

ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS  
Supported by Allotments of the Regional Research Fund  
Hatch Act, as Amended August 11, 1955  
January 1 to December 31, 1977

1. PROJECT: S-9 Plant Germplasm - Its Introduction, Maintenance, and Evaluation
2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

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3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS:

Five plant explorations were conducted in 1977 to collect germplasm of (1) Trifolium spp. in Greece and Italy, (2) sugarcane in New Guinea, (3) peanuts in Argentina and Bolivia, (4) Setaria in Taiwan, and (5) forage grasses in the U.S.S.R. Germplasm of 450 new accessions were added to the regional germplasm collection, increasing the inventory of plant introductions held at the regional station to 34,500. Clovers from Greece and Italy constitute much of the new material.

\*Indicates voting members of the Technical Committee

3477 accessions were grown at the regional station for seed increase and preliminary evaluation. 617 introductions from the tropics or semi-tropics were increased at the Mayaguez Institute of Tropical Agriculture, and cooperators in Alabama, Florida, Georgia, Oklahoma, and Texas increased the seed of 2937 accessions for use at the regional station and storage in NSSL.

New sources of resistance to gummy stem blight were found in cantaloupe P.I.'s 266928, 266931, 266935, 266936, 296345, 313969, 323498, 381802, and 390452. Resistance of these introductions is equal to that found in the small wild cantaloupe P.I. 140471. Resistance to race 2 anthracnose was confirmed in watermelon P.I.'s 189225, 203551, 270550, 271775, 271778, 271779, and 299379. Pepper P.I. 159261 showed immunity to a common strain of TMV. Pseudomonas pseudoalcaligenes subsp. citrulli was established by pathogenicity tests as the cause of a leafspot of cantaloupe. Tolerance was observed in several of 800 Vigna accessions screened for resistance to the cowpea aphid. No resistance was found in 300 Cucumis accessions screened for resistance to the melon aphid.

Catalogues listing currently available introductions of Cajanus cajan, Warm Season Grasses, Capsicum spp. and Vine Crops have been updated. 23,241 packets of seed and plants were distributed to plant scientists for further evaluation and use. All states in the region participated in the evaluation of agronomic and horticultural plant introductions. 938 accessions were evaluated at four SCS Plant Materials Centers for use in the conservation of soil, water, and wildlife. A total of 541 field plantings involving 104 accessions that previously showed good potential for conservation uses were made throughout the South. Plant introductions found to possess useful characteristics are listed in Supplement I to this report. Arachis monticola P.I. 263393 and A. hypogaea P.I. 121067 were used in the development of 'Tannut 74' and 'NC-6' peanut cultivars, respectively.

Chemical assays were made of seed from 86 new species to locate new sources of unique oils and other useful constituents. Cultural studies of kenaf and other potential crops for industrial uses were continued in Georgia, North Carolina, and Texas. Sweet sorghum continues to look promising as a new sugar crop in the South.

In cooperation with IS/GR, University of Colorado, a study was made to determine the feasibility of computerizing evaluation, maintenance, and distribution of plant germplasm.

The S-9 Technical Committee met August 18-19 at Oklahoma State University, Stillwater, Oklahoma. Progress reports presented by each participant are recorded in the minutes of the meeting.

A new 24' x 90' seed storage building equipped with temperature and humidity controls was completed and put into use, and two 20' x 25' sections were added to the greenhouse facilities at the regional station.

#### 4. USEFULNESS OF FINDINGS:

Results obtained through this project at the regional station, at state experiment stations, by federal agencies, and by private enterprise are mutually beneficial to plant breeders and other plant scientists, and through them ultimately to the public. Desirable traits found in plant introductions can be used to develop

superior varieties thereby increasing the efficiency of production and reducing the need for pesticides. Through work at the regional station seed of world collections of economic crops is maintained for future use. New information gained from cultural studies of potential crops may lead to greater diversification of agriculture.

5. WORK PLANNED FOR NEXT YEAR:

Plant explorations will be made to collect germplasm of (1) Oil palms and subtropical fruits in Brazil and Paraguay, and (2) Leucaena in Mexico and Central America. The regional station will continue to receive, propagate and catalogue plants for distribution to plant breeders and other cooperators. Inventories and evaluations of available plant germplasm will be computerized for easy access to cooperators. Screening studies will be continued to locate resistance to insects and diseases.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS APPROVED DURING THE YEAR:

Journal Series Articles

Oakes, A. J. and J. H. Graham. Resistance in Digitaria species to Pyricularia grisea (Cke.) Sacc. Crop Sci. 16 (1976). p. 709-711.

Sowell, G., Jr. and J. W. Demski. 1977. Resistance of plant introductions of pepper to tobacco etch virus. Plant Dis. Reprtr. 61:146-148.

Sowell, G., Jr. and A. H. Dempsey. 1977. Additional sources of resistance to bacterial spot of pepper. Plant Dis. Reprtr. 61:684-686.

White, G. A., B. C. Willingham, W. Calhoun, and R. W. Miller. Agronomic evaluation of prospective new crop species. VI. Briza humilis -- source of galactolipids. Econ. Bot. 30 (1976). p. 193-197.

Willingham, B. C. and G. A. White. Agronomic evaluation of prospective new crop species. V. Jarilla chocola -- A proteinase source. Econ. Bot. 30 (1976). p. 189-192.

All publications related to evaluation and use of plant germplasm in the Southern Region during 1977 are listed in Supplement II to this report.

7. APPROVED:

3/6/78  
Date

Gordon M. Prine  
Gordon M. Prine, Chairman, Technical Committee

2/24/78  
Date

C. R. Jackson  
C. R. Jackson, Administrative Advisor

Supplement I  
to  
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Plant introductions that exhibited desirable characteristics in S-9 Regional evaluation tests, 1977

Name & P.I. No.	State reporting	Reported Value
<u>Vegetable Plants</u>		
<u>Brassica napus</u>		
305278	ARK.	)High seed yield
<u>Capsicum spp.</u>		
152222	GA.	)
152225	GA.	)
152234	GA.	)
159241	GA.	)Resistance to Tobacco Etch Virus
163201	GA.	)
183441	GA.	)
264281	GA.	)
<u>Capsicum chacoense</u>		
260435	FLA.	)Resistant to <u>Xanthomonas vesicatoria</u>
<u>Citrullus lanatus</u>		
189225	ALA.	)Resistance to Gummy Stem Blight
271778	ALA.	)
203551	GA.	)
271775	GA.	)
271778	GA.	)Resistance to race 2 anthracnose
271779	GA.	)
299379	GA.	)
364460	GA.	)
<u>Cucumis melo</u>		
140471	ALA.	)Resistance to Gummy Stem Blight
<u>Lycopersicon esculentum</u>		
128230	S.C.	)Resistance to Tomato Fruitworm

Name & P.I. No.	State reporting	Reported Value
<u>Lycopersicon hirsutum</u>		
126449	S.C.	)Possible source of antibiotic )factor in Fruitworm resistance
251303	KTY.	)Mite resistance
<u>Lycopersicon peruvianum</u>		
128650	ALA.	)Mosaic Virus resistance
128657	ALA.	)Nematode resistance
<u>Phaseolus vulgaris</u>		
165426	ARK.	)Resistant to <u>Rhizoctonia</u> )Root Rot
136684	S.C.	)
136695	S.C.	)
164752	S.C.	)
165078	S.C.	)Moderate to highly resistant
165426	S.C.	)to Powdery Mildew
180742	S.C.	)
180748	S.C.	)
195377	S.C.	)
282057	S.C.	)
164897	VA.	)
166066	VA.	)
169790	VA.	)Resistant to a complex of
169906	VA.	)diseases; resistant to Mexican
171767	VA.	)Bean Beetle
171785	VA.	)
282073	VA.	)
299382	VA.	)
<u>Spinacia oleracea</u>		
165560	ARK.	)White Rust resistance
<u>Vigna unguiculata</u>		
189099	ALA.	)Potential protein source
293535	S.C.	)
353383	S.C.	)Moderate levels of resistance
354468	S.C.	)to Root-Knot Nematode
354718	S.C.	)

Name & P.I. No.	State reporting	Reported Value
<u>Vitis spp.</u>		
354108	FLA.	)Crack resistance
360749	FLA.	)Early ripening
360750	FLA.	)Very early ripening
<u>Ornamental Plants</u>		
<u>Betula platyphylla</u>		
NA 33520	OKLA.	)Drought resistance
<u>Castanea mollissima</u>		
70314	SCS	)Wildlife forage
<u>Impatiens platypetala</u>		
349629	LA.	)Reseeds prolifically
<u>Juniperus conferta</u>		
323932	LA.	)One of best, dwarf & compact
Mandarin 'mateira'		
226740	FLA.	)Cold tolerant
<u>Malus hupehensis</u>		
122586	SCS	)Wildlife forage
<u>Persea americana</u>		
218196	FLA.	)Full crop production, some )cold tolerance
<u>Pinus brutia</u>		
NA 33064	OKLA.	)Cold & drought resistance
<u>Quercus chenii</u>		
102653	GA.	)Screening in large areas

Name & P.I. No.	State reporting	Reported Value
<u>Agronomic Crops</u>		
<u>Arachis hypogaea</u>		
109839	TEX.	)Resistance to <u>Cercospora</u> )Leafspot
262817	FLA.	)Good drought resistance
269114	FLA.	)
274191	FLA.	)
306230	FLA.	)Possible source of <u>Cercospora</u>
383423	FLA.	)resistance
383424	FLA.	)
268689	GA.	)Early maturity
288160	GA.	)Possible source of peanut flour
259747	GA.	)
298115	GA.	)
315608	GA.	)
341817	GA.	)
341879	GA.	)Rust resistance
350680	GA.	)
381622	GA.	)
405132	GA.	)
121067	N.C.	)Used in development of 'NC 6'
269006	N.C.	)
269049	N.C.	)Resistant to Potato Leafhopper
269062	N.C.	)
270853	N.C.	)
<u>Arachis monticola</u>		
263393	TEX.	)High yield
<u>Arachis sp.</u>		
338279	GA.	)Leafspot resistance
338280	GA.	)
<u>Arachis villosulicarpa</u>		
336985	GA.	)Leafspot resistance
<u>Desmodium heterocarpum</u>		
217910	FLA.	)Long-lived perennial

Name & P.I. No.	State reporting	Reported Value
<u>Festuca arundinacea</u>		
231560 231562	ALA. ALA.	)Possible use in winter- )productive varieties
<u>Glycine max</u>		
88788	TENN.	)Resistance to race 4 Soybean )Cyst Nematode
<u>Hemarthria altissima</u>		
299995	FLA.	)Use as a conserved forage crop
<u>Hibiscus cannabinus</u>		
365441	N.C.	)High yielding kenaf variety
<u>Lotus corniculatus</u>		
296318	ALA.	)Improved seedling production
<u>Macroptilium atropurpureum</u>		
296959 307599 316463	FLA. FLA. FLA.	) )Resistance to common mosaic )virus
<u>Sorghum bicolor</u>		
200503 227555	TEX. TEX.	)Resistance to SMV )
<u>Stylosanthes erecta</u>		
358375	FLA.	)Good winter survival; with- )stands high water table
<u>Trifolium pratense</u>		
315538	FLA.	)Best yield & stand maintenance
<u>Trifolium repens</u>		
195531 195532 195533 208567 214207 257808 291837	LA. LA. LA. LA. LA. LA. LA.	) ) )Good virus resistance ) ) ) ) )

Name & P.I. No.	State reporting	Reported Value
<u>Zea mays</u>	TENN.	)Corn earworm resistance
217413		

Supplement II  
to  
1977 ANNUAL REPORT FOR REGIONAL PROJECT S-9

Publications related to evaluation and use of plant germplasm in the Southern Region, 1977

1. Adjei, M. B. and G. M. Prine. 1976. Establishment of perennial peanuts (Arachis glabrata Benth) Soil and Crop Sci. Soc. Fla. Proc. 35:50-53.
2. Barnett, J. C., Jr. 1977. The effect of amendments applied to quartz sand tailings from phosphate mining on forage and grain production. Masters Thesis University of Florida.
3. Elkins, C. B., R. L. Haaland, and C. S. Hoveland. 1977. Tetany potential of forage species as affected by soil oxygen. Proc. XIII Int. Grassland Cong. Sect. 10:588-594. Leipzig, German Democratic Republic.
4. Evans, I. M., J. E. Ford, and L. C. Hannah. 1976. Comparison of chemical and microbiological methods in the estimation of methionine in cowpea (Vigna unguiculata) seeds. British Jour. Nutr. 36:289-293.
5. Fogle, H. W. and H. F. Winters. June 1977. Fruit and tree nut germplasm resources inventory. ARS-NE-76. 321 pp.
6. Greenleaf, W. H., J. L. Turner, and K. S. Rymal. 1977. Auburn 76 FMN, a fusarium wilt, tobacco mosaic virus, and root knot nematode resistant tomato variety. Auburn Univ. Agr. Exp. Sta. Cir. 235.
7. Hannah, L. C., B. B. Rhodes, and I. M. Evans. 1977. Examination and modification of the use of Leuconostoc Mesenteroides for measurements of the sulfurs - containing amino seeds from Vigna unguiculata. Agric. and Food Chem. 25:620-623.
8. Hannah, L. C., J. Ferrero, and D. W. Dessauer. 1976. High methionine lines of cowpea. Trop. Grain Leg. Bul. 4:9-10.
9. Hoveland, C. S. 1977. Foreign plant immigrants make good Alabama citizens. Auburn Univ. Agr. Exp. Sta. Highlights of Agr. Res. Vol. 24, No. 1.
10. Hyland, H. L. 1977. Plant Inventory No. 183.
11. Kilpatrick, R. A., L. Gilchrist, and A. M. Golden. 1976. Root knot on wheat in Chile. Plant Dis. Repr. 60:135.
12. Kilpatrick, R. A. 1976. Fungal flora of Crambe seeds and virulence of Alternaria brassicicola. Phytopathology 66:945-948.
13. Langford, W. R. 1977. Breeding stocks available at regional plant introduction stations. Proc. 34th Sou. Pasture and Forage Crops Improvement Conf.

14. Leppik, E. E. 1976. Flowers as a natural source of beauty. Amer. Hort. 55:6-10.
15. Leppik, E.E. 1976. Morphogenic stagnation in the evolution of Magnolia flowers. Delhi, India. Phytomorphology 25:451-464.
16. Mislevy, P. and P. H. Everett. 1976. The response of fifteen tropical grasses to stubble height and irrigation. Agron. Abst. Nov. 28-Dec. 3, 1976.
17. Norton, J. D. 1976. Breeding for resistance to Mycosphaerella citrullina in watermelon. Hort. Sci. 11:227.
18. Norton, J. D., H. M. Bryce, C. C. Carlton, K. C. Short, J. E. Barrett, M. H. Hollingsworth, and C. A. Brogden. 1976. New cantaloupes suited for commercial production. Auburn. Univ. Agr. Exp. Sta. Highlights of Agr. Res. Vol. 23, No. 4.
19. Oakes, A. J. and J. H. Graham. 1976. Resistance in Digitaria species to Pyricularia grisea (Cke.) Sacc. Crop Sci. 16:709-711.
20. Prine, G. M. and O. C. Ruelke. Winter Forage Legumes Trials at Gainesville, Fla. during 1976-77 Growing Season. Univ. of Fla. IFAS Agronomy Dept. Research Report AY 77-2. 12 p.
21. Ruelke, O. C. 1976. Bermudagrass Variety Evaluations in Florida. Univ. of Fla. IFAS Agronomy Dept. Research Report AY 77-1. 6 p.
22. Schuster, D. W. 1977. Resistance in Tomato Accessions to the Tomato Pinworm. Offered for publication in J. Econ. Entomology.
23. Sowell, G., Jr. and A. H. Dempsey. 1977. Additional sources of resistance to bacterial spot of pepper. Plant Dis. Repr. 61:684-686.
24. Sowell, G., Jr. and J. W. Demski. 1977. Resistance of plant introductions of pepper to tobacco etch virus. Plant Dis. Repr. 61:146-148.
25. White, G. A., B. C. Willingham, W. Calhoun, and R. W. Miller. 1976. Agronomic evaluation of prospective new crop species. VI. Briza humilis -- source of galactolipids. Econ. Bot. 30:193-197.
26. Willingham, B. C. and G. A. White. 1976. Agronomic evaluation of prospective new crop species. V. Jarilla chocola -- A proteinase source. Econ. Bot. 30:189-192.
27. Winters, H. F. 1976. Microcitrus papuana, a new species from Papua, New Guinea (Rutaceae) Bailey 20:19-24.