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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, 1965

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

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

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Experiment Stations	Representatives
Alabama	*C.S. Hoveland
Arkansas	*A.M. Davis
Florida	*G.B. Killinger
Georgia	*A.H. Dempsey
Kentucky	*W.H. Stroube, Acting Chairman
Louisiana	*J.C. Miller
Mississippi	*H.W. Bennett
North Carolina	*W.T. Fike
Oklahoma	*R.S. Matlock
Puerto Rico	*Hassan Azzam, Chairman (Deceased)
South Carolina	*J.H. Martin
Tennessee	*W.E. Roever
Texas	*Eli L. Whiteley
Virginia	*T.J. Smith
Administrative Advisor	R.L. Lovvorn
U.S. Department of Agriculture	
New Crops Research Branch, ARS	*J.L. Creech
	Quentin Jones
Plant Introduction Investigations	H.L. Hyland
Plant Materials Investigations	
Agronomic Crops	A.J. Oakes
Horticultural Crops	H.F. Winters
Chemurgic Crop Investigations	G.A. White
Cooperative State Experiment Stations Service	D.Y. Perkins
Utilization Research and Development Divisions, ARS	*I.A. Wolff
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
Assistant Horticulturist	W.L. Corley

* Voting Members of the S-9 Technical Committee

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS

Receipt of New Plant Materials

Seed or vegetative stocks of 1932 new accessions were added to the regional seedstocks collection in 1965. The new material represents 103 plant genera and 292 species. Propagating material was collected from previously selected apple, pear, and pecan trees in southern Mississippi. Budwood of each accession was transferred to the collection of domestic fruit stocks held at the Louisiana Experiment Station.

Production and Distribution of Seed

The number of accessions grown for seed increase and preliminary evaluation at the regional station was greater than ever before. This was necessitated by the large collection of new material obtained in 1964 from Oklahoma and Africa and by the depletion of seedstocks in the disease screening program. With the carry-over of 563 perennial grasses from the previous season the 1965 nursery contained 4061 accessions.

A complete inventory of plant materials available at the regional station was prepared and distributed to plant scientists. The inventory contained 12,886 accessions representing 130 plant genera and 583 species. As a further aid to plant breeders in selecting disease resistant breeding stocks, summaries of reports citing disease resistant plant introductions were compiled and distributed to state stations. Through the exchange of plant inventories, lists of plant materials held at the other regional stations were obtained and distributed to plant scientists in the region.

Research workers in the southern region were supplied with 9894 lots of seed or vegetative stocks for further evaluation and use in new plants research.

Evaluation and Use of Plant Materials

Although additional testing will be required to determine the merits of these new introductions, further evaluation of many accessions that entered the program previously was quite rewarding. Several new varieties that were developed entirely, or in part, from introduced plant stocks were released during the year. Others reached the advanced stage of testing and probably will be released in the near future.

Agronomic Crops

'Magnolia' ryegrass, a crown rust resistant variety developed from rust-resistant strains (P.I's. 193145, 194394, 194395, and 201980) introduced from South America was released by the Mississippi Agricultural Experiment Station and ARS.

P.I. 168535, *Lupinus angustifolius*, and 'Borre' lupine (P.I. 189191) were used in the development of 'Rancher' sweet lupine, a new variety with resistance to anthracnose and grey leafspot. The gene for sweetness was found in P.I. 189191 and genes for resistance to grey leafspot and anthracnose were found in two different selections from P.I. 168535. This new disease-resistant variety was released by the Georgia Coastal Plain Experiment Station and ARS.

Two new guar varieties, 'Hall' and 'Mills', were released to certified seed producers in Texas and Oklahoma in the spring of 1965. Both of these varieties are direct selections from heterogenous lines introduced from India. 'Hall', selected from P.I. 179930, is a late maturing variety while 'Mills', selected from P.I. 263875, is early maturing. Both are resistant to the most serious guar diseases, bacterial blight and Alternaria leafspot. No further selection (except roguing of natural crosses) was required for either variety.

Short Kaura, a yellow endosperm sorghum, introduced as P.I. 221688 from Africa, was used in the development of several new sorghum lines scheduled for release this year by the Oklahoma Experiment Station.

In disease screening studies at the Georgia Experiment Station a high level of resistance to anthracnose caused by Colletotrichum orbiculare was found in four introductions of grain-type sorghum. The resistant introductions are P.I's. 267519, 267459, 267444, and 267340.

Horticultural Crops

Further use was made of P.I. 197087, Cucumis sativa, in the development of superior varieties of cucumbers in South Carolina. 'Poinsett', a new slicer-type cucumber with both P.I. 197087 and P.I. 220860 in its pedigree, is scheduled for release this winter to seed producers. This new variety has high resistance to downy and powdery mildew and to race 1 anthracnose. It has moderate resistance to race 2 anthracnose and good tolerance to Angular leafspot.

Progress was also made in the multiplication of seed of gynoecious lines for use in producing F_1 hybrids of both slicer and pickle-type cucumbers. P.I's. 197087, 196289, and 220860 were used in developing these lines. Both types have the same disease resistance as 'Poinsett', and in addition the pickle types have good tolerance to cucumber mosaic virus. Some of these hybrids are scheduled to be released during 1966.

P.I. 236355, Cucumis melo var. reticulatus, proved highly resistant to bacterial wilt in Kentucky, and it was incorporated into the cantaloupe breeding program to transfer this characteristic to acceptable commercial types.

In screening studies at the Georgia Experiment Station to locate a source of resistance to bean yellow mosaic virus (BYMV), four introductions of Vigna sinensis (P.I's. 154134, 160024, 175962, and 177101) were found to be immune to the virus. Since immunity is the highest level of resistance obtainable, these introductions should be very valuable to plant breeders. Vigna cylindrica, P.I. 226106, was used as a highly-susceptible tester plant for detecting BYMV in southern pea. This introduction should be useful to virologists, plant breeders, and others interested in detecting BYMV.

In screening Cucumis introductions at the USDA Vegetable Breeding Laboratory for resistance to Diabrotica (cucumber beetle), potent attractants to this insect were found in the root extract from a number of introductions, but no attractant was found in the extract from P.I.

292190, Cucumis metuliferus. There is some evidence that Diabrotica-repellant substances occur in other wild species of Cucumis. Inter-specific crosses are being attempted in order to transfer this quality to commercial type Cucumis melo.

In breeding cabbage for resistance to downy mildew in South Carolina several lines with good resistance were solected from the progeny of a cross involving P.I. 261774, Brassica oleracea var. capitata.

Chemurgic Crops

Studies to determine the adaptation and cultural requirements of new plants for industrial use were continued in 1965. Forty-five new accessions of chemurgic interest were received at the regional station for seed increase and preliminary evaluation. These include 8 accessions of Vernonia, 9 Solanum, 3 kenaf, 2 okra, 9 sorghum, and 14 miscellaneous plants containing special seed-oils or classified as potential pulp-crops. Adequate increases of seed were obtained from the new introductions of Vernonia, sorghum, and kenaf for regional testing in 1966; but many of the other species failed to flower or mature a seed crop under Georgia conditions. Ipomoea parasitica, Ipomoea sp., P.I. 279715, Polanisia viscosa, Trichosanthes cucumerina, and Solanum aviculare, which entered the program prior to 1965 were increased adequately for regional evaluation in 1966.

Kenaf continued to show promise as a pulp crop. Four paper manufacturers have shown an interest in kenaf as a source of raw material either by growing it for pilot-plant studies or making plans to grow it in 1966. Results from field studies show that yields of 7 to 15 tons of dry stalks per acre can be obtained from the Everglades 71 or Everglades 41 varieties in Florida. Satisfactory yields have been obtained also from plantings in Louisiana, Arkansas, and Texas. Results from a cultural study of kenaf at the Georgia Experiment Station showed that Treflan applied at the rate of 3/4 lb. per acre gave good control of weeds throughout the growing season, and that planting in rows one foot apart yielded significantly more than wider row spacing. Results from a date of harvest study in Arkansas indicate that harvesting in September sharply reduces yield. Greatest production was obtained from plots harvested immediately after the first killing frost.

A feeding trial was conducted at the Florida Experiment Station to determine the value of kenaf silage. Dairy steers consumed only 40 lbs. per day whereas the same steers would consume 90 to 100 lbs. of corn silage. Sheep failed to consume enough to maintain their weight.

Studies of Crotalaria juncea, Sorghum, and okra were continued in 1965 to determine their value for pulp. Although these plants were less productive than kenaf, satisfactory yields were obtained from Crotalaria juncea and sorghum, P.I. 229837.

A study involving 3 row-widths and 3 within-row spacings was conducted to determine the effect of plant spacing on seed yields of

Vernonia anthelmintica and Cassia occidentalis. No significant differences in yield were obtained for either species.

Four methods of harvesting V. anthelmintica seed to minimize shattering loss were compared. Cutting and windrowing plants when first seed matured gave more than five times as much seed as a single late harvest. Multiple harvests gave intermediate yields.

A contract for 20 tons of Cassia occidentalis seed was arranged between a commercial company and a farmer in Autanga County, Alabama. Diseases destroyed virtually the entire planting.

Other Activities

The S-9 Technical Committee met at Oklahoma State University July 21-22, 1965. Progress reports given by each committee member occur in the Minutes, copies of which can be obtained from the Coordinator. Attached to this report is a list of plant introductions reported by committee members as exhibiting useful characters but needing further evaluation to determine their value.

The National Coordinating Committee for New Plants Research met at Louisiana State University October 19-20, 1965. Regional Project S-9 was represented by:

W. H. Stroube, Acting Chairman of S-9 Technical Committee
Eli L. Whiteley, Past Chairman of S-9 Technical Committee
J. C. Miller, Technical Committee representative
W. R. Langford, Regional Coordinator

Evaluations of Capsicum spp. and warm-season grass introductions were recorded on IBM cards to facilitate retrieval of data and preparation of seed inventories. Codes were devised for recording evaluations of other major species held at the regional station.

A survey was made to determine the plant material needs of research workers in the region. Results of the survey will be used in planning future plant explorations by NCRB.

4. USEFULNESS OF FINDINGS

Improved crop varieties such as 'Hall' and 'Mills' guar, 'Rancher' lupine, 'Magnolia' ryegrass, and 'Poinsett' cucumber which were developed from superior breeding stocks provided through the S-9 project should improve the efficiency of crop production in the South. New sources of disease resistance and other valuable germplasm discovered in the screening and evaluation program in 1965 will enable plant breeders to continue their development of better varieties. New information obtained from chemical and cultural studies of plants containing special seed-oils and pulping qualities will contribute to the development of new crops. Replacement crops that produce new industrial end-use products will improve the agricultural economy of the South.

5. WORK PLANNED FOR NEXT YEAR

The regional station will continue to receive, propagate, and catalogue new plant materials. Preliminary evaluations will be made at the regional station as seed and vegetative stocks are increased. Screening studies will be continued to find new sources of disease resistance. A catalogue of available plant materials will be prepared and distributed to plant scientists at state stations.

Further studies will be made at state stations to determine the cultural requirements of new plants that show potential of being developed into chemurgic crops. More emphasis will be placed on evaluation of plants for use as ornamentals.

A new project to collect domestic stocks of Vaccinium spp. (blueberry) will be initiated. Germplasm collected through this project will be maintained at North Carolina State University.

Evaluations of introductions within major crop groups or species held at the regional station will be recorded on punch cards for rapid retrieval.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

Regional Station

Corley, W. L. Some preliminary evaluations of okra plant introductions. Georgia Agricultural Experiment Stations Bulletin N.S. 145. Sept. 1965.

Sowell, Grover, Jr., C. W. Kuhn and B. B. Brantley. Resistance of southern pea, Vigna sinensis, to cowpea chlorotic mottle virus. Proc. Amer. Soc. Hort. Sci. 86:487-490. 1965.

Sowell, Grover, Jr. Alternaria leafspot of Guar. Pl. Dis. Reptr. 49: 605-607. 1965.

Sowell, Grover, Jr. Anthracnose of Guar. Pl. Dis. Reptr. 49:607-609. 1965.

Alabama

Hoveland, C. S., and D. M. Elkins. Germination response of arrowleaf, ball, and crimson clover varieties to temperature. Crop Sci. 5: 244-246. 1965.

Hoveland, C. S., and H. L. Webster. Flooding tolerance of annual clovers. Jour. Amer. Soc. Agron. 57:3-4. 1965.

Arkansas

Davis, A. M. Investigations with new crops. Ark. Agri. Exp. Sta. Rpt. Ser. 139. June 1965.

Davis, A. M. Sugar beets in Arkansas. Ark. Agri. Exp. Sta. Rpt. (in press).

Florida

Killinger, G. B. Kenaf, Hibiscus cannabinus L. and Erucastrum abyssinica as Potential Industrial Crops for the South. Proc. Assn. Sou. Agri. Workers. p. 54-55. Feb. 1965.

Killinger, G. B. Kenaf, Hibiscus cannabinus, A potential paper-pulp crop for Florida. Proc. 2nd World Kenaf Conf. Dec. 1964 (In press).

Killinger, G. B. Kenaf, A potential paper-pulp crop for Florida. Sunshine State Agri. Res. Rpt. Vol. 2. April 1965.

F. D. Wilson et al. 'Everglades 41' and 'Everglades 71' two new varieties of Kenaf (Hibiscus cannabinus L.) for fiber and seed. Fla. Agri. Exp. Sta. Circ. S-168. April 1965.

Georgia

Brantley, B. B., C. W. Kuhn, and Grover Sowell, Jr. Effect of cucumber mosaic virus on southern pea (Vigna sinensis). Proc. Amer. Soc. Hort. Sci. 87: (In press).

Kuhn, C. W., B. B. Brantley, and Grover Sowell, Jr. Immunity to bean yellow mosaic virus in cowpea. Pl. Dis. Reptr. 49:879-881. 1965.

Mississippi

Johnson, H. W. and Hugh W. Bennett. Magnolia is new rust resistant ryegrass variety. Mississippi Farm Res. 28: July 1965.

Oklahoma

Cordner, H. B., Hugh Thomson and Charles Galeotti. Origin and development of the Nemared tomato. Okla. Agri. Exp. Sta. Bul. B-635. 1-19. 1965.

Ford, R. N., Bill Webb, R. M. Oswalt, R. S. Matlock and B. J. Ott. Irrigated sugar beets in Oklahoma. Okla. Exp. Sta. Proc. Series. (In press) 1965.

Harlan, Jack R., Wayne W. Huffine, J. M. J. deWet and S.P. Sen Gupta. Biosystematics of the genus Cynodon (Gramineae). Okla. Exp. Sta. Proc. Series P-499. 1965.

South Carolina

Martin, J. A. GOURDS of all types for Garden and Market. S. C. Agri. Exp. Sta. Res. Series 64. March 1965

Texas

Dollshite, J. W., J. B. Henson and G. T. Householder. Coffee Senna (Cassia occidentalis). Poisoning in Animals. Progress Report No. 2318. Texas Agri. Exp. Sta. July 1964.

Wolfenbarger, Dan A. Corn earworm resistance in sweet corn inbreds and hybrids in South Texas. Progress Report No. 2321. Texas Agri. Exp. Sta. August 1964.

Wolfenbarger, Dan A. Variations in turnips, mustard, lettuce, and cabbage varieties to various Aphid species. Progress Report No. 2320. Texas Agro. Exp. Sta. August 1964.

Matocha, J. E., W. R. Cowley, and B. J. Lime. Yield and quality of sugar beets produced in the Lower Rio Grande Valley. Progress Report No. 2317. Texas Agr. Exp. Sta. August 1964.

De Werth, A. F. New Coleus for Texas gardens. Leaflet 639. Texas Agr. Exp. Sta. Sept. 1964.

7. APPROVED

1-19-66
Date

W. H. Stroube, Acting Chairman
S-9 Technical Committee

1-21-66
Date

R. L. Lovvorn, Administrative Advisor

APPENDIX A
1965 Annual Report Regional Project S-9, New Plants

Plant Introductions that exhibited desirable characteristics in S-9 regional evaluation tests, 1965

Name & P.I. No.	State reporting	Reported value
Agronomic plants		
Arachis hypogaea		
161300	Okla.	) High content of oil and protien and high iodine number
229553	Okla.	
259662	Okla.	
259681	Okla.	
Arachis villosa		
261870	Okla.	) Winter-hardy
Cassia occidentalis		
200812	Ga.	) Very high seed yields
292844	Ga.	
Hibiscus cannabinus		
292207	Fla.	) Resistant to root-knot nematode
Phalaris tuberosa		
240280	Ala.	) High yield of winter forage and good summer survival
240282	Ala.	
Phaseolus acontifolius		
213014	Okla.	) Free of diseases and insects. Potential wild life feed
214332	Okla.	
214333	Okla.	
218101	Okla.	
Phaseolus mungo		
271497	Okla.	)High seed yields
271498	Okla.	
288602	Okla.	
Trifolium michelanium		
248405	Ky.	) Winter-hardy and high seed yield
Trifolium repens		
214207	Fla.	) High yield of forage and persists through summer
214208	Fla.	
Zea mays		
217413	Tenn.	) Resistant to corn earworm

Name & P.I. No.	State reporting	Reported value
Vegetable plants		
Brassica oleracea var. *botrytis*		
189028	S.C.	Used in developing downy mildew resistant broccoli
Brassica oleracea var. *capitata*		
194226	N.C.	Most resistant to cabbage looper of all varieties tested in 1964
261774	S.C.	Used in developing downy mildew resistant cabbage
275004	S.C.	High ascorbic acid content
303629	S.C.	Black rot resistant
Capsicum annuum		
264281	Ga.	Used in crosses to develop tobacco etch virus resistant pimiento
Capsicum frutescens		
135824	Miss.	Resistant to root-knot nematode
135873	Miss.	
141927	Miss.	
152225	La.	Used in crosses to develop tobacco etch virus resistant tobasco pepper
155299	Miss.	Resistant to root-knot nematode
Capsicum sinense		
294453	Puerto Rico	Resistant to pepper mosaic virus (potato virus Y, P.R. strain?)
Citrullus lanatus		
164248	Fla.	Resistant to downy mildew
185635	Fla.	
185636	Fla.	
189225	Ga.	Resistant to some isolates of gummy stem blight
225557	Ga.	The most resistant of P.I's. screened for resistance to anthracnose, race 2
255136	Fla.	Resistant to downy mildew
255137	Fla.	
270562	Fla.	
270563	Fla.	
270564	Fla.	
271769	Fla.	
271770	Fla.	
271771	Fla.	
271773	Fla.	

Name & P.I. No.	State reporting	Reported value
Vegetable plants con't.		
Citrullus lanatus		
271774	Fla.	Resistant to downy mildew
271775	Fla.	
271776	Fla.	
271777	Fla.	
271778	Fla.	
271779	Fla.	
Cucumis anguria		
233646	S.C.	Resistant to root-knot nematode
Cucumis melo		
140471	Ala.-Fla.-Ga.	Resistant to gummy stem blight
164756	Fla.	Source of cytoplasmic male sterility
183310	Fla.	Powdery mildew resistant
211937	Fla.	Source of cytoplasmic male sterility
236355	Ky.	Highly resistant to bacterial wilt
Cucumis metuliferus		
292190	S.C.	Root extract lacks attractant for *Diabrotica*
Cucumis sativus		
196289	S.C.	Used in developing gynoecious lines for producing hybrid cucumbers
197087	S.C.	Used in developing gynoecious lines for producing hybrid cucumbers. Parent of 'SC 59' slicer cucumber
Lactuca sativa		
264334	Fla.	Produced satisfactory spring yields
264335	Fla.	
271476	Fla.	
Lycopersicon esculentum		
126915	Fla.	Used in breeding program for leaf mold resistance
Lycopersicon peruvianum		
128658	Okla.	Parent of Nemared, a nematode resistant tomato
Phaseolus mungo		
271497	Okla.	Excellent seed yields
271498	Okla.	
288602	Okla.	

Name & P.I. No.	State reporting	Reported value
Vegetable plants con't.		
Phaseolus vulgaris		
165426	S.C.	Appears to have good resistance to cotton root-knot nematode
165435	S.C.	
Vigna cylindrica		
226106	Ga.	Highly susceptible tester plant for bean yellow mosaic virus
Vigna sinensis		
154134	Ga.	Immune to bean yellow mosaic virus
167024	Ga.	
170865	Okla.	No plants killed in Fusarium wilt test
175962	Ga.	Immune to bean yellow mosaic virus
177101	Ga.	
Vigna vexillata		
238110	Okla.	The outstanding producer in 1964
Ornamental plants		
Abelia grandiflora x *Abelia schumanii*		
124956	Fla.	Outstanding, large flowered
Begonia semperflorens		
292730	Fla.	Attractive and good grower
292732	Fla.	
Betula pandula		
262712	S.C.	Has grown well and survived two winters
Eleagnus crispa		
237869	S.C.	Used as screen and highway beautification
Helicia cochinchinensis		
237873	Fla.	Foliage plant suitable as large potted plant
Hypericum patulum		
247782	S.C.	Highway beautification
Hypocyrta radicans		
247251	Fla.	Outstanding, tender potted plant specimen
Ilex crenata		
275853	Miss.	Increased for extensive testing

Name & P.I. No.	State reporting	Reported value
Ornamental plants con't.		
Ilex integra		
235500	S.C.	Highway beautification
Ilex sugeroki		
275805	Fla.	Slow grower but attractive
Ilex 'Lydia Morris'		
267824	S.C.	Has grown well and survived two winters
Ilex 'John T. Morris'		
267825	S.C.	Has grown well and survived two winters
Medinella nenosa		
242347	Fla.	Foliage and flowers very attractive; use as potted plant
Myrsine retusa		
254602	Fla.	Small hedge with slightly different texture than boxwood
Osmanthus x *osmarea burkwoodii*		
242241	Miss.	Increased for extensive testing
Raphiolepsis umbellata		
277653	Miss.	Increased for extensive testing
Raphiolepsis sp.		
237897	S.C.	Highway beautification
Rhamnus alaternus		
241910	S.C.	Highway beautification
Trachelospermum sp.		
241339	Fla.	Attractive vining plant for hanging baskets or pots
Vaccinium bracteatum		
237910	S.C.	Has grown well and survived two winters
275490	Fla.	Dwarf, one of the most attractive of the species, possible use as potted specimen

APPENDIX B
1965 Annual Report Regional Project S-9, New Plants

REGIONAL STATION PLANT PATHOLOGY REPORT FOR 1965

A. Screening introductions for resistance

1. Resistance of cantaloupe to gummy stem blight

A replicated test in which P.I. 140471 was compared with a number of commercial varieties demonstrated the very high level of resistance of the introduction. 'Banana' (Disease Index 4.8) showed no resistance to a new isolate of the pathogen while it was highly resistant to the previously-used isolate. P.I. 140471 (Disease Index 1.2) was highly resistant to both isolates. P.I. 140471 was superior to all other introductions tested when resistance was evaluated on excised cotyledons.

2. Resistance of southern peas to viruses

This research was cooperative with Dr. C. W. Kuhn and Dr. B. B. Brantley of the Georgia Agricultural Experiment Station.

(a) Resistance of southern pea to cucumber mosaic virus (CMV)

Recovery of the virus from symptomless plants indicates that the apparent resistance to CMV is actually tolerance. The virus multiplies in the plant but does not affect yield. Tolerance to CMV is common in commercial varieties as well as in plant introductions.

(b) Immunity of southern pea to bean yellow mosaic virus (BYMV)

P.I. 154134, P.I. 160024, P.I. 175962, and P.I. 177101 of *Vigna sinensis* are immune to BYMV. Since immunity is the highest level of resistance obtainable, these introductions should be very valuable to plant breeders. *Vigna cylindrica*, P.I. 226106, was used as a highly susceptible tester plant for detecting this virus. This introduction should be valuable to virologists, plant breeders and others interested in detecting BYMV.

3. Resistance of sorghum to anthracnose

This research was conducted in cooperation with Dr. H. B. Harris of the Georgia Agricultural Experiment Station. Approximately 600 of the first sorghum introductions have been screened in preliminary screening tests in the greenhouse and the field. Introductions that demonstrated a resistance which approached that of 'Wiley' in preliminary tests were planted in a replicated field test. P.I. 267519, P.I. 267459, P.I. 267444, P.I. 267340, P.I. 164447, P.I. 55123 from Africa and P.I. 180002, P.I. 180004, and P.I. 180005 from India were as resistant as 'Wiley' to the leaf phase of the disease: Stalk resistance of P.I. 267444, P.I. 267459, P.I. 267519, P.I. 267340, P.I. 164447, and P.I. 221656 was equal to that of 'Wiley'. Head

resistance of P.I. 267444, P.I. 267519, P.I. 267459, P.I. 267340, P.I. 164447, P.I. 180005, and P.I. 221656 was equal to that of 'Wiley'. Several of the introductions approached a grain-type sorghum more closely than does 'Wiley'. Therefore these introductions will make a significant contribution to sorghum breeding by shortening the time required to incorporate resistance into grain-type sorghum varieties.

B. Production of pathogen-clean seed from infected stocks

A regular program of spraying Cucumis melo and Vigna spp. introductions to control insects and diseases was followed. The value of this program on Cucumis melo was clearly demonstrated by the production of ample seed on a high percentage of the introductions grown. Diseases were successfully controlled although weather conditions were favorable to diseases. Pathogen-clean seed of four introductions of Indigofera spp. suspected of carrying Colletotrichum dematium f. truncata were produced. Attempts to produce pathogen-free material of a single introduction of Digitaria pentzii failed and the introduction was destroyed.

C. Supporting research to screening introductions for disease resistance

1. Gummy stem blight of cucurbits

Research to study genetics of sporulation in Mycosphaerella citrullina indicate that non-genetic factors have the predominant influence. Seed harvested from apparently immune plants of P.I. 189225 produced plants which were no more resistant than unselected seed of P.I. 189225.

2. Sorghum anthracnose

Single-conidium isolates from six locations in Georgia did not differ significantly in their pathogenicity either within or between locations. These preliminary results indicate that Colletotrichum graminicola, the sorghum anthracnose fungus, is a relatively stable fungus---that is, it does not form new pathogenic strains readily. The fact that 'Wiley' has been immune in all field tests since its release in 1957 supports this hypothesis. If this is correct, the resistance of sorghum introductions should be stable in the field and it may not be necessary to continually breed for resistance to new pathogenic strains of the fungus.

D. Compilation of information on the disease and insect resistance of plant introductions

Lists of reports of disease and insect resistance for the following crop groups were published during the year: (1) Selected Forage Crop and Field Crop Species, (2) Vigna spp. (Southern pea or cowpea) and (3) Cucumis melo (revised 1965).