

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, 1961

1. PROJECT: SOUTHERN REGIONAL PROJECT S-9, "NEW PLANTS"

The Introduction, Multiplication, and Evaluation of New Plants for Industrial and Agricultural Use and the Preservation of Valuable Germplasm.

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Experiment Stations

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

Representatives

\*C. S. Hoveland  
\*A. M. Davis  
\*G. B. Killinger  
\*A. H. Dempsey  
\*E. N. Fergus (12/1/61 W. H. Stroube)  
\*J. C. Miller  
\*H. W. Bennett  
\*W. T. Fike  
\*R. S. Matlock, Chairman  
\*Roy Woodbury  
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\*W. E. Roever, Secretary  
\*Eli L. Whiteley  
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Administrative Advisor

R. D. Lewis

U. S. Department of Agriculture

New Crops Research Branch, A.R.S.	*W. E. Whitehouse
Cooperative State Experiment Station Service	W. C. Kennard
Utilization Research and Development Divisions, A.R.S.	*I. A. Wolf
Soil Conservation Service	*W. C. Young

Southern Regional Plant Introduction Station, Experiment, Georgia

Regional Coordinator	W. R. Langford
Plant Pathologist	Grover Sowell, Jr.
Assistant Agronomist	J. H. Massey

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### 3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS

#### Evaluation Program

##### Industrial Crops

Increasing effort was directed toward evaluation of plants for the production of new end-use products. These include plants for new seed-oils, fiber, paper-pulp, gums, drugs, and insecticides.

In chemical and agronomic screening tests several plants showed promise as potential oilseed crops. Crambe abyssinica, P.I. 247310, appears to have a wide range of adaptation, and it is among the most promising oilseed plants now under evaluation. Seed of it were produced in sufficient quantity during 1961 for pilot plant evaluation. Erucastrum abyssinica, P.I. 243913, produced over 2000 pounds of seed per acre in small-plot tests in Florida. The seed are now being analyzed for erucic acid and other constituents of value to industry. Aster, Cuphea, Dimorphotheca, Lesquerella, and Vernonia are other plant genera that appeared promising upon chemical screening; although problems involving diseases and cultural practices must be solved before satisfactory seed yields can be obtained from these plants. Hale castorbean (RA 11-15-4 x Cimarron) was released by the Texas Agricultural Experiment Station. This midseason cultivar carries resistance to bacterial leaf spot and Alternaria leaf spot and it has the dwarf internode character obtained from castorbean stocks introduced from Brazil.

Introductions of bamboo, kenaf, crotalaria and sesbania were evaluated in several states as possibilities for the production of fiber and paper pulp. Crotalaria juncea was the most promising annual species for pulp. Results from preliminary pulping tests were so encouraging that plans are being developed to produce enough C. juncea during 1962 for a full scale trial on a paper machine. Okra is a promising source of pulp from the standpoint of its fiber content and structure. Root knot nematode and wilt caused by Fusarium oxysporum limited the growth of many okra introductions, but 25 accessions showed a degree of tolerance to both organisms in field experiments near Pontiac, South Carolina.

Evaluation of bamboo as a source of pulp was continued in Alabama and South Carolina, and new plantings were made in Arkansas and North Carolina. Applications of lime and nitrogen proved beneficial to the growth of bamboo on coastal plain soils in South Carolina. Foliage diseases were severe on new plantings in Arkansas.

In the search for plants that produce seed with a high gum content, Crotalaria intermedia and Cassia marilandica were sufficiently promising to merit further work on cultural practices and strain improvement. A study of diseases affecting guar was initiated, and all introductions of this species are being screened for resistance to Alternaria leaf spot.

Tuberous roots of Dioscorea are the chief plant source of raw material for production of hormones, progestational agents, and other steroidal compounds. Results indicate that suitable soil and subtropical environments are available in the United States for growing Dioscorea. The problems of propagation and low content of sapogenin or steroidal precursors has discouraged commercial domestic production.

Tephrosia vogelii is a source of rotenone for insecticides. The principal problem in the development of Tephrosia as a crop concerns the low rotenoid content. Hybridization has resulted in lines of T. vogelii that contain as much as 5 percent total rotenoids compared with 2.0 percent in original materials.

### Agronomic Crops

Several forage crop introductions were released or utilized in breeding programs. Suhi-1, a new Sudangrass hybrid developed from Sorghum arundinaceum (P.I. 156549) and combine Kafir 60, was released in Georgia. This hybrid is characterized by a long production period, high yield of forage, disease resistance, and late maturity.

Cherokee Alfalfa was released in North Carolina. It resulted from a program of seven cycles of recurrent phenotypic selection for disease and insect resistance. The original material from which selections were made consisted of 400 plants of about equal numbers from each Buffalo, Williamsburg, four Kansas synthetics, Oklahoma common, Kansas common, and DuPuits (P.I. 158837).

A new blue lupine whose parentage includes early introductions of bitter blue lupine will be released in Florida in the near future. Further improvement of Blanco lupine was made in Georgia by crossing it with introductions resistant to grey leaf spot. Lines from the progeny of these crosses have been selected that are resistant to grey leaf spot and also have the desirable characteristics of Blanco.

Starr peanuts resulting from a cross of Spantex and P.I. 161317 was released in Texas. Florigiant, whose parentage includes the Basse peanut from Africa, was released in Florida.

Selections were made from the F<sub>4</sub> progeny of a cross involving Vicia angustifolia (P.I. 121275) and V. sativa (Ala. 1894) in an attempt to incorporate hard seed coat and non-dehiscent pods with desirable characteristics of V. sativa. In the evaluation of other forage plant introductions Trifolium vesiculosum (P.I. 233816) produced more total forage than did crimson clover, but it was later coming into production than crimson clover. Two accessions of Bromus cartharticus (P.I. 189612 and P.I. 202359) produced excellent yields in Florida, and B. cartharticus (P.I. 217593) produced more forage than other rescuegrasses in Alabama. Glycine ussuriensis (P.I. 163453) and Lespedeza virgata (P.I. 218004) were promising plants for hay and wild-life cover and feed. Two accessions of Echinochloa crusgalli (P.I. 196291 and P.I. 211025) were considered good possibilities for wild duck feed.

Other plants that appeared promising for wild-life feed are Vigna sinensis (P.I. 244571 and P.I. 246132) and Cajanus cajan (P.I.'s 218066, 249632, and 249633).

In the evaluation of turf grasses Poa compressa (P.I. 204485) appeared to be immune to mildew and rust at the Arkansas Experiment Station. In Arkansas 529 legume introductions representing 176 species were screened for susceptibility to the soybean cyst nematode, Herterodera glycines. Twenty-six accessions representing 12 genera were found susceptible to this organism.

### Vegetable Crops

Two new cucumbers were approved for release in South Carolina. They are Polaris, developed for its slicing qualities, and Pixie, developed for pickling. Both have P.I. 197087 in their ancestry, and they are highly resistant to downy mildew, powdery mildew, and race 1 anthracnose. They have moderate resistance to race 2 anthracnose. P.I. 196289 is being used in further breeding for resistance to race 2 anthracnose.

A citron-type melon (P.I. 142449) was used as a source of resistance to anthracnose and fusarium in the breeding of watermelons in Louisiana and Arkansas.

Pepper accessions (P.I. 163192 and P.I. 163189) were crossed with Truhart Perfection and certain Georgia lines to incorporate resistance to Xanthomonas vesicatoria into commercial types. P.I. 264281 and P.I. 152225 were used in crosses to incorporate resistance to tobacco etch virus in commercial peppers.

Tomato breeders in Florida made further use of P.I. 79532, Lycopersicon pimpinellifolium and P.I. 126445, L. hirsutum, in the development of Manapal, a disease-resistant tomato with the desirable qualities of Rutgers. The pedigree of Manapal includes both the Manalucie and Indian River cultivars which were developed in part from P.I. 79532 and P.I. 126445. Manapal has a record for the highest degree of known resistance to graywall; and it is equal to Rutgers in quality and productivity under a wide range of conditions. Valuable characters useful in the breeding of tomatoes were found in four other Lycopersicon introductions. These are cracking resistance in P.I. 126409, earliness in P.I. 247089, and genetic markers in P.I. 193399 and P.I. 193403.

In the breeding of summer squash in South Carolina P.I. 135394 and P.I. 172870 were used as a source of resistance to squash mosaic virus. Seventh generation selections from crosses involving these introductions were tested in replicated yield trials, and they showed a high tolerance to squash mosaic virus. Cucurbita okeechobeensis (P.I. 201772) and C. pepo (P.I. 234616) were grown as breeding stocks to incorporate greater disease resistance in commercial types in Texas. P.I. 189416, Vigna sinensis, was used as a parent breeding line in the development of Topset, a new cream-type pea, released by the Florida Agricultural Experiment Station. Topset is a high quality, easy-shelling type that produces high yields of erectly held pods. Topset tends to be more determinate in fruiting habit than other varieties of southern pea, making it better adapted to mechanical harvesting.

### Ornamentals

Eight Coleus accessions introduced from England were released in Texas and

they were well accepted in the florist trade. They are:

Autumn, P.I. 249770	Blackburn, P.I. 249773
Crimson Velvet, P.I. 249777	Freckles, P.I. 249783
Laing's Croton, P.I. 249787	Pineapple Beauty, P.I. 249793
Red Croton, P.I. 249795	Vesuvius, P.I. 249806

A number of camellia introductions were used as breeding stocks in Alabama to develop strains with more hardy buds and blooms for landscape plantings in the mid and upper South.

In the evaluation of other ornamentals Plectranthus cilliatus (P.I. 239684) and Cissus discolor (P.I. 247189) appeared suitable for use in hanging baskets for interior plantings or patio use in areas with warm winters. Nolina microcarpa (P.I. 262388) and Podocarpus glaucillar (P.I. 241377) appeared outstanding for tub specimens. Introductions worthy of further evaluation as pot plants include Nolina recurvata (P.I. 249498), Kohleria amabilis (P.I. 238875), Strobilanthes lactatus (P.I. 204766), and Boehmeria biloba (P.I.'s 236017 and 239076). Ulmus pumila (P.I. 260885) and Pyrus colleryana (P.I. 209840) showed promise for use as shade trees. P.I. 146130, Amygdalus persica, was used in the development of a new ornamental peach released under the name Flordahome by the Florida Agricultural Experiment Station. Flordahome is a second-generation seedling from the cross P.I. 146130 X Prunus davidiana (C-26712). It produces a profusion of large, double, pink flowers in Northern Florida.

### Fruits

Malus sylvestris (P.I. 209939) made excellent growth in Louisiana and it is a consistent producer. Although the fruit is of low quality, this tree appears to be a valuable breeding line.

### New Materials Received and Catalogued

Seed or vegetative stocks of 1133 new accessions representing a wide assortment of plant materials were received by the regional station. The largest collections of individual species were 172 sorghums, 56 peppers, 201 peanuts, and 83 watermelons.

The project to collect fruit stocks in the Gulf Coast area was continued with four states participating. Sixty-five items collected through this project have been assigned P.I. numbers, and the plants are being maintained by the Louisiana Agricultural Experiment Station. Additional stocks have been collected in Mississippi and Alabama. These will be assigned P.I. numbers and propagating material of each will be transferred to the Louisiana Station.

Thirty-one hundred accessions were grown for preliminary evaluation and seed-increase. From these plantings 1329 introductions that had not been distributed previously were added to the regional seed lists for distribution and further evaluation at state experiment stations.

### Other Activities

A national program was initiated in 1960 to inventory asexually propagated

tree fruits and nuts. Seven state stations reported 371 items for this clonal inventory.

By invitation of the S-9 Technical Committee Dr. I. A. Wolff was named as the formal representative of the Utilization Research and Development Divisions of ARS. This strengthens the program of research on new plants with potential industrial values.

The annual meeting of the S-9 Committee was held at the Puerto Rico Agricultural Experiment Station on December 13-15, 1961. The committee was impressed with indicated utilization studies of many tropical and subtropical crops and with the potentials of further complementary activities in support of the regional program. Each committee member gave a detailed report on the progress of new crops research in his state or field of activity. A summary of each report appears in the minutes of the meeting, copies of which can be obtained from the coordinator.

The National Coordinating Committee for New Plants Research met at Longwood Gardens, Kennett Square, Pa. May 18-19, 1961. Regional Project S-9 was represented by:

Director R. D. Lewis, Administrative Advisor  
R. S. Matlock, Chairman of S-9 Technical Committee  
G. B. Killinger, Past-Chairman of S-9 Technical Committee  
W. R. Langford, Regional Coordinator

#### 4. USEFULNESS OF FINDINGS

New and valuable information obtained from chemical and cultural screening of introductions for seeds containing new fatty acids and mucilage and plants for new sources of pulp and fiber will contribute to the development of new crops. Replacement crops with new industrial end-use products will be valuable to the agricultural economy of the South.

Hale castorbeans, Suhi-1 Sudangrass, Starr peanuts, Nugget sweetpotato, Flordahome ornamental peach, Polaris cucumber, Pixie cucumber, Cherokee alfalfa, and Topset pea, all of which contain introduced germplasm, were released for commercial production during 1961. Efficiency of production should be improved in areas where these cultivars are adapted.

Certain ornamentals including introductions of Coleus, Ilex, Correa, and Ulmus were sufficiently promising for commercial use. These will add to the beauty of the home and landscape in the South.

Several plant introductions were found to possess characters that merit their use in plant breeding programs. Among these were 25 accessions of okra with tolerance to root knot nematode and wilt, one Poa introduction immune to mildew and rust, and pepper accessions with resistance to Xanthomonas vesicatoria and tobacco etch virus.

The ten year summary of results (Southern Cooperative Series Bulletin 79) obtained through this project should provide leads and incentives for the

development of important new plants for agricultural and industrial use.

#### 5. WORK PLANNED FOR NEXT YEAR

Revision of Regional Project S-9 "New Plants" was initiated to include more work on new crops for industrial uses. The revision will be completed during 1962. An S-9 subcommittee is developing a list of chemically promising new plants and outlining the phases of research needed for developing each into an economic crop. This list will be used to plan a cooperative team approach on the various phases of new plant research.

The regional station will increase and evaluate new introductions that were received since the last planting season. Seed lists will be prepared and distributed to workers and seed will be distributed as requested.

#### 6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

##### Regional Station

Langford, W. R. and Gordon B. Killinger. New Plants for the South. Southern Cooperative Series Bulletin No. 79. Published by the Georgia Agricultural Experiment Stations. 1961.

##### Alabama

Bahiagrass for Forage in Alabama. Alabama Agricultural Experiment Station Cir. 140. 1961.

##### Florida

Sharpe, R. H. Flordahome, Ornamental Peach for Florida. Circular S-125, Agricultural Experiment Stations, University of Florida. September 1960.

Walter, J. M., D. G. A. Kelbert and N. C. Hayslip. Manapal, A Disease-Resistant Tomato with the Desirable Traits of Rutgers. Cir. S-131, Agricultural Experiment Stations, University of Florida. April 1961.

Lorz, A. P. and L. H. Halsey. Topset, A New Cream-Type Southern Pea. Cir. S-130, Agricultural Experiment Stations, University of Florida. April 1961.

Whitner, B. F., Jr. Seminole, A High-Yielding, Good Quality, Downy and Powdery Mildew-Resistant Cantaloupe. Cir. S-122, Agricultural Experiment Stations, University of Florida. April 1960.

Carver, W. A. Florigiant, A Jumbo Runner Peanut. Cir. S-129, Agricultural Experiment Stations, University of Florida. February 1961.

##### Georgia

Forbes, Ian, Jr. and Homer D. Wells. Inheritance of Resistance to Anthracnose in Blue Lupine. Lupinus angustifolius L. Crop Sci. 1: 139-141. 1961.

Craigsmiles, J. P. and S. V. Stacy. Suhi-1 Hybrid Sudangrass. Georgia Agricultural Experiment Station Leaflet N. S. 26. 1961.

##### North Carolina

Fike, W. T. The Search for New Crops. Research and Farming. North Carolina Agricultural Experiment Station. 19: 8-9. 1960.

Pope, Daniel T., L. W. Nielson, and M. W. Hoover. Nugget, A High Yielding, Cork and Wilt Resistant Sweet Potato. North Carolina Agricultural Experiment Station. Bull. 415. 1961.

Greatz, Karl E. The Wild Reseeding Soybean. Wildlife in North Carolina. pp. 14-15. June 1961.

Oklahoma

Matlock, Ralph S. Guar Variety and Cultural Studies in Oklahoma. 1950-59 Okla. Agri. Exp. Sta. Processed Series p-366. December 1960.

South Carolina

Epps, W. M. and W. R. Sitterly. Marion Tomato, A New Disease-Resistant Variety. Cir. 130, South Carolina Experiment Station. March 1961.

Texas

Hale---An Improved Dwarf-internode Castorbean Variety. Texas Agri. Exp. Sta. Leaflet 511. 1961.

Texans Look For New Crops to Boost Income. Farmer-Stockman, Texas Edition. April 1961.

USDA

Thompson, Ross C. and Edward J. Ryder. Description and Pedigree of Nine Varieties of Lettuce. USDA Agricultural Research Service Technical Bull. 1244. 1961.

Kahn, Robert et al. Detection of Viruses in Foreign Introductions Under Quarantine in the United States. (In press)

7. APPROVED:

1-16-62  
Date

W. R. Langford  
W. R. Langford, Coordinator  
Regional Project S-9

1-12-62  
Date

R. S. Matlock  
Ralph S. Matlock, Chairman  
S-9 Technical Committee

1-16-62  
Date

R. D. Lewis  
R. D. Lewis, Administrative Advisor