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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, 1973

1. PROJECT: S-9 "New Plants" - Their Introduction, Multiplication, Evaluation, and Preservation

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Experiment Stations and Representatives

Ala.	C. S. Hoveland*	N. C.	W. T. Fike*
Ark.	J. L. Bowers*	Okla.	R. S. Matlock*
Fla.	G. B. Killinger*	P. R.	J. Velez Fortuno*
Ga.	W. R. Langford*	S. C.	J. A. Martin*
Ky.	R. E. Sigafus*	Tenn.	M. J. Constantin*
La.	R. J. Stadtherr*	Tex.	E. L. Whiteley, Chm.*
Miss.	R. G. Creech, Sec.*	Va.	T. J. Smith*

Administrative Advisor — C. R. Jackson

U.S. Department of Agriculture

National Program Staff, ARS	Quentin Jones
Germplasm Resources Laboratory, ARS	H. L. Hyland
	A. J. Oakes
	H. F. Winters
	G. A. White
Cooperative State Research Service	C. I. Harris
Northern Regional Research Laboratory	W. H. Tallent*
Soil Conservation Service	W. C. Young

Southern Regional Plant Introduction Station, Experiment, Ga.

Regional Coordinator	W. R. Langford
Plant Pathologist	Grover Sowell, Jr.

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS:

Seed or plants of 1574 new introductions were received in 1973. Major additions to the S-9 germplasm collection were 420 accessions of mungbean, 148 urdbeans, and 55 chickpeas from Iran; 126 peanuts from Israel, Japan, and Nigeria; 170 peppers from Yugoslavia; and 54 cowpeas from Nigeria. More than 28,000 accessions representing 265 plant genera are now held at the Southern Regional Plant Introduction Station. 3362 accessions were gorwn for seed increase and preliminary evaluation. The catalogue of available grass introductions was revised. Plant scientists in this country were supplied with 8339 packets of seed or plants, and through international exchange of plant materials scientists in foreign countries were supplied with 2429 packets.

All states in the region participated in the evaluation of agronomic and horticultural plant introductions. In Alabama Desmodium sandwicense P.I.'s 364513, 322469, and 322468 and Dolicuos biflorus P.I.'s 330577 and 345729 showed promise of producing high yields of highly digestible forage from mid-summer to early October. Resistance of Arachis P.I.'s 337394 and 337409 to toxin-producing strains of Aspergillus flavus was verified. Resistance of Arachis P.I.'s 109839, 162857,259639,259679,259747,270806, and 350680 to Cercospora arachidicola was verified in Georgia; and 3 other peanut introductions (P.I.'s 268894, 262090, and 206230) were selected in Florida for further evaluation of their resistance to Cercospora leafspot. All peanut introductions were analyzed at the Georgia Station for protein content; and 764 peanut accessions were screened in Texas for resistance to pod rot, burrowing-bug, and lesser cornstalk borer. In preliminary tests Pennisetum clandestinum P.I. 300082 showed promise of producing high yields of forage in Southeastern Louisiana.

From preliminary screening tests in South Carolina 32 cowpea introductions were selected for further evaluation for resistance to cowpea curculio, and 53 were selected for further study of resistance to stinkbug. 74 tomato introductions were selected for further evaluation of fruitworm resistance. Introductions of chickpea, mungbean, and other pulse crops were evaluated in Oklahoma. Dolichos biflorus P.I. 212636 showed much promise as a crop for wildlife feed. Evaluation of starchy root crops and tropical fruit and nut crop introductions was continued in Puerto Rico. High yielding plantains with more fruits per bunch were selected for further tests.

All states in the region participated in the evaluation of ornamental plant introductions. Six Impatiens from New Guinea with variegated foliage or colorful flowers were selected at the Georgia Station for further evaluation as breeder plants or use in hanging baskets. Evaluation of 289 ornamental grasses was completed at the Georgia Station.

1730 accessions were entered in initial evaluation plots at 4 SCS Plant Materials Centers to determine their adaptation and value for conservation uses. 48 others that had performed well in previous tests were under study to determine cultural requirements.

274 new seed samples, including 118 new species, were received for chemical analysis to determine their content of constituents useful to industry. Cultural studies of species having potential as new crops were conducted in Arkansas, Florida, Georgia, North Carolina, Oklahoma, South Carolina, and Texas. 'Transvala' digitgrass, an increase of Digitaria decumbens P.I. 299601 from South Africa, was released by the University of Florida. Other plant introductions found to possess useful germplasm or that merit further evaluation are summarized in Appendix A.

The S-9 Technical Committee met at the University of Kentucky, July 23-24. Detail progress reports presented by each participant are recorded in the Minutes of the meeting.

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 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 chemurgic crops will aid in the development of new crops and diversification of agriculture.

5. WORK PLANNED FOR NEXT YEAR:

The regional station will continue to receive, propagate, and catalogue plants for distribution to plant breeders and other cooperators. Screening studies will be continued to locate new sources of disease and insect resistance. Evaluation of introductions will be continued at state stations and SCS plant material centers.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS APPROVED DURING THE YEAR:

Station publications

Florida

Boyd, F. T., S. C. Schank, Rex L. Smith, E. M. Hodges, S. H. West, A. C. Kretschmer, J. B. Brolmann, and J. E. Moore. 1973. Transvala Digitgrass. Fla. Agron. Exp. Sta. Circ. S-201. 16 p.

Journal Series Papers

Alabama

Mixon, Aubrey C. and Kenneth M. Rogers. 1973. Peanut Accessions Resistant to Seed Infection by Aspergillus flavus. Agron. J. 65:560-562.

Florida

Schank, S. C., M. A. Klock, and J. E. Moore. 1973. Laboratory Evaluation of Quality in Subtropical Grasses: II. Genetics Variation among Hemarthria in in vitro Digestion and Stem Morphology. Agron. J. 65:256-258.

Georgia

Corley, W. L. 1973. Response of Muskmelon Botanical Varieties to Pickleworm Infestation. HortScience Vol. 8(4). 326-328.

Massey, J. H. and M. D. Jellum. 1973. Effects of Spring Planting Date and Row Spacing on the Agronomic Characteristics and Chemical Composition of Crambe. Agron. J. Vol. 65, No. 2. 299-300.

Massey, John H. 1973. Effects fo Plant Density on Two Varieties of Kenaf in the Georgia Piedmont Region. Agron. J. Vol. 65. No. 5. 848-849.

Agricultural Research Service

Miller, Roger W. and Cecil R. Smith, Jr. 1973. Indigofera Species: Their Content of Amino Acids that may be Deleterious. Agricultural and Food Chemistry. Vol. 21, No. 5. p. 909.

7. APPROVED:

14 January 1974
Date

Eli L Whitely
Chairman, Technical Committee

1/11/74
Date

Curtis R Jackson
Regional Administrative Advisor

APPENDIX A

1973 Annual Report Regional Project S-9 "New Plants"

Plant Introductions that exhibited desirable characteristics in S-9 regional evaluation tests, 1973

Name & P.I. No.	State or agency reporting	Reported value
Agronomic Plants		
Arachis glabrata		
118457	SCS	High forage production
262817	SCS	" " "
262839	SCS	" " "
Arachis hypogaea		
262090	Fla.	Resistant to Cercospora leafspot
268894	Fla.	" " " "
306230	Fla.	" " " "
331326	Fla.	Resistant to toxin producing molds
337394	Fla.	" " " " "
337409	Fla.	" " " " "
341884	Ga.	Resistant to bacterial wilt (*Pseudomonas solanacerum*)
341885	Ga.	" " " " " "
341886	Ga.	" " " " " "
370149	Fla.	High yielding early maturing Spanish type
Avena sterilis		
295919	Tex.	Has pubescent leaves and apparent resistance to cereal leaf beetle
320793	Ark.	
Brassica napus		
282570	Ala.	High percentage of oil content
311727	Ark.	Low glucosinulate content
Brassica oleracea		
189028	Va.	Resistant to race 2 of downy mildew
261774	S.C.	Resistant to downy mildew
Desmodium sandwicense		
322468	Ala.	High yield of
322469	Ala.	good forage -
364513	Ala.	late summer

APPENDIX A continued

Digitaria decumbens		
299601	Fla.	Resistant to pangola stunt virus and to sting nematode
Dolichos biflorus		
212636	Okla.	Wildlife food
330577	Ala.	High yield of good
345729	Ala.	forage - late summer
Glycine max		
200503	Tex.	Resistant to soybean
227555	Tex.	mosaic virus
Hemarthria altissima		
364344	SCS	Warm season forage production on moist soils
Lolium multiflorum		
227020	Tex.	
238937	Tex.	
240732	Tex.	
241586	Tex.	
241912	Tex.	
241913	Tex.	
266111	Tex.	Good seedling vigor, excellent
268333	Tex.	fall growth, frost tolerance and
283609	Tex.	excellent forage production.
295600	Tex.	
321395	Tex.	
324711	Tex.	
321396	Tex.	
Pennisetum clandestinum		
300082	La.	High forage yield
Phalaris aquatica		
292206	S.C.	Outstanding vigor
Vigna sinensis		
186340	Ark.	Resistant to powdery mildew and
255785	Ark.	Cercospora leafspot
293546	Ark.	Used in breeding to improve pod fill
339584	Ark.	Resistant to powdery mildew

APPENDIX A continued

Zea mays

163597	Fla.	)
195114	Fla.	)
209135	Fla.	)
226685	Fla.	)
253730	Fla.	) Better than average resistance to
317326	Fla.	) *Helminthosporium maydis*
317330	Fla.	)
318728	Fla.	)
326535	Fla.	)
331453	Fla.	)

Horticultural Plants

Begonia serratipetala

354180	S.C.	) Flowers year round - good hanging
		) basket plant

Camelia sinensis

236247	S.C.	) May be source for hybrid vigor

Capsicum annuum

163184	Ga.	)
163189	Ga.	) Resistant to bacterial wilt
163192	Ga.	)
174810	P.R.	) Resistant to potato virus Y
183441	Ga.	) Resistant to bacterial wilt
244670	Ga.	) " " " "
264281	Ga.	) Resistant to TEV
271322	Ga.	) Resistant to bacterial wilt
281434	S.C.	)
344282	S.C.	)
344284	S.C.	)
344291	S.C.	) Characterized by high yield
355720	S.C.	) and ease of picking
355723	S.C.	)
357420	S.C.	)

Capsicum chinense

152225	Ga.	) Resistant to TEV

Capsicum praetermissum

342947	Ga.	) Resistant to TEV

APPENDIX A continued

Citrullus lanatus

255137	Fla.	) Source of tolerance to watermelon mosaic virus

Cucumis melo

140471	Ala.	) Resistant to M. incognita acrita and pickle worm
164756	S.C.	) Resistant to downy mildew
321005	Ga.	) " " " "

Cucumis sativus

227207	Miss.	) Resistant to powdery mildew
227208	Miss.	) " " " "
277741	Fla.	) Resistant to C. cassiicola
308916	N.C.	) Compact dwarf type - useful in breeding

Daucus carota

226043	Fla.	)
294079	Fla.	)
294090	Fla.	)
261648	Fla.	) Tolerant to Alternaria leaf blight
277064	Fla.	)
279767	Fla.	)

Impatiens sultani

354257	Ga.	) Large orange flowers, purple foliage and red stems
354261	S.C.	) Fancy colored leaves on red stems
354263	Ga.	) Variegated leaves and stems
354265	Ga.	) Variegated foliage
354266	S.C.	) Fancy colored leaves on red stems

Ipomoea batatas

280036	Miss.	) Blooms profusely - self sterile - useful in plant breeding

Lycopersicon esculentum

129080	N.C.	) Resistant to Southern bacterial wilt

L. hirsutum

252303	Ky.	) Resistant to Tetranychus utricae
251305	N.C.	) Resistant to bacterial canker

not a valid Lycopersicon # 251303 ?

APPENDIX A continued

Metasequoia glyptostroboides

286608	Ga.	) Ornamental, good growth, vigorous,) over 10' tall

Phaseolus vulgaris

169865	Ky.	) Resistant to two spotted spider
176706	Ky.	) Resistant to mite attack
189013	Ky.	) " " " "

Solanum sisymbrifolium

337597	Ga.	) Resistant to *Meloidogyne incognita*

Vitis unifera

286535	Fla.	) Shows resistance to fruit cracking) and fungus diseases
354108	Fla.	) Early ripening characteristic
360749	Fla.	) Resistant to anthracnose
360750	Fla.	) " " "

APPENDIX B

Report of Plant Pathology Research at the Regional Station During 1973

Grover Sowell, Jr.

A. Screening for Disease Resistance

Peanut leafspot: Seven introductions of peanut showed significantly less early leafspot caused by Cercospora arachidicola than did Argentine or Florunner. P.I.'s 109839, 162857, 259639, 259679, 259747, 270806, and 350680 had disease indicies which varied from 1.5 to 3.0 as compared to 5.0 for Florunner and Argentine. This experiment was conducted in cooperation with Dr. R. O. Hammons at Tifton, Ga. Analysis of free argenine indicated that all of the resistant introductions matured as early as Florunner or earlier. Four hundred fifty-six additional introductions were screened without detecting additional sources of resistance.

Tobacco Etch Virus on Pepper: P.I. 342947, P.I. 152225, and P.I. 264281 were not infected by TEV in the greenhouse or the field when the plants were mechanically inoculated. P.I. 342948 which was introduced as 'Avelar' was significantly less resistant than 'Avelar' plants grown from fresh seed of 'Avelar' obtained from Dr. Nagai in Brazil. This indicates that outcrossing of this introduction may have occured in seed-increase plots. These tests were conducted with American Type Culture number PV69 in cooperation with J. W. Demski.

Watermelon Mosaic Virus on Squash: The progeny of crosses between two introductions with mild fruit symptoms developed severe fruit symptoms when inoculated with WMV-2.

Gray Leafspot of Tomato: Only two introductions (P.I. 118408 and P.I. 126412) out of 13 previously reported to be resistant to gray leafspot were equal to Marion, Walter, Manalucie, and Florida MH-1 in resistance in a replicated field test.

Multiple Disease Resistance of Cantaloupe P.I.321005 was confirmed in replicated greenhouse tests. Resistance to downy and powdery mildews is equal to that of the best available (Ga. 47 and PMR6). This introduction also has intermediate resistance to gummy-stem-blight equal to that of Ga. 47. The superior horticultural characteristics and resistance of this introduction combine to make it the best source of multiple disease resistance available to cantaloupe breeders. It may be satisfactory for home gardens without modification.

B. Diseases Associated with Plant Introductions

Downy Mildew of Sorghum was observed for the first time in the nursery. Reddish local lesions were more common than the typical systemic symptoms.

Fusarium and Helminthosporium on Sorghum: A Fusarium sp. and a Helminthosporium sp. were found on germinating sorghum seed from Ethiopia. The Fusarium sp. may be F. moniliforme but pathogenicity tests were not conducted. The Helminthosporium caused small reddish spots on Martin inoculated with conidia.

Research Planned for 1974

(1) Compare yield and leafspot resistance of the seven resistant peanut introductions.
(2) Continue preliminary screening of peanuts for resistance to early leafspot.
(3) Test the resistance of pepper introductions to different isolates of Xanthomonas vesicatoria.
(4) Continue screening for resistance ot Rhizoctonia solani in peanut.
(5) Investigate factors affecting severity of gummy stem blight of cucurbits and early leafspot of peanuts in greenhouse screening tests.
(6) Resume screening peanuts for resistance to peanut mottle virus.

APPENDIX C

Publications that resulted from Regional Project
S-9 and other Plant Introduction activities

Adamson, W. C., G. A. White, and J. J. Higgins. 1972. Variation in leaf development and dry matter yield among kenaf varieties and introductions. Crop Sci. 12:341-343.

Bennett, H. W. 1972. Viability and fertility of three Paspalum species as affected by time and storage conditions. Agron. Abstracts. p. 56.

Bhagsara, A. S. and R. H. Brown. 1973. Photosynthesis in peanut genotypes. Abstract. Presented at the Amer. Peanut Res. & Educ. Assoc.

Boyd, F. T., S. C. Schank, Rex L. Smith, E. M. Hodges, S. H. West, A. C. Kretschmer, J. B. Brolmann, and J. E. Moore. 1973. Transvala Digitgrass. Fla. Agron. Exp. Sta. Circ. S-201. 16 p.

Braverman, S. W. and E. E. Leppik. 1972. Origins of cultivated plants and the search for disease resistance. New York's Food and Life Science 5:15-18. 3 maps.

Braverman, S. W. and A. J. Oakes. 1972. Disease resistance in warm season forage, range, and turfgrasses. The Botanical Review 38:491-544.

Brown, R. H. and V. E. Gracen. 1972. Distribution of the post-illumination CO_2 burst among grasses. Crop Science. Vol. 12, p. 30-33.

Burson, B. L. and H. W. Bennett. 1972. Cytology of hybrids between an introspecific dallisgrass hybrid and two Paspalum species. Proc. Assoc. Sou. Agric. Workers. p. 48-49.

Burson, B. L. and H. W. Bennett. 1972. Genome relationships between intraspecific Paspalum dilatatum hybrid and two diploid Paspalum species. Can. J. Genet. Cytol. 14:609-613.

Chen, T. M., R. H. Brown and C. C. Black. 1970. CO_2 Compensation, Concentration, Rate of Photosynthesis, and Carbonic Anhydrase Activity of Plants. Weed Sci. Vol. 18, No. 3.

Corley, W. L. 1973. New Ornamental Gourds from Africa. Amer. Horticulturist (in press)

Gaskins, M. H., G. A. White, F. W. Martin, N. E. Delfel, E. G. Ruppel, and D. K. Barnes. 1972. Tephrosia vogelii: A source of rotenoids for insecticidal and piscicidal use. U.S. Dept. Agr. Tech. Bull. No. 1445.

Gracen, V. E., Fr., Joe H. Hilliard, R. H. Brown and S. H. West. 1972. Peripheral Reticulum in Chloroplasts of Plants Differing in CO_2 Fixation Pathways and Photorespiration. Planta (Berl.) 107, 189-204.

Hanson, C. H., T. H. Busbice, R. R. Hill, Jr., O. J. Hunt and A. J. Oakes. 1972. Directed mass selection for developing multiple pest resistance and conserving germplasm in alfalfa. Jour. Environmental Quality 1:106-111.

APPENDIX C continued

Hare, W. W. 1973. Mississippi Purple Cowpeas. Miss. Farm Res. 36:2. O. 1-8.

Hartwig, E. E. 1972. Forest soybean. Miss. Farm Res. 35:9. p. 1.

Hodges, E. M. and S. C. Schank. 1972. 'Slenderstem' digitgrass registration. Crop Sci. 12:715.

Hoveland, C. S., R. F. McCormick, Jr., and W. B. Anthony. 1972. Productivity and forage quality of Yuchi arrowleaf clover. Agron. J. 64:552-555.

Hoveland, C. S., R. F.McCormick, Jr., and E. L. Mayton. 1972. Easy Establishment of Yuchi on Coastal Bermuda sod. Auburn Univ. Agr. Exp. Sta. Highlights of Agr. Res. Vol. 19, No. 3.

Hyland, H. L. 1972. Plant Inventory No. 178.

Knight. R. J. and H. F. Winters. 1971. Mango and avocado evaluation in Southeastern Florida. Proc. Fla. St. Hort. Soc. 84:314-317.

Leppik, E. E. 1972. Evolutionary specialization of rust fungi (Uredinales) on the Leguminosae. Annales Bot. Fennici Helsinki, Finland 9:226-239. 6 fig.

Leppik, E. E. 1972. Origin and evolution of conifer rusts in the light of continental drift. Mycopath. at Mycolog. A-plicata (The Hague, Netherlands) 44:1-16. 6 fig.

Leppik, E. E. and A. Sierra-Bracero. 1972. Post-glacial migration of rust fungi to North Europe. Annales Bot. Fennical (Helsinki, Finland) 9:85-90. 9 maps.

Massey, J. H. 1973. Influence of Within-row Plant Spacing on the Production of Two Varieties of Kenaf. Ga. Agron. Abst. 16:14.

Massey, J. H. 1973. Effects of Plant Density on Two Varieties of Kenaf in the Georgia Piedmont Region. Agron. J.

Massey, J. H. and M. D. Jellum. 1973. Effects of Spring Planting Date and Row Spacing on the Agronomic Characteristics and Chemical Composition of Crambe. Agron. J. 65:299-300.

Norton, J. D. 1972. Resistance to Mycosphaerella citrullina in watermelon. Proc. Assoc. Sou. Agr. Workers 69:167.

Norton, J. D. 1972. Chilton - a high quality fruit for the commercial market. Auburn Univ. Agr. Exp. Leaflet 84.

Oakes, A. J. and A. Sierra-Bracero. 1972. Resistance to yellow sugarcane aphid, Sipha flava (Forbes) as related to temperature and rainfall. Jour. Agr. Univ. Puerto Rico 56:33-38.

Overcash, J. P. 1972. Dormanred raspberry. Miss. Agric. For. Exp. Sta. Bul. 793.

APPENDIX C continued

Pennock, W. 1972. Tecnicas Para Injertar Plantas Tropicales. Bol. 229. Est. Exp. Agr. Univ. of Puerto Rico.

Pennock, w. 1972. Yield and Fruit Size Comparisons in the First Six Crops of 16 Mango Varieties. J. Agr. Univ. of Puerto Rico 56(4).

Pennock, W. 1972. Yield, Tree Size, and commercial desirability of 16 mango varieties in Puerto Rico. A.S.H.S. Trop. Region. Vol. 16.

Prine, G. M. 1972. Perennial peanuts for forage. Soil and Crop Sci. Soc. Fla. Proc. 32 (in press).

Schank S. C. 1972. Chromosome numbers in eleven new Hemarthria (Limpograss) introductions. Crop Sci. 12:550-551.

Schank, S. C., M. A. Klock, and J. E. Moore. 1973. Laboratory evaluation of quality in subtropical grasses: II. Genetics variation among Hemarthria in in vitro digestion and stem morphology. Agron. J. 65:256-258.

Schank, S. C., E. M. Hodges, G. B. Killinger, and D. E. McCloud. 1972. 'Pangola' digitgrass registration. Crop Sci. 12:715.

Sowell, Grover Jr. and W. L. Corley. 1973. Resistance of Cucurbita Plant Introductions to powdery mildew. HortScience (in press)

Tereshkovich, G. and F. L. Finch. 1972. Ornamental peppers for West Texas. Coll. of Agr. Sci. Pub. No. T-6-111. Texas Tech University.

Wade, R. H., C. S. Hoveland and A. E. Hiltbold. 1972. Inoculum rate and pelleting of arrowleaf clover seed. Agron. J. 64:481-483.

White, G. A. 1972. New Crops on the Horizon- Seed World 110 4:20-22.

Winters, H. F. 1972. New germplasm of ornamental plants from New Guinea. Proc. Trop. Reg. Am. Soc. Hort. Sci. 14:280-284.

Winters, H. F. 1970. New Plant Introductions. Arboretum and Botanical Garden Bul. 4(1):29-32.

Winters, H. F. 1972. Introductions of cudrang or silkworm thorn into the United States. The Am. Hort. Mag. 51(2):6-8.

Wynn, Tommy, R. H. Brown, Wilbur Campbell and C. C. Black, Jr. 1973. Dark Release of 14_{CO_2} in higher plants. (In press).

Young, Clyde T. and Ray O. Hammons. 1973. Variations in the Protein levels of a wide range of peanut genotypes (Arachis hypogaea L.) Oleagineux 28: (in press).

Young, Clyde T., G. R. Waller and R. O. Hammons. 1973. Variation in the Amino Acid Content of Peanut Flour. JAOCS 50(2): Abstract 13-81A. (Manuscript accepted with revision).

Young, Clyde T., L. W. Morgan and Y. P. Tai. 1973. Film Documentation of Plant Introduction Peanuts. Accepted for presentation at the 1973 APREA meeting and published in Jour. of APREA