th June 20	Total
Moapa - 69	2712	3571	3607	3200	13,090
Florida - 66	2455	3944	3670	3581	13,650
Tanhuato	2409	3313	3642	3324	12,688
UC - 164	2958	4210	3561	3592	14,321
UC - 76 E	2721	3367	3040	3046	12,994
UC - 163	3126	3709	3070	3202	13,907
Mesa-Sirsa	3109	4150	3613	3353	14,225
Hayden FX-1	3214	4497	4100	3460	15,359
$\bar{X}$	2838	3845	3751	3345	
Rainfall (mm)	41.6	29.2	30.7	101.6	202.1

Identification of Legumes

SPECIES	Plant Introduction Number USDA PI[1/]	PR PI[2/]	Origen
1. Stylosanthes guyanensis	361877	13265	Philippines
2. Stylosanthes gracilis	261266	13262	B. Congo
3. Stylosanthes guyanensis	279603	13264	China
4. Stylosanthes guyanensis var. "Endeavour"	-	-	Australia
5. Stylosanthes guyanensis var. "Schofield"	-	IRFL-1413	Australia
6. Stylosanthes guyanensis	-	IRFL-1416	Brazil
7. D. milanjiana (6543) & "Stylo-Endeavour"	-	-	-
8. Digitaria milanjiana	299699	6543	-

Table 2 : Yield (Kg/ha) of 6 Stylosanthes cultivars, Pangola grass alone and Pangola - Stylosanthes association

	TREATMENT	Dry Forage yield (45 days) Date and Number of Harvest 1 6/26/78	2 8/11/78	3 9/25/78	4 11/09/78	Dry Forage Yield (79 days) Date and Number of Harvest 5 12/26/78	6 2/09/79	7 3/27/78	8 5/10/79	9 6/25/79	10 9/12/79	11 11/30/79	12 2/19/80	13 5/07/80	TOTAL	Av. Yield
8	Digitaria milanjiana	4,736	1,726	5,758	2,869	2028	1799	3976	3228	3257	9018	6520	5551	7953	58,419	4,493.77
7	D. milanjiana + Stylo "Endeavour"	4,826	1,483	4,297	2,298										12,904	3,226
6	Stylosanthes guyanensis	3,185	2,596	4,674	1,420	1594	519	1981	1574	836	3366	3022	575	4517	29,859	2,296.85
4	S guyanensis "Endeavour"	2,524	1,990	3,327	1,743	1193	173	1765	1214	757	2669	2411	652	4709	25,125	1,932.69
5	S. guyanensis "Schofield"	2,687	1,105	2,743	1,349	1237	542	2226	1357	417	2189	2899	785	3587	23,123	1,778.69
2	S. gracilis	2,407	850	3,212	638	1444	486	1995	1701	520	3592	2027	449	3471	32,252	2,480.92
1	S. guyanensis	1,729	1,061	2,913	681	1547	192	1829	1693	976	4494	2628	740	3454	23,937	1,841.31
3	S. guyanensis	1,681	1,383	2,501	744	1547	435	1448	1778	529	3508	2548	818	4744	23,664	1,820.31

Table 3 : Yield (Kg/ha) of 6 Stylosanthes cultivars, and Pangola grass alone and Pangola - Stylosanthes association

	TREATMENT	Dry Forage Yield (65 days) Date and Number of Harvest 1 7/18/78	2 9/21/78	3 11/27/78	4 1/29/79	5 4/04/79	6 6/05/79	7 8/13/79	8 10/17/79	9 12/2C/80	10 2/25/80	11 5/01/80	TOTAL	.Av. Yield
8	Digitaria milanjiana	7983	5689	5233	4585	3570	9271	6559	7439	6049	2747	6000	65,125	5,920.45
7	D. milanjiana + Stylo "Endeavour"	6451	5864	5483	5130	2475							25,403	5,080.60
6	Stylosanthes guyanensis	5683	4801	4447	2998	432	573	5740	2189	2668	870	4108	34,509	3,137.18
4	S. guyanensis "Endeavour"	4034	4251	3604	1525	413	175	2881	2133	1709	1525	4664	26,914	2,446.73
3	S guyanensis	4284	3795	2904	1955	708	457	2393	2106	2481	1570	4855	27,528	2,502.55
2	S. gracilis	3702	3003	3075	2132	544	651	2422	1613	1787	878	3734	23,541	2,140.09
5	S. guyanensis "Schofield"	3448	3163	3680	2279	477	728	2829	2359	2022	1224	3301	25,510	2,319.09
1	S. guyanensis	3179	2726	3464	1679	356	1000	4298	2572	1774	943	3616	25,607	2,327.91

Table 4.- Forage and crude protein yields of five tropical grasses over 1.5 year at Corozal[1/]

	Weighted green forage yields[2/]	Dry matter content	Weighted dry forage yields	Weighted crude protein yields
	kg/ha/yr	%	kg/ha/yr	kg/ha/yr
Hemarthria altissima (Bigalta)	161,929 a	23.61 d	35,421 a	3,092 a b
Do (Redalta)	111,331 b c	28.57 b	29,209 b	2,711 b
Digitaria decumbens (Transvala)	128,055 b	27.69 b	31,699 a b	3,315 a b
Cynodon nlemfuensis var. *nlemfuensis* (Star)	114,703 b c	30.70 a	32,383 a b	3,595 a
Digitaria decumbens (Pangola)	105,510 c	25.74 c	24,461 c	2,840 b

1/ Meaned for three harvest intervals and three fertilizer rates.

2/ Yields in the same column followed by one or more letters in common do not differ significantly at the 5% level according to Duncan's multiple range test.

Forage introductions under evaluation in Puerto Rico

Cultivar	U.S.D.A. P.I. No.
Pennisetum purpureum	285303
" "	300086
" "	337630
Digitaria sp.	300935
" *decumbens*	299752
" "	111110
" *milanjiana*	299699
Panicum maximum	349676
Hemarthria altissima	299993
" "	299994
" "	299995
" "	349752
" "	364861
" "	364867
" "	364877
Stylosanthes guyanensis	279603
" "	361877
" *gracilis*	261266
Cynodon plectostachyus	469745
" "	469746
" "	469748

South Carolina Agricultural Research
Service Report to S-9 Technical Committee
August 8-9, 1980
David W. Bradshaw

Germplasm of nine hundred and three P.I.'s were distributed to cooperators in S.C. during 1979. Primarily germplasm was of genera Citrullus, Cucumis, Trifolium, and Festuca.

The following reports were received from cooperator throughout the state.

Dr. Pryce Gibson, Agronomy Department, Agricultural Experiment Station, Clemson, SC.

The screening program for virus resistance to alfalfa mosaic, clover yellow vein and peanut mosaic virus is continuing in Trifolium P.I.'s. One or more plants showing resistance can be traced back to the following P.I.'s:

234678	201214	224680
234679	420803	246751
234680		

Dr. E.A. Rupert, Agronomy and Soils, Agricultural Experiment Station, Clemson, SC.

During the last six years, S.C.A.E.S. 00184, Cytogenetics of White Clover and Related Species, has obtained more than 50 Trifolium species from the Plant Introduction stations in Geneva, New York, and Experiment, Georgia. From these we have made selections of Trifolium ambiguum which will hybridize with Trifolium hybridum.

1978 Trifolium ambiguum (6X) P.I. 325456 X T. repens
T. ambiguum (2X) P.I. 325487 X T. montanum
Both crosses died before flowering

1979 T. ambiguum (2X) P.I. 206482 X T. montanum resulted in a very dwarf plant that died; no evidence of root hair formation.

1980 T. ambiguum P.I. 369329 X T. hybridum (2X)
A very healthy plant but has not yet bloomed.

T. ambiguum (4X) P.I. 231891 (from Australia)
Appears to be very compatible with T. hybridum.

Dr. Billy B. Rhodes, Horticulture Department, Edisto Experiment Station, Blackville, SC.

Dr. Billy B. Rhodes has received notification of a grant from USDA/SEA Competitive Research Grants Office to study biochemical genetics of resistance to race 2 anthracnose in Citrullus P.I.'s.

Sowell, G. Jr., B.B. Rhodes and J.D. Norton. 1980. New sources of resistance to watermelon anthracnose. J. Amer. Soc. Hort. Sci. 105(2):197-199.

Dr. Jim Wyatt, U.S. Vegetable Laboratory, Charleston, SC.

In 1980, we released B4175, a bush snap bean with resistance to the southern root-knot nematode, Meloidogyne incognita. Resistance to this nematode species was derived from P.I. 165426, an indeterminate, brown-seeded, fiberous-podded line from Mexico. In greenhouse and field tests, B4175 has had significantly less galling and nematode reproduction than susceptible commercial cultivars. B4175 is the first bush snap bean released that has this level of nematode resistance.

We studied resistance to the Mexican bean beetle, Epilachna varivestis, in 70 F_5 bush snap bean breeding lines. Resistance

was derived from P.I. 169903, and indeterminate, white-seeded introduction. We identified lines at 3 locations that had resistance equal to or better than P.I. 169903. Resistance was a non-preference type and we found no evidence of anti-biosis.

A selection and backcrossing program is underway to incorporate the large seed size of P.I. 165078 into a green-shell bean for use by home gardeners. Seeds of selections from the second backcross have weighed more than twice as much as seeds from the nonrecurrent parent.

In response to the requests last year for more widespread dissemination of information to the public, the following article will be printed in the October issue of Agri-Search Publication printed by the S.C. Agricultural Experiment Station. (See next page).

Plant Introductions Help Improve American Agriculture

For many years plant introductions have played a vital role in American agriculture and have contributed substantially to the increase in productivity of both horticultural and agronomic crops. Virtually all U.S. crops are of foreign origin or have been improved by the incorporation of germplasm collected in foreign countries. Approximately 80% of the ornamental plants growing in gardens in the Southeast are immigrants from other countries.

Since the turn of the century, the U.S. Department of Agriculture has supported "plant hunters" as they searched remote areas for plants exhibiting characteristics needed for crop improvement. But in a sense the search for foreign plant germplasm contributed greatly to the formal organization of the Department of Agriculture. As early as the colonial period Benjamin Franklin sent home collections of seeds and plants from his travels. Later President John Quincy Adams requested all foreign consuls to forward rare seeds to Washington for distribution. In 1836 Commissioner of Patents, Henry L. Ellsworth took the initiative to send introduced seeds to American farmers. Thus, the Congressional Seed Distribution program was initiated. In 1847, appropriations for this program became an annual event allowing further experimentation on the establishment of new crops. Sorghum and tea were two of the first new crops investigated in 1856. (Some of the first tea plants grown in the United States were grown in South Carolina.) In 1862, the United States Department of Agriculture was established. Plant Introduction activity is specifically mentioned in the Organic Act of 1862 enacted by the 37th Congress for the

formation of the Department of Agriculture. However, it was not until the end of the century when the Department's head attained cabinet rank as Secretary of Agriculture that a "Section of Seed and Plant Introduction" was created.

The early job of the Section of Seed and Plant Introduction was "to bring into this country for experimental purposes any foreign seeds and plants which might give promise of increasing the value and variety of our agricultural resources." Even today this remains a primary objective of plant explorers. Resistance to insects and diseases is a characteristic especially sought after. A disease resistant spinach discovered in China rescued Virginia's spinach industry from ruin.

Between 1897 and 1934, when the U.S. was allowed free entry to China and Japan, plant explorations reached a peak in these countries. Due to their latitude and diversity in topography and elevation, these countries are rich in flora suitable for planting in the United States. David Fairchild devoted over a quarter of a century to plant introductions and is credited with the introduction of zoyzia lawn grass and 30 kinds of Japanese flowering cherry trees among hundreds of other finds. One of the most romantic figures in early plant explorations was Frank N. Myer who made three expeditions to Asia, once hiking over 1800 miles across Manchuria. Myer sent back new varieties of soybeans grains and cold-hardy fruit trees. However, Frank Myer should best be remembered for his contribution to the development of the Bradford pear, Pyrus calleryana 'Bradford'. In 1917, he embarked on his final expedition to Asia in search for Pyrus calleryana which were resistant to a blight that was then devastating American pear orchards. Plant breeders hoped to crossbreed the resistant callery pear with

U.S. varieties. Unfortunately Myer mysteriously disappeared from a river steamer in the middle of the night in May, 1918. His collection of callery pear seeds was forwarded to the U.S. where they were planted in California. Eventually selected seedling trees were dug and shipped to Glenn Dale, Maryland. Further evaluations and experimentation with propagation techniques followed. Finally one selected seedling was named after F.C. Bradford, a former Glenn Dale superintendent, and released in 1950 as Pyrus calleryana 'Bradford'. The Bradford pear has become an important landscape plant as over 300,000 have been planted in the last three decades.

World contributions to U.S. agricutlure have been widespread providing new food sources and germplasm for improvement of established crops. Some notable examples are corn, potatoes, squash, avacado, tomatoes and peanuts from South America. Sorghum, watermelons and vinifera grapes are African contributions. Asparagus, strawberries, beets, cabbage, carrots, spinach, and sweet cherries have arrived from Europe. Asia has contributed apricots, persimmons, mulberries, rice, peaches, soybeans and many more. From Russia honeydew melons and a drought resistant cold tolerant wheat has been introduced. While plant introductions have contributed to imporve production quality and quantity of most agronomic crops through breeding programs, some plant introductions have exhibited unexpected potential and have evolved as pests. Kudzu, first introduced for use in erosion control, is a more notorious example. Johnson grass, brought to the U.S. as a potential forage grass, is considered an undesirable immigrant by many farmers.

Plant explorers must operate under the constant spectre of the possibility of inadvertently introducing insects and diseases. Consequently, seeds and scion must be thoroughly cleaned and shipped to quarantine stations in the United States where they undergo strenuous inspection and treatment before being planted. Plant introductions subject to quarantine are those imported

as vegetative propagations. Seed introductions are controlled by quarantine procedures through two methods: a) the class of plant material that may be introduced and grown under specified conditions of isolation and periodic inspection until certified as free of injurious insects and diseases (post-entry quarantine); b) that material entirely prohibited except when allowed to enter for research purposes by the U.S. Department of Agriculture.

Plants involved in post-entry quarantine are generally planted at the Plant Introduction Station at Glenn Dale, Maryland where they are grown and observed for one or two growing seasons before being forwarded to state locations. One such state location for observation and evaluation of ornamental plant introductions is the arboretum in the Horticultural Gardens of Clemson University.

Established on several acres of land twenty years ago, the arboretum has now been expanded to almost fifteen acres. Hundreds of different plant introductions have been planted in the arboretum in the Clemson Horticultural Gardens and numerous new introductions are received yearly from Glenn Dale, Maryland, and from the U.S. National Arboretum in Washington. All plant introductions are given a six digit P.I. number by the U.S.D.A. Germplasm Institute before being sent to state locations. The National Arboretum assigns a five digit N.A. number to all plants released.

Evaluations and release of plant introductions can be a lengthy process as evidenced by the history of the Bradford pear. All plants are evaluated biweekly year round. Time and color of flowers as well as color and duration of fruit are recorded. Other characteristics evaluated are size, form, texture and color of individual plants. Also important to determining the

suitability of a new plant for use in the landscape is resistance to insects, diseases, and weather. Cooperation and assistance of the Department of Entomology and Economic Zoology, the Plant Pest Regulatory Service and the Department of Plant Pathology and Physiology aid in the identification and control of insects and diseases. The weather station located adjacent to the arboretum and operated in cooperation with the Department of Commerce, National Oceanic and Atmospheric Administration provides weather data pertinent to evaluating hardiness of plant materials.

The following plant descriptions are just a few of the many fine plant introductions now growing in the Clemson Horticultural Gardens. The Horticultural Gardens are open to the public from 8:00 am until dusk seven days a week. Guided tours for groups are available by reservation at 656-3404.

Acer ginnala - P.I. 262710. Planted as a rooted cutting in 1967 this interesting small tree has an open irregular form with multiple trunks. A slow-growing plant it is six feet tall and six feet wide with good color and medium texture. Pink winged seed remain on the plant from May through June. It should be best used as a specimen plant.

Cryptomeria japonica - P.I. 239487. One of the finest plant introductions growing in the arboretum, this upright pyramidal evergreen retains its rich green color through Clemson's coldest winters and hottest summers. Thirty feet tall and only ten feet wide it should best be used as a specimen plant or as a tall screen in full sun. May ultimately reach over 130 feet high.

Eurya japonica - P.I. 237671. This attractive evergreen shrub has waxy shiny green leaves of medium texture. After twenty years this six foot shrub has assumed a rounded globe shape as broad as it is tall. Fragrant creamy white flowers during the first two weeks of June add to its appeal. Small fruit turning black in the fall remain on the plant most of the winter. This plant should be useful as a foundation plant, a specimen plant or in a shrub border.

Myrsine semiserrata - P.I. 285468. A large shrub with an extremely open irregular form, this plant exhibits several interesting characteristics. A deciduous shrub, the medium fine leaves are shed in the fall and expose the attractive branching multiple trunk and the seed. The seed, dark brown marble-sized balls, are supported on 6 inch wiry stems. While the flowers are not extremely showy, they are unusual. The plant should be used as a specimen plant on in a shrub border.

Stachyrus praecox - P.I. 296026. This interesting flowering shrub from Japan blooms in the spring before leaves emerge. Long yellow panicles of flowers are followed by panicles of heavy green fruit which persist throughout the summer. While the young plant was upright and vase-shaped, the mature specimen is ten feet tall, fully rounded and slightly pendulous from the weight of the fruit. This plant should be used in a shrub border or as an accent plant where the unusual flowers and fruit can be observed.

Lonicera insularis - P.I. 316409. The fruit of this deciduous flowering shrub is its most appealing feature. The juicy translucent red

marble-sized fruit are attractive from May through July and frequently persist well into late winter. The oval irregular form and creamy white flowers are of average appeal. This hardy and durable plant appears to have no insect nor disease problems in this location.

Tennessee S-9 Progress Report for 1979-80

L. N. Skold
Department of Plant and Soil Science
University of Tennessee

Gossypium: Accessions of G. Pilosum from Australia germinated and grew well in the greenhouse but died before flowering, presumably from root rot. G. Turneri from Mexico is growing in the greenhouse but has not yet flowered. Two accessions of G. Arboreum and two of G. Herbaceum from China have been received by Dr. J. M. Stewart. He is attempting crosses among several species to establish genome relationships and to produce a new source of germplasm for cotton improvement. Dr. Stewart is hoping to explore for cotton species in Australia in 1981.

Dactylis glomerata: Dr. B. V. Conger is continuing evaluation of a number of accessions of orchardgrass received from the NE-9 Regional Plant Introduction Station. (Conger, B. V. 1979. An Orchardgrass Source Nursery to Evaluate Genotypes Adaptable to Tennessee. Tennessee Farm and Home Science No. 109: pp 7-9.)

Zea mays: The Regional Plant Introduction Station at Ames, Iowa sent 146 accessions of corn to a commercial corn breeder in West Tennessee. Dr. West, corn breeder at the University of Tennessee, received 7 accessions of white dent corn from the same source for use in the white corn breeding program. Accessions received previously are being used as a source of corn earworm resistance.

ANNUAL REPORT OF NEW CROPS RESEARCH IN TEXAS

Contributing to Southern Regional Project S-9

Oliver E. Smith and Eli L. Whiteley

August 8-9, 1980

The 1979-80 crop year began with good moisture throughout most of the State during late fall, winter and early spring. Planting of warm season crops was delayed in some areas of the State due to wet soil conditions.

This summer has been unusually dry and hot resulting in reduced yields and complete loss of crops in some areas of the State under dry land farming.

Industrial Crops:

Cotton (Gossypium hirsutum)

Tamcot A-788 was developed at the Texas A&M University Research Center at Lubbock from a cross of CA 398, a stormproof breeding line from the Lubbock program and PI 874, an experimental line with excellent fiber quality, from the Texas A&M University Research Center at El Paso.

Tamcot A-788 is very similar to Tamcot 788, the recurrent parent, and theoretically approximately 97 percent of genes are from Tamcot 788.

Tamcot A-788 does not produce viable pollen. It has the cytoplasmic genetic components for male sterility. When Tamcot A-788 is pollinated with standard cotton varieties the line will produce male-sterile offsprings.

Peanuts (Arachis hypogaea)

Dr. Olin D. Smith of the Texas A&M University Agricultural Experiment Station reported that P.I. 365553 has shown good field resistance to pod-rot caused by Pythium and Rhizoctonia.

Unduplicated data from a 1979 test of 3 replicates indicate that it also has resistance to Lesion nematodes.

Microscopic examinations indicate that the shells of P.I. 365553 have a thickened sclerenchyma ring and compacted schlereids orientated in several planes. Histochemical stains revealed that the sclerenchyma bands contain high levels of lignin and cellulose. This PI selection is being heavily used in the Texas peanut breeding program.

PI 295233 and PI 290606 have shown good resistance to Lesion nematodes.

Progeny of crosses with these PI's and adapted cultivars indicate the characteristic is heritable but the inheritance has not been defined.

Sesame (Sesamum indicam)

60 PI's and 38 varieties and selections of sesame are being grown at the Texas A&M University Agricultural Research Center at Dallas where Dr. James H. Gardenhire and associates are carrying on a breeding program to develop a non-shattering, sesame variety with high yield, thin walled capsule and good oil and meal qualities.

56 PI's are being grown in root-rot infested soil at the Texas A&M University Styles Demonstration Farm at Thrall, Texas. It is hoped that sources or resistance may be found.

12 varieties and lines are also being grown at 8 locations in the State, namely College Station, Corpus Christi, Dallas, Lubbock, Stephenville, Thrall, Uvalde and Weslaco.

Vericillium Wilt and powdery mildew caused considerably damage to the sesame plantings in 1979 at College Station and at Lubbock. Yields were reduced due to the presence of these diseases.

Soybeans (Glycine max)

Dr. Peter C. Bagley of the Texas A&M University Agricultural Research Center at Beaumont reported that PI's 204331, 208204, 219652, 279088 and 325779 are being used in the breeding program there for general adaptation and seed quality evaluations.

PI's 171451, 229358 and 371609 are being used in the breeding program for foliar feeding insect resistance.

Dr. Richard A. Creelman of the Texas A&M University Agricultural Research Center at Weslaco planted 1300 soybean lines, two replicated variety tests and one soybean fertilizer test in 1979.

14 varieties of VI, VII, and VIII maturity groups are being grown at College Station during 1980 to determine yield and adaptation responses.

Sunflower (Helianthus annuus)

Dr. Raymond D. Brigham of the Texas A&M University Agricultural Research Center at Lubbock reported that PI 229345 originally from Iran is a parent line from which the "Y-branched" character in sunflower was observed in a nursery row at the Lubbock center in 1975.

The "Y-branched" character may have potential in a breeding program if it can be stabilized and incorporated in suitable lines or hybrids.

PI 386316 is a short attractive introduction from the Soviet Union that includes germplasm from Argentina. The most useful characteristics of this line are its dwarf nature, large head and large leaves. PI 386316 is being used in a number of crosses by Dr. Freeman K. Johnson at Mission, Texas. PI's 380565, 380577 and 406022 are being used by Dr. Johnson to contribute greater seed length to new sunflower inbred lines.

Sweet Sorghum (Sorghum bicolor)

Dr. Sim A. Reeves of the Texas A&M University Agricultural Research Center at Weslaco tested 27 sweet sorghum varieties and lines for yields of sorghum and sugar per acre. Mer 73-10 produced the highest yield (32.17 tons per acre) of sorghum stalks while the Keller variety had the highest sugar per ton with 212.9 pounds per tons.

The designation of "mer" before a set of numbers indicates that this line was developed at the U. S. Department of Agriculture Sweet Sorghum Field Station at Meridian, Mississippi.

Table 1. The net tons of sorghum and sugar per acre, height, head exertion and bloom dates of nine sweet sorghum varieties. Weslaco, Texas 1978

Variety	Height[1]	Head[2] Exertion	No. of Days to 50% Bloom	Tons Net Sorghum/AC Tns/AC	Tons Sugar/AC[3] Tns/AC
Mer 73-10	107.30"	11.58	105	32.17	2.29
Mer 75-10	109.12	12.33	101	27.02	2.50
Mer 74-8	111.75	13.63	92	25.74	*
Roma	108.30	12.30	92	25.33	2.01
Ramada	106.52	13.22	101	23.71	2.00
Mer 73-7	97.15	13.00	105	20.22	*
Keller	104.92	15.85	72	19.27	2.05
Wray	99.18	15.48	72	19.07	1.90
Rio(check)	107.97	12.43	72	18.70	1.88

*Discarded RDS less than 15.
1 - Inches.
2 - Inches.
3 - Determined on maximum sugar per ton sampling.

Table 2. The net tons sorghum and sugar per acre along with height, head exertion and blooming dates for nineteen lines in a sweet sorghum nursery test. Weslaco, Texas, 1978

Variety	Height	Head Exertion	No. of Days to 50% Bloom	Sorghum Tns/AC	Sugar Tns/AC[1]
Mer 76-8	124.83	11.58	114	44.26	2.32
Mer 76-4	115.25	12.72	114	37.51	*
Mer 74-2	133.30	12.50	105	36.32	2.55
Mer 77-7	121.67	9.69	105	35.25	*
Mer 77-3	119.44	10.69	114	32.32	2.33
Mer 76-7	120.61	13.67	101	32.07	2.29
Mer 76-2	120.14	17.00	105	30.39	1.63
Mer 73-12	133.78	13.31	101	29.70	2.51
Mer 77-6	115.17	9.38	101	28.96	*
Mer 76-3	112.58	12.53	92	28.07	2.17
Mer 76-1	103.83	12.72	101	27.52	*
Mer 77-5	118.28	14.20	105	26.74	1.94
Mer 73-4	111.25	12.88	106	20.50	*
Mer 77-8	115.86	13.83	77	19.10	1.22
Mer 77-4	96.92	20.58	85	17.95	*
Mer 77-1	104.92	15.67	92	15.80	*
Mer 75-6	93.03	11.06	101	15.74	*
Mer 77-2	104.28	14.19	101	13.38	*
Mer 74-10	91.81	17.61	66	20.09	.81

*Samples discarded never reach over 15 RDS.
[1]Ts/AC were figures on maximum lbs sugar per ton, of the dates samples.

All of these varieties and "Mer" lines were grown at College Station in 1979 with similar yields of sorghum. The sugar determinations were not made at College Station.

The tests with 9 varieties and 29 varieties and lines are being conducted in College Station in 1980.

Forages

Dr. C. L. Gonzalez, Range Scientist with the U.S.D.A.-S.E.A. Southern Region Soil and Water Conservation Research Center at Weslaco, Texas tested the following tropical beans at Weslaco:

Dolichos lablab - PI's 164302, 164772, 180438, 195851, 212996, 212998, 215753, 219696 267705, 280861, 284801, 284802, 288466, 288467, 387994, 388000, 388002, 388003, 388006 and 388019.

Tepary beans (Phaseolus sp.) - PI's 200749, 239050, 319551, 321637, 321638.

These tropical beans are all high in protein (about 16%) and Phosphorus (about .35%). They grow fast and produce enough forage for grazing or hay making in about 45 days. The total forage production yearly in 3 or 4 cuttings average 5 to 8 tons of dry weight. These tropical beans are now being tested for grazing purposes.

Dr. John Sij of the Texas A&M University Agricultural Research Center at Beaumont reported some testing of Meadow-Foam (Limanthes sp.). The plants produced an abundance of flowers which were very attractive to honey bees.

Seed production was rated as poor. The plants were prostrate which made harvesting difficult. Dr. Sij believes that with the right plant type and improved seed development, this plant may have limited potentials as a winter annual.

Dr. Timothy Hunter at the Iowa Park Experiment Station reported that Rape (Brassica campestris) PI 34091 exhibited some natural resistance to insects however, yield was low and plants were short in height. To date some 21 accessions of rape introductions have been received at the Iowa Park Station for testing.

Dr. L. R. Nelson of the Texas A&M University Agricultural Research Center at Overton reported that he and assoicates have planted some 300 orchard grass (Dactylis glomerata) PI selections. These selections are not being screened for their potentials on the bottom land soils of East Texas.

Work planned for next year:

Research in 1980-81 will include sesame studies at eight locations in the State Soybeans studies at College Station, and sweet sorghum studies at College Station.

PUBLICATIONS

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2. Boswell, T. E., O. D. Smith and B. L. Jones. Pot Rot Resistance: Germplasm Evaluation. Proceedings of American Peanut Research and Education Society. 1979.

3. Latigo, G. V. and C. L. Gonzalez. Dolichos lablab, A Potential Forage Legume in South Texas, Can Improve Pastures and Beautify Homes. Journal Rio Grande Valley Horticultural Society, Vol. 33 and pages 121-123. 1979.

4. Pettit, R. E., R. A. Taber, O. D. Smith and B. L. Jones. Reduction of Mycotoxin Contamination in Peanuts Through Resistant Variety Development. Annals of Technical Agriculture 27:343-351. 1977.

5. Ray, L. L. Tamcot A-788 - A New Cytoplasmic Male-sterile Line for Hybrid Cotton Research. Texas Agricultural Experiment Station Leaflet L-1771 September, 1979.

6. Reeves, Sim A., Jr. Sweet Sorghum Variety Yield and Sugar Performance. Texas A&M University Agricultural Experiment Station Progress Report-PR-3646. January, 1980.

7. Smith, Olin D. and T. E. Boswell. Breeding for Resistance to Pod Rot and Lesion Nematodes. Proceedings of the American Peanut and Education Society. 1980.

8. Smith, Olin D., T. E. Boswell and W. H. Thames. Lesion Nematode Resistance in Peanut. Crop Science 18:1008-1011. 1978.

1980 S-9 Technical Committee Report
Virginia Agricultural Experiment Station

A. J. Lewis III
Virginia Representative

A total of 544 accessions were received in 1979; 1939 have been received thus far in 1980. All of these were requested by P. S. Benepal and M. Rangappa (Virginia State University, Petersburg) respectively. Neither provided reports requested for 1980, however previous reports have indicated their interests involves screening Brassica oleracea var. capitata and Phaseolus vulgaris accessions for insect, disease and pollution resistance.

R. L. Boman (Southern Piedmont Research and Continuing Education Center, Blackstone) reports that subterranean clovers continue to show promise as reseeding winter annuals for sections of the state with relatively mild winters. Of 13 accessions seeded in October, 1978, several reseeded in August, 1979. Subjective observations ranked them: (1) Woogenellop, (2) Tallarook, (3) Mt. Barker, (4) Divalganup, (5) Mississippi ecotype, (6) Howard, and (7) Nangeela.

This year's Horticulture Department Variety Trial Garden (Virginia Tech, Blacksburg) contains 450 varieties of flowering ornamental plants. Although none are P. I.'s, many new varieties from numerous foreign and domestic sources are represented.

Eleven vegetative National Arboretum and Glenn Dale accessions were requested in 1980 (J-265-78, J-59-78, J-711-78, 227681, 436991, 437005, 430448, 430449, 262713, 399396 and 436993) for the Horticulture Department Arboretum (Virginia Tech, Blacksburg).

Report of the National Program Staff to NE-9, NC-7, S-9, W-6 1980 Meetings

Quentin Jones

1. NPGS Restructuring Study

On June 27, 1979, Dr. A. R. Bertrand, Director, SEA, asked the National Plant Germplasm Committee to study the organizational aspects and problems of the National Plant Germplasm System. The Committee agreed to do this and appointed a Subcommittee to handle the assignment. The Subcommittee members are: Wilson Foote, (Chairman), Don Barton (in the Philippines, unable to attend), Bill Brown, Bob Hougas, Curtis Jackson, and Quentin Jones. Dr. Bertrand authorized and encouraged the GRIP Management Team's participation in the study.

The Subcommittee had its first structured meeting on January 15, 1980, and a number of meetings since. Participants in the NPGS, line and staff officers of SEA/AR, SEA/CR, the State agricultural Experiment stations, and the Soil Conservation Service were interviewed during these meetings and many more were contacted by phone and letter to ascertain their perceptions and expectations of the NPGS.

The results of this rather broadly-based survey show a general concurrence that the System has a number of serious deficiencies with regard to focus, operations, administrative strength and commitment, general support, user community participation, and planning capabilities.

Based on these results, which parallel its own assessment, the Subcommittee considered a number of alternatives, organizational modes, and program alignments for strengthening the System. These considerations and recommendations, with justification and documentation are being put together in a report to Dr. Bertrand from the Subcommittee. The target date for the report to be in Dr. Bertrand's hands is September 1.

2. The International Plant Genetics Resources Board (IBPGR)

The International Board for Plant Genetic Resources (IBPGR) is an autonomous, international, scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR, which was established by the CGIAR in 1974, is composed of 15 members from 13 countries; its Executive Secretariat is provided by the Food and Agriculture Organization (FAO) of the United Nations, Rome.

The basic function of the IBPGR, as defined by the Consultative Group, is to promote an international network of genetic resources centers to further the collection, conservation, documentation, evaluation and use of germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

The total pledged so far for 1980 is $3,025,000. The five largest donors are: USA ($750,000), Japan ($400,000), World Bank ($365,000), United Kingdom ($270,000), and West Germany ($220,000).

The Board's budget has progressed as follows (rounded to nearest $1,000):

1974 - $53,000	1977 - $1,258,000	1980 - $3,239,000 (approved)
1975 - $487,000	1978 - $2,008,000	1981 - $3,654,000 (projected)
1976 - $915,000	1979 - $2,738,000	

The budget level for 1980 will continue for the forseeable future except for cost-of-living increases (estimated at 10%) or unanticipated program expansion.

Costs of the Secretariat at headquarters in Rome are shared approximately equally between the Board and FAO.

As a new member of the IBPGR, I attended my first meeting 4-7 March, 1980, and first Executive Committee meeting 5-7 May, 1980.

The Board covers a lot of territory in a 2-1/2 day meeting. It hears reports on and discusses activities in each of nine Regions (Europe, Mediterranean, Southwest Asia, South Asia, Southeast Asia, Far East and Pacific, Central and South America, Ethiopia, West and East Africa). It hears reports and takes action on crop activities involving 15-20 crops or crop groups; takes up conservation matters such as base collections and other seed storage facilities; clonal repositories; seed physiology as it relates to storage; training; explorations; publications; and administrative matters including budget and program planning.

I will just touch on some of the highlights of the Board's current activities.

Quinquennial Review

The Technical Advisory Committee (TAC) to CGIAR conducted a review of the Board's program, policies, and procedures for the period 1974-1979. TAC will report to CGIAR and then its report will be released. It recommends some changes in emphasis, concepts, and operational procedures, most of which the Board agrees with. There are some fundamental concept disagreements which may be resolved before the report is released.

Rolling Five-Year Plan of Action

The Secretariat has taken a first cut at a draft of such a plan. Activities to be included are:

* Exploration and collection
* Conservation
* Evaluation (preliminary) and utilization
* Documentation

Supporting functions in training, research, and administration will also be included in the plan.

The Executive Committee recommended that the Secretariat call upon crop advisory committees, working groups, and consultants as needed to produce a definitive plan based on the best information available. It is planned to have a draft ready for review by the Executive Committee at its December 1980 meeting.

Directories of germplasm collections around the world

Two documents have been put out in rough draft form for review by institutions and curators. One is a directory to all known seed collections around the world and the other is a directory of collections of vegetatively propagated crops, Part 1. Tropical Species. The Secretariat will need a great deal of help in accurately describing collections and how to access them through proper national and institutional channels.

Working Group on Sweet Potato

This Working Group will meet in early August in Charleston, South Carolina, at the U.S. Vegetable Laboratory to develop basic descriptors for the crop and to consider clonal preservation needs.

Collection of tomato germplasm in Peru and Ecuador

A grant of $17,400 to the Universidad Nacional Agraria, La Molina, to collect tomatoes in northern Peru and southeast Ecuador was approved.

Collection of landraces of maize in Chile

The Board approved $20,636 for the collection of primitive landraces of maize in Chile by the Chilean Agricultural Research Institute (INIA).

Evaluation and characterization of maize germplasm

A proposal for evaluation of maize germplasm in the Southern Cone countries of Latin America, in order to produce racial groupings of the populations to facilitate conservation and utilization, was approved for 2 years at about $43,000. The proposed third year phase, evaluation of composites in different localities to define range of adaptation and genetic potential, was identified as a country or CIMMYT responsibility.

3. Plant Germplasm Team Exchanges with the Peoples Republic of China (PRC)

In 1979 we had our first exchange of teams with the PRC. Our team, headed by Dr. E. V. Wann, Director, U.S. Vegetable Laboratory, Charleston, S.C., consisted of seven scientists with interests in soybean, sorghum and millet, and vegetables. The reciprocal PRC Team also consisted of seven scientists, one of whom was an interpreter. They were interested in oilseed crops, wheat, seed processing equipment, and organization of germplasm systems. Both sides were pleased with the results of this exchange.

In 1980 we are sending two teams for 1 month each. One on wheat, rice, vegetables, and forages will consist of four people, lead by Dr. Doug Dewey. The other will be concerned with medicinal plants and will involve a two-man team lead by Dr. J. A. Duke.

The PRC is sending a five-man team on cotton genetics and germplasm for 1 month and a medicinal plants team of three people for 3 weeks. In addition, the Chinese are sending five people under the Work-Study Program to undertake special studies in genetics and breeding of cotton, peanut, and soybean. These scientists will be in the U.S. for 1 or 2 years. This is not a reciprocal activity so all costs are to be borne by the PRC.

We have to get our plans for CY 1981 exchanges in for review by August 1, 1980. Proposals not in by that date will be considered for CY 1982.

4. Plant Explorations, CY 1980

Exploration plans for this year ran into a number of difficulties. First, the R. Haaland trip to Yugoslavia for forages, which was rescheduled from 1979, was not approved by the Yugoslavs. Secondly, the Rumbaugh and Asay range forages exploration in the USSR fell victim to the Russian's invasion of Afghanistan. Thirdly, the Kehr-Rumbaugh alfalfa exploration in Peru, Bolivia, and Ecuador was cancelled because of political tensions in two of the countries brought on by national elections.

We did not lose the funds. With a good deal of telephoning and exchanges of letters, we effectively reassigned funds to support: Alfalfa collection in Chile (W. R. Kehr); alfalfa collection in the U.S. and Canada (Rumbaugh and Wilton); wild sunflower, U.S. and Canada (C. E. Rogers and L. Cuk); dogwoods of New England (P. Hepler).

The cucurbits exploration in Mexico (Knight & Whitaker) went off as planned. Dr. Van der Zwet is now in Eastern Europe collecting apples and pears. Dr. Pellet's azalea and rhododendron collecting in northeastern U.S. is in its third and final year.

5. New Crops

Guayule is the hottest item in new crops at the moment. Legislation is pending which would provide $1.2 million for research on this domestic rubber source in FY 1981. This proposed increase would be implemented equally between SEA/AR and SEA/CR ($600,000 each). Detailed implementation plans are being developed.

S-9 Technical Committee Report
Subtropical Horticulture Research Station
Miami, Florida
August 8, 1980

R. J. Knight, Jr. and P. K. Soderholm

DISTRIBUTIONS AND INTRODUCTIONS.--Plant distributions through the year that began on 1 June 1979 totalled 845, with the largest quantity, 42.49% of the total, going to cooperators in Florida and the next largest quantity, nearly 14%, going to the rest of the United States (except California) and Canada. South America received over 10% of the station's distributions, and nearly 8% went to Mexico and Central America. Hawaii, Puerto Rico and the Virgin Islands received 7.45% of all distributions, and more than 4 but less than 5% went to countries in Africa, the Pacific Basin, Asia, and California, respectively (See Table 1). Introductions received at the Miami station during the same period totalled 687 (See Table 2).

PLANT EXPLORATIONS.--R. J. Knight and T. W. Whitaker spent 6 weeks in Mexico (October 9 through November 22) collecting Cucurbitaceae (see map). A total of 183 collections of Cucurbita species were made, plus 16 related genera. An additional 94 introductions were collected of ornamental, chemurgic and fruit crops. The largest collections in this group were of wild marigolds (Tagetes spp., 19 introductions) and zinnias (17 introductions). An additional 31 fruits and ornamentals were collected by Knight in Chiapas state, Mexico and the Peten department of Guatemala during mid and late February 1980. This supplemented 56 fruits and ornamentals he collected in Chiapas in May 1979, including the seeds of Eugenia biflora that produced the plants distributed in 1980.

1980 PLANT DISTRIBUTION.--Twenty-six introductions of tropical and subtropical ornamental plants, four of which bear edible fruits, were distributed from the Miami station in 1980. Of interest in the group are Chrysothemis pulchella 'Amazon', a colorful, sun-tolerant gesneriad, and Eugenia biflora, a fine-leaved Mexican species that may offer possibilities as an indoor living Christmas tree. Ixora coccinea 'Thai Dwarf' is of value for its compact growth habit, but its flowers are less vivid than the most colorful cultivars. It may offer possibilities of breeding an improved group of dwarf cultivars. A list of the plants distributed this year follows, with brief descriptions where available.

U.S. SUBTROPICAL HORTICULTURE RESEARCH STATION
1980 Plant Distribution

Plant Descriptions

Agave sp.----------Agavaceae----------M 26352

Origin of seeds: collected from plant on USDA Station; medium-sized Agave with gray-green leaves, deeply serrated; attractive ornamental. Seeds only.

Aglaonema costatum f. virescens.-------Araceae----------M 22463
P.I. 354158

Collected Lae Botanic Garden, New Guinea. A herbaceous plant with creeping stem; leaves to 20 cm ovate, yellow-green, spotted irregularly with white, slow growing. Propagated by cuttings.

Arecastrum romanzoffianum.----------Palmae----------M 24881
P.I. 424693

Origin S. Brazil to Argentina. Queen palm; a tall palm to 30 m. Terminal crown of dark green pinnate leaves. Collected in Curitiba, Parana, Brazil, about 26° latitude.

Bignonia echinata.----------Bignoniaceae----------M 25473
P.I. 438607

Collected in the wild semi-arid region of Mexico. A woody evergreen climber, leaves opposite, compound; leaflets 2, with terminal tendril; flowers large in axillary cymes; can be grown as a wall cover; propagated by cuttings.

Chrysothemis pulchella, 'Amazon'.------Gesneriaceae----------M 24801
P.I. 424916

Collected in the wild in the Amazon region. Herb to 20 cm tall; leaves opposite, elliptical, dark green above, purplish below. Flowers 15 cm long, have orange-red calyx 1.5 cm long and tubular petals, yellow, 2 cm long. It makes an attractive potted plant and hanging basket, and is easily propagated from cuttings.

Delonix Regia.----------Leguminosae----------M 24764
P.I. 424644

Collected in Corrientes Province, Argentina. Royal Poinciana. This one differs from others in that the flowers are basically yellow with red petal tips on upper surface. Tree to 7 m.

Dorstenia sp.----------Moraceae----------M 24066

Origin: Australia. A tropical herb to 46 cm; leaves large, elliptic and dark green. The fig, which is borne on a long stem above the plant, is a flattened or cup-like receptacle which represents an intermediate stage of development between the edible fig and other plants in the genus. Excellent for pot culture. Reproduces rapidly from seed.

Eugenia biflora.----------Myrtaceae----------M 25567

Collected in Chiapas, Mexico. Common Mexican name "Pirul". Large shrub or small tree to 8 m in height with very fine leaves resembling a conifer. Small white flowers with many stamens. Fruit is a small dark blue to black sweet berry to 10 mm diameter with one or two small round seeds. Probably not cold tolerant. Propagated by seed.

Eugenia brasiliensis "Grumichama"------Myrtaceae----------M 24716
P.I. 424754

Collected from a cultivated tree in Brazil. A tree to 15 m; leaves elliptic to obovate to 12 cm long tapering at base; flowers white, solitary on peduncles to 5 cm long; fruit the size of a cherry, dark red, later black. Fruit is pleasant to eat when fresh and also makes good jellies, pies and candied fruit.

Gliricidia sepium.----------Leguminosae----------M 25775

Collected in Costa Rica. Common name "Madero Negro". Tree to about 10m; leaves odd-pinnate; flowers rose-pink to white in large ornamental clusters; seeds said to be poisonous if eaten.

Guaiacum sanctum.----------Zygophyllaceae----------M 25477
P.I. 438841

Collected on Oaxaca, Mexico. Common name Lignum-vitae. Large shrub or tree sometimes 10 m; slow growing; flowers purple; leaves dark green pinnate; resistant to salt spray. Attractive ornamental; also native to south Florida.

Hippeastrum sp.----------Amaryllidaceae----------M 25372
P.I. 430579

Collected in Corrientes Province, Argentina. No further description available.

Ixora coccinea 'Thai Dwarf'.----------Rubiaceae----------M 22495
P.I. 413760

Received from Thailand. Handsome compact bush with small fine opposite leaves, flowers light red-orange. Very good plant for dwarf hedge to 1 m tall. Cuttings root easily.

Lucuma sp.----------Sapotaceae----------M 25368

Open-pollinated seedlings of P.I. 142216 growing on USDA Station, Miami. Original tree from Panama. A 7 m tree of pleasing shape. Flowers in June. Fruits 3-4 cm diameter rounded, dryish, sweet pulp. Edible but not outstanding.

Monstera dubia.----------Araceae----------M 25621

Collected in the wild in Acre State, Brazil. A very handsome climber; juvenile leaves are heart shaped with silver markings. Leaves overlap. Mature leaves like M. deliciosa but more pinnately cut. Excellent totem-pole subject. Rapid grower.

Nerium oleander 'Petite Pink'.----------Apocynaceae----------M 25188

Original plants received from the Los Angeles State and County Arboretum. A dwarf variety with light pink flowers; cuttings root easily.

Nicolaia elatior.----------Zingiberaceae----------M 25692

Received from Mayaguez, Puerto Rico. Common name Torch Ginger or Philippine Waxflower. Leafy stems to 5 m; leaves linear-to-oblong-lanceolate to 60 cm long, 15 cm wide. Flower bracts waxy, red, margined with pink, to 12 cm long; inner bracts 5 cm long; corolla red. Seedlings available.

Phyllanthus acidus.----------Euphorbiaceae----------M 25561

Collected in Chiapas, Mexico. Common names are Otaheite Gooseberry, Grosella. It is a shrub or small tree up to 6 m; leaves ovate and pinnate 3 to 5 cm long; flowers usually on separate branches below foliage; fruit angled, 2 cm in diameter, thick and fleshy.

Piper nigrum 'Kudravali'.----------Piperaceae----------M 14875
P.I. 212965

Origin: India common black pepper. Climbing vine; leaves ovate; berries red when mature. Hardy enough to grow outdoors in south Florida. Can be grown as a totem-pole plant. Propagated by cuttings.

Randia sp.----------Rubiaceae----------M 25466
P.I. 438926

Collected in the wild in Chiapas, Mexico. A shrub to 3 m armed with spines at nodes; leaves are light-green and whorled at nodes; fruit globose, ribbed, 8 cm long, 1 cm thick, dull orange. Propagation by seeds.

Schinopsis balansae.----------Anacardiaceae----------M 24758
P.I. 424661

Collected in the wild in Argentina. A tree 25 m tall with upright scrubby growth; simple leaves similar to willow oak; flowers small, inconspicuous; has one of the most durable woods known. Grown from seeds only.

Senecio sp.----------Compositae----------M 25022

Bought in market in Bangkok, Thailand. A medicinal plant. Leaves dark purple above with green veins below; dentate. Bright orange flowers.

Tabebuia sp.----------Bignoniaceae----------M 25464
P.I. 438600

Cultivated in Guatemala. Tree to 15 m; flowers large and pinkish. Propagated by seed.

Tabebuia sp.----------Bignoniaceae----------M 25465
P.I. 438601

Collected in the wild in Guatemala. Medium-sized tree with orchid-lavender flowers with yellow throat, 4 cm long and 5 cm wide. Propagated by seed.

Thevetia sp.----------Apocynaceae----------M 25900

Collected in Chiapas, Mexico. Ornamental shrub with dark, glossy leaves and brilliant red two-lobed fruit.

Undetermined.----------Amaryllidaceae----------M 24762
P.I. 424669

Collected in the wild in Corrientes Province, Argentina. Plant to 15 cm tall. No further description.

Table 1. Distributions of Plant Introductions from USDA/SEA/AR, Miami, Florida from 1 June 1979 through 31 May 1980

Destination	Number	Percent of Total
Florida	359	42.49
California	35	4.14
Rest of Continental U.S. and Canada	118	13.96
Hawaii, Puerto Rico, and Virgin Islands	63	7.45
Mexico and Central America	67	7.93
South America	88	10.41
Europe	1	0.12
Asia	37	4.38
Africa	39	4.62
Pacific Basin [z]	38	4.50
Total:	845	Total: 100.00

[z] Australia, Guam, New Zealand, Philippines, Pacific Islands

Table 2. Germplasm Receipts at USDA/SEA/AR, Miami, Florida, from 1 June 1979 through 31 May 1980

Material	Number of Introductions received
Miscellaneous ornamentals and shade trees (includes orchids and ferns)	119
Tropical and subtropical fruits	354
Cacao	52
Coffee	112
Medicinal, chemurgic, and tropical vegetables	50
Total:	687

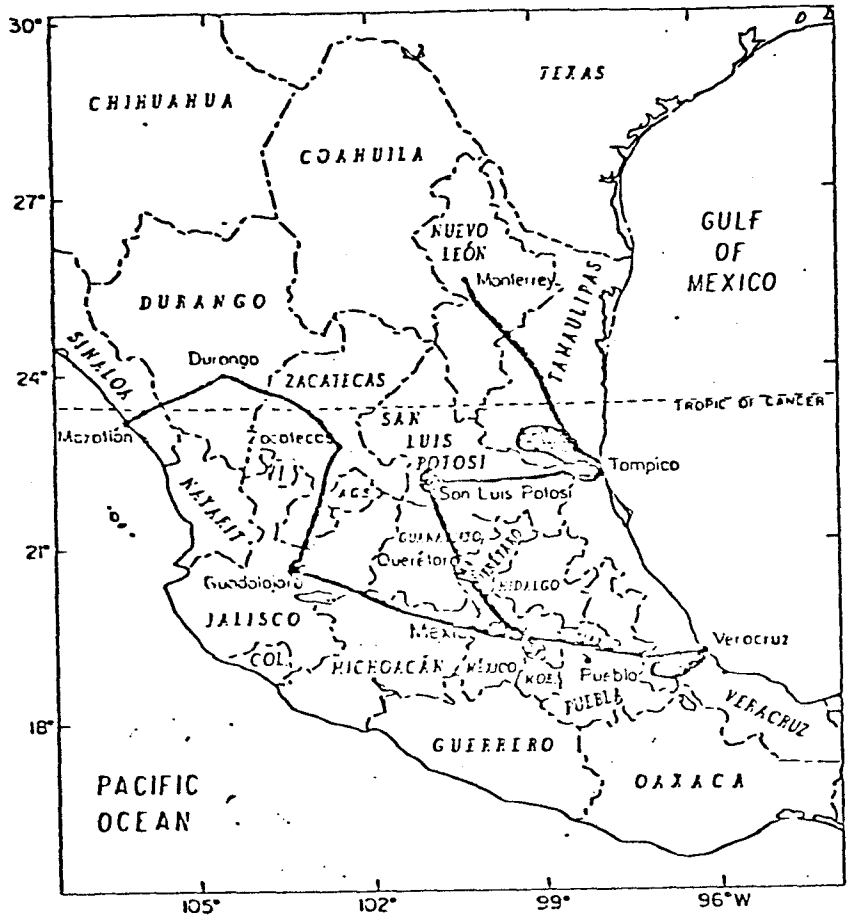

Fig. 1. Map showing the route of the Knight-Whitaker expedition to collect Cucurbita in Mexico. The main collection areas were: (1) Tampico-Valles-Ocampo; (2) San Luis Potosi; (3) Celaya-Queretaro; (4) Veracruz; and (5) Zacatecas-Durango-Mazatlan. Additional collections were made in the vicinity of Tapachula, Chiapas (not shown).

NEEM.--Neem tree, Azadirachta indica (P.I. 137990) shows promise as a crop for warm arid lands, the source of a substance that repels the Japanese beetle. Twenty-three seedlings grew from 60 seeds that resulted from self-pollination of the parent tree in 1979. Approximately 26% of the seedlings were weak, probably from inbreeding depression, but the balance are developing normally. Scions of neem were demonstrated in summer 1979 to unite readily when placed on stocks of the same species in the side-veneer graft customarily employed in southern Florida to propagate the mango and avocado.

Twenty-five seeds of Neem, P.I. 137990, were sent to Dr. Martin Jacobson, USDA, Betlsville, Maryland, who re-distributed some of them to the Mayaguez Institute of Tropical Agriculture (MITA) in Puerto Rico for propagation and further testing.

PASSION FRUIT.--P.I. 424814, an introduction of the purple passion fruit (Passiflora edulis Sims) collected wild in southern Brazil in 1978, extends this crop's season by blooming a month earlier (beginning in February) than other introductions, and re-blooming in autumn (through mid-November), as other introductions of this type of passion fruit have failed to do. This introduction also shows more self-incompatibility than other purple passion fruit introductions, and probably is much more heterozygous.

Seedlings of various self-compatible introductions of yellow passion fruit, out-crossed and inbred, began to flower in spring 1980. A few show promise in combining vigor with a high degree of self-compatibility.

PUBLICATIONS

Crocker, T. E., Sherman, W. B., and Knight, R. J., Jr. 1979. Self-unfruitfulness of 'Anna' apple. Fruit Varieties J. 33:65-66.

Shaw, P. E., Wilson, C. W. III, and Knight, R. J., Jr. 1980. High performance liquid chromatographic analysis of D-manno heptulose, perseitol glucose, and fructose in avocado cultivars. J. Agric. Food Chem. 28(2):379-382.

Knight, R. J., Jr. and Sauls, J. W. 1980. The Passion Fruit, Fruit Fact Sheet No. 60. IFAS, University of Florida, Gainesville.

S-9 Technical Committee
Report of the USDA-Soil Conservation Service
August 8 & 9, 1980

This report of the Soil Conservation Service studies with introduced plants is presented in two parts. The first section deals with those plants that are in some stage of initial evaluation at the Knox City, Texas, Coffeeville, Mississippi, Americus, Georgia, or Brooksville, Florida Plant Materials Centers.

The second phase of the report briefly summarizes observations of plant performance selected for advanced testing in field conditions.

In addition to the foreign plant introductions, major emphasis has been placed on collecting and evaluating large assemblies of native plants with potential for solving the high priority problems identified in the south.

Summary of foreign plant introductions at the Soil Conservation Service Plant Materials Centers.

Plant Materials Center	*Initial Evaluation*	*Advanced Evaluation*
Brooksville, Florida	*251*	*9*
Americus, Georgia	*208*	*40*
Coffeeville, Mississippi	*108*	*8*
Knox City, Texas	*181*	*3*

In addition, several large assemblies of select species are being evaluated in cooperation, and at the request of, other agency personnel. These plants resulted from their breeding, or selection work. Many of them do not have PI numbers, but are of foreign origin.

Plant introductions that have superior characteristics are selected for advanced study at the PMC's, in controlled off center studies and for final evaluations by Soil & Water Conservation District Cooperators. A brief summary of plant performance follows:

Arachis benthamii, PI-338282 - *Is a stoloniferous perennial peanut from Brazil. The leaves are shorter and wider than the Arbrook peanut. The leaves are 3.5-4.5 cm long and 1.5-2.5 cm wide. The large stems support a generally erect growth habit (50-60 cm high). It possesses a deeply penetrating system of tap roots. This characteristic gives this legume a high potential for use on well-drained soils. PI-338282 roots readily from vegetative cuttings.*

Because it does not produce rhizomes, it has good potential as a border crop or as a ground cover where control of plant spread is necessary. The growth period, insect and disease resistance and forage production closely parallel the Arbrook perennial peanut. Roush.

Arachis glabrata, PI-262817 - *Is a rhizomatous, perennial peanut introduced from Braziel. The leaves and stems are larger than the recently released Florigraze (PI-421707) perennial peanut. They are approximately 4.0-5.0 cm long, 1.5-2 cm wide. The larger stems give it a more erect habit, with heights to 50 cm. It is very drought resistant with tap roots penetrating downward in the soil more than 100 cm. This characteristic gives it high potential for use on well-drained soils. Annual forage production is generally considered to be equal to the Arblick peanut, which normally produces 6.75-9.00 metric tons of air dry forage per hectare in a growing year. Roush.*

The largest number of evaluation plantings are with PI-262817, Arachis glabrata which is now being evaluated with "Floragraze" forage peanut, a new release from Florida that should be readily available from producers in Florida in the winter of 1981-2. PI-262817 looks promosing as it appears to have more of a tap root than "Floragraze" and can probably withstand droughty conditions better than "Floragraze." Smith.

Arachis moticola, PI-263393 - *Plantings of these accessions were made in Pensacola bhaiagrass sod at several locations on roadbanks to evaluate them for adaptation and for attractiveness during the flowering season. A good stand was obtained, but seedlings were killed by Rhizoctonia solani. Haynsworth.*

A large growing plant with good qualities. Powell.

Arachis sp., PI-338279 & PI-338280 - *This spreading annual shows promise for use on road shoulders and banks. It has showy flowers. The fields are heavily dug by wildlife during the dormant season. Powell.*

These were also severely affected by Rhizoctonia solani. Haynsworth.

Castanopsis sclerophylla, PI-95630 - *This evergreen plant does not transplant well as bare root stock. Fair survival has been obtained when plants are given good care. Generally, growth has been slow. Some plants grown on Lakeland sand in the Coastal Plain have exhibited a manganese deficiency. Growth and appearance have been some better in the Piedmont. Haynsworth.*

Coronilla varia, PI-204871, PI-325260 & PI-346776 - *These crown vetches reseed well, spread by rhizomes and show promise for use as ground covers in the south. Powell.*

Dichanthium sp., PI-421783 old world bluestem (PMT-587) - *This perennial warm-season forage grass has good potential for increasing forage production in the more acid portions of Texas. It is widely adapted and extremely drought resistant. It grows rapidly when moisture is present and palatability appears to be acceptable. Protein content averages approximately 5% through the growing season. IVDMD averages better than 50%. Lorenz.*

Plantings throughout the state of Texas have proven this composite of several old world types to be widely adapted for range, pasture, and critical area seedings. Cattle have shown preference to T-587 and forage production of this accession has been greater than many of the other bluestem types such as 'K-R' and 'Plains'. This plant should be informally released in 1980-1. Heizer.

Digitaria macroglossa, PI-299648 - *A perennial bunchgrass, is being evaluated as a plant for erosion control on coastal dunes. As a bunchgrass that produces little, if any, viable seed, the plantings five years later have changed very little from the original row plantings. Beach dune plantings of potted material have been highly successful in plant hardiness zone 10a and southward. Plants have been propagated vegetatively under greenhouse conditions and these plants have a high survival rate at the beach. The question that must be answered is: Will this plant be accepted for use by state governmental agencies and then by the public for use on coastal dunes when native grasses like sea oats, Uniola paniculata and bitter panicum, Panicum amarum are so well adapted and can be readily propagated under less restrictive conditions. Smith*

Long fingergrass is not cold hardy. Because of the means required for reporduction, it is not being considered for forage use. Some moderate insect damage has been observed by army worms and other leaf eating larvae. Roush.

Clycine ussuriensis, PI-163453 - *This is an annual, twining type soybean which produces a good amount of forage and seed. Seed are small, olive green to black in color, and shatter soon after ripening. They are good food for both songbirds and gamebirds. The plant is a good re-seeder, with a light disking improving the stand. Some type of support crop improves seed yield and makes harvest easier. Billingsley.*

PI-163453 produces seeds that are excellent food for quails and doves. In the 1979 field plantings, most were reported as failures. This, I think, was the fault of the weather and other conditions and not the plant. Some plantings were devoured by deer before they had a chance to produce seeds. Wolfe.

Hemarthria altissima, Limpograss, PI-364875 - *Is an "unnamed" accession from South Africa. It is a stoloniferous, perennial grass of the tribe Andropogoneae. To date, three limpograsses have been released. They are 'Redalta', 'Greenalta' and 'Bigalta'.*

The abundant green leaves of this accession are broader and longer than those of Redalta. The stems are more coarse than Redalta, which suggests that 364875 may also be used as green chop feed or as silage as well as for hay or direct grazing. Establishment is made vegetatively as very little seed is produced.

Cold tolerance compares favorably with Redalta. Seasonal growth and disease resistance parallel Redalta.

Additional field plantings should be made to determine the ranges of geographic and soil adaptability. Further study should include digestability and nutrient content tests. Roush.

It has been planted on a sewage spray area at St. Petersburg along with 'Redalta' limpograss. 'Bigalta' was not available at that time to be used as a standard. PI-364875 produced a thicker stand and production was greater. Smith.

Hemarthria altissima, 'Redalta', PI-299993 - *Establishment has been slow under field conditions where weed competition is a problem. Once a good stand is established, it tends to suppress weeds very well. In some situations, the stand has been damaged when excessive top growth is left over winter. It appears this grass will be restricted to the Coastal Plain and possibly the lower part of it. Haynsworth.*

A fairly cold hardy forage grass that has many of the good characteristics of bermudagrass. It is reported by some to hold higher feeding value after frosting than most grasses. Powell.

Hemarthria altissima, PI-364344 - *This is by far the most cold hardy of more than twenty accessions of Hemarthria tested at Coffeeville. This grass spreads rapidly by stolons and produces a good volume of leaves and tender stems. It should be good forage. This plant is able to withstand competition well. Propagation is by means of stolons. Billingsley.*

Indigofera pseudotinctoria, PI-197015 - *Best success has been obtained from transplanted plants. Obtaining good stands from seed has been difficult. This plant is being evaluated for aiding in erosion control on roadbanks, minespoil, and streambanks. Haynsworth.*

A large rooted legume that will grow in deep sands. A possible forage plant. Difficulty of seed harvest and low seedling vigor are drawbacks. Powell.

Juniperus conferta, PI-323932 - *'Emerald' Seashore Juniper - A plant being used as a ground cover in our area and also for planting on inner dunes near the seacoast. Powell.*

Lespedeza cuneata, PI-421873 - *This vigorous perennial legume is being evaluated on soils of the Coastal Plain for erosion control on roadbanks and for forage and hay production. Haynsworth.*

This is being tested for adaptability further south than other sericeas. Powell.

Lespedeza thunbergii, VA-70 shrub lespedeza - *This is a leguminous shrub which grows to a height of about five feet. The woody stems are killed back to the ground each winter and this reduces or even eliminates the need for mowing. New stems are produced from the crown and increase in number annually with up to 40 stems growing in a clump one to two feet across. McDonald.*

Lespedeza virgata, 'Ambro' virgata lespedeza, PI-218004 - *Its attractive appearance, bronze coloration, and deciduous leaves make it a desirable stabilization plant for urban sites. It is being evaluated by the North Carolina Department of Transportation as a roadbank stabilizing plant in several of their districts. It is also being overseeded in tall fescue pastures to evaluate its effect in improving quantity and quality of forage during hot summer months. McDonald.*

'Ambro' virgata lespedeza. This has a spreading type of growth that makes it useful as a highway shoulder cover. Its low height makes it safe to plant on the inside of curves. We maintain the Foundation seed at the Americus PMC. Powell.

Malus baccata, PI-99907 - *This plant normally produces large numbers of apples about one CM in diameter. These fruit ripen in November, and are readily taken by birds. Those not taken may persist on the trees until late winter.*

The plants are multistemmed, and produce a thick growth of lateral branches. Several species of birds regularly nest in these trees. Two or more nests being occuppied in a single tree at one time is not uncommon. Propagation from seed produces plants which uniformly resemble each other and the parent plant. Billingsley.

Although the field plantings were too young to bear fruits, the Siberian crabapple (Malus bacatta, PI-99907) appeared to be growing well and free of disease. Wolfe.

Panicum miliaceum, PI-196292 - *'Dove' proso millet. A superior plant for dove and quail food that has become very popular throughout the South. We maintain Foundation Seed at the Americus, Georgia, PMC. Powell.*

Paspalum nicorae, PI-304004 & PI-310131 - *These two forage grasses resemble bahiagrass but spread by rhizomes instead of stolons which is desirable in some situations. Powell.*

Paspalum vaginatum, PI-410293 - *This plant spreads very rapidly by means of stolons. Seed are produced, but many are destroyed by erogot. This grass appears to be well adapted to very salty, wet areas. It does suffer rather severe winter injury at Coffeeville. Billingsley.*

Pennisetum purpureum, Napiergrass, PI-300086- *Is a perennial bunch type grass. Its fast rate of growth and height are well documented at the Plant Materials Center at Brooksville. Heights of 3-4 meters have been obtained with yields of 135-157 metric tons per hectare. Reproduction is accomplished by planting 2-3 node stalk sections which root and sprout from the nodes.*

Napiergrass will tolerate light frost and a broad range of soils. It has made exceptional growth on deep droughty sands.

Because of the extremely rapid growth rate, this introduction has a high forage potential as green chop feed or silage. Roush.

While SCS was mainly interested in this plant as a windbreak plant for vegetable fields, the SWCD cooperators are more interested in it as a forage plant. It is capable of producing a heavy tonnage of forage material and makes good grazing. One cooperator in Polk SWCD is using his planting for pasture. It is doing well and his cattle readily eat it and are doing well on it. Smith.

Pinus brutia, afghanistan pine (PMT-4018), PI-362153 - *This pine is adapted to hot, arid conditions where rain is usually received only in the winter months. The trees shape, color, and rapid growth rate give it potential for use in landscaping, windbreaks, and Christmas tree production. Lorenz.*

Pistacia chinensis, PI-21970 - *This is an attractive tree with good fall color. It has survived and grown good on moist, fertile soils. Planting locations should always have full sun and adequate space for good spread of limbs. Haynsworth.*

A shade tree with beautiful fall foliage. The fruit is eaten some by birds. Powell.

Quercus myrsinaefolia, PI-74222 - *As an evergreen tree, it does not transplant well as bare root stock. This is an attractive specimen tree when planted in full sun with space to allow for spreading growth. Moist, fertile soil is preferred. Haynsworth.*

Recent Publications:

"Redalta, Greenalta and Bigalta Limpograss, Hemarthria altissima, Promising Forages for Florida", Bulletin 802, published by Agricultural Experiment Stations, IFAS, University of Florida, Gainesville, in cooperation with USDA Soil Conservation Service. K.H. Quesenberry, L.S. Dunavin, Jr., E.M. Hodges, G.B. Killinger, A.E. Kretschmer, Jr., W.R. Ocumpauch, R.D. Roush, O.C. Ruelke, S.C. Shank, D.C. Smith, G.H. Snyder and R.L. Stanley.

"Research Continues for Improved Wildflower Strains" - News Release - J. Walstrom.

"Plant Materials Solve Conservation Problems" - News Release - J. Walstrom.

"New Plants for Conservation Uses" - Kansas Wildflower News - J. Walstrom.

"Digger Pine for Windbreaks in Oklahoma" - Tree Planter Notes" - Norman Smola, SCS, Stillwater, Oklahoma

"How Many Bobwhites Do You Want" - FCX Carolina Cooperator - J.V. McDonald & F. Jeter.

"Yield and N Content of Closely Clipped Bahiagrass as Affected by N Treatments" - Agronomy Journal - E.R. Beaty, K.H. Tan, R.A. Creery, J.D. Powell.

"Herbicides for Weed Control During Establishment of Arrowleaf Clover" -The University of Georgia, College of Agriculture, Experiment Stations, Research Report 324 - A.E. Smith, J.D. Powell.

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July 1980

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

Laboratory Personnel

Several changes in personnel and research programs occurred during the past year. Harold Winters retired as Laboratory Chief in February after a long and industrious career. Harold's career spanned four decades; it began with his work on the agricultural census in Washington in 1940 and culminated in Beltsville in 1980. During his career Harold made significant contributions, particularly to tropical and subtropical agriculture through his many research publications. One such publication, "Vegetable Gardening in the Tropics", became a classic in its field. The position of Laboratory Chief has been filled on a rotating basis since Harold's retirement. Dr. J. C. Craddock, Curator of the World Collection of Small Grains, and his assistant, Mrs. June Jones, both retired simultaneously in August, 1979. Dr. David H. Smith, Jr. has replaced Dr. Craddock as Curator of the Small Grains Collection.

Some changes in support personnel occurred within the Laboratory during the past year. Mrs. Alma Delpy, secretary at the Glenn Dale Plant Introduction Station, retired after over two decades of service. Mr. H. T. Jane, plant propagator at Glenn Dale, was placed on extended sick leave following a serious on-the-job accident in late 1979. Other changes in support personnel also occurred in the laboratory during the year.

In May, 1980, Dr. T. Austin Campbell, Research Agronomist, received the Ph.D. degree from the University of Maryland.

Program Review

A review of the research programs of the Germplasm Resources Laboratory was held on April 8, 1980 before the Regional Director, Area Director, and representatives of the National Program Staff. All permanent support personnel were also invited to attend the review to improve the knowledge transfer and interaction among clerical, technician, and scientific personnel. This review was followed by a written critique from the Area Director. The development and evaluation of new crops for small farms is being continued.

Plant Introduction and Exchange

PI documentation included 5,527 items in 1979 on a new, fully implemented computer system. Vegetables and small grain cereals accounted for more than half of the documented introductions. In addition, 472 shipments of 28,340 items were received from foreign sources and distributed to U.S. scientists. Some of this material has been, or will be, documented with PI numbers. Exchange totals were 181,743 items in 1898 shipments to 118 countries. These totals include about 39,800 samples of cereals and cotton for nursery programs. During 1979, 49 shipments of 724 samples were sent to 21 countries as part of our AID project which services AID missions worldwide.

Considerable progress has been made on documentation of backlogged collections. Some of the collections include:

1. Completed

Collector(s)	Crop(s	Country(ies)	Approx. No. of Accessions
Craddock-Barclay	Cereals	Chile	500
Dewey-Plummer	Forages	Russia	903
Erickson	Vegetables	Brazil	541
Winters-Clark	Tomatoes-cucurbitas	Guatemala-Mexico	420
Knight-Whitaker	Cucurbitas	Mexico	288
Oakes-Brewbaker	Leucaena	Mexico-others	287
--	Soybeans[1/]	Russia	1,444
---	Corn[2/]	Colombia	1,900
Banks, Simpson, Gregory	Peanuts	South America	--
Rawal	Southern pea (Cowpea)	Nigeria-others	1,800
---	Sorghum[3/]	Ethiopia	2,700

1/ Exchange.

2/ Entire collection per NPGC request to introduce various corn collections.

3/ Increase completed in Mexico. Seed not received yet by Plant Introduction Office.

The PIO has received the Colombian corn collection of 1,900 accessions, and documentation is almost complete. The Brazilian corn collection, including recently collected samples from the area of Amazonas near Bolivia, has been promised.

The output of PI documentation in 1980 has been excellent. As of June 27, 5,932 PIs have been assigned. Three data forms were developed for organizing data for input. Serious hardware problems that plagued us in 1979 were corrected. Personnel have become quite competent in the operation of the new system. With the increasing level of explorations, over 600 new plant names have been added to the computer dictionary. We anticipate a print program change soon that will simplify and shorten the PI records. Plant Inventory No. 185 (for 1977) is ready to go to GPO for typesetting and page proofs. No. 186 is still being proofed. Numbers 187 and subsequent issues will be available on a more timely basis since they will be computer generated after PIO editing on camera ready copy, reduced, and printed.

Reidentification Report No. 61 was completed and distributed. Plans call for preparation of No. 62 in September, 1980. It has been suggested that these reports be compiled and computerized by PI number. We concur with the desirability of this approach, but implementation cannot be handled at present.

The Plant Introduction Office (PIO) has provided backup support for all plant explorations and assisted various germplasm and other teams that have traveled and collected plant materials abroad. Foreign scientists from many countries visit the PIO and the Laboratory.

Scientific exchange with the People's Republic of China has resulted in the inclusion of additional Chinese plant germplasm into our collections. The 1979 Team on Vegetables, Soybean, and Sorghum Germplasm was responsible for obtaining about 120 accessions (a few duplicates). U.S. Germplasm Teams to PRC in 1980 include:

1. Germplasm of wheat, soybeans, forage grasses, vegetables
   D. R. Dewey, USDA, Logan, Utah - team leader (forages)
   Rex Thompson, U. of Arizona, Mesa - wheat
   D. Sunderman, Aberdeen, Idaho - wheat
   T. J. Orton, U. of California, Davis - vegetables

2. Germplasm of medicinal plants
   J. A. Duke, USDA, Beltsville - team leader

Mike Faust, Chief of the Fruit Laboratory, just returned (June) from China. He made several contacts that should prove useful relative to fruit germplasm. Further, Dr. Fred Hough, Rutgers University, will be in China through most of August and September. Additional contacts on fruit germplasm and, possibly, cuttings of some fruit cultivars are anticipated.
A Botanical expedition is planned for the Sheng-nung-Chia-Hsien area of

western Hubei Province during the period of August 1 - November 15. One seeondary site for shortterm collection and floristic survey is also planned. This joint expedition of PRC-US botanists should yield considerable ornamental and tree germplasm. Dr. T. R. Dudley, National Arboretum, is a member of the U.S. Delegation. The PIO is requesting the botanical team to collect plant germplasm (both specific and general items) through Dr. Dudley.

Increasingly, quarantine problems for both introduction and exchange are encountered. Some recent modifications in U.S. quarantine regulations follow:

1. Glycine, Dolichos, Pachyrhizus (yam bean), Phaseolus, Pueraria, and Vigna - restricted from Africa, Australia, many Asian countries, USSR, Brazil, Costa Rico, and West Indies because of soybean rust (Phakopsora pachyrhizi). A specified slurry or dust seed treatment takes care of the restriction.

2. Seed of Solanum tuber-bearing species now restricted. Permits can be obtained by qualified scientists.

3. Grapes (vegetative) - now prohibited from all countries (previously Europe). Permits presently in effect at Davis, CA, Geneva, NY, and Corvallis, OR.

Concerning quarantine problems with germplasm exchanges, some progress in solving the problems has been made particularly with organized plant introduction programs such as those in New Zealand, Australia, and South Africa. Further efforts are needed to speed up the flow of plant materials into foreign research programs.

The PIO issued a cooperator's letter during 1979 about movement of plant materials into and out of the United States. This is available upon request. We hope to process collections and other germplasm quicker in the future. The plant material and all associated information are needed to minimize documentation time and errors.

"A blade of grass--a simple flower,
Cull'd from the dewy lea;
These, these shall speak with touching power,
Of change and health to thee".

Agronomic crop germplasm

Foreign exchange of rice germplasm is being continued. Exotic rice germplasm received during 1979 consisted of 443 accessions from 17 countries. Germplasm of 1,600 rice accessions was increased at El Centro, California, in cooperation with the University of California. Dr. McIlrath and his associates increased 3,124 accessions of old germplasm at Crowley, Louisiana, in 1979. This rejuvenated seed is being added to the World Collection.

Work is continuing on the collation, automation, and transfer of rice data to the Rice Data Bank in the Washington Computer Center (WCC). Ten-gram seed samples of the entire collection were transferred to NSSL in the fall of 1979. As a result of this transfer a portion of the World Collection is now stored in NSSL in duplicate samples. The entire collection was transferred to Bldg. 047, BARC-West, during 1979. The new storage building is equipped with new environmental control machinery which is now operating. Additional rice germplasm was transferred from IRRI to NSSL for storage during 1979.

Characterization of the Hemarthria collection was completed for genome composition (chromosome counts), and the determination of leafiness (leaf-stem ratio) was completed. The remainder of the collection is being screened for yellow sugarcane aphid resistance in greenhouse trials.

The addition of data into the WCC wheat research file was continued. Substantial amounts of disease and insect resistance data were entered in the past year. This information was transferred to microfiche and distributed to 208 wheat researchers in the USA. The development of methods and techniques for selecting valuable combinations of germplasm accessions for use in plant improvement programs was initiated. Potentially valuable germplasm for use in plant improvement programs is being selected by use of the computer. Work was initiated on the development of techniques for the selection of multiple pest resistant germplasm from a newly developed data file.

Requests for seed from the Small Grains Collection, numbering 159 from approximately 50 foreign countries and 131 from 31 States, were received and filled. A total of 138,644 samples were shipped. Requests for barley seed exceeded those for all other crops.

Two nurseries for increasing seed and for quarantine of introduced accessions have been planted. One, at the Branch Station of the University of Arizona, Mesa, Arizona, included about 6,700 lines of wheat, barley, oats, rye, and related species. This nursery has been harvested, and the seed is being prepared for storage in the Collection. A smaller nursery is planted at the Branch Station of the University of Idaho, Aberdeen, Idaho.

Horticultural Crop Germplasm, Pathology

Activities at the Glenn Dale, Maryland, Plant Introduction Station during this past year include the following:

Plant introductions received included 85 potatoes, 42 deciduous fruits, 81 camellias, 38 bulb items, 31 grasses, about 50 miscellaneous species, and about 100 miscellaneous ornamental items. Many arrived as a result of SEA collection trips to Central/South America, New Zealand, and Japan. Distribution of germplasm included 70 scions of pome fruits, 301 bulbs, 500 plants or cuttings of woody ornamental crops, 700 coffee plants, 210 of potatoes, 16 of sweet potato, 101 items of seed, and about 50 miscellaneous distributions. Indexing tests for viruses were performed on 50 ornamental introductions. Viruses were isolated from Eucharis, amaryllis, paramongia, Onoseris, and orchids. Apparently three new viruses were detected among the 51 potato introductions. Known viruses were also detected in grasses, pome fruits, and in potato introductions. A low molecular weight RNA associated with cucumber mosaic virus (CMV) but unrelated to CMV has a great effect on the pathogenicity of the virus. It competes with CMV during infection and later within the plants. The net result is a reduction in severity of symptoms normally caused by the virus when alone, e.g. CMV causes severe disease in squash, lima beans, and clover. However, when RNA-5 is present upon inoculation with the virus, the CMV did not infect most clover plants. Where infection occurred, symptoms were much less severe than when CMV alone enters the plants, such as in corn and squash. This RNA may be a first example of biocontrol of viruses at the molecular level.

At Beltsville, MD, the remaining 263 P.I. accessions of Solanum melongena, eggplant, were evaluated for resistance to Verticillium albo-atrum, wilt, in replicated tests under controlled environmental conditions. This completes the preliminary mass evaluation of all eggplant lines presently in the P.I. system. Thirty-six lines were rated resistant/tolerant based on scores of 5 or better/5 plants in each replication on a scale of 0 = dead to 10 = resistant. These 36 lines are being grown at Glenn Dale station this summer for seed increase along with several varieties and the resistant Harrow-Ottawa "strain" of P.I. 176579 kindly furnished to our project by Dr. V. W. Nuttall, Harrow Research Station, Canada. In progress are tests with adjusted inoculum dosages of a virulent isolate to provide some indication possibly of field-type immunity. To test the reaction of selected lines to various isolates, studies are being conducted using a virulent isolate cross-protected with avirulent isolates from other crops as well as using single isolates from other crops individually.

Alternaria brassicicola was isolated from Crambe abyssinica growing in a field plot at Beltsville, MD. This isolate serves as the test organism for evaluative work at Beltsville. A. brassicicola was also isolated from the embryos of three field-grown cultivars of Crambe and several P.I. lines. The internal carriage of the fungus could serve as an inoculum source in the field when the seeds germinate.

New Crops Germplasm

Fifteen grain or vegetable types of Amaranthus were evaluated in the greenhouse for reaction to high exchangeable Al. Three A. tricolor entries demonstrated moderate tolerance. Three A. cruentus, one A. dubius, and 16 A. tricolor vegetable cultivars were evaluated in the field. The latter species produced the lowest yields but had the highest preference by taste panels. The cultivar Chin was preferred to all other cultivars and spinach as a cooked vegetable.

Approximately 1,300 Crambe seedlings were evaluated for Alternaria brassicicola resistance and agronomic desirability in the field. F_3 seeds from 90 plants were screened for Alternaria resistance in the greenhouse. Approximately 800 seedlings from four Crambe introductions were also screened in the greenhouse for Alternaria resistance. Forth-three were selected and crossed with cultivar Meyer. Approximately 30,000 Stokesia laevis seedlings were screened for seedling vigor in the greenhouse; 10,000 were selected for agronomic evaluation in a field nursery. Approximately 1,000 F_2 seeds of kenaf (Hibiscus cannabinus) were planted in the field and subjected to chilling; 440 emerged and 69 were selected based on agronomic desirability. Seed and dry matter samples from 50 Rhus glabra, 56 Asclepias spp., and four Apocynum spp. were collected from Maryland and northern Virginia.

Presentations

Albert J. Oakes presented a paper, "Winter Hardiness in Limpograss Hemarthria altissima (Poir.) Stapf & C. E. Hubb.", at the Soil and Crop Science Society of Florida in October, 1979.

Porter, W. M. and R. C. Kling. 1978. Collecting and computerizing data from cooperative germplasm evaluations. ASA Annual meeting, Chicago, Illinois.

George A. White presented a joint invitational paper (White-Oakes) entitled "Introduction and Documentation of Forage Crop Germplasm" at the 36th Southern Pasture and Forage Crop Improvement Conference in May, 1979.

George A. White presented an invitational paper, "How Plant Introduction and Exchange Works", Symposium on Crop Germplasm, ASA Annual meeting, Fort Collins, Colorado, August, 1979.

George A. White presented a paper, "Plant Germplasm Exchanges with the People's Republic of China", at the annual ASA meeting, Fort Collins, Colorado, August, 1979.

George A. White acted as Chairman of the U.S. Panel on joint panel meetings of United States-Japan National Resources Project on Forage Germplasm Exchange and Evaluation at Beltsville in October, 1979.

Muriel J. O'Brien, as a member of the Collections and Germplasm Committee, American Phytopathological Society, participated in a National Work Conference on Microbial Collections of Major Importance to Agriculture, held at the University of Maryland, March 12-14, 1980. Miss O'Brien co-chaired the section on Preservation and coordinated the section's report for the complete Conference Report derived from all sessions. This is an ongoing project. At the present time, some decisions will be made on conserving and preserving sizeable, major fungal and bacterial collections of crop diseases where the collections are in danger of being abandoned.

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Kahn, R. P., H. E. Waterworth, A. G. Gillaspie, and J. A. Foster. 1979. Detection of viruses or virus-like agents in vegetatively propagated plant importations under quarantine in the United States, 1968-1978. Plant Dis. Reptr. 63: 775-779.

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S-9 Technical Committee Report - 1980
Mayaguez Institute of Tropical Agriculture
SR, SEA, USDA
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TROPICAL PLANT GERM PLASM - José A. Santiago, Ruth Ruberté and Lehel Telek.

Explorations - None.

New Introductions - Cacao - 70 clones from Miami Subtropical Horticulture Station, and Plant Introduction Station, Maryland.

Several seeds of the Neem tree (Azadirachta indica) were obtained and germinated to be field planted soon. This tree reportedly has a number of active medicinal and insecticidal properties.

Evaluations - In cooperation with Dr. Francisco Jordán of the University of Puerto Rico evaluation continues of the fruit trees Durian, Canistel, Pomelo and others introduced from Southeast Asia. Canistel (Lucuma nervosa) has come in to bearing quickly and the fruit have been received favorably. Durian and the Pomelo have been slow to bear and have not set many fruit as yet.

Research - Due to the temporary absence of Dr. F. W. Martin to a ROCAP-IICA, small farmer program in Costa Rica, most of the tropical fruit and vegetable research has been suspended other than the following:

Chemical analysis - Lehel Telek. Plants for production of leaf protein concentrates (LPC) - More than 400 cultivars representing 102 species were received from the Southern Regional Plant Introduction Station, Experiment, Georgia and were planted and evaluated for field production. Chemical analysis included dry matter, protein, and protein extraction and heat fractionation characteristics. Pilot plant scale work gave LPC of good quality and quantity for nutritional evaluation by rats. Ten superior cultivars were identified.

Evaluation of tropical fruit trees - includes Mangosteen, Durian, Canistel, Pomelo, Langsat, Rambutan and Sapote.

Okra seed - African varieties have been added to the collection. Evaluation continued of plant growth, yield, pod set and fruit characteristics, and protein, oil and gossypol determination. Okra flowers were also extracted for potential attractants of fire ants. Seed of 9 okra cultivars were analyzed for toxic cyclopropenoid fatty acids.

Distribution - MITA continues to receive numerous requests from all parts of the world for tropical germ plasm. A summary of these distributions follows:

Germ plasm	Packets	No. of persons	Countries
Vegetable seed	276	95	32
Tubers, yams, etc.	254	30	10
Trees, fruit and nuts	85	40	14
Other trees	46	35	17

In addition, exotic tropical fruit trees have been distributed, in cooperation with UPR in Mayaguez and vicinity--many of these going to public parks. These include:

Mangosteen	- 250
Canistel	- 319
Pejibaye	- 220
Langsat	- 144
Pomelo	- 103
Durian	- 128
Mamey Sapote	- 12
	1176 - to 170 persons

Collections

Cacao collection - Funded in part by the American Cacao Research Institute, a large collection of disease-free clones are maintained by MITA (approximately 4 acres). Distribution to growers and breeders worldwide is one major objective of this work. The P.I. material is screened at Miami Subtropical Horticulture Station and budwood is then sent to Mayaguez for grafting on Amelonado seedlings. These collections consist of 213 established clones, 34 Amelonado seedlings, 53 new grafted clones.

Yam varieties - Dioscorea - 6 species including 17 selections of alata and 6 selections of esculenta. Of these, 5 varieties have been identified as superior.

Vegetables - The following have been investigated relatively recently and seed is available of most. Superior lines have been identified in most of these crops.

Cowpea	Vigna	Squash	Cucurbita
Winged bean	Psophocarpus	Cucumber	Cucumis
Hyacinth bean	Dolichos	Watermelon	Citrullus
Jackbean	Canavalia	Bittergourd	Mamordica
Pepper	Capsicum	Lettuce	Lactuca
Eggplant	Solanum	Pigweed	Amaranthus
Okra	Abelmoschus	Cabbage	Brassica
Tomato	Lycopersicum		

Budget and Personnel - approx.

	MITA	P.R.
Scientific (2)	55,100	
Technician (4)	42,200	
Labor (5)	42,200	15,540
Services	2,000	
Supplies and Equipment	12,400	
Total	153,900	15,540

Problems and Needs. Loss of staff from retirements and transfers has seriously affected the Tropical Plant Germ Plasm research programs at MITA. Increased costs, principally due to inflation, have affected maintenance and field work. Priority long-term research projects with adequate budget and staff could more effectively utilize the tropical location and germ plasm at Mayaguez.

Publications

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CORN AND SORGHUM - Antonio Sotomayor

Plant Explorations - None.

New Germ plasm - Seed Increase. Yemen sorghum collections - 1,200 lines, Robert Voigt, University of Arizona; Sorghum lines - 400 lines, Gilbert Lovell, USDA, Experiment, Georgia; Pearl millet and Teosinte-290 lines, Gilbert Lovell; Sorghum from India - 25 lines.

Evaluations - Corn - superior yellow flints and dents (EVT-13), CIMMYT, Mexico.

Research

MITA Program - development of hybrid field corn by use of local varieties and lines and by use of Colombian and Venezuelan lines. Development of sweet corn by use of Suresweet and Colombian lines.

Cooperative - Corn virus resistance and yield - William Findley, Ohio. Sorghum tropical conversion program - 63 new numbers added - F. Miller, Rosenow and Johnson, Texas A&M. Sorghum, anthracnose resistance - R. Duncan, Georgia. Sorghum, high digestibility in forage - L. Gounley, Mississippi. Sorghum genetics, translocations - O. Webster, Arizona.

Winter Nursery - Corn, insect resistance - L. Darrah and D. Barry, Missouri. Corn, opaque-2 - A. Hallauer and Loesch, Iowa. Sorghum, greenbug resistance - D. Weibel, Oklahoma. Sorghum forage hybrids - H. Gorz, Nebraska. Sorghum, new cytoplasm - K. Schertz, Texas.

Collections in storage.

Sorghum - World Collection	6,916
- Ethiopian	266
- Harlan and DeWet	162
- Cameroon	109

Budget and Personnel

Personnel - Scientific	34,100
Technical	32,400
Workers	24,000
Services	18,500
Cooperative	3,000
Total	112,000

Problems and Needs

a. Research scientists to visit and participate in evaluation during winter season.
b. Additional permanent personnel to carry out program work.

GRAIN LEGUME PRODUCTION - George F. Freytag

Plant Explorations - None.

New Germ Plasm

Phaseolus vulgaris

BGMV tolerant - 5 lines from ICTA and 2 cultivars from Guatemala.
High protein standard cultivars and lines - 63 items from Wisconsin.
Bacterial blight (Xanthomonas) tolerant and resistant lines - 23 lines from Cornell and 4 lines from MITA.

Phaseolus species - seed increase

3 species (microcarpus, anisotrichus, tuerkheimii) from Mexico.

Evaluations - Evaluation of resistant and tolerant P. vulgaris lines and P. coccineus populations and interspecific hybrids to 6 virulent races of Xanthomonas. Several types of resistance have been found apparently corresponding to species (vulgaris, acutifolius, coccineus).

Research

MITA Program - P. vulgaris. Multiple disease resistance for tropics. High protein and low antinutritional factors in dry beans. Improved plant types for high bean yields in the tropics. Development of new variability in populations (gene pools) from interspecific crosses.

Vigna - multiple disease resistance for tropics. High yield in dry seed types and green shell types.

Cooperative - High protein - F. Bliss, Wisconsin. Interspecific crosses and bacterial blight resistance - M. Bassett, Florida. Plant type and high yield - M. W. Adams, Michigan. Xanthomonas resistance - R. Wilkinson, Cornell.

Distributions - 25 advanced lines to 9 foreign cooperators for field trials. 27 releases to 11 U.S. and 15 foreign scientists.

Collections in Storage - approx.

Phaseolus vulgaris	5,273
" coccineus	383
" acutifolius	55
" lunatus	748
" spp. wild	45
Vigna unguiculata	3,406
" " sesquepedalis	9
Vigna others	139

Budget and Personnel - approx.

			MITA	UPR*
Scientific -	(0.2)	GS-13 (UPR)	47,600	8,604
	(1)	GS-12		
	(0.5)	GS-11		
	(0.2)	GS-11		
Technician -	(3)	GS-6 (UPR-AID)	25,296	37,934
	(1.0)	GS-5		
	(0.5)	GS-7		
	(1)	Typist (UPR-AID)		
Laborers	(5)	WG-2 (UPR-AID)	10,200	46,491
	(1)	WG-4		
Travel				2,000
Services			27,500	
Supplies and Equipment			10,000	2,500
		Sub-Total	120,596	97,529
Broad Cooperative Agreements			10,000	
		Total	130,596	97,529

* AID support through University of Puerto Rico.

Problems and needs. This project is mostly funded by temporary funding or other soft monies. More direct, in-house support should be found since this project should continue to provide important germ plasm for grain legumes for some time yet.

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_____ and F. Bliss. 1980. Total protein content of advanced bean lines developed in Puerto Rico. (Abstract - in Spanish.) In XXVI Reunión Anual PCCMCA. P. 82.

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1980 Report of the National Seed Storage Laboratory to the National Plant Germplasm Committee and to the Regional Technical Committees on Plant Germplasm

by

Louis N. Bass, Director

The National Seed Storage Laboratory experienced a very busy year with the receipt and distribution of numerous seed samples, many requests for tours of the Laboratory and talks by members of the professional staff. Over 700 visitors from more than 40 states and 24 foreign countries toured the National Seed Storage Laboratory. This includes several grade school, high school, and college classes and many persons who attended the American Society of Agronomy meetings held in Fort Collins in 1979. The Laboratory also hosted a film crew which made an educational movie on germplasm preservation featuring the National Seed Storage Laboratory and the NC-7 Regional Plant Introduction Station for Deere Inc. The movie was used as part of their educational promotion program during the winter of 1979-1980.

Germplasm Preservation

The 8,979 seed samples added during 1979 brought the total seed lots in storage on December 31, 1979, to 109,038. Approximately 15,000 rice samples and 81,000 small grain samples representing the world collection have been received but not cataloged. During 1979, 2,339 germplasm samples, including 689 virus indicator samples, were distributed to 200 scientists in 36 countries.

Arrangements were made for seed increases of approximately 1,900 accessions that were either low in germination or in number of seeds. Seed increase samples received totaled 2,100. Approximately 20,000 germination and 300 special tests were made on stored and incoming seed samples.

Seventy barley genetic stocks were grown and their characteristics recorded. Also, 187 stocks for marker genes located on/or associated with chromosome maps were increased. New accessions received included 25 stocks for genetic male sterility from Montana, 4 multiple marker stocks for chromosome 6 from Canada, and 8 balanced tertiary trisomics from Arizona. Seeds of 130 genetic stocks were distributed. Linkage mapping studies of chromosomes 1 and 4 found a gene for albino (a_c2) to be located at the proximal segement, less than 30% of the short arm from the centromere. Four genes, f5 for chlorina 5, br for brachytic, f_c for chlorina, and gs3 for glossy sheath and spike were found to be located at the more distal segment of the 1S.

Inventory requests were filled with computer printout seed lists for the requested crops. A new improved computer-assisted information system for inventory maintenance and control was developed and made operational. The new system minimizes cataloging errors through use of check digits and creates computer-printed labels for seed containers and record cards, which reduces transcription errors and processing time for new samples.

Cooperation with IBPGR

The National Seed Storage Laboratory is cooperating with the International Board of Plant Genetic Resources. During the past year, 437 samples of

sorghum from Malawi and 3,000 potato samples from Peru have been received.

Facility Needs

With the increase in rate of acquisition and the additional accessions generated by cooperation with the International Board of Plant Genetic Resources, it appears that the available storage space will be fully utilized within the next 5 to 6 years. A request for planning funds for an addition to the National Seed Storage Laboratory has been submitted, but no money has been allocated.

To conserve as much as possible the remaining storage space, a switch was made from metal cans to heat-sealable moisture-barrier flexible packages. Space occupied by such containers varies with the amount of seed in the container.

For 3 years we have been trying to get the cold storage refrigeration system upgraded to provide longer storage without the need for a seed increase, but each time bids are received they far exceed the funds available.

New Facility

The National Seed Storage Laboratory now has greenhouse space, which should be a big help in increasing seed accessions which cannot be grown in the field and cannot be contracted because of the lack of funds. The greenhouse will also be useful for some aspects of the Laboratory's research program.

Cooperation with GRIP Project

D. C. Clark

The National Seed Storage Laboratory is cooperating with the GRIP project. We have done a preliminary evaluation on the maintenance and control prototype

developed, using data for several genera of vegetable seeds. We are presently evaluating the registry system.

Research Notes

Environmental and Other Factor Effects Upon Seed Viability and Storage

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

Seed moisture content continues to be more critical than surrounding atmosphere to the longevity of 4, 7, and 10% moisture content lettuce seeds stored at temperatures between -12°C and 30°C in sealed metal cans containing air, CO_2, N_2, A, He, or a partial vacuum. Germination tests were not scheduled for other seeds stored under a variety of temperature and relative humidity conditions.

Tests on 130 seed samples stored 1 year in LN_2 showed no damage to viability except for seedcoat cracking in one bean and one radish cultivar. Seeds of 19 tree and shrub species have been stored in LN_2 in cooperation with BLM and FS. Maximum seed moisture content for safe cooling to -196°C has been determined for radish (15%); corn (18-20%); tomato (12-15%); cucumber (15-16%); cauliflower (13-14%); cabbage (12-13%); and carrot (10-14%). Over a 30-day period, seeds of 20 species underwent 15 cycles of cooling to -196°C and rewarming to 20°C with no apparent adverse effects except for one bean cultivar.

Genetic Changes in Seeds During Storage

E. E. Roos

The frequency of chromosomal aberrations observed at first mitosis in root tips of germinating artificially aged barley seeds was correlated with loss of germinability. The frequency of aberrations was markedly reduced after 3 and 5 weeks of plant growth, at meiosis, and in root tips of germinating

seeds produced by plants from aged seeds, which suggests that aberrations induced by aging are eliminated during plant growth and reproduction and are not transmitted to the next generation.

A 3-year study of the effects of deterioration and regeneration on the genetic integrity of mixed populations of bean seeds has resulted in a model for examining the effects of each factor. The number of plants used for regeneration is the most important factor influencing genetic shifts in heterogeneous populations. Storage effects were significant. At 50% germination, the relative survival of individual components ranged from 0.62 to 1.0. Obviously when heterogeneous germplasm stocks are increased, an adequate number of plants must be grown to compensate for selection pressures exerted during storage and regeneration.

Differential deterioration within chlorophyll-deficient isolines of pearl millet at different storage conditions makes questionable the reliability of artificial aging tests for predicting the storability of seed lots within a species. At 21°C/70% RH, three lots showed selective deterioration of the homogeneous chlorophyll-deficient phenotype as compared to the normal green phenotype, but at 32°C/70% RH no differences in longevity between normal and chlorophyll-deficient phenotypes occurred.

Seeds of artificially aged orchardgrass at eight viability levels were evaluated for spring vigor, heading date, anthesis date, number of panicles, plant height, and stem angle in a field trial. No differences were observed between plants from aged and unaged seeds, which indicates that artificial aging to reduce germination had no influence on the genetic expression of the seeds which remained viable.

Storage of Tropical Germplasm

P. C. Stanwood

The National Seed Storage Laboratory has received a 2-year ($150,000) grant from Tropical Agriculture Research funds to study the possibility of using cryogenic techniques to preserve tropical seeds. Dr. Phillip Stanwood is leader of this project, which is being carried out in cooperation with the University of Hawaii.

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Invitational Papers

Roos, E. E. Physiological, biochemical, and genetic changes in seed quality during storage. Joint Meeting of the American Society for Horticultural Science and the American Society of Plant Physiologists. Columbus, Ohio. July 1979.

Bass, L. N. Germplasm preservation. 71st Annual Meeting of the American Society of Agronomy. Fort Collins, Colorado. August 1979.

Technical Presentations

Presented at the S-9 Regional Technical Committee Meeting. Fort Collins, Colorado. August 1979.

Reports of the National Seed Storage Laboratory
Louis N. Bass
D. C. Clark
E. E. Roos
P. C. Stanwood

Presented at the SEA Plant Germplasm Coordinating Committee Meeting and the National Plant Germplasm Committee Meeting. St. Louis, Missouri. September 1979.

Report of the National Seed Storage Laboratory
Louis N. Bass

Presented at the Annual Meeting of the Association of Official Seed Analysts, Saskatoon, Saskatchewan, Canada. June 1979.

Bass, L. N. Storage of lettuce seeds.

Presented at the Annual Meeting of the American Society of Agronomy, Fort Collins, Colorado. August 1979.

Bass, L. N. Storage of lettuce seeds.

Roos, E. E., P. C. Stanwood, and L. N. Bass. Potential genetic losses in seed germplasm resulting from seed deterioration and regeneration.

Stanwood, P. C. Survival of sesame seed at liquid nitrogen temperatures (-196°C)

Moore III, F. D., E. E. Roos, and A. E. McSay. Evaluation of germination data from seed storage experiments.

Murata, M., T. Tsuchiya, and E. Roos. Chromosomal aberrations in plants grown from artificially aged barley seeds.

Presented at the Annual Meeting of the Society for Cryobiology, Atlanta, Georgia. September 1979.

Stanwood, P. C. Seed Cryopreservation.

Presented at the Bean Improvement Cooperative and National Dry Bean Council Research Conference, Minneapolis, Minnesota. November 1979.

Roos, E. E. Physiological, biochemical, and genetic changes in seed quality during storage.

The professional staff gave guest lectures for various classes at Colorado State University during 1979.

Report for 1980 Meetings of the
W-6, NC-7, and S-9 Technical Committees

Northern Regional Research Center

General Developments at NRRC--A major reorganization has taken place at NRRC during the past year. The former Cereal Products and Engineering Laboratories have been combined, and thus a new Biomaterials Conversion Laboratory was created, with new missions, under the leadership of Dr. William M. Doane. Also one of the two SEA Energy Centers was located at NRRC under the leadership of Dr. Edward B. Bagley.

Staffing problems have been alleviated slightly with the creation of several budgeted vacancies and actual recruitment of some scientists and technicians. The Horticultural and Special Crops Laboratory gained several new people, but also lost several through early retirements. One such retirement resulted in a complete collapse of our jojoba research program. Two major vacancies to be filled as yet are for one horticulturist/agronomist and for one analytical/instrumental chemist.

New Crops Screening--Three hundred forty-five seed samples were added to the collection. These samples included the Papaver bracteatum collection from the Regional Plant Introduction Station at Pullman, Washington, seeds collected in India and Australia, and those collected locally in the Peoria area. Of the 54 samples chemically screened, a high of 39% protein was found in Gompholobium latifolium and 49% oil in Trichilia connaroides. Many indicated unusual constituents by thin-layer and gas chromatography and by spectral analysis. Of the 112 samples analyzed for fatty acid composition, 39 were Compositae, many of which contained trans-3 acids. Other unusual fatty acids were observed in seed oils of Dyckia montevidensis (cis-vaccenic), Calendula tomentosa (57% conjugated triene), Asclepias mellodora (8% 16:1), Cynanchum auriculatum (12% 16:1), Entandrophragna angeleuse (17% 16:1), Ephedra intermedia (30% cis-5 acids), and Cuphea micropetala (87% C_{10} saturate).

Discovered in the seed oil of Knema elegans (Myristiaceae) was a new class of anacardic acids with a terminal phenyl group on a C_{10} or C_{12} saturated, or a C_{12} monoenoid connecting chain. These compounds coexisted with the previously known type of anacardic acids. Galbacin and two related lignans were also identified. trans-2-hexadecenoic acid, previously unrecognized as a seed constituent, was isolated from Aster scaber seed oil.

Chemical Analyses and Methods Development--In the continuing program to develop rapeseed as a crop for the northwestern United States, 172 high erucic acid/low glucosinolate Brassica lines were analyzed in cooperation with Oregon State University. Consistent erucic contents of more than 55% were found along with low glucosinolate values. Low erucic acid lines were analyzed for the University of Idaho. Twenty samples of Jessenia oenocarpus were analyzed in conjunction with the Botanical Museum of Harvard University. Fatty acid and amino acid composition in addition to oil percentage was determined.

A new medium resolution mass spectrometer has been made operational. This equipment increases our capabilities by allowing for chemical ionization of compounds and determination of precise molecular formulas.

About 13,000 samples were received from public soybean breeders throughout the United States and Canada. These samples were examined for their oil and protein content by the infrared reflectance method. Samples (4,150) of soybean plant parts were analyzed for nitrogen using a rapid digestion-colorimetric autoanalyzer system. These samples included roots, stems, leaves, pods, and seed and exhibited protein levels from 5 to 50%.

In an effort to search the soybean germplasm collection for low linolenic lines, rapid esterification and gas chromatographic methods were developed. These methods allow us to analyze up to 300 samples per day for fatty acid compositions.

Fatty acid composition was determined on 1,450 soybean samples. Included in these samples were those from the "wild" collection from the University of Illinois and Plant Introduction from Stoneville, Mississippi. Linolenic acid content as high at 25% was found in the "wild" samples. Some accessions from the germplasm collections were as low as 4.3% in linolenic acid.

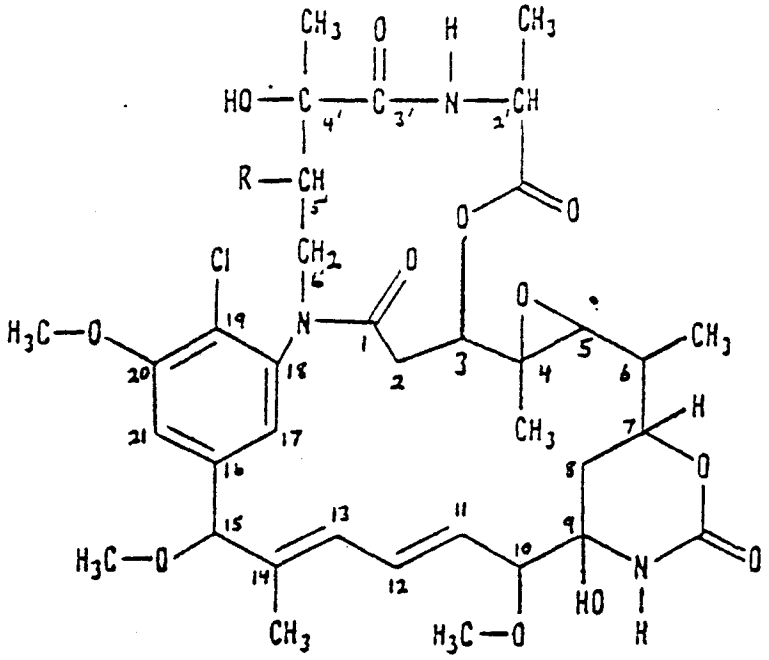
Jojoba--NRRC's jojoba research suffered an irreparable loss in 1979 with Dr. T. K. Miwa's departure under the Department's blanket early retirement option. Effort in support of this promising new crop has been terminated even though public interest continues at an exceptionally high level and much remains to be learned of germplasm, sex determination, cold tolerance, and fruiting. Interestingly, a growth chamber malfunction after Dr. Miwa left led to first-flowering in plants that he had maintained (some as long as 6 years) in the laboratory. This accidental discovery suggests a light-triggered rather than a temperature-triggered mechanism in flowering. It also disclosed that Dr. Miwa inadvertently had been culturing a rather high proportion of male plants.

Vernonia galamensis--Seed of this epoxy-oil plant has many attached fibers that impede oil extraction processes. Heat and moisture treatment (required for lipase inactivation) facilitates fiber removal. Oil produced in pilot-plant equipment is darker in color than oil extracted in the laboratory, but is chromatographically "cleaner." Baked films formed on steel panels in the presence of low levels of metal octoate driers were harder than films formed without driers. The films were exceptionally resistant to attack by acid, alkali, detergent, and organic solvents.

Crambe--A number of 5-acre plots of crambe are again being grown in Kentucky to study herbicide and fertilizer effects and to maintain a supply of viable seed. Our cooperator is Murray State University. Crambe and kenaf are also being grown on sludge-treated stripmine land. Last year's results were disappointing because of poor plant stands and extreme competition from barnyard grass that is associated with the sludge. Word has been received that FDA has tentatively accepted our proposal to use crambe meal as a protein supplement for beef cattle rations. The petition is

in the hands of FDA's legal staff for preparation of the announcement in the Federal Register.

Trewia nudiflora--At least four new maytansinoid alkaloids have been isolated from seed of Trewia nudiflora (Euphorbiaceae). These are highly active antitumor agents in a wide range of experimental tumor systems. The discovery of maytansinoids in the Euphorbiaceae is unexpected since they previously have been restricted to two unrelated plant families. Two of the new alkaloids have unprecedented structures with two macrocyclic rings:



3. TREFLORINE
R = H

4. TRENUDINE
R = OH

These alkaloids are also highly active in controlling European corn borer larvae.

Thevetia thevetioides (yellow oleander)--Fractionation of extracts of seeds (nuts) of this plant, a member of the Apocynaceae, has yielded a naturally occurring pest control agent, neriifolin, which is quite effective against European corn borer larvae (in laboratory tests in which insects are raised on an artificial diet). It also appeared effective in initial trials with another lepidopterous insect, the codling moth (observation of Dr. David Reed, Vincennes).

Taxus wallichiana (Cephalotaxus mannii)--Three new cytotoxic alkaloids have been isolated from this plant and characterized; these are taxanes related to cephalomannine (reported last year). These are: 19-hydroxybaccatin-III, 10-deacetylcephalomannine, and 10-deacetyltaxol; the latter two are anti-leukemic as well as cytotoxic.

Kenaf--As previously reported, newsprint was prepared from 100% kenaf [65% thermomechanical pulp (TMP) and 35% semi-bleached kenaf soda pulp].

Subsequently, kenaf was processed in a pilot facility to TMP, refiner mechanical pulp (RMP), and chemi-refiner mechanical pulp (CRMP). Papers with newsprint properties were formed from 100% TMP and from 100% RMP after each was bleached. The CRMP was brightened excessively (85% compared to 62% newsprint brightness). One consequence of the high brightness was undesirable, low non-newsprint opacity.

The American Newspaper Publishers Association (ANPA) continues to express interest in kenaf for newsprint fiber. During January 1980, ANPA joined with International Paper Sales Company to announce successful trials with the manufacture of several tons of kenaf pulp and paper. Press run tests were conducted at The Miami Herald, Nashville Banner, St. Petersburg Times, Pine Bluff Commercial, The Wall Street Journal, and the Yuma Daily Sun.

Kenaf fiber research has been discontinued at NRRC. Research efforts of the former Fibrous Products Research unit have been redirected and the staff has been combined with other researchers to form Hydrocarbon Plants and Biomass Research. This unit conducts research in three broad areas. Of primary interest to this group is the identification and evaluation of uncultivated plants for whole plant oil and hydrocarbon content as part of a whole plant use program. Marvin O. Bagby, Research Leader, is anxious to add additional species to the collection for screening and to include species from other geographic areas.

Guayule--Guayule, a plant of the arid Southwest United States, is being considered as a possible commercial source of natural rubber in the United States and Mexico. The processing of this plant would leave considerable fibrous residue. Guayule fibers, which resemble hardwood fiber, are short (0.3 mm, average) and form paper sheets of low strength. Blends containing up to 70% guayule pulp admixed with bleached softwood kraft formed papers satisfactory for several purposes.

Botanicals Producing Plants--Three hundred species representing 57 families have been screened for whole plant oil and hydrocarbon content. Forty-two species show sufficient promise to justify additional research. Cultural studies with most species are proceeding at Experiment, Georgia. Several hundred samples, initially screened as sources of biologically active agents, were obtained from Raltech Scientific Services, Inc., Madison, Wisconsin. About 60 new species were collected mainly from the Midwest. Collection emphasized the Leguminosae family.

Natural Toxicants in Vegetables--The ratio of allyl to phenylethyl glucosinolates in 15 horseradish cultivars varies from 2.1 to 8.1. Glucosinolates in the principal cultivars of radish, turnip, and rutabaga have been surveyed. The range, 150-355 μmol/100 g in fresh turnip roots, is in the same order of magnitude as cabbage heads.

The method for falcarinol assay assures 90% recovery in carrots; capability for analysis of oxidized derivatives of falcarinol is now possible as well.

A new cooperative agreement with the University of Wisconsin (P. H. Williams) is underway. Genetics of glucosinolate inheritance, particularly in Raphanus-Brassica crosses will be studied. An additional employee, Dr. Richard Petroski (Ph.D., University of Connecticut), has been added to strengthen the natural toxicant program.

Toxicants in Forage--Lathyrus sylvestrus (flat pea) is being investigated as a possible forage by N. E. Regional Pasture Laboratory, Broomall, Pennsylvania. NRRC is cooperating by assaying the forage for the toxic amino acid, 2,4-diaminobutyric acid. NRRC also is involved in consultation on methodology for the Pasture Laboratory in their research on Brassica forage.

Bioresource Mobilization--Principles and concepts that underlie botanical resources and new crops programs seem destined for wide acceptance as the nation becomes committed by recent domestic and international accords (Synfuels Bill; S-932; Seven-Nation Summit Conference, Venice, June 1980) to end reliance on petroleum during the next decades.

Such expressions of intent bring new significance and immediate importance to knowledge accumulated in NRRC's germplasm characterization programs. The past year alone brought many visitors and numerous written requests and telephone inquiries seeking information on the types of chemicals and their distribution and availability in plant seeds. New programs intend to provide similar information on whole-plant constituents.

Equally important is knowledge that links specific botanochemicals to particular uses in polymers, coatings, lubricants, pesticides, medicines, fuels, etc., or that provides the means to sufficient quantities of highly desired chemicals. Accordingly, activities at NRRC have been broadened to encompass methodologies relating chemical structures to functional properties. For example, computer modeling of lipid molecules and their interactions with other chemicals now seeks to provide preliminary insight into behavior without requiring large amounts of scarce plant material and without extensive in-use evaluations. Where necessary, more direct tests of utility have been miniaturized to reduce time and sample requirements. Microcalorimetry provides a quick estimate of the effectiveness of fatty acid soaps as grease thickeners, and a mini four-ball wear test measures lubricant properties of small oil samples.

Other investigations utilizing plant cell and tissue culture techniques seek knowledge of factors that control the biosynthesis or conversion of specific chemicals and secondary metabolites in dedifferentiated tissue to identify biological options for increasing yields of desired chemicals or removing undesirable constituents. Better understanding of plant metabolism is an additional regular benefit. This year an NRRC-developed hypothesis concerning precursor relationships in antitumor alkaloid biosynthesis in Cephalotaxus was corroborated by tracer studies of a Rice University group.

Related Information and Discussion--As expressed earlier in this report, interest in new and existing crops as sources for energy, biomass, replacements for petrochemicals, and strategic materials, has grown rapidly during the past year. Private enterprise is taking a hard look at the possibilities of making better use of agricultural products in their manufacturing processes and energy requirements. Universities make many inquiries to increase their knowledge and skills in these areas of expertise, for the purpose of attracting research grants that are becoming available from the U.S. Government through NSF and various departments. Even USDA is looking more seriously and more favorably at the future needs of the Nation in terms of nonfood crops, to alleviate our dependence on imported petroleum and foreign agricultural products.

However in terms of real action, we are still much behind other nations. Our research in many areas tends to benefit other nations more rapidly than the USA. For example, development of kenaf as a paper source is moving forward rapidly in Australia and Thailand; and jojoba is actively pursued in Israel, Egypt, South Africa, and other semiarid countries. Cuphea species, as sources of short-chain fatty acids, are being readied for crop production in Germany, and Vernonia galamensis is studied seriously by English interests as a source of epoxy fatty acids for coatings and adhesives. Even crambe is considered seriously in Sweden, England, and several other countries as a replacement crop for high-erucic rapeseed. Lunaria is studied in the Netherlands as a source of long-chain fatty acids. Mexico is moving rapidly toward guayule as a domestic source of rubber.

A long time ago the regional committees (W-6, NC-7, S-9, and NE-9) were strongly committed to new crops research and development, in addition to their work on field crops, fruits and vegetables, and ornamentals. However, lately little has been done to further these early efforts during the past 5 years. For example, the New Crops Subcommittee of NC-7 has not been active during that time. Several new Regional Committees have been formed recently (NC-114, W-157) with missions that may encroach upon, duplicate, or take over at least some of the traditional missions of the existing Technical Committees. Several questions will require solutions, or at least discussion at state, regional, and/or national levels so that all concerned parties will recognize their roles, missions, and communication lines.

In light of recent developments and increased interest in new crops for American agriculture, it may also be wise to reexamine our own thrusts and to determine if efforts in genetics, plant breeding, and agronomic research on new crops should be warranted at this time.

L. H. Princen

L. H. Princen, Chief
Horticultural and Special Crops Laboratory

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SOUTHERN REGIONAL PLANT INTRODUCTION STATION
Report to S-9 Technical Committee
August 8-9, 1980

Summary of Staff Changes

Coordinator - Dr. W. R. "Bob" Langford retired January 13, 1979 after 21 years in this position. Mr. R. V. Connin, Research Entomologist, served as Acting Coordinator until his retirement February 24, 1979. Dr. Grover Sowell, Jr., Research Plant Pathologist, then served as Acting Coordinator through October 20, 1979. Gilbert Lovell was appointed Coordinator and Research Leader effective October 21, 1979.

Research Entomologist - Mr. R. V. Connin retired February 24, 1979 after 4 years in this position. There is no planned date for filling this vacancy.

Research Plant Geneticist - Dr. Charles Adamson transferred from the Savannah Plant Introduction Station effective August 12, 1979.

Support Staff - There have been several vacancies and rehires in different positions:

(1) Seed Room Technician, hired July, 1979 resigned May, 1980. The vacancy was filled by our Accessioning Clerk through competitive job application procedures. This is the fourth person in this position since Charlie McKnight retired in May, 1978 after 25 years in the position.

(2) The Accessioning Clerk position is being reclassified from Permanent Part-time (20 hours per week) to Permanent Full-time.

(3) The ARA II Lab Assistant to the Research Plant Pathologist became vacant in June, 1980 through promotion and transfer to the Agronomy Department. The position was filled in July by Merrelyn Spinks. Ms. Spinks has a B.S. Degree and has gained excellent experience in previous temporary positions in the Experiment Station's Plant Pathology Department.

(4) A vacancy in the ARA I position under the Farm Manager was filled in April, 1980.

(5) The current ARA III position (James Walden) which has led the development of our Seed Collection Inventory and conversion to Computer Data Base will be vacant September 1, 1980. Mr. Walden has been promoted and transferred to the Agricultural Economics Department of the Experiment Station. We have a "gentlemens' agreement" with the Economics Department that James will be able to assist us in trouble-shooting and correcting problems with our present Computer Programs. Careful consideration is being given to how this vacancy will be filled.

Screening for Disease Resistance, Report by Grover Sowell, Jr., Research Plant Pathologist

Pepper, Bacterial Spot: The remainder of Plant Introductions not screened for resistance to bacterial spot previously, were screened. Out of the 490 PI's screened only one (PI 369994) was resistant in greenhouse tests. In a replicated test PI 369994 was superior to the susceptible cultivars but inferior to PI 163189.

Muskmelon, Gummy Stem Blight: Approximately 150 lines from the National Muskmelon Research Workers Group were tested for resistance to gummy stem blight. Eleven of these lines were equally as resistant as PI 140471. PI 266935, PI 296345, and PI 436533 were as resistant as PI 140471 in a replicated field test. PI 321005, Planters Jumbo and Mainstream were intermediate between the above resistant entries and the susceptible cultivar Gulfcoast in this test. In a greenhouse test PI 296345 was not as resistant as it was in field tests. A spore concentration of 2×10^5 conidia per ml. usually gives results in greenhouse tests that are the same as those of field tests. A concentration of 2×10^4 conidia per ml. gives equal infection. Significantly less infection is produced by a concentration of 5×10^3 or less.

Muskmelon, Watermelon Bacterium: The bacterium from muskmelon produced no symptoms on any of the 1979 entries in the Southern Cooperative Muskmelon Variety Trials. Treatment of muskmelon seed with 1000 ppm streptomycin significantly reduced stand when compared with 5 minutes in 0.5% sodium hypochlorite or the untreated check. The bacterium was present on seed from the National Muskmelon Research Workers Group in Indiana. This represents the first time that the bacterium has been found on seed grown at a location other than Experiment, GA.

Pepper, Ripe Rot: Severe clumping of the conidia of Colletotrichum dematium from pepper prevented screening PI's for resistance. Infection of four-week-old seedlings was severe with 2×10^5 conidia per ml. Leafspots were more numerous and larger and stem lesions were produced by some isolates of the pathogen but not by others.

Sorghum, Anthracnose: A spore concentration of 10^5 conidia per ml. produced severe infection in some screening tests but not others. For this reason screening for resistance was discontinued in the greenhouse. Several hundred sorghum PI's will be planted in a field screening test.

Peanut, Cercospora Leafspot: PI 109839 which is highly resistant in field tests was infected in greenhouse tests. This fact prevented studies of the factors affecting infection in the greenhouse. Seven PI's which are highly resistant in the field are being tested again to determine variability of disease reaction in field tests.

Peanut, Testa Nematode: All peanut PI's from Nigeria were checked for peanut testa nematode by staining a small piece of testa and examining under the microscope. Nematodes were found in the testa of three PI's. At first the nematodes were thought to be the peanut testa nematode, Aphelenchoides arachidis but William Friedman, nematologist, determined that the nematodes were another species of Aphelenchoides. As a precaution against the introduction of the peanut testa nematode I am recommending that all peanut PI's from Nigeria received in the future be treated with hot water.

Research Projects by Dr. Charles Adamson, Research Plant Geneticist

1. Legumes: Replicated nurseries of 40 Vicia sativa introductions and 39 introductions of Lespedeza cuneata and miscellaneous other Lespedeza species were established for evaluation and seed increase. Three of the best plant introductions of V. sativa were crossed with one of the improved cultivars.

2. New Crops for Hydrocarbon Production: Field and greenhouse tests having 95 entries, including 32 species, were established at Experiment. These species were chosen for evaluation on the basis of previous screening work at Peoria, IL. Plants will be evaluated for yield potential and hydrocarbon or oil production. This research has received direct SEA-AR funding for Energy Feedstock Production Evaluation.

3. Bacterial Spot Resistance: Three bacterial spot resistant pepper, Capsicum annuum, introductions and one susceptible cultivar were crossed in all combinations. The F_1's are now being grown and backcrosses to the parent lines are being made. Parental, F_1's, F_2's, and backcrosses will be evaluated for susceptibility to Xanthomonas vesicatoria. Information will be used to establish the inheritance of resistance to bacterial spot, and resistant lines will be selected.

4. Kenaf and Roselle Work: A kenaf, Hibiscus cannabinus and roselle, H. sabdariffa, nursery with 90 entries was established at Savannah, GA. The nursery consists of segregating material from a 6x6 set of crosses in kenaf and a 6x6 set of crosses in roselle. Selections are made on the basis of leaf-type, bark percentage, vigor and photoinsensitivity. A PL 480 Project in Egypt involves studies of growth regulators, irrigation, and other factors upon kenaf and roselle fiber yield. A cooperative project with Florida State University involves study of the possible ancestry of roselle.

Plant Introductions

Seed of 1,290 new introductions from 39 countries have been received since July 1, 1979. The major portions of these new collections are composed of the following crop groups:

Crop Group	Number
Peppers	301
Cucurbita	276
Peanuts	153
Other Legumes	132
Okra	125
Eggplant	80
Melons	60
Grasses	61
Miscellaneous	102

Included in the above are the Winters-Clark collection from Belize and Guatemala and the Knight-Whitaker collection from Mexico.

Introductions pending involve two sorghum collections: (1) 2,788 samples from Ethiopia being grown in Mexico by CIMMYT, (2) 4,467 samples from Yemen was to be grown at MITA, Puerto Rico during the 1979-80 winter nursery season.

Seed Increase

The total of 468 introductions planted at the Regional Plant Introduction Station for increase is the lowest number in many years. This was the result of the accumulation of new vine crops that require wide space plantings. These collections (Citrullus, Cucumis, Cucurbita) have been requested on a high priority basis and we could no longer postpone increase of these vine crops.

The MITA unit (Mayaguez Institute of Tropical Agriculture) is increasing Pearl Millet, Sorghum, Corn, and Okra for a total of 1102 PI's. Increase seed are being received in relatively large quantities. The quantity and quality of these increases are excellent and reflect a marked improvement over previous years.

Other cooperators are:

1. University of Florida

   Dr. D. E. McCloud - 193 Peanuts
   Dr. A. E. Kretschmer 1000 Tropical Legumes

2. Auburn University

   Dr. J. D. Norton - 100 Cantaloupes
   100 Watermelons

Curatorships:

1. Trifolium Collection - Dr. N. L. Taylor
   University of Kentucky

2. Tripsacum Collection - Dr. D. H. Timothy
   North Carolina State University

Seed Distribution

A total of 16,520 seed packets were distributed. Of this total 13,797 were distributed for basic research and plant breeding; 1514 were sent to cooperators for seed increase to renew seed inventory; and 1209 packets of forage legume cultivars as a service function to the Legume Section of the Southern Forage Breeders Work Group were distributed.

Distribution by Regions

S-9 (Total = 10,804)

Alabama	559	North Carolina	198
Arkansas	13	Oklahoma	313
Florida	2940	Puerto Rico	675
Georgia	2893	South Carolina	1036
Hawaii	192	Tennessee	35
Kentucky	64	Texas	1394
Louisiana	186	Virginia	0
Mississippi	302	Virgin Islands	4

NC-7 - 430 NE-9 - 684 W-6 - 1570 NSSL - 1262

In addition to the domestic distribution, 1770 seed packets were shipped to 48 foreign countries.

Southern Regional Plant Introduction Station Budget

Source of Funds	FY-80	FY-81
Regional Research Funds (Pooled)	$73,740	$78,901
Regional Research Funds (Georgia Station)	21,686	29,573
Committee of Nine	7,933	--
TOTAL	$103,359	$108,474
Expenditures		
Personal Services	81,626	89,496
Travel	300	317
Supplies & Operating	6,402	6,661
Equipment	9,031[1/]	--
Seed Increase (MITA)	6,000	12,000
TOTAL	$103,359	$108,474

[1/] $9,031 - Steam Heating System for Greenhouse
$7,933 - Allocation by Committee of Nine
1,098 - Georgia Station RRF

Source of Funds	FY-80	FY-81
SEA-AR (Base)	$225,196	$236,600
Special Allocations:		
SEA-AR-NPS - Clover Curatorship, KY	5,000	5,000
Curatorship, NC	10,000	10,000
SEA-AR-Energy/Hydrocarbon Crops	42,600	?
TOTAL	$282,796	$251,600
Expenditures		
Personal Services	146,996	155,325
Travel	3,000	6,000
Printing & Reproduction (Catalogs)	5,000	5,000
Construction & Repairs	3,000	5,000
Supplies & Materials	12,200	23,275
Support Equipment	10,000	0
Broad Form Cooperative Agreements		
1. University of Georgia (Temp. labor)	20,000	20,000
2. Auburn University	5,000	5,000
3, University of Florida, Gainesville	8,000	5,000
" " " Ft. Pierce	5,000	5,000
4. Florida State University	7,000	7,000
5. University of Kentucky	5,000	5,000
6. North Carolina State University	10,000	10,000
SubTotal	240,196	251,600
Energy/Hydrocarbon Crops Research		
1. Research Assistant - Aug. or Sept., 1980 through Mar., 1982	27,000	?
2. Equipment	10,300	?
3. Supplies	5,300	?
SubTotal	42,600	?
TOTAL	$282,796	$251,600

APPENDIX B

PLANT EXPLORATION PROPOSALS

1. Acquisition of seeds of Gossypium species indigenous to Australia - James McD. Stewart

2. Exploration for rabbiteye blueberries and related Vaccinium species in the Southeastern United States - Paul M. Lyrene, Wayne B. Sherman, and Robert J. Knight, Jr.

Date: August 5, 1980
Revised: September 2, 1980

Proposal for Plant Exploration by James McD. Stewart

1. TITLE: Acquisition of seeds of Gossypium species indigenous to Australia.

2. OBJECTIVES:

   a) Obtain seed of G. cunninghamii, G. pulchellum and G. costulatum specifically, and of other Gossypium species of Australia for which there are limited accessions in the U.S., such as G. robinsonii, G. pilosum and G. populifolium;
   b) Establish contacts and working relations with individuals who can cooperate and assist in a future extensive survey of the Australian Gossypium species and related genera by the USDA taxonomic authority of the genus.
   c) Add collected material to the US Gossypium germplasm collection at College Station, Texas;
   d) Hybridize new accessions with cultivated cottons to determine cytogenetic relations and the influence of genome on fiber and seed properties (Knoxville, TN).

3. JUSTIFICATION:

   a) I plan to attend the 13th International Botanical Congress in Sydney, Australia, August 21-28, 1981; so the proposed exploration will be an extension of that travel.
   b) The three species specifically sought will complete the germplasm collection of the known species of Gossypium. The available nursery material of the other 8 Gossypium species of Australia are from limited collections and do not adequately represent the diversity within each species.
   c) The phylogenetic relation of the Australian species is the least known of the genus, in large part because of the lack of nursery material. All the species have been grouped in one genome based on geographic distribution, but recent karyotype studies (Edwards, 1979) and cytogenetic examination of interspecific hybrids (Stewart, unpublished) indicate that at least two genomes are present. A complete collection of the species would facilitate the study of this genome.
   d) The taxonomic distribution and diversity of the Australian species have not been examined closely. It is anticipated that the proposed travel and exploration would establish working relations with a number of Australian scientists and officials that would cooperate with Dr. Paul Fryxell, taxonomist, in an extensive systematic survey and exploration of Australian Gossypium and related genera.
   e) A recognized morphological trait of agronomic interest that occurs in the Australian species is the glandless seed (plant is glanded). This trait in commercial cotton would allow consumption of cotton seed without processing to remove gland material. Other characteristics such as pest resistance and drought tolerance have not been examined.

4. COLLECTION PLAN:

a) Collections will be coordinated with Dr. D. R. Marshall, CSIRO, Canberra and Dr. Norm Thomson, CSIRO, Narrabri, NSW. It is anticipated that these individuals will establish or facilitate all local contacts necessary. (According to Dr. Dick Brock, Scientific Liaison Officer, Australian Embassy, the possibility exists that one of these scientists could conduct a concurrent exploration to the area proposed.

b) Some of the species of Gossypium are already in nurseries in Australia. These will be identified and arrangements made for seed to be sent to the US through established plant introduction channels.

c) Two of the three species specifically sought apparently have not been collected into nursery (G. pulchellum and G. costulatum). The uncollected species are known to occur in the Kimberley's area in the northern part of Western Australia. Information concerning probable sites for these will be obtained in collaboration with Dr. Paul Fryxell, College Station, Texas and scientists in Australia. Light aircraft is the anticipated mode of access to the area.

d) If seeds are not available at the time of exploration, arrangements will be made with Australian collaborators for individual plants to be transferred to a nursery and seed sent through plant introduction when they become available.

e) Proposed dates for contacts and exploration are August 30-September 14.

5. COLLABORATORS:

Dr. Paul Fryxell
Dept. Crop Sciences
Texas A&M University
College Station, Texas 77841

Principle Contacts:

Dr. D. R. Marshall
CSIRO, Division of Plant Industry
P. O. Box 1600
Canberra City, ACT 2601
AUSTRALIA
Phone: Canberra, 464911

Dr. Norm Thomson
CSIRO, Cotton Research Unit
P. O. Box 59
Narrabri, NSW 2390
AUSTRALIA
Phone: Narrabri, 931105

Cost Items	Estimated Costs		
	Source of Funds		
	USDA	State	Other (specify)
Travel including rental vehicles	$1,000*		
Per Diem	630		
Supplies, etc.	100		
Total	$1,730		

* I plan to attend the International Botanical Congress in Sydney, Australia, August 21-28, 1981, so project funds (USDA) will pay air fare to and from Australia. This proposal requests air and ground costs and per diem while actively engaged in the activities of the proposal.

Personnel

James McD. Stewart
Research Leader, Cotton Physiology
USDA-SEA-AR
Dept. of Plant & Soil Science
University of Tennessee
Knoxville, TN 37916

Reference:

Edwards, A. G. and M. A. Mirza. 1979. Genomes of the Australian wild species of cotton. II. The designation of a new G. genome for Gossypium bickii. Can. J. Gen. Cyto. 21:367-372.

UNIVERSITY OF FLORIDA

INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

GAINESVILLE, FLORIDA 32611

FRUIT CROPS DEPARTMENT
1143 HS/PP
TELEPHONE: 904/392-4711

MEMORANDUM

DATE: November 12, 1980 (Original date June 26, 1980; retyped for S-9 minutes)

TO: SEA Plant Germplasm Coordinating Committee

FROM: Fruit Crops Department
1143 HSPP
University of Florida
Gainesville, FL 32611

1. Title: Exploration for rabbiteye blueberries and related Vaccinium species in the Southeastern United States.

2. Objectives: a) Collect early-ripening plants of Vaccinium constablaei for use in breeding early-ripening rabbiteye blueberry cultivars.
b) Study the distribution, abundance, and patterns of variability in rabbiteye blueberry and collect superior and unusual clones for breeding.
c) Assess the extent to which valuable blueberry germplasm is endangered in the Southern U.S.

3. Justification: Blueberries are one of the few crop plants whose primary germplasm resources lie within the United States. Because blueberries have only recently been domesticated, this germplasm has received relatively little study. The rapidly growing interest in blueberry cultivation, both in the U.S. and abroad, indicates that U.S. blueberry germplasm deserves additional study.

The cultivated blueberry industry in North America has historically been based on Northern highbush cultivars grown in Michigan and New Jersey (5). Cultivated acreage of highbush blueberries increased from about 200 acres in 1930 to 20,000 acres in 1965 and is continuing to increase (5). Highbush cultivars are tetraploid and are based on crosses between Vaccinium corymbosum and V. australe.

During the last five years, there has been a tremendous surge of interest in cultivation of a southern blueberry, the rabbiteye, V. ashei. This species is hexaploid and is native along the Gulf Coast from southern Alabama to central Georgia (2,3). Reasons for the great interest in rabbiteyes are:

(1) The high cost of producing blueberries in traditional highbush production areas due to low average yields per acre.

(2) Realization that the potential blueberry market is far greater than what is presently being supplied.

(3) The extreme vigor and dependably high yields of rabbiteye cultivars grown in the southeastern U.S.

(4) The high suitability of rabbiteye blueberries as a home-orchard or dooryard fruit.

Compared to highbush cultivar breeding, breeding rabbiteyes began late and has been conducted on a relatively small scale (6). All present cultivars and most of the cultivated gene pools trace back to 6 or 7 plants selected from the woods (1). The rabbiteye blueberry is highly variable, and it seems likely that this starting population was too small to adequately sample this variation or to prevent serious inbreeding depression in later generations of selection. Additional superior wild rabbiteye clones should be collected and used in breeding.

A problem with rabbiteye blueberries is late ripening, which results in rabbiteye blueberries from the South coming on the market at the same time as highbush blueberries from the North (6). This late ripening results because of a long bloom-to-ripening interval, which averages about 90 days for rabbiteyes compared to 60 days for highbush. Transferring earliness from highbush to rabbiteye is complicated by ploidy differences; highbush are tetraploid and rabbiteyes hexaploid. A highly-variable hexaploid blueberry species from North Carolina, V. constablaei, contains plants that ripen their fruit within 50 days from flowering (7). This species is known to produce vigorous hybrids with V. ashei (4), and should be a good source of earliness for rabbiteye cultivar breeding.

Hexaploid rabbiteye blueberries are believed to be complex amphidiploids to which the genomes of various diploid and tetraploid species have contributed (2). A study of the ranges and hybridization patterns of these species may indicate the approximate evolutionary pathway by which rabbiteyes evolved. Such information would allow synthetic breeding of new rabbiteye types and would indicate which Vaccinium species should receive the greatest attention in germplasm conservation efforts.

Approach: The explorations will have 2 broad purposes: (1) To collect germplasm for use in breeding rabbiteye blueberries; (2) To collect information on how best to breed rabbiteye blueberries and how best to preserve the germplasm needed to breed rabbiteyes. We will be looking for two kinds of germplasm: (1) Early-ripening, high quality V. constablaei clones from the mountains of western North Carolina; (2) High-yielding, high-quality V. ashei clones from various parts of the species' range. We will observe how V. ashei varies throughout its range so that breeders seeking particular characteristics will know where to look for plants most useful to their purpose. We will try to determine which diploid and tetraploid species most consistently accompany V. ashei throughout its range, and which hybrid combinations seem most likely to have contributed to V. ashei evolution.

The expedition will require about 7 days and will be made in late July or early August when fruit is ripe on the species of most interest. We plan to spend 2 days exploring the northern range of V. ashei distribution in Central and Northern Georgia,

then procede to the mountains of western North Carolina to study and collect V. constablaei in locales from which it has been reported (2), and finally explore the upper reaches of the Conecuh and Yellow Rivers in southeast Alabama and Econfina Creek in West Florida, all of which are areas where V. ashei is abundant.

The plant material collected will be maintained in field nurseries in Gainesville, Florida, except that V. constablaei clones may have to be grown in containers until they can be used in crosses so that their high chilling requirement can be satisfied. The emphasis will be on quality rather than quantity of material collected. Germplasm and information will be shared with other blueberry breeders in whatever way seems most useful.

(5) Budget:

Travel by automobile; estimated 2000 miles at 14¢/mile	$280.00
Per diem $40.00 per day	840.00
Total	$1120.00

(6) Suggested Personnel:

Paul M. Lyrene and Wayne B. Sherman
Fruit Crops Department
University of Florida
Gainesville, Florida

and

Robert J. Knight, Jr.
USDA, SEA, Subtropical Horticulture Research Unit
Miami, Florida

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